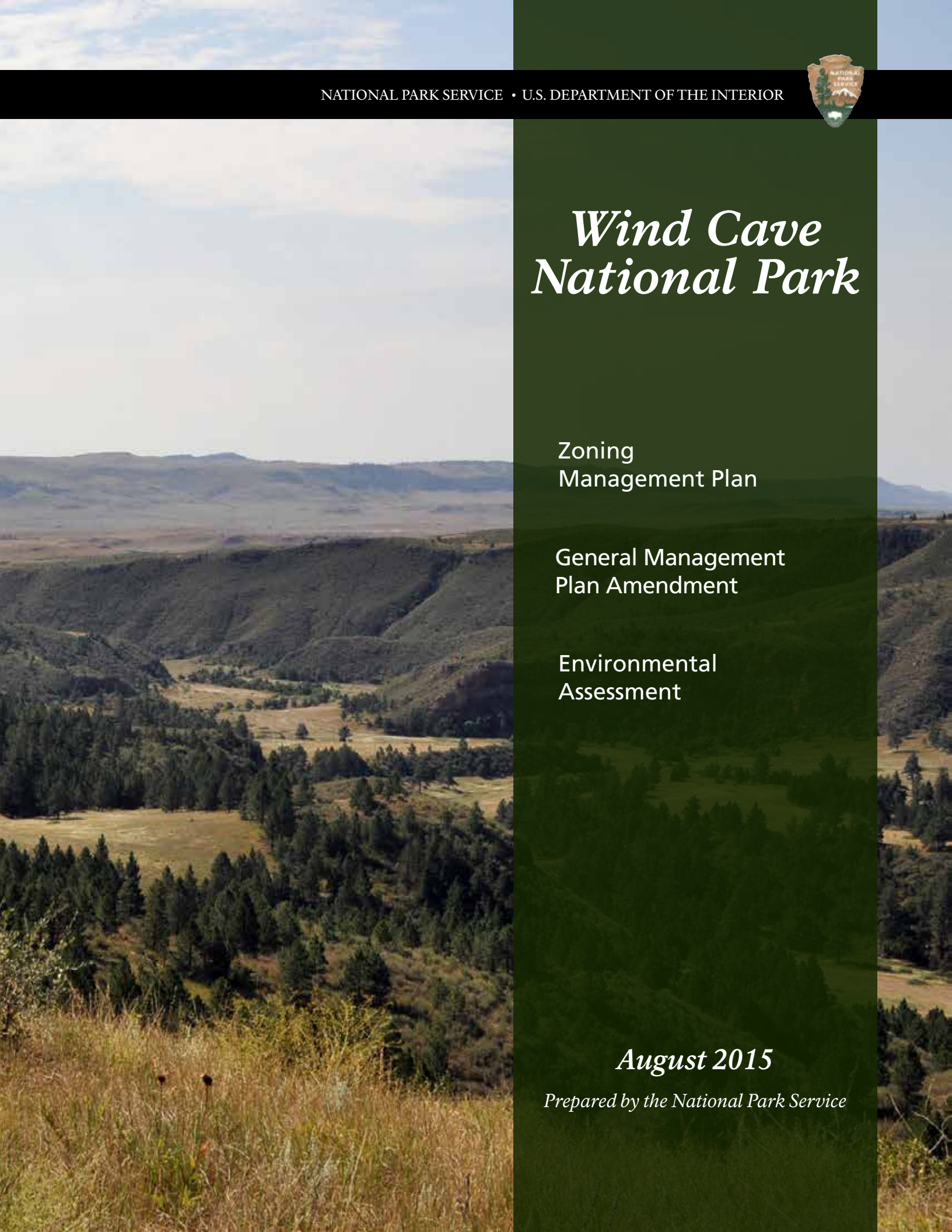

NATIONAL PARK SERVICE • U.S. DEPARTMENT OF THE INTERIOR

Wind Cave National Park

Zoning
Management Plan

General Management
Plan Amendment

Environmental
Assessment

August 2015

Prepared by the National Park Service

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EXECUTIVE SUMMARY

SUMMARY

The National Park Service (NPS) has prepared this Zoning Management Plan / General Management Plan Amendment and Environmental Assessment for Wind Cave National Park (the Park). The Environmental Assessment documents the results of the Zoning Management Plan / General Management Plan Amendment and the potential environmental impacts associated with the preferred alternative.

The purpose of this project is to prepare a Zoning Management Plan and update the existing 1994 General Management Plan for the Park. This plan provides the basis for future planning and decision making related to geographically distinct areas at the Park, and will be incorporated into all existing and future planning documents. Existing plans will evaluate future actions based on management zones as outlined in this plan. Management zones have been created to support and uphold the purposes for which Wind Cave was established as a National Park.

This plan, based on a comprehensive resource suitability analysis and in conjunction with the foundation document, defines allowable types and general intensities of uses, activities, and development associated with public enjoyment and use of the Park specified locations. As part of this analysis, desired conditions for the preservation of key resource categories at the Park have been defined.

The Zoning Management Plan does not assess specific construction and development activities as a General Management Plan would normally address. Management zones describe the types of management to be emphasized in specific locations in the Park, provide a long-range vision for the desired future conditions, and establish a framework for decisions on future use and development. Please note proposed management zones have different levels of allowable uses and prescriptions. This plan does not take the place of the compliance necessary to implement site-specific actions such as the construction of a trail or building.

The following basic precepts provide the overall vision for future management of this very special place: Management will continue to focus on providing the best services to the visiting public, including first rate cave tours and facilities that meet the highest standards. The visitor will be able to tour the Park and will experience viewing natural and cultural resources on the surface of this 33,923-acre Park. The Park will also concentrate on getting future generations to visit and enjoy the Park using the most modern information technology they can provide.

This document analyzes three action alternatives for the greater park area, four action alternatives for the Sanson Ranch area, and three action alternatives for the existing visitor center area. These proposed alternatives focus on what resource conditions, visitor uses, and experiences/opportunities could be at the Park rather than on details of how these conditions and uses/experiences would be achieved. In addition to the proposed zoning alternatives a description of the existing management zones is included and for this plan is considered the no-action alternative. The no-action alternative is used as a baseline to compare and analyze the effects of the proposed approaches to management, and involves determining the relative magnitude, intensity, and characteristics of their effects of the proposed actions on park resources.

PUBLIC COMMENT

If you wish to comment on the environmental assessment, you may post comments online at http://parkplanning.nps.gov/projectHome.cfm?projectID=46063 or mail comments to: Superintendent, Wind Cave National Park, 26611 US Highway 385, Hot Springs, SD, 57747. This environmental assessment will be on public review for 30 days. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment—including your personal identifying information—may be made publically 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 would be able to do so.

CONTENTS

Executive Summary *i*

CHAPTER 1: PURPOSE OF AND NEED FOR ACTION **vii**

Introduction *1*

Park Description *2*

Legislative History of the Park *5*

Historical Background *7*

Plan Purpose and Need *8*

Purpose 8
Need 8

General Management Plan Amendment *10*

Issues to be Addressed in the Zoning Management Plan *11*

Issues not Addressed in the Zoning Management Plan *12*

NPS Organic Act and National Environmental Policy Act *13*

Park Purpose, Significance and Fundamental Resources and Values *14*

Purpose 14
Significance 14
Park Fundamental Resources and Values 14
Other Important Resources and Values 15

General Direction *16*

Existing Setting and Future Park Visions *17*

Climate Change and the Park Response 17

Management Zoning Process and Suitability Analysis *19*

Implementation of the Plan: Next Steps *20*

Park Plans That Provide Management Direction *21*

Impact Topics Considered In This Plan *22*

Cultural Resources 23

Resources Considered but Dismissed from Further Analysis *25*

CHAPTER 2: ALTERNATIVES **29**

Introduction *31*

Management Zoning Matrix *32*

No-Action Alternative *50*

Natural Zone 50
Park Development Zone 50

Proposed Management Zoning Alternatives *52*

Greater Park Alternatives *53*

Alternative 1 Summary 55
Alternative 2 Summary (Preferred) 58
Alternative 3 Summary 62

Specific Area Management Zone Alternatives 64

Visitor Center Alternative A Summary 66
Visitor Center Alternative B Summary (Preferred) 68
Visitor Center Alternative C Summary 71
Sanson Ranch Alternative i Summary 74
Sanson Ranch Alternative ii Summary 76
Sanson Ranch Alternative iii Summary (Preferred) 78
Sanson Ranch Alternative iv Summary 81

Environmentally Preferable Alternative 82

Greater Park Alternative 3 82
Visitor Center Alternative B and C 82
Sanson Ranch Alternative i 82

Agency Preferred Alternative 83

CHAPTER 3: AFFECTED ENVIRONMENT 87

Introduction 89

Cave/Karst Resources (Greater Park and Visitor Center Alternatives) 90

Vegetation (Greater Park and Sanson Ranch Alternatives) 92

Greater Park Area 92
Sanson Ranch Area 92

Floodplains (Sanson Ranch Alternatives) 94

Visitor Center 94

Scenery (Greater Park, Visitor Center, and Sanson Ranch Alternatives) 96

Setting 96
Landscape Characteristics of the Study Area – Existing Conditions 96
Landform – Land and Water 97
Vegetation 99
Structures and the Existing Built Environment 100
Scenery/Visual Resource Inventory Classes 103
Scenery Conservation Management Classes 103
Objectives for Scenery Conservation Management Classes 103
Threats and Stressor Factors 104
Overall Condition 104

Cultural Resources 106

Archeological Resources 107

Ethnographic Resources 108

Cultural Landscapes and Historic Structures 109

Greater Park 109
Visitor Center Area 111
Sanson Ranch 112

Visitor Experience 114

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES 115

Introduction 117

General Methodology for Analyzing Impacts 118

Cumulative Impact Scenario 118
Past and Present Actions (NPS and non-NPS) 118
Future Actions (NPS and non-NPS) 120
Assessing Impacts Using CEQ Criteria 120
Assumptions 121

Greater Park Alternatives – Impact Analysis 122

Cave/Karst Resources 122
Vegetation 130
Scenery 133
Cultural Resources 142
Archeological Resources 142
Ethnographic Resources 147
Cultural Landscape / Historic Structures 149
Visitor Experience 152

Visitor Center Alternative Impact Analysis 156

Cave/Karst Resources 156
Scenery/Viewshed 160
Archeological Resources 165
Ethnographic Resources 167
Cultural Landscape and Historic Structures 168
Visitor Experience 171

Sanson Ranch Alternative Impact Analysis 174

Vegetation 174
Scenery/Viewshed 178
Floodplain for Beaver Creek 187
Archeological Resources 189
Ethnographic Resources 195
Cultural Landscape/Historic Structures 197
Visitor Experience 201

CHAPTER 5: CONSULTATION AND COORDINATION 207

Scoping 209

Consultation 210

List of Preparers and Contributors 212

Midwest Regional Office 212
Wind Cave National Park 212
Midwest Archeological Center – National Park Service 212
US Forest Service 212

Glossary 213

Selected References 222

Index 227

APPENDICES 231

Appendix A: Legislation 233

Appendix B: Servicewide Mandates and Administrative Commitments 239

Appendix C: Parkwide Desired Conditions by Resource Topic 242

Introduction 242

Appendix D: Expanded Historical Background 277

Appendix E: SHPO, USFWS and Tribal Consultation Letters 281

Appendix F: Suitability Analysis Maps and Descriptions 290

Cave Protection Layer (For Groundwater Contamination Potential) Suitability Analysis Methodology: 293

Riparian Protection Layer Suitability Analysis Methodology: 295

Forage Suitability Layer (Based on USGS GAP Analysis) Suitability Analysis Methodology: 297

Forage Suitability Layer (Based on NRSC Soils Data) Suitability Analysis Methodology: 299

Scenic Inventory and Management Classes Analysis Methodology (see Appendix E for specific applied methodology): 302

Historic Cultural Sensitivity Layer Analysis Methodology: 303

Archeological Sensitivity Layer Analysis Methodology: 304

Recreational Opportunity Spectrum Analysis Methodology: 308

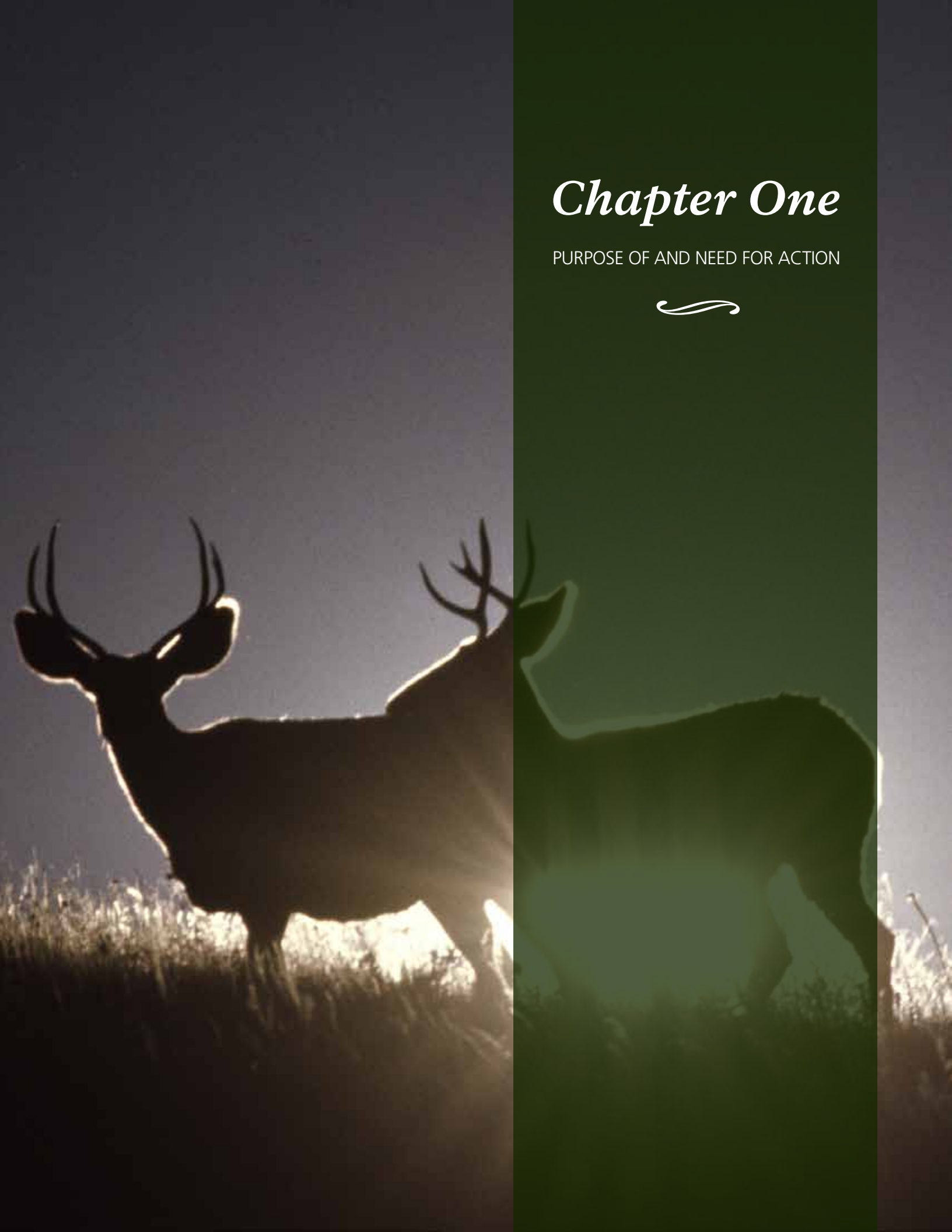
Building and Use Suitability Analysis Methodology: 317

Appendix G: Process for Addressing Scenery Conservation at Wind Cave National Park 319

Process Flow Chart 324

Addressing Potential Effects or Impacts to Scenery of Project Proposals Using Park Management Zones and Scenery Conservation Management Classes 325

Appendix H: Supplementary Historic and Contemporary Park Images 348



Chapter One

PURPOSE OF AND NEED FOR ACTION

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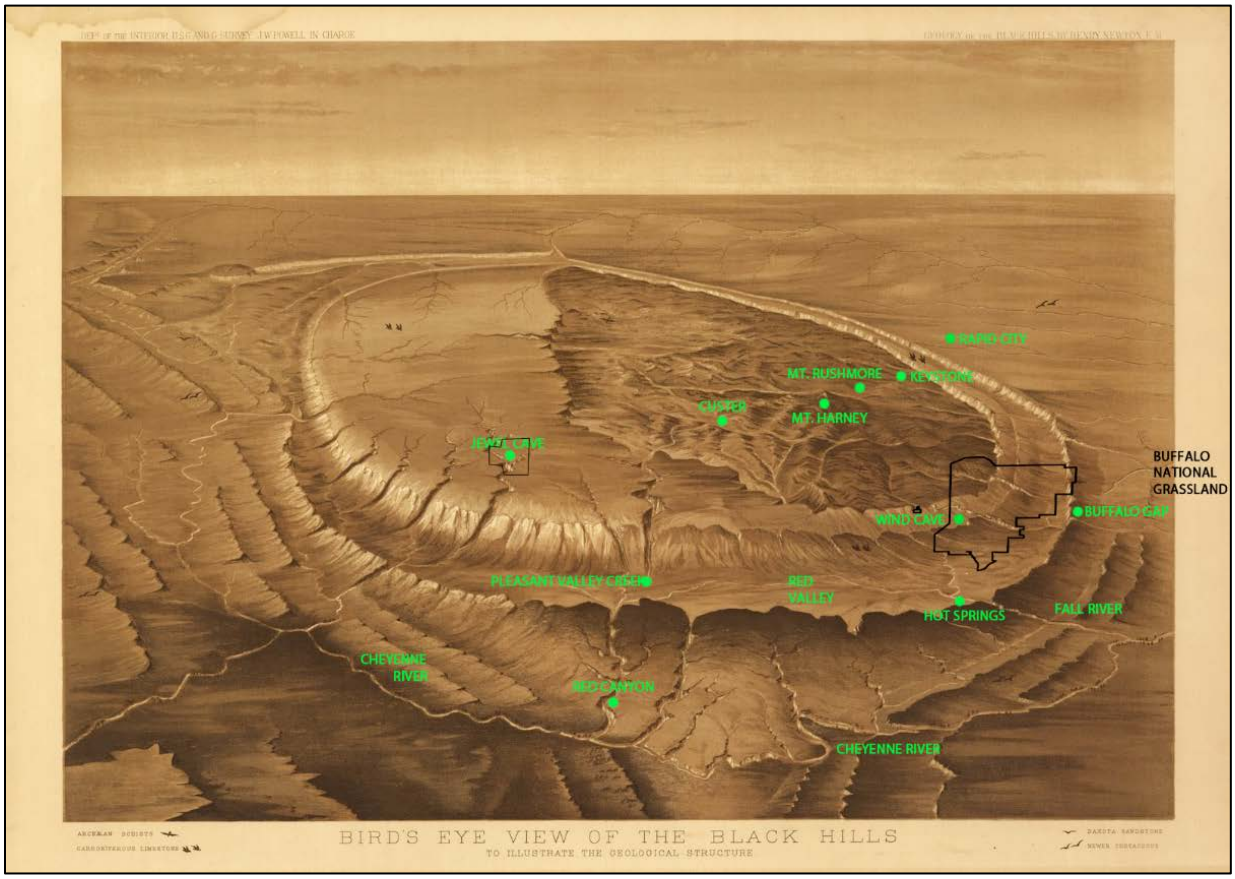
INTRODUCTION

The National Park Service (NPS) has prepared this Zoning Management Plan (ZMP)/ General Management Plan Amendment (GMP-A) and Environmental Assessment (EA) for Wind Cave National Park (the Park). The EA documents the results of the ZMP/GMP-A and the potential environmental impacts associated with the preferred alternative.

PARK DESCRIPTION

Wind Cave National Park, the eighth national park, was established by an Act of Congress on January 9, 1903 (32 Stat. 765). The Park is located in western South Dakota, on the southern edge of the Black Hills.



The Park boundary is approximately six miles north of Hot Springs, South Dakota, and is bounded by Custer State Park on the north, Black Hills National Forest on the west, and by private property on the south and east. The Park is one of a variety of destinations for Black Hills visitors. The Park was established in 1903 to protect Wind Cave (NPS 1994). The Park encompasses 33,923 acres of prairie ecosystem, underlain by extensive karst deposits, with Wind Cave being one of the world's longest caves. The cave is well known for its outstanding display of boxwork, an unusual cave feature composed of thin blades of calcite that resemble honeycombs. In addition, the Park has more than 40 other, smaller backcountry caves.

The surface features of the park include expanses of mixed-grass prairie, ponderosa pine, and riparian ecosystems. The gently rolling landscape of the Park is a transition zone between eastern and western biomes, and supports a great diversity of plant and animal species (NPS 1994). The Park is well known for its resident bison (*Bison bison*) herd, as well as its opportunities to view mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virgianus*), pronghorn (*Antilocapra americana*), elk (*Cervus elaphus*), prairie dogs *(Cynomys ludovicianus)*, wild turkey (*Meleagris gallopavo*), and a variety of other small mammals.

Bisected and framed by the Fall River and Beaver Creek drainages, which flow southward and southeastward from the park area, this section of the Black Hills is open to the plains through the broad openings in the Dakota Sandstone Hogback Ridge that have been cut through the Cascade Springs area to the south and the Buffalo Gap to the east of the national park. With open access to the surrounding plains, but set between the foothills and the Hogback, this "bay" has long been a sheltered haven for bison, elk, pronghorn, and other wildlife. The place name Buffalo Gap corresponds to these special conditions, which provided an important winter refuge and springtime

nursery for bison. As American Indians described it for countless generations, the animals seemed to emerge from the Black Hills every spring as they passed through the natural break in the Hogback and pushed on to the plains (Spence 2011).

The cultural resources of the Park include evidence of prehistoric and Plains Indian cultures, records of early cave exploration, historic ranching and tourism, and Civilian Conservation Corps (CCC) structures. The National Register of Historic Places includes the Wind Cave National Park Administrative and Utility Area Historic District along with several related historic properties. Other national register-eligible properties are scattered throughout the Park. South Dakota Highway 87 within the Park appears to meet the criteria for national register eligibility as a cultural landscape. No national register-eligible traditional cultural properties have been formally defined for the Park (NPS 2005a).

Today, Wind Cave National Park exists as testament to the long-range visions and collective efforts of many local, state, and national advocates to protect and restore the important resources, setting, and natural systems within this area of the Southern Black Hills as a public resource to be enjoyed by all in perpetuity. Approximately 500,000 people visit the Park annually for recreation visits, including 100,000 touring Wind Cave. Other popular visitor activities include wildlife viewing, camping, hiking, and otherwise enjoying the area for its natural values.

LEGISLATIVE HISTORY OF THE PARK

Since first established in 1903 as a 10,532-acre Park to protect Wind Cave and the underground resources of this unique site, five additional Acts of Congress have modified the original purpose of Wind Cave National Park from cave preservation to protection of both subsurface and surface ecosystems and resources. Today, the Park encompasses 33,923 acres.

> Wind Cave is often referred to as one park that is composed of "two worlds," one above ground and one below the surface. The underground world of the park is its namesake feature: a vast, complex, and often ornate realm of chambers and passages that make up one of the world's longest caves. The surface world of the park covers [33,923] acres composed primarily of mixed-grass prairie, canyons, creeks, and Ponderosa pine forest. The prairies and grasslands support the other signature feature of Wind Cave; the array of native wildlife that includes bison (*Bison bison*), elk (*Cervus canadensis*), pronghorn (*Antilocapra americana*), prairie dogs (*Cynomys ludovicianus*), black-footed ferrets (*Mustela nigripes*), and a host of migratory and resident bird species. (Spence 2011)

In 1912, establishment of the Wind Cave National Game Preserve provided a permanent range for bison and "such other native American game animals as may be placed therein" (Agricultural Department Appropriation Act, Wind Cave National Game Preserve Legislation, August, 10, 1912). Bison, elk, and pronghorn were extirpated from the area prior to establishment of Wind Cave National Park. Herds of bison, elk, and pronghorn were reestablished, as the need to preserve and protect big game species was realized.

In 1935, Section 601 of Public Law 148 (49 Stat. 383, USC 141b) transferred management of the game preserve from the Department of Agriculture to Wind Cave National Park, subject to all applicable Park laws and regulations and for the purposes of the former game preserve.

Boundary changes were enacted March 4, 1931, (46 Stat. 1518) and August 9, 1946, Public Law 708 (60 Stat. 970, 16 USC 141a). The 1946 act expanded the Park to more than 28,000 acres to maintain a viable population of a variety of big game, especially pronghorn, by adding lands from the former Custer Recreational Demonstration Area and adjusted boundaries between Wind Cave National Park and Custer State Park and the Harney National Forest (now Black Hills National Forest).

The "National Parks and Recreation Act of 1978," approved November 10, 1978, Public Law 95-625 (92 Stat. 3475), added approximately 232 acres to the Park's south boundary and authorized the Secretary to acquire lands and interests by donation, purchase with donated or appropriated funds, or exchange or transfer from any other federal agency. The purpose of the 1978 boundary adjustment was to prevent the possibility of unsightly residential or commercial developments at the southern entrance to the Park so as to maintain the scenic and natural integrity of the area.
Two other pieces of legislation are significant to the protection of land values and resources at Wind Cave National Park:

1) The Act to establish the National Park Service approved August 25, 1916, (39 Stat. 535), and
2) The Act of March 27, 1978, amending the Redwood National Park Act of October 2, 1968, (92 Stat. 163) and the Act of August 19, 1970 (84 Stat. 825).

Since Wind Cave National Park had been in existence since 1903, it was one of the areas specifically included in the 1916 Act:

> The Service thus established shall promote and regulate the use of the Federal areas known as national parks, monuments and reservations hereinafter specified by such means and measures as conform to the fundamental purpose of the said parks . . . which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations. (USC, title 16, section 1)

The Act of March 27, 1978, approved in the same year as the act extending Wind Cave National Park's south boundary states that:

> Congress further reaffirms, declares, and directs that the promotion and regulation of the various areas of the National Park System, as defined in section 2 of the Act, shall be consistent with and founded in the purpose established by the first section of the Act of August 25, 1916, to the common benefit of all the people of the United States. The authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and Specifically provided by Congress (PL Stat. 3467).

The Act of September 21, 2005, authorized revision of the Park boundary to include, upon acquisition, privately owned land totaling 5,595 acres and two tracts of federal land, 40 acres and 35.01 acres, to be transferred from the Bureau of Land Management. On September 22, 2011, 5,556 acres were added to the south and eastern border of the Park. As stated in the official 2005 committee report to Congress, the purpose of the acquisition in 2011 was to "protect archaeological sites such as a thousand-year-old Buffalo Jump (a cliff formation which American Indians historically used in order to hunt and kill plains bison in mass quantities), expand the backcountry, preserve a viewshed, and increase natural habitat for bison, elk, deer and pronghorn antelope. The lands are a natural extension of the rolling hills and prairie that dominate the current Park landscape and will help preserve the magnificent mixed-grass prairie and ponderosa forest of this national treasure." The 2011 addition, known as the Casey tract, includes the historic Sanson Ranch, along with the two federal tracts (2015 acquisition), raised the total Park area to 33,923 acres.

HISTORICAL BACKGROUND

The Black Hills region that includes the Park has had a complex and changing history of human occupation that extends back centuries and many generations to prehistoric times. Wind Cave is one of the most sacred and culturally significant areas in the Black Hills for the Lakotas and Cheyennes. Although American Indian tribes of the Black Hills had known about the opening to Wind Cave for thousands of years, two setters, Jesse and Tom Bingham, are credited as the first white discoverers of the cave entrance in 1881 when they observed strong winds blowing out of the cave's natural opening. On January 9, 1903, after years of various attempts to monetize the cave through tourism, President Theodore Roosevelt signed the bill creating Wind Cave National Park as the eighth national park and the first park created to protect a cave resource. The Department of Agriculture's US Biological Survey followed in 1912 by establishing the Wind Cave National Game Preserve on the surface lands within the Park boundary for the purposes of reintroducing bison, elk, and pronghorn.

In July 1935, Wind Cave National Park assumed authority for the Wind Cave National Game Preserve above it, thereafter combining the two entities into Wind Cave National Park. The move ended dual agency authority within the Park boundary. The decision to incorporate the preserve changed the Park mission from solely protecting a cave to also protecting surface resources. It also allowed the Park to serve as a sanctuary for the reintroduction of elk and pronghorn (NPS 2011a). The Park boundary expanded in 1946 with the addition of 16,341 acres. This and other previous additions enlarged the Park to 28,059 acres by that point. Park staff began to actively manage the carrying capacity of the bison, pronghorn, and elk herds in the 1950s and 1960s. Additional land acquisitions have further increased the Park's acreage to 33,923 acres.

Continued exploration has revealed Wind Cave to be one of the longest and most complex caves in the world and its full extent is still unknown. Ongoing exploration has increased the length of the cave survey to 143 miles as of 2014. Development and application of the Passage Density Model determined that there could be as much as 250 miles of passage within the current footprint of Wind Cave. The current length of the survey is 57% of that projected length. However, the cave could also extend beyond the current boundaries and could be much larger than the projected 250 miles (Horrocks 2009).

The Park embarked on new management approaches in the 1970s and 1980s. In 1972, Wind Cave National Park became one of the first parks to incorporate an active fire program, with its first prescribed fire occurring the following year. The park adapted its first cave management program in 1978 to preserve and manage the cave based on science using monitoring and cave inventories. For a more detailed historical background of the Park, see appendix D.

PLAN PURPOSE AND NEED

PURPOSE

The purpose of this project is to prepare a Zoning Management Plan and update the existing 1994 General Management Plan for the Park. This plan will provide the basis for future planning and decision making related to geographically distinct areas at the Park, and will be incorporated into all existing and future planning documents. Existing plans will evaluate future actions based on management zones as outlined in this plan. Management zones have been created to support and uphold the purposes for which Wind Cave was established as a national park (NPS *Management Policies 2006*, section 3.2.1).

This plan, based on a comprehensive resource suitability analysis and in conjunction with the foundation document, will define allowable types and general intensities of uses, activities, and development associated with public enjoyment and use of the Park specified locations. As part of this analysis, desired conditions for the preservation of key resource categories at the Park have been defined.

The recently completed foundation document will inform and provide overall direction for delineating management zones based on identified broadscale landscape issues, conditions, trends, threats, and general parkwide desired conditions. The foundation elements are described later in the "Park Purpose, Significance, and Fundamental Resources and Values" section in this chapter. This project continues to build on work originally initiated as a General Management Plan (GMP)/Environmental Impact Statement (EIS) in February 2010. It was determined that a zoning plan would address the most immediate needs of the Park, and would be more feasible to complete than a full general management plan.

As a component of the general management planning process, required by the National Park System development program (16 USC, section 1a–7), the Zoning Management Plan will focus specifically on the portions required by law and policy that address landscape- and resource-based requirements necessary to achieve the Park purpose. Unlike a general management plan, the Zoning Management Plan will not assess specific construction and development activities, but it will address appropriate locations for these types of activities and stipulations regarding the appropriate locations for each. This plan does not take the place of the compliance necessary to implement site-specific actions such as the construction of a trail or building.

NEED

Developing management zones will help uphold the purposes for which the Park was established. The planning process will be coordinated within the broader regional context of the Black Hills and prairie grasslands to outline and provide potential existing and future collaborative management strategies for the Park with other adjacent land management agencies and land owners. The 1994 Park General Management Plan (1994 GMP) provides limited direction for the protection of the cave resources, wildlife, air quality, water resources, geology, soils, vegetation, cultural resources, and visitor experiences. Most of the issues and concerns identified at the time of that planning effort have been addressed or accomplished with the exception of construction of adequate maintenance facilities.

Issues that park managers face today are changing or have changed since the early 1990s, and are either not mentioned in the 1994 GMP or have increased in importance due to previous management actions, land uses, or visitor use patterns. Road rehabilitation, the incorporation of wildland fire into management actions or decisions, research needs, housing, backcountry management, adjacent land uses and development, and sewage treatment all have direct geographical resource management considerations that management zoning addresses. As such, up to date, comprehensive, area-specific management direction is needed.

In addition to the needs based on outdated and limited guidance, on September 21, 2005, (PL 109-71) was approved by Congress allowing for the expansion of the Park to include a 5,675 acre tract of land, 5,556 of which included the 2011 Addition Lands (Casey Property, which includes the historic Sanson Ranch). Funding to purchase this land came from the Land and Water Conservation Fund and on September 22, 2011, this tract of land became part of the Park, constituting an approximate 20% increase in the park's current land base.

No plan exists for the 2011 Addition Lands (Casey Property) and therefore this recent addition requires comprehensive analysis and integration with parkwide management guidance regarding resources protection, access, use, and development. Major issues to be addressed for these additional lands include: cultural and natural resource planning with emphasis on archeological resource protection and expanded wildlife range, visitor use facilities and programs, access for resource patrols and visitor protection, trail development and backcountry recreational opportunities, vegetation management, scenery conservation, and protection of threatened and endangered species.

GENERAL MANAGEMENT PLAN AMENDMENT

This project builds on work originally initiated as a General Management Plan / Environmental Impact Statement in February 2010. Due to programmatic changes in the NPS planning program, this zoning management planning process has been designed to address the new planning program standards and will produce a Zoning Management Plan that will include general parkwide desired resource conditions and appropriate uses, use types, and activities based on specific geographic locations. This plan updates the existing management zones from the 1994 GMP.

Considerable development and land use pressures exist in the surrounding area and on the ranchlands directly adjacent to the park. The pressures include big game production and hunting, recreational use, potential industrial development, and suburban residential and guest ranch land development. Impacts to Park resources and values must be addressed in an updated, prescriptive Zoning Management Plan. A visual resource inventory and classification will also be addressed as part of this formal plan.

Articulation of general parkwide desired resource conditions will address wildlife populations, and cave and karst resource management issues related to surface activities. Parkwide desired conditions will incorporate these and other broadscale landscape issues and resource concerns into defined management zones as appropriate. Park purpose, significance, and fundamental resources and values will provide direction with regard to general allowable actions and activities within individual management zones.

As Park operations and infrastructure are improved over time, updated management zones will outline the appropriate locations, types, and general intensities of development associated with public enjoyment and use of the Park, including support operations, to ensure that Park resources and values are adequately preserved and protected for future generations. A Zoning Management Plan, complete with desired future conditions, is critical for providing comprehensive long-term management direction for future uses, actions, and operations within the Park boundary. This plan will address new addition lands and the continued need for additional maintenance facilities as identified in the 1994 GMP.

Updating management zones lay the groundwork for future user capacity analyses by identifying locations where various visitor uses could potentially be permitted based on resource resiliency, sensitivity, desired future conditions, and suitability analyses.

ISSUES TO BE ADDRESSED IN THE ZONING MANAGEMENT PLAN

- **Current cave management protection issues –** allowable uses above known cave and karst areas will be delineated to ensure reduced impacts.
- **Park infrastructure needs –** including park trails, roads, administrative and visitor facilities.
- **Recent land acquisitions –** such as the 5,556-acre 2011 Addition Lands (Casey Property) located on the southern Park boundary. Resource types and/or activities that may require special management considerations (including potential use, development, or access restrictions), will be identified and delineated as management zones based on resource sensitivity and associated protection requirements.
- **Natural resource integrity and scenery conservation –** development of any intensity can impact the Park's viewshed. A visual resource inventory and classification will also be addressed as part of this plan to identify optimal areas for development.
- **Transportation –** issues related to the width, road material composition, storm water runoff management, use, and permitted transportation uses of US Highway 385.
- **Backcountry management and use issues –** such as appropriate levels, types, and intensities of uses, activities and development, including the existing trail system, which was established and developed as a result of conversions from fire roads, rather than as part of an intentional plan. Determining appropriate locations and qualities of hiking trails, in order to provide appropriate visitor experiences and to address dispersal of backcountry uses and impacts.
- **Ethnographic Resources –** twenty affiliated tribes are routinely included in formal government-to-government consultation to ensure Park projects will not affect ethnographic resources valued by the tribes. Defining the management zones' allowable uses and activities, combined with agreements with tribes related to specific sites, uses or activities, should streamline future consultation.

ISSUES NOT ADDRESSED IN THE ZONING MANAGEMENT PLAN

Not all of the issues faced by the Park are included in this plan. In general, some issues are not addressed in this plan because they: were not feasible; were already prescribed by law, regulation, or policy; would be in violation of laws, regulations, or policies; were at a level that was too detailed for a Zoning Management Plan and are more appropriately addressed in subsequent planning documents.

- **Wilderness suitability –** preliminary assessment of potential wilderness suitability indicated that new and existing park lands likely do not meet wilderness criteria based on two of the five necessary criteria for wilderness designation: untrammeled and unconfined. The proposed zoning management and transportation corridor overlays would likely not impact any future wilderness designation or take away from the wilderness character if a future study concluded a positive finding for wilderness.
- **Water resources and rights –** this includes surface and groundwater quantity and quality issues. A United States Geological Survey (USGS) report (forthcoming) will provide appropriate, additional direction for standards and guidelines related to groundwater resources. Any direction provided will be addressed in subsequent implementation planning efforts.
- **Visitor use on 2011 Addition Lands –** a separate management plan addressing these issues is being completed in accordance with this Zoning Management Plan.
- **Nonnative species –** specific management actions directing nonnative/invasive species control will not be addressed in the Zoning Management Plan.
- **Species of concern –** management actions to protect species of concern will continue to be a priority. Adherence the Endangered Species Act and consultation with US Fish and Wildlife, and South Dakota Game, Fish and Parks will continue.

NPS ORGANIC ACT AND NATIONAL ENVIRONMENTAL POLICY ACT

In making decisions about NPS-administered resources, the National Park Service is guided by the requirements of the 1916 Organic Act (16 USC 1). The authority for conservation and management of the NPS is stated in the Organic Act as the agency's purpose "…to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations."

The Organic Act establishes the management responsibilities of the National Park Service. While Congress has given the NPS management discretion to allow certain impacts within parks, that discretion is limited by the statutory requirements that park resources and values be left unimpaired, unless a particular law directly and specifically provides otherwise. The impairment provision of the Organic Act establishes the primary responsibility of the National Park Service, which is to ensure that park resources and values will continue to exist in a condition that will allow the American people to have present and future opportunities for enjoyment of them. NPS *Management Policies 2006* provides the NPS interpretation of the Organic Act and the definition of impairment.

This plan has been prepared in compliance with:

- The National Environmental Policy Act (NEPA) of 1969 (42 USC 4321), which requires an environmental analysis for major federal actions having the potential to impact the quality of the environment.
- Council of Environmental Quality (CEQ) Regulations at 40 CFR 1500-1508, which implement the NEPA requirements.
- Regulations of the Department of Interior (DOI) for NEPA implementation at 43 CFR 46.
- Director's Order 12: Conservation Planning, Environmental Impact Analysis, and Decision-making and DO-12 Handbook (NPS 2011b)

There are three primary purposes of an environmental assessment:

- To help determine whether the impact of a proposed action or alternative could be significant;
- To aid in NEPA compliance when no environmental impact statement is necessary by evaluating a proposal that will have no significant impact, but that may have measurable adverse impacts; and
- To facilitate preparation of an environmental impact statement, if one is determined to be necessary.

Key NEPA goals are to help federal agency officials make well-informed decisions about agency actions and to provide a role for the general public in the decision-making process. This study and NEPA-associated documentation mechanisms seek to provide decision makers with sound knowledge of the comparative environmental consequences of the proposed actions. NEPA studies, and the documents recording their results, such as this Environmental Assessment, focus on providing input to the particular decisions faced by the relevant officials.

PARK PURPOSE, SIGNIFICANCE AND FUNDAMENTAL RESOURCES AND VALUES

PURPOSE

The purpose of the Park was clarified from the 2011 foundation document using available scientific and scholarly research; the Park's history; the legislative history of Park expansion; and professional expertise. The Park's purpose is to protect the unique Wind Cave resources and preserve and enhance the mixed-grass prairie and native wildlife, while providing for the enjoyment of the public.

SIGNIFICANCE

The statement of significance describes the park's distinctiveness and helps to place it in regional, national, and international contexts. The following significance statements were identified for the Park:

- Wind Cave is one of the longest, oldest, and most complex caves in the world and contains the largest concentration of boxwork, a rare cave formation first described at Wind Cave.
- Wind Cave is one of the best places in the world to view remnants of ancient sediment-filled caves (i.e., paleokarst).
- Wind Cave is considered a sacred site for many American Indian tribes. This setting gives a sense of life and spiritually that fosters respect, cultural understanding, and an appreciation for the diverse cultures that have cared for this special place.
- The Park supports one of the most intact prairie wildlife communities in North America, with pronghorn, mule deer, white-tailed deer, elk, prairie dogs, mountain lion, endangered black-footed ferret, and genetically diverse and brucellosis-free American bison.
- The Park supports one of the last remaining examples of mixed-grass prairie, ponderosa pine, and riparian plant communities found in the Black Hills.
- The Park provides one of the most expansive unobstructed beautiful natural vistas, night skies, and natural soundscapes found in the Black Hills region.

PARK FUNDAMENTAL RESOURCES AND VALUES

Fundamental resources and values (FRVs) are those features, systems, processes, experiences, stories, scenes, sounds, smells, or other attributes determined to warrant primary consideration during planning and management processes because they are essential to achieving the purpose of the park and maintaining its significance. Fundamental resources and values are closely related to a park's legislative purpose and are more specific than significance statements.

Fundamental resources and values help focus planning and management efforts on what is truly significant about the park. One of the most important responsibilities of NPS managers is to ensure the conservation and public enjoyment of those qualities that are essential (fundamental) to achieving the purpose of the park and maintaining its significance. If fundamental resources and values are allowed to deteriorate, the park purpose and/or significance could be jeopardized.

The following fundamental resources and values have been identified for the Park:

- Cave and Karst Features
- Native Wildlife
- Native Vegetation (Mixed-Grass Prairie Communities)
- Water Resources including Hydrology
- Exploration and Discovery of Wind Cave

OTHER IMPORTANT RESOURCES AND VALUES

Other important resources and values are those that are not fundamental, and not as closely related to park purpose and significance, but are still important resources to protect and address in planning actions. Other important resources or values include the following:

- Origin Story
- Viewsheds/Vistas
- Archeology
- Solitude/Soundscapes
- Paleontology
- Historic Structures and Cultural Landscapes

GENERAL DIRECTION

This Zoning Management Plan is founded on the directions outlined in the 1994 GMP, 2011 foundation document, and other management plans at the Park. All lands administered by the National Park Service, including Wind Cave National Park, are managed to achieve the agency mission, and park purpose.

EXISTING SETTING AND FUTURE PARK VISIONS

The Park's size and configuration make it especially susceptible to outside influences. Even with the 2011 Addition Lands increasing the Park to 33,923 acres, the issue of landscape carrying capacity for wildlife when considering the original purpose for establishing a permanent range for native wildlife remains a challenge, and requires intensive management efforts to regulate and simulate natural conditions.

From a scenic and solitary experience standpoint, no point within the Park is more than three miles from the fenced in confines of the external Park boundary. Fortunately, topography and the land ownership pattern along the boundaries combine to preserve the natural scene, setting, and soundscape within most of the Park, especially the more remote locations. With the exception of lands along the southern and eastern Park boundary, changing use patterns along the remainder of the Park boundary are not expected to adversely affect primary visitor use areas or the Park's overall scenic integrity.

Custer State Park on the north is also managed as a scenic wildlife park and a major tourist attraction. The Forest Plan for the Black Hills National Forest recognizes the need to consider national park resources in the management of areas along the Park' s west and northwest boundary. Due to topographic screening, private inholdings within the national forest do not intrude on the Park scene, although effects to surface and groundwater resource conditions by adjacent land owner uses and activities remain an ongoing concern for Park managers regarding the protection of associated Park fundamental resources.

Ownership along the remainder of the south and eastern half of the Park consists of several large cattle ranches and private residential subdivisions. The graded NPS Route 5 enters the Park from the south through these ranchlands. NPS Route 5 and NPS Route 6, continuing north into Custer State Park, are used primarily by local residents and by Park visitors wishing to access and view the more remote Park areas and wildlife. Ranchlands adjacent to the southeastern portion of the Park are not visible from the primary scenic drives (US 385 and Route 87) or the primary public use areas of the Park. Because these contiguous ranchlands closely resemble the high plains grasslands environment within the Park, and such use is generally compatible with designated Park purposes, the National Park Service hopes to work with adjacent landowners to ensure that existing land uses and/or open space characteristics continue to be maintained and protected into the future.

The following basic precepts provide the overall vision for future management of this very special place: Management will continue to focus on providing the best services to the visiting public, including first-rate cave tours and facilities that meet the highest standards. The visitor will be able to tour the Park and will experience viewing natural and cultural resources on the surface of this 33,923-acre Park. The Park will also concentrate on getting younger generations to visit and enjoy the Park using the most modern information technology they can provide.

CLIMATE CHANGE AND THE PARK RESPONSE

Ongoing and future changes in climate affect all aspects of park management, from natural and cultural resource protection to park operations and visitor experience. Continuously changing conditions challenge management efforts to maintain desired conditions and require a flexible and responsive approach. Inherent variability in the climate system and other uncertainties make it

impossible to precisely predict conditions during the life of this plan. However, ongoing changes and future events related to climate change, such as drought and wildfires, will require managers to reassess goals and strategies and revise these as necessary. Recently completed NPS technical reports on climate change at the Park will be used for resource protection, including "Vegetation Protections for Wind Cave National Park with Three Future Climate Scenarios" (NPS/WICA/NRTR—2013/681) and "Two Approaches for Incorporating Climate Change into Natural Resource Management Planning at Wind Cave National Park" (NPS/WICA/NRTR—2014/918).

MANAGEMENT ZONING PROCESS AND SUITABILITY ANALYSIS

NPS *Management Policies 2006* states that

> each park's approved general management plan will include a map that delineates management zones or districts that correspond to a description of the desired resource and visitor experience conditions for each area of the park. Management zoning will outline the criteria for (or describe the kind of) appropriate uses and facilities necessary to support these desired conditions. Some desired conditions may apply parkwide, but the delineation of management zones will illustrate where there are differences in intended resources conditions, visitor experiences, and management activities. (Section 2.3.1.2)

Management zoning is the method used to identify and describe the appropriate variety of resource conditions and visitor experiences to be achieved and maintained in the different areas of the Park. As part of the zoning process, significant issues facing the entire Park related to maintenance, cultural and natural resources, and visitor use levels will be identified and outlined. Comprehensive delineation of management zones will not only provide management guidance for preserving and interpreting fundamental resources now, but also eliminate the need to produce this portion of the GMP within the next 15–20 years. This stable, long-range Zoning Management Plan will streamline future decision making.

This plan, based on a comprehensive resource suitability analysis and in conjunction with the Park foundation document, will define allowable types and general intensities of uses, activities, and development associated with public enjoyment and use of the Park within specified locations. As part of this analysis, desired conditions and accompanying goals and objectives for the preservation of resources fundamental to the established purpose of the Park will be outlined and defined.

IMPLEMENTATION OF THE PLAN: NEXT STEPS

The implementation of the approved plan will depend on future funding. The approval of a plan does not guarantee that the funding and staffing needed to implement the plan will be forthcoming. Full implementation of the approved plan could be many years in the future. The implementation of the approved plan also could be affected by other factors. Once the Zoning Management Plan has been approved, additional feasibility studies and more detailed planning and environmental documentation would be completed, as appropriate, before any proposed actions can be carried out. Examples of such steps include the following:

- Appropriate permits would be obtained before implementing actions that would impact wetlands.
- Appropriate federal and state agencies would be consulted concerning actions that could affect threatened and endangered species.
- American Indian tribes and the state historic preservation officer would be consulted.
- Appropriate NEPA documentation would be prepared for site specific actions.

This plan does not describe how particular programs or projects should be prioritized or implemented. Those decisions will be addressed during the more detailed planning associated with strategic plans, implementation plans, and so forth. All of those future, more detailed plans, will tier from the approved Zoning Management Plan and will be based on the goals, future conditions, and appropriate types of activities established in this plan.

General management direction provided by this plan or in subsequent implementation plans are accomplished over time. Budget restrictions, requirements for additional data or regulatory compliance, and competing national park system priorities could prevent immediate implementation of many actions.

PARK PLANS THAT PROVIDE MANAGEMENT DIRECTION

Listed below are the planning efforts that the Park has undertaken since the 1994 GMP was finalized over 20 years ago. These plans are still in force today and direct aspects of resource management in the Park. The following lists the management plans relevant to the Park today:

- Long-Range Interpretive Plan (2012)
- Foundation Document (2011)
- Natural Resource Condition Assessment (2011)
- Historic Resources Study (2010)
- Elk Management Plan (2010)
- Core Operations Evaluation (2008)
- Historic Structures CCC Bunkhouse (2008)
- Cave and Karst Resource Management Plan (2007)
- Black Footed Ferret Reintroduction Plan (2007)
- Bison Management Plan (2006)
- Black-tailed Prairie Dog Management Plan (2006)
- Parkwide Cultural Landscape Report (2005)
- Fire Management Plan (2005)
- NPS Midwest Region Prairie Dog Management Policy Statement (2004)
- Archeological Inventory Project (2004)
- Impact of Wildland and Prescribed Fire on Archeological Resources (2004)
- Ethnographical Study – The Home of the Bison (2003)
- Headquarters Parking Lot – Prevent Polluted Runoff from Entering Wind Cave (2002)
- Boundary Expansion Study (2002)
- Backcountry Management Plan (2000)
- General Management Plan (1994)
- Resource Management Plan (1994)
- Land Protection Plan (1985)
- Integral Vista Identification Plan (1980)

IMPACT TOPICS CONSIDERED IN THIS PLAN

All proposed projects must be screened for potential impacts against a list of natural and cultural resource categories. Impact topics are resources and issues of concern that could be affected, either beneficially or adversely, by implementing any of the proposed alternatives. The planning team utilized individual resource suitability mapping and an interdisciplinary review process to determine which resources could be affected by the three main alternative categories: 1) Greater Park Alternatives (1–3); 2) Visitor Center Alternatives (A–C); and 3) Sanson Ranch Alternatives (i–iv). These alternatives are fully described in chapter 2. Impact topics for a particular alternative type (Greater Park, Sanson Ranch, or Visitor Center) may or may not overlap with each other depending on the proposed management zone and potential impacts.

- **Cave/Karst Resources** (Greater Park and Visitor Center Alternatives)
  The Park is named for its primary natural feature, Wind Cave. Wind Cave is one of the longest and most complex caves in the world and its full extent is still unknown. Ongoing exploration has increased the length of the cave survey to 143 miles as of 2014. There could be as much as 250 miles of passage within the current footprint of Wind Cave, according to the Passage Density Model. The current length of the survey is 57% of that projected length. However, the cave could also extend beyond the current boundaries, and then it could be much larger than the projected 250 miles (Horrocks 2009). In addition to Wind Cave, the Park has numerous karst features. Greater Park alternatives could have adverse or beneficial impacts on Wind Cave and karst features, and as a result, this impact topic is retained for further analysis.

- **Vegetation** (Greater Park and Sanson Ranch Alternatives)
  One of the significant features of the park is the native plant communities such as the mixed-grass prairie. The Park vegetation is characteristically diverse and consists of three major types with approximately 63% prairie grassland, 29% forest, and 7% shrublands. Greater Park and Sanson Ranch Alternatives presented in this plan could affect native vegetation, and as a result, this impact topic is retained for further analysis. No actions are proposed throughout the visitor center area that would adversely impact native vegetation communities, as a result, vegetation is not fully impacted out in the visitor center alternatives.

- **Scenery/Viewshed** (Greater Park, Visitor Center, and Sanson Ranch Alternatives)
  The NPS Organic Act (16 USC 1) requires the need to protect viewsheds of NPS units. The Park provides some of the most expansive unobstructed natural vistas/viewsheds in the Black Hills region. However, the quality of the Park's viewshed is deteriorating in certain areas from adjacent development. Some action alternatives allow for development where the viewshed could be impacted, and as a result, this impact topic is retained for further analysis.

- **Floodplains** (Sanson Ranch Alternatives)
  Presidential Executive Order 11988 mandates floodplain management. Most floodplains in the Park are throughout the drainage of the perennial streams (Beaver Creek, Cold Spring Creek, and Highland Creek). Some of the Sanson Ranch alternatives allow for development

where the floodplain could be impacted, and as a result, this impact topic is retained for further analysis.

- **Visitor Experience** (Greater Park, Visitor Center, and Sanson Ranch Alternatives)
  The Park is managed in accordance with the NPS Organic Act (16 USC 1) and NPS *Management Policies 2006*. Alterations of the existing management zones and the prescriptions of each management zone may affect visitor experiences, uses, and visitation patterns; therefore, this impact topic is retained for additional analysis.

CULTURAL RESOURCES

Consideration of effects to cultural resources is mandated by that National Environmental Policy Act and section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended. The provisions of section 106 require federal agencies to take into account the effects of their undertakings on historic properties and to afford the Advisory Council on Historic Preservation an opportunity to comment on such undertakings. The procedures for implementing section 106 are contained in 36 CFR Part 800, "Protection of Historic Properties."

These regulations define a federal undertaking as an action that is proposed by a federal agency (or a project proposed by others that would receive funding, permits, licenses, or authorizations from federal agencies) that has the potential to affect historic properties. Historic properties are defined as properties that are either listed or eligible for listing in the National Register of Historic Places, including buildings, structures, historic districts, objects, sites, or archeological resources. In addition, NHPA section 106 requires those agencies to consult with the state historic preservation office (SHPO) in determining if previously unidentified historic properties exist in the area of potential effects.

- **Archeology** (Greater Park, Visitor Center, and Sanson Ranch Alternatives)
  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. Approximately 14% of the lands within the Park have been inventoried, with 116 archeological sites having been recorded. Archeological resources could incur impacts to known and unknown sites as a result of the prescribed management zones. Therefore, this impact topic will be retained for further analysis.

- **Ethnography** (Greater Park, Visitor Center, and Sanson Ranch Alternatives)
  Wind Cave is considered a sacred site for many American Indian tribes. While no burial sites are known within the Park, should any be discovered, all applicable laws and regulations would be enforced to ensure appropriate protection and consultation with affiliated individuals. Ethnographic resources could incur impacts as a result of prescribed management zones. Therefore, this impact topic will be retained for further analysis.

- **Cultural Landscapes and Historic Properties** (Greater Park, Visitor Center, and Sanson Ranch Alternatives)
  Cultural landscapes and historic structures of the Park are integrated with one another. As a

result, these topics will be analyzed together. The existing Park headquarters is listed in the National Register of Historic Places. In addition, other sites are listed or eligible for inclusion in the national register. Cultural landscapes and historic properties could incur impacts depending on the prescribed management zones. Therefore, this impact topic will be retained for further analysis.

RESOURCES CONSIDERED BUT DISMISSED FROM FURTHER ANALYSIS

The impact topics described in this section are not fully evaluated in this plan because they were not identified during scoping as being of concern, nor is it anticipated that implementation of the preferred alternative would substantially affect these resources. Additional information regarding their dismissal is provided for each potential impact topic.

- **Prime and Unique Farmlands**
  Prime or unique farmland is defined as soil which particularly produces general crops such as common foods, forage, fiber, and oil seed. Unique farmland produces specialty crops such as fruits, vegetables, and nuts. A review of the soils status for the Park on the US Department of Agriculture 2014 "Web Soil Survey" reveals that a small amount of the soils in the Park are classified as prime farmland if irrigated. However, no action is being proposed to permanently convert the prime agricultural lands from production. Therefore, this impact topic has been dismissed from further consideration.

- **Soils**
  Four of the eight major soil associations found in the southern Black Hills occur in the Park (NPS 2006a). Soils of the Park can be affected by surface disturbing activities such as construction, restoration, and visitor uses. All action alternatives would likely have negligible adverse impacts on soils of the Park, especially employing parkwide best management practices, and as a result, this impact topic has been dismissed.

- **Riparian Areas**
  Riparian areas comprise only a small fraction of the total lands within the Park, but are some of the most productive, ecologically valuable, and utilized areas. Riparian cover is limited in the Park and represents valuable habitat for many species of wildlife. Although some of the alternatives generally prescribe zoning that allows for development, in riparian areas this would generally not be permissible. Common to all management zones (see appendix C) stipulates no development may occur unless for resource protection purposes. Therefore, this impact topic has been dismissed from further consideration.

- **Wildlife**
  The Park supports one of the most intact prairie wildlife communities in North America, with pronghorn, mule deer, white-tailed deer, elk, prairie dogs, mountain lion, and bison. These animals are managed through law, policy, guidance documents, and detailed plans. No foreseeable impacts will occur to wildlife as a result of this plan. Therefore, this impact topic has been dismissed from further consideration.

- **Special Status Species**
  Analysis of potential impact on special status species (federal or state endangered, threatened, candidate species; or species of concern) is required by the Endangered Species Act, NPS *Management Policies 2006*, the National Environmental Policy Act, and other

regulations. Consultation with the US Fish and Wildlife Service concluded no adverse impacts to special status species would result from the Zoning Management Plan. Implementation of any action would require further consultation with the US Fish and Wildlife Service to determine potential adverse effects to listed species. Therefore, this impact topic has been dismissed from further consideration.

- **Air Quality**
  The Clean Air Act stipulates that federal agencies have a responsibility to protect the air quality from adverse air pollution impacts. The Park is a designated class I air quality area. Class I areas are defined as national parks that are permitted only a small amount of certain kinds of additional air pollution. Action alternatives that allow for development would result in short-term negligible adverse impacts on air quality, and as a result, this impact topic has been dismissed.

- **Wetlands**
  While there are many wetlands in the Park, there is no indication that they would be affected by management prescriptions or actions. Before initiating any ground-disturbing projects, further investigation would be conducted to ensure that no wetlands would be affected. Therefore, this impact topic has been dismissed from further consideration.

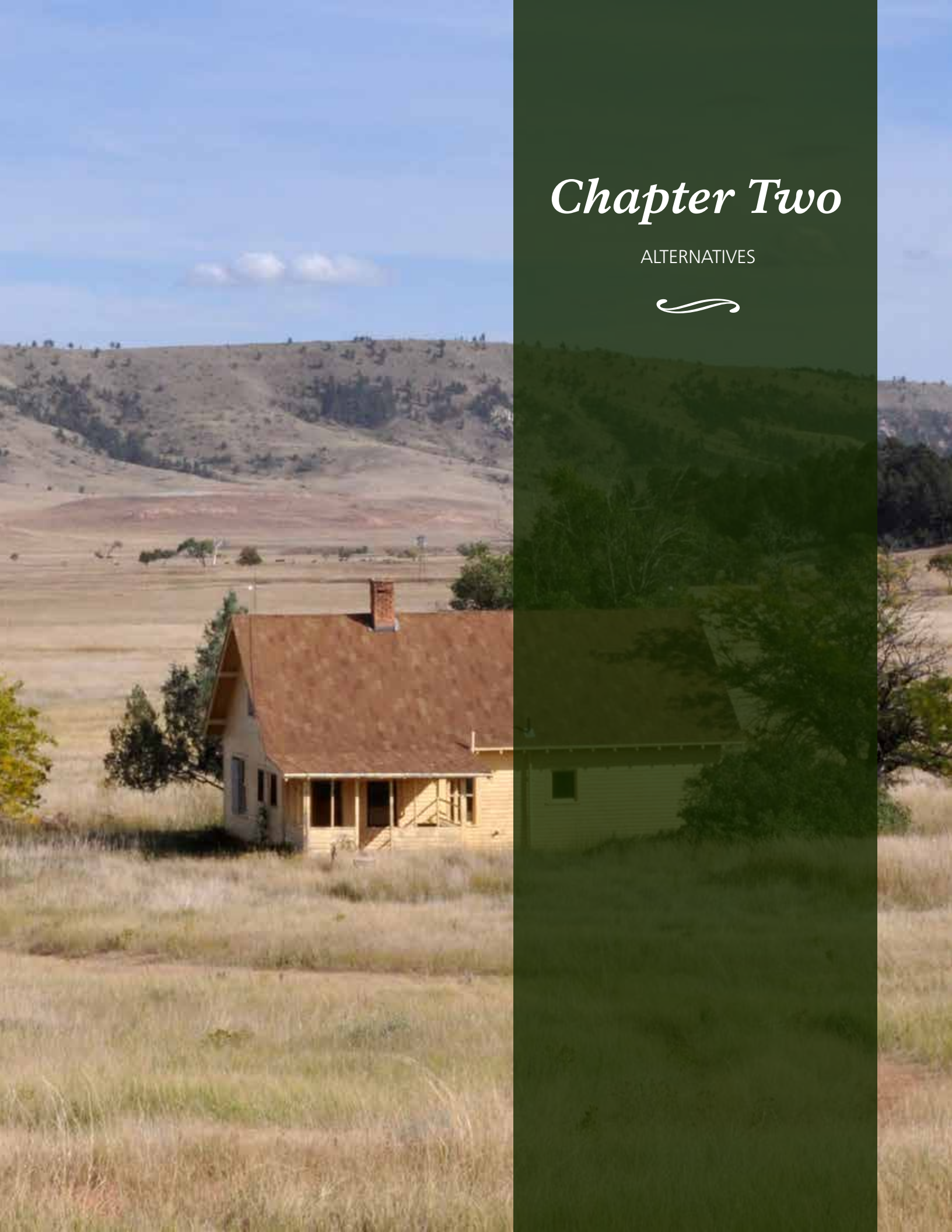
- **Environmental Justice**
  Executive Order 12898 requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs or policies on minorities and low-income populations and communities. The proposed management zones in this plan would not adversely affect socially or economically disadvantaged populations.

- **Paleontology**
  Paleontological resources have been identified in high concentration in certain areas of the Park. No foreseeable impacts will occur to paleontological resources as a result of this plan. Therefore, this impact topic has been dismissed from further consideration.

- **Energy Consumption**
  None of the alternatives presented in this plan would result in a major change in energy consumption compared to current conditions. The National Park Service would pursue sustainable practices whenever possible in all decisions regarding Park operations, facilities management, and development activities. Whenever possible, the National Park Service would use energy conservation technologies and renewable energy sources. Therefore, this impact topic has been dismissed from further consideration.

- **Night Skies**
  Starry night skies and natural darkness are important components of the Park. The natural lightscapes are critical for nighttime scenery, such as viewing a starry sky, but are also critical for maintaining nocturnal habitat. NPS policy requires the preservation, to the extent possible, of the natural lightscapes of parks and minimization of the intrusion of artificial

light (light pollution) into the night scene (NPS *Management Policies 2006*). No foreseeable impacts will occur to the Park night skies as a result of this plan. Therefore, this impact topic has been dismissed from further consideration.



Chapter Two

ALTERNATIVES

INTRODUCTION

The National Environmental Policy Act requires that federal agencies conduct a careful, complete, and analytical study of the impacts resulting from proposals that have the potential to affect the environment, and to consider alternatives to those proposals before any decisions are made. This section describes the three action alternatives for the greater park area, four action alternatives for the Sanson Ranch area, and three action alternatives for the existing visitor center area. This chapter also includes the environmentally preferable alternative and the agency preferred alternative. In addition to the proposed zoning alternatives, a description of the existing management zones is included and for this plan is considered the no-action alternative. The no-action alternative is used as a baseline to compare and analyze the effects of the proposed approaches to management, and involves determining the relative magnitude, intensity, and characteristics of their effects of the proposed actions on park resources.

Management zones are used by the National Park Service to identify and describe the appropriate variety of resource conditions and visitor experiences to be achieved and maintained in the different areas of a park. Zoning is generally a two-step process: (1) Identify a set of potentially appropriate management zones; and (2) allocate those zones to geographic locations throughout the Park. The proposed alternatives are alternative zoning configurations that address various issues and provide different options for resource conditions and visitor experiences in specific areas.

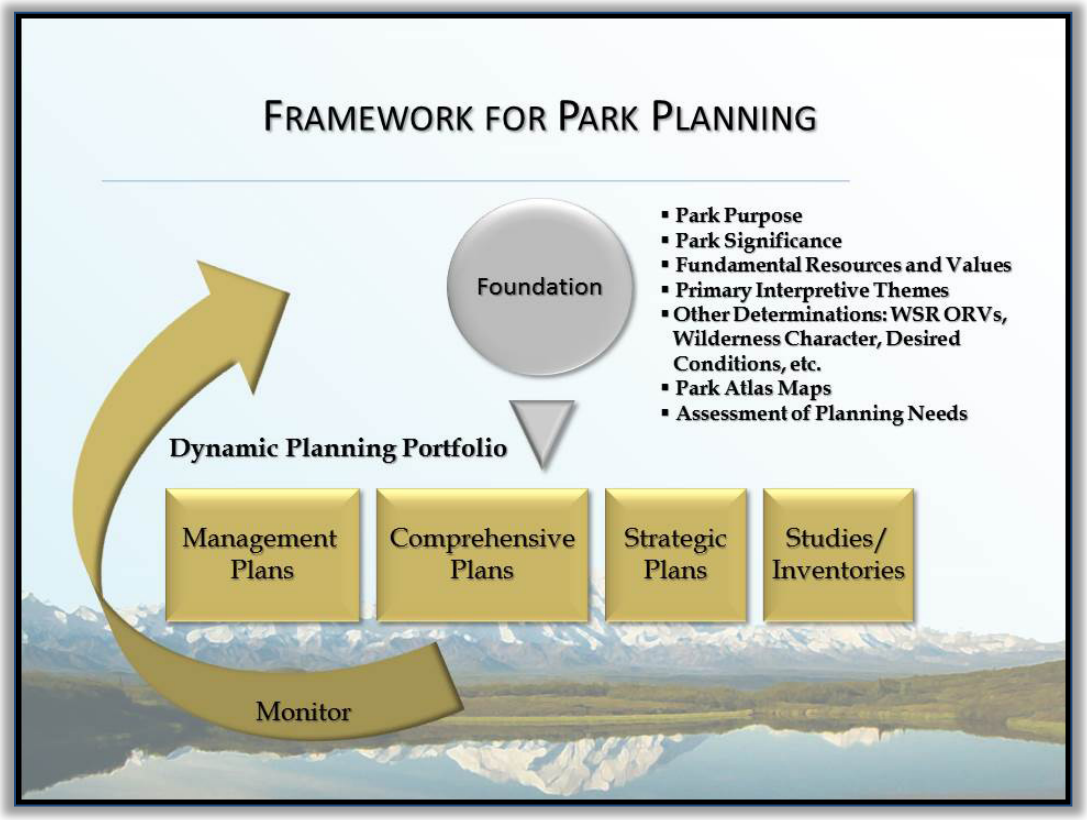
The application of management zones (integrated sets of resource conditions and associated visitor experiences) to geographic areas throughout the Park is intended to provide for a variety of resource conditions and visitor uses in a manner that is compatible with the Park's purpose and that preserves its fundamental resources and values.

Management zones describe the types of management to be emphasized in specific locations in the park, provide a long-range vision for the desired future conditions, and establish a framework for decisions on future use and development. The proposed alternatives were collaboratively developed by the interdisciplinary planning team to address outlined issues and needs, based on a comprehensive resource suitability analysis and best management practices.

MANAGEMENT ZONING MATRIX

Land Use Management Zoning and the process of prescribing desired future resource and visitor experience conditions is a forward looking, visioning process used to help define, communicate, and provide management direction for how the Park will look and function in the future. As part of this process, resource managers fully consider each area's potential future conditions, not just the existing conditions. It is important to recognize that zoning for future desired conditions, if different than existing conditions, is a prescriptive process that illustrates potential changes in resource conditions, settings, and associated visitor opportunities and experiences rather than a description of the current conditions. The needed and allowable changes required to meet the desired future conditions, when different than existing conditions, will outline major considerations and necessary steps to be taken during more detailed implementation level planning efforts.

Desired future conditions help guide the identification of measurable indicators and standards needed for implementation, as well as for ongoing resource monitoring, and for adaptive management of resources and visitor experience conditions. The development of management zones is used to identify and describe desired resource conditions, opportunities for visitor experiences, and appropriate uses, as well as the appropriate types and levels of management, access, and development within geographically distinct areas of the Park in a manner that is compatible with the Park's purpose and that preserves fundamental resources and values.



The NPS planning framework begins with broadscale general management planning and proceeds through progressively more specific programs, strategic planning, implementation, and annual planning. The foundation statement and the desired condition statements developed during general management planning and in this case, management zoning, are the common threads that connect these different planning components. Desired conditions in general management plans and associated management zones provide the feedback loop during subsequent planning that allows park staff to determine if the goals articulated in these long-range park vision documents are being met.

The delineation of distinct management zones is based on a suitability analysis that combines resource suitability with Park purpose, significance, and associated fundamental resources and values. The suitability analysis was conducted to identify appropriate locations for various types and general intensities of development and use within different areas of the Park based on resource protection requirements and to outline measures for the preservation of associated Park resources. Individual resource map layers were developed as an informative tool to guide the development of the management zones and are included in appendix F.

Management zones provide park managers with long-term direction for desired conditions while allowing flexibility for decision making in future plans and strategies. This plan does not provide detailed direction for implementing any particular set of actions for the achievement of desired conditions. One purpose of future planning is to translate the broad qualitative standards of desired conditions established in this document into measurable or objective indicators. These indicators can be monitored over time to assess whether desired conditions are being achieved. Measurable objectives and decisions about specific actions to be taken fall within the purview of resource stewardship strategies, strategic plans, and other implementation level planning efforts.

In summary, management zoning:

- Establishes an overall character for the park by emphasizing some potential conditions and experiences over others in particular locations.
- Considers the relationships among resources and experiences in adjacent zones and in areas outside the park boundaries.
- Provides for some variety of resource conditions and visitor experiences in different geographic areas throughout the park.
- Reflects decisions about which resources and values are preeminent in each particular area of the park.
- Is prescriptive, rather than descriptive (may zone an area for the continuation of existing conditions ***or*** may zone an area for a dramatic departure from what currently exists).

A total of nine different management zones were developed within three broad categories:

Developed Area Zones include:

1. Primary Visitor Service Development Zone
2. Administrative Services Zone
3. Historic Resource Zone

Natural Area Zones include:

1. Frontcountry-Natural Zone
2. Remote-Natural Zone
3. Resource Protection Zone

Transportation Corridors include:

1. Primary Passage Zone
2. Secondary Passage Zone
3. Tertiary Passage Zone

The purpose of each of these management zones is described in the following table. The Zoning Matrix Table is organized for the reader to easily compare the differences and similarities between desired resource and visitor experience conditions and the associated types and levels of management, access, facilities and development within each management zone.

Table 1. Management Zones

	DEVELOPED AREAS			NATURAL AREAS		
Resource Conditions	**Primary Visitor Service Development Zone**	**Administrative Services Zone**	**Historic Zone**	**Frontcountry Natural Zone**	**Resource Protection Zone**	**Remote Natural Zone**
Zone Summary	Provides visitor education, interpretation, orientation, parking, and customary amenities. Characterized by resources and visitor facilities that serve educational and practical needs of the visitor. Secondary purpose is to provide space for administrative activities. Includes public development (visitor center) and associated administrative functions (such as those housed within the visitor center). Concentrated visitor service facilities, developed campground with associated amenities present.	Supports Park operations. Zone is subservient to overall purpose and significance of Park. Designated for Park support needs, primarily for Park operations and maintenance functions. Managed to provide facilities that are safe, secured, and appropriate for functions required for Park management. Visitors are generally accommodated within this zone only when on official business with the Park.	Actively uses and protects significant cultural resources, resources that are "managed as historic," and those resources that are complementary and/or compatible with zone's cultural context and resource character. As in all other areas of the Park, identification, treatment, and use of cultural resources follows National Historic Preservation Act (NHPA) and *Secretary of the Interior's Standards for the Preservation of Historic Properties* (and other specific standards) to accommodate visitor services and/or Park operations, provided that alterations do not destroy character-defining features. Historic resources emphasized as the prominent resource theme. Promotes public access and active use (including adaptive reuse) of listed and/or eligible resources, including historic facilities, cultural landscapes, and compatible resources. Enhances visitor's cultural experience and expands interpretation opportunities while maintaining resource integrity.	Provides visitor orientation and enhance visual and physical connectivity to natural setting of the Park. Transitional zone connecting primary developed visitor service areas and primary roadways to the more remote natural areas in a functional, safe, and enjoyable manner. Accommodates interpretation opportunities, trails, and associated facilities, limited in context to feature Park resources. High to moderate levels of day use are accommodated.	Protects fundamental resources that are highly sensitive to a variety of activities and receives highest level of protection Resources managed to preserve their fundamental values while being monitored and often studied for scientific purposes Access to these areas is highly controlled and is highly limited	Provides undeveloped, primitive, and self-directed visitor experience within a natural setting. Characterized by appearance of unmodified natural or natural-appearing environment. Facilities generally absent, except those necessary for resource protection, such as trails, footbridges, or boardwalks in sensitive resource areas. Retains native species and natural processes. Natural resources managed to preserve and restore resource integrity. Visitor opportunities to directly experience natural resources primarily from trails or off-trail travel.
General Management Zone Characteristics	Highly developed. Orientation and information. Active use. Largest crowds.	Administrative setting. Necessary to support Park operations. Out of sight of the general public.	Setting retains and maintains cultural resource character through approved treatment strategies and sensitive management/maintenance of resources. Continued/enhanced/nonconsumptive use, access, and interpretation of resources encouraged for visitors and staff to appreciate zone's rich historical context.	Lightly developed "natural park" setting.	Delicate, scientific, living museum opportunity to observe and experience remarkable resources.	Isolated. Natural. Wild.
Natural Resources (General)	Natural resources may be highly modified and manipulated to accommodate and withstand high levels of visitor use. Moderate to high tolerance for resource modifications.	Situated so as to have little impact on Park resources and the natural setting. Uses appropriate and resource compatible materials and design. Natural resources may be highly modified and manipulated to accommodate and withstand high-level park support operations. Moderate to high tolerance for resource modifications.	Natural resources reflect human response to natural features and conditions. Natural resources contribute to cultural resource integrity through provision and accommodation of setting, feeling, and association. Treatments and management strategies accommodate and allow for cultural expression and value, including native/non-native species, land use patterns, and in-kind/compatible materials as identified in approved planning and treatment documents and assessments such as a CLR, HSR or similar document.	Natural resources are maintained in good condition to the extent possible. In some places resource conditions may exhibit signs of human use. Natural resources may be modified for visitor access, recreation, and visitor services, but in ways that harmonize with the natural environment. Low tolerance for resource modifications.	Natural resources are maintained in excellent condition, with any rehabilitation efforts striving to enhance resource from its current state. Protecting integrity of natural processes, including conservation of biodiversity and functioning of ecosystem processes, is the highest management priority. Extremely low tolerance for resource modifications.	Natural resources are maintained in excellent condition, approaching or matching the resource protection zone. Protecting integrity of natural processes, including conservation of biodiversity and functioning of ecosystem processes, is the highest management priority. Natural resources may be modified for visitor access, recreation, and visitor services, but in ways that harmonize with the natural environment.

Table 1. Management Zones

Resource Conditions	DEVELOPED AREAS			NATURAL AREAS		
	Primary Visitor Service Development Zone	**Administrative Services Zone**	**Historic Zone**	**Frontcountry Natural Zone**	**Resource Protection Zone**	**Remote Natural Zone**
Cave Protection	Geologic processes, including Wind Cave, can be modified to provide for a safe experience.	Geologic processes, including Wind Cave, can be modified to provide for a safe experience.	Geologic processes, including Wind Cave, can be modified to provide for a safe experience. Cave's cultural value to past, present, and future generations guides decisions relative to cave protection and visitor use.	Geologic processes, including Wind Cave, are maintained in a natural condition.	Geologic processes, including Wind Cave, are maintained in a natural condition.	Geologic processes, including Wind Cave, are maintained in a natural condition.
Vegetation	Appropriate native species used for landscaping around developed facilities. Vegetation management strives to maintain natural appearances and density. Nonnative and invasive species are detected, prevented, and controlled to the greatest extent possible per Programmatic Northern Great Plains Exotic Plant Management Plan.	Appropriate native species used for landscaping around developed facilities. Vegetation management strives to maintain natural appearances and density. Nonnative and invasive species are detected, prevented, and controlled to the greatest extent possible per Programmatic Northern Great Plains Exotic Plant Management Plan.	Appropriate compatible, native, and non-invasive species used to preserve, restore, or convey the cultural context's setting, feeling, and association. Treatments and management decisions guided by approved treatment documents and vetted through compliance processes. Vegetation management strives to convey human response to and values relative to the vegetative setting and cultural resource period of significance. Mimicking patterns of vegetation placement/density and replacement with in-kind or compatible species that convey landscape character yet do not introduce invasive species. All species are monitored to detect changes in vegetative response to climate change to inform strategies to build resilience and promote adaptation.	Native vegetation communities and patterns are maintained to the greatest extent possible, although vegetation manipulation to accommodate visitor activities may be common in highly used areas. Invasion by nonnative plant species can be higher in this zone as a result of higher levels of visitor use. Vegetation management strives to maintain natural appearances and density. Nonnative and invasive species are detected, prevented, and controlled to the greatest extent possible per Programmatic Northern Great Plains Exotic Plant Management Plan.	Native vegetation communities and patterns are maintained to the greatest extent possible. Plant communities monitored regularly. Invasions by nonnative species are controlled, where feasible. Vegetation management strives to maintain natural appearances and density. Nonnative and invasive species are detected, prevented, and controlled to the greatest extent possible per Programmatic Northern Great Plains Exotic Plant Management Plan.	Native vegetation communities and patterns are maintained to the greatest extent possible. Plant communities monitored regularly. Invasions by nonnative species are controlled, where feasible. Vegetation management strives to maintain natural appearances and density. Nonnative and invasive species are detected, prevented, and controlled to the greatest extent possible per Programmatic Northern Great Plains Exotic Plant Management Plan.
Wildlife	Large ungulates are prevented from accessing primary visitor service areas through use of cattle guards and fencing. Impacts on wildlife and habitat are avoided to the greatest extent possible using proper facility design and setting and by minimizing size of disturbances.	Large ungulates are prevented from accessing administrative service areas through use of cattle guards and fencing. Impacts on wildlife and habitat are avoided to the greatest extent possible using proper facility design and setting and by minimizing size of disturbances.	Cultural value of wildlife relative to identified periods of significance and park history is acknowledged and interpreted. Acceptable controls may be used to deter and prevent large ungulates from accessing the primary visitor service areas and areas where vulnerable cultural resources are located.	Preservation of wildlife habitat is a primary goal of this management zone. Natural conditions are preserved, and altered habitats are restored where possible.	Preservation of wildlife habitat is a goal of this management zone. Natural conditions are preserved, and altered habitats are restored as nearly as possible. Some wildlife may be excluded in this zone for resource protection requirements.	Preservation of wildlife habitat is a primary goal of this management zone. Natural conditions are preserved, and altered habitats are restored as where possible.

Table 1. Management Zones

Resource Conditions	DEVELOPED AREAS			NATURAL AREAS		
	Primary Visitor Service Development Zone	**Administrative Services Zone**	**Historic Zone**	**Frontcountry Natural Zone**	**Resource Protection Zone**	**Remote Natural Zone**
Fire Management	Park's fire management program continues a program of prescribed fires used for fuel reduction throughout the park, as well as to achieve resource management goals. Fire suppression continues as in the past, natural ignitions are generally suppressed.	Park's fire management program continues a program of prescribed fires used for fuel reduction throughout the park, as well as to achieve resource management goals. Fire suppression continues as in the past, natural ignitions are generally suppressed.	Fire suppression with regard to historic structures continues as implemented throughout this cultural zone. Modifications to existing systems and new installations go through the compliance process and follow the recommendations found in the historic structure report or similar approved treatment document for the building/structure. Controlled fire as a landscape treatment to retain/maintain desired resource conditions is permitted through the compliance process and is based on approved treatment documents and management plans such as a CLR and Fire Management Plan. Structural and wildland fire programs are provided with the data they need to protect cultural resources in their plans and strategies.	Park's fire management program continues a program of prescribed fires used for fuel reduction throughout the park, as well as to achieve resource management goals Fire suppression continues as in the past, natural ignitions are generally suppressed	Park's fire management program continues a program of prescribed fires used for fuel reduction throughout the park, as well as to achieve resource management goals.	Park's fire management program continues a program of prescribed fires used for fuel reduction throughout the park, as well as to achieve resource management goals. Fire suppression actions are determined by the updated Fire Management Plan which allows natural ignitions under certain circumstances throughout this zone.
Soundscape	Natural sounds are limited. Sights and sounds of other visitors dominates.	Natural sounds are limited. Sounds of park operations are present.	Controls to promote and enhance a natural soundscape experience are limited. The sounds of park visitors and activities are present in this zone. Minor sounds associated with daily maintenance activities may also be present.	Natural sounds are dominant although often mixed with human generated sounds. Sounds of other park visitors and traffic likely intrudes on the natural soundscape, with seasonal variations.	Natural sounds could dominate. Sounds of other park visitors and traffic could be high as access is likely ranger led only.	Natural sounds dominate with minimal intrusions. Sounds of other park visitors and traffic is limited.
Visitor Experience						
Overall Visitor Experience and the Level of Interaction with Resources	Primary visitor experience goals in this zone are conveying Park interpretive themes and educating visitors. Zone also provides orientation, many opportunities for interpretation, education programs, and research activities. Zone supports the visitor center so visitors of all ages and abilities have opportunities to learn about park resources. Visitor comforts and basic needs are met, and there are numerous opportunities for programs and interactions with park staff.	Visitors are discouraged from the administrative maintenance facilities and employee Park housing, and as such, no visitor experience exists in this zone. Visitor experience in this zone is incidental, as its function is to support Park operations and visitor functions. Visitor parking is provided only for visitors on official business with Park administration.	Visitors have opportunities that promote cultural resource education and stewardship relative to the resource types found in the park. Park programs and staff work collaboratively to develop interpretive programs and aids that not only explain the unique relationships between resource types in the Park, but also respond to various learning styles and physical abilities presented in the Park visitor demographic.	Visitors have easy access to a wide range of recreational activities with some opportunities for self-discovery. Visitor experience in this zone is primarily self-directed orientation and wayfinding. Transitional zone between primary developed Park areas and remote Park natural areas that is functional, safe, and enjoyable.	Primary use is ranger-guided tours to ensure resource protection of the sensitive Park resources and for research purposes. Visitor experience in this zone is specific to the resource(s) being showcased and protected. High degree of management controls are employed within this zone with regard to general visitor access.	Visitors have opportunities for primitive recreation with some solitude, adventure, self-discovery, and self-directed learning.
Interpretation and Education	Visitors have many opportunities for interaction with park resources. Interpretation is facilitated through visitor center and related ranger tours.	NA	Visitors have numerous opportunities to learn about significance and care of cultural resources. Strategies for how to experience and interact with Park cultural resources will be developed.	Visitors are in a natural setting with opportunities for close contact with the resources of the park.	Visitors are in close contact with resources of the park.	Visitors are in close contact with resources of the park.

Table 1. Management Zones

Resource Conditions	DEVELOPED AREAS			NATURAL AREAS		
	Primary Visitor Service Development Zone	**Administrative Services Zone**	**Historic Zone**	**Frontcountry Natural Zone**	**Resource Protection Zone**	**Remote Natural Zone**
Activities and Uses	Visitor activities are moderately self-directed. Typical activities include picnicking, running, camping, walking, biking, wildlife viewing, interpretive and educational programs. Visitors use this zone for day use only except for the Elk Mountain Campground. Visitors are required to stay on trails and roads.	Typical activities related to visitor experience are not be permitted in park support areas.	Typical activities include interpretive and educational programs that convey the importance of cultural resource stewardship and protection. Visitors are required to stay on trails, roads, and designated visitor use areas.	Typical activities include hiking and viewing wildlife, flora, and fauna. Zone is for day use only. Visitors are generally encouraged to stay on trails.	Typical activities are limited to research opportunities. Use of this area by general park visitors are highly controlled and may be subject to ranger-guided tours to ensure resource protection. Visitors are required to stay on trails.	Typical activities include backcountry camping, hiking, viewing wildlife, and flora and fauna. Backcountry camping is permitted in this zone and must follow all applicable park and agency rules. Zone is for day use only except for permitted backcountry camping.
Use Levels and Density/ Encounters	Frequent visitor-to-visitor and visitor-to-staff contacts are expected. Probability of meeting other visitors on a regular basis is very high to extremely high. Areas might be crowded, but use levels might vary seasonally. Very high likelihood of encountering park staff.	NA	Frequent visitor-to-visitor and visitor-to-staff contacts are expected. Probability of meeting other visitors and parties is moderate to high and might vary seasonally. Areas may be moderately to highly crowded, but use levels might vary seasonally. High likelihood of encountering park staff. Use levels are monitored and controlled in some areas as to not adversely affect cultural resources. Any visitor use of historic structures and cultural landscapes takes care to ensure the cultural resource character and value for the designation is maintained.	Frequent visitor-to-visitor and visitor-to-staff contacts. Probability of meeting other visitors and parties is moderate to high, and might vary seasonally. Areas may be moderately crowded, but use levels might vary seasonally. Moderate likelihood of encountering park staff.	Probability of meeting other visitors and park staff is high as this area is predominantly accessible to visitor with staff guided tours. Visitation levels vary depending on the area and resource protection needs. Most visitor opportunities are in small guided tour groups.	Probability of meeting other visitors on a regular basis is low. Visitors may sometimes be free of sight and sound of others. Very low likelihood of encountering park staff.
Skills, Risk, Time Required	Visitors of all levels of physical ability can enjoy this zone, and knowledge of outdoor skills and self-sufficiency would not be needed. Visitor time commitment varies, depending on information or services desired, but is anticipated to be approximately 30 minutes to six hours.	NA	Visitors of all levels of physical ability can learn about and enjoy this zone directly or through comparable opportunities and experiences, and knowledge of outdoor skills and self-sufficiency would not be needed. Visitor time commitment varies, depending on visitor desire for information or experience. Visitor time commitment may vary seasonally and by demographic, but is anticipated to be approximately 30 minutes to two hours.	Visitors need an average level of physical ability, and moderate knowledge of outdoor skills and being relatively self-sufficient is recommended. Visitor time commitment ranges from 30 minutes to two hours to experience this zone.	Visitors need a moderate to high level of physical ability, and moderate knowledge of outdoor skills and being relatively self-sufficient is recommended. Visitor time commitment ranges from 2 to 3 hours to tour the primary attractions within this zone.	Visitors need a moderate to high level of physical ability, and strong knowledge of outdoor skills and being relatively self-sufficient is recommended. Time commitment ranges from 2 hours to several days to experience this zone.

Table 1. Management Zones

	DEVELOPED AREAS			NATURAL AREAS		
Resource Conditions	**Primary Visitor Service Development Zone**	**Administrative Services Zone**	**Historic Zone**	**Frontcountry Natural Zone**	**Resource Protection Zone**	**Remote Natural Zone**
Levels of Development						
Types of Facilities, Design Standards, and Characteristics Development	Visitor facilities include visitor centers, entrance/ kiosks /stations, trailheads, picnic areas, wayside exhibits, parking areas, and museum collections storage and management spaces. Zone allows for the most expansive development as it relates to visitor use and experience. Appropriate types of facilities in this zone include interior and exterior interpretive exhibits, museums, library, archives, theaters, classrooms, restrooms, benches, visitor centers, transit facilities, and staff offices. Buildings, nonhistoric additions, and other developments are compatible within the natural and cultural landscape and may be used for visitor or administrative purposes. Curbing, sidewalks, and ramps are prevalent. Universal Design is employed for all new construction and is employed on existing development when possible.	Administrative support facilities include maintenance, headquarter operations, parking areas, and employee housing. Facilities in this zone are focused on park support through maintenance and operation structures. Appropriate types of facilities in this zone include administrative and operational facilities, parking, storage, and roads. Buildings and other development are used for administrative functions that support the operation and maintenance of the Park. Curbing, sidewalks, and ramps are prevalent. Universal Design is employed for all new construction and is employed on existing development when possible.	Orientation and interpretation facilities such as contact stations, kiosks, wayside exhibits, and other interpretive media are appropriate and are designed and placed as to not impact the cultural setting. Compliance would be required for modification of existing and new interpretation facilities. Cultural resources are primarily historic buildings and historic landscape features that may or may not have approved treatment documents such as a HSR, CLR, or similar. Regardless of preferred treatment strategies (preservation, restoration, rehabilitation/adaptive reuse), Secretary of the Interior Standards will apply to protect and/or enhance cultural resource integrity. Modifications to existing and new facilities would be compatible yet differentiated per Secretary of Interior Standards and utilize sensitive design and placement to minimize impacts and avoid adverse effects to cultural resource. Curbing, sidewalks, ramps, and similar accommodations for universal accessibility will undergo a needs evaluation and utilize sensitive design and placement. Process of site analysis, design, and compliance addresses accessibility holistically within the zone to avoid cumulative impacts and adverse effects to cultural resources. Actively used historic buildings, structures, and landscapes are studied using the process described above and follow recommendations for appropriate sensitive modifications to provide access and/or equivalent comparable experiences per the Architectural Barriers Act Accessibility Standards (ABAAS).	Facilities include designated, natural, and hard surface trails. Generally, facilities throughout this zone have a greater presence on visitors compared to that of the natural (backcountry areas). Appropriate types of facilities, amenities and landscape elements in this zone include overlooks, barrier free walkways, ramps, benches, wayside exhibits, orientation exhibits and kiosks, restrooms, shade ramadas, drinking fountains, parking areas, and naturalized plantings for purposes of restoration and/or screening human activities and landscape modifications. Buildings, nonhistoric additions, and other development in this zone are compatible with the natural and cultural landscape. Universal Design is employed for all new construction and is employed on existing development when possible.	Facilities include a small number of support facilities when determined necessary for preservation of sensitive resource values. Generally, trails are not permitted through this zone, but this is determined on a case-by-case basis, as designated trails or paths may be required for resource protection purposes. Resource protection takes precedence over visitor experience. Some resource areas may require formal barriers or other visitor use controls to ensure resource protection. This zone has the smallest footprint for any new or existing facility, with the footprint being the minimum size needed to accommodate Park visitors in a manner that protects sensitive resources.	Facilities include designated, natural surface trails, if needed. Support facilities may be permitted if determined necessary to support preservation of resource values. Some minor changes might be permitted when necessary to provide for trails, pit toilets, and other minimal visitor facilities.

Table 1. Management Zones

Resource Conditions	DEVELOPED AREAS			NATURAL AREAS		
	Primary Visitor Service Development Zone	**Administrative Services Zone**	**Historic Zone**	**Frontcountry Natural Zone**	**Resource Protection Zone**	**Remote Natural Zone**
Roads and Parking **(see Transportation Corridor Matrix below)**	May include more extensive roadway system. Access is by paved or unpaved two-lane road. Roads within zone do not include shoulders. Pullouts, scenic overlook, viewpoints, parking areas, and access to park attractions and trailheads may be provided.	May include more extensive roadway system. Access is by paved or unpaved two-lane road. Roads through zone do not include shoulders. No associated visitor facilities such as pullouts, scenic overlooks, viewpoints, parking areas, and access to park attractions and trailheads are provided. Visitor parking is provided only for visitors on official business with Park administration. Functional zone used primarily to conduct Park business and provide staff parking.	May include circulation patterns and features (roads and parking) that contribute to the significance of the cultural landscape. Modification and new circulation features are studied and designed to complement the original design intent of the circulation/ roadway system and features such as parking and pull off areas. Access is primarily by paved or unpaved two-lane road. Roads through historic resources zone do not include shoulders. Pullouts, scenic overlook, vantage points, parking areas, and access to park attractions and trailheads may be provided.	Parking lots adjacent to zone may be permitted, but surface and footprint is limited in scope.	Generally, no parking lots or roads are allowed.	No parking lots or roads are allowed.
Campgrounds and Campsites	Developed campgrounds include well-defined individual or group campsites, including the existing Elk Mountain Campground and associated support amenities.	Campgrounds and campsites are not permitted.	New campgrounds and campsites not permitted. Existing campgrounds and sites are evaluated per the national register criteria for evaluation.	Campgrounds and campsites are not permitted.	Campgrounds and campsites are not permitted.	Backcountry camping is permitted in this zone and must follow all applicable park and agency rules.
Types/ Character of Access Routes	Highly developed trail/road area with hardened and unpaved surfaces.	Highly developed road area with hardened and unpaved surfaces for administrative support purposes.	Developed trail/road area with hardened and unpaved surfaces that follow or are compatible with existing circulation patterns and surfaces.	Natural surface, hardened trails, and wayfinding or E-trails.	Designated natural surface trails on a case-by-case basis.	Natural surface trails on a case-by-case basis. Use of wildlife trails and wayfinding or E-trails.
Amount and Character of Signs	Regulatory, directional, safety, and interpretive signs are permitted.	Regulatory, directional, and safety signs are permitted.	Regulatory, directional, safety, and interpretive signs are permitted and may utilize design and placement standards that are sensitive to visual quality within zone and preserve cultural setting.	Directional, safety, and interpretive signs are permitted.	No interpretive or regulatory signage.	Minimal directional and safety signs are permitted. If needed, signage is minimal.
Trail Type	Trail types include accessible trails maintained according to the ABAAS and universal design, where feasible and in consideration of park resources. Trails typically access primary park features. Trail surfaces are hardened, and the use of directional and interpretive signs and structural elements to enhance safety and mitigate erosion is likely. Trails include single or multiuse trails that are constructed and maintained for moderate to heavy use by visitors with beginner to intermediate skills.	Visitor trails are not permitted within the administrative services zone. Sidewalks and other like "trails" are permitted and strive to be in accordance with the ABAAS and universal design, where feasible and in consideration of park resources.	Trails, in keeping with the identified periods of significance are studied and possibly modified to improve accessibility or fully achieve accessibility standards, in accordance with the ABAAS and universal design principle. Feasibility of modifications for accessibility is based on cultural resource protection and allowances follow Secretary of the Interior Standards. Trails typically access primary park features, and modifications to trails that follow historic circulation patterns follow recommendations in the approved treatment document and utilize compliance process to avoid adverse impacts.	Trails are permitted and strive to be in accordance with the ABAAS and universal design, where feasible and in consideration of park resources. Trails include single or multiuse trails that are constructed and maintained for moderate to heavy use by visitors with beginner to intermediate skills. Trails are maintained to mitigate potential or actual safety hazards and resource impacts. Trails are constructed of natural or hardened materials and have moderate variations and occasional	Visitors are accommodated in this zone in a manner that preserves specifically identified sensitive resources. If trails or walkways are present, each is designed on a case-by-case basis for resource protection purposes. If trails are deemed appropriate, design and construction of said trails strives to be in accordance with ABAAS and universal design, where feasible and in consideration of park resources.	Trails generally are not present except where needed for resource protection purposes (or in specific cases where long distance trails cross this zone or for other specified purposes). Wildlife paths are likely the dominant form of paths/trails. Existing trails and/or two-track roads which are deemed unwanted may be restored to natural condition where deemed not to impact cultural or natural resources. Trails types include single or multiuse trails that are constructed and

Table 1. Management Zones

Resource Conditions	DEVELOPED AREAS			NATURAL AREAS		
	Primary Visitor Service Development Zone	**Administrative Services Zone**	**Historic Zone**	**Frontcountry Natural Zone**	**Resource Protection Zone**	**Remote Natural Zone**
	Trails are maintained to mitigate potential or actual safety hazards and resource impacts. Trails surfaces also include option of being constructed of natural materials and have moderate variations and occasional rock or root protrusions. Trail surfaces are unpaved, and feature directional signs and structures that minimize safety hazards and mitigate erosion. Unwanted trails may be removed and rehabilitated or allowed to recover naturally.		Trail surfaces may be hardened to facilitate use and maintenance. Use of sensitively placed directional and interpretive signs and structural elements to enhance safety and mitigate erosion is likely. Modifications to existing trails and the construction of new trails may be evaluated for multiuse potential that will facilitate maintenance and accommodate a variety of user levels and capacity, and visitor safety and cultural resource protection strategies apply. Trails surfaces also include option of being constructed of natural materials and have moderate variations and occasional rock or root protrusions, with trail maps denoting such areas and defining skill and ability level required so visitors can determine if they should use a particular trail. Trail surfaces may be unpaved and receive limited maintenance based on use and seasonality. Trails feature directional signs and structures meant to mitigate potential or actual safety hazards and resource impacts. Signs and structures in this zone follow a design and placement standard to avoid visual obtrusions and mitigate the potential for cumulative effect. Unwanted trails like social trails and trails closed for safety reasons are documented, removed, and rehabilitated or allowed to recover naturally.	rock or root protrusions. Trails feature directional signs and structures that minimize safety hazards and mitigate erosion. Unwanted trails may be removed and rehabilitated or allowed to recover naturally.	Unwanted trails may be removed and rehabilitated or allowed to recover naturally.	maintained for light to moderate to heavy use by visitors with beginner to intermediate to high skills levels. Trails are maintained to minimize safety hazards and resource impacts. Trails are constructed of natural materials and have moderate variations and occasional rock or root protrusions. Trail surfaces are unpaved and feature directional signs and structures that mitigate potential or actual safety hazards and resource impacts.
Management Activities						
Resource Management and Visitor Protection Activities	Management activities include road patrol, resource impact mitigation, and interpretive and education activities/services.	Management activities include road patrol, resource impact, and mitigation services. All management tools are available.	Management activities include road/trail patrol, resource impact mitigation, interpretive and education activities/services and limited maintenance.	Management activities include road patrol, resource impact mitigation, and interpretive and education activities/services.	Management activities include interpretive and education activities, research and monitoring activities, prominent staff intervention for resource protection.	Management activities include research, resource management, and backcountry patrols.

Table 1. Management Zones

	DEVELOPED AREAS			NATURAL AREAS		
Resource Conditions	**Primary Visitor Service Development Zone**	**Administrative Services Zone**	**Historic Zone**	**Frontcountry Natural Zone**	**Resource Protection Zone**	**Remote Natural Zone**
Visitor Management	High degree of physical controls (e.g., fencing, barriers) are placed on visitor movement and access. Regulatory controls (e.g., no off-trail hiking) are used for visitor movement and access.	Visitors are allowed in this zone only for official business and thus managed accordingly.	High degree of physical controls (e.g., fencing, barriers) may be placed on visitor movement and access in addition to visitor education on appropriate behavior within the zone to protect cultural resources. Regulatory controls (e.g., no off-trail hiking) are used for visitor movement and access.	Moderate degree of physical controls (boardwalks, etc.) may be placed on visitors.	High degree of physical controls (fences, barriers) may be placed on visitors should the need arise. High degree of regulatory controls (ranger-led tours) may be placed on visitor management and access and could include restricted visitation.	Low degree of physical controls (e.g., fences, barriers) are placed on visitor movement and access. Specific Park regulations (e.g., no backcountry camping within certain distances of water, etc.) are detailed in the Superintendents Compendium and may be subject to change; would be used for protection of resources.

TABLE 2. TRANSPORTATION CORRIDORS

RESOURCE CONDITION	PRIMARY PASSAGE ZONE (PRINCIPAL PARK ROAD)	SECONDARY PASSAGE ZONE (SCENIC PARK ROAD)	TERTIARY PASSAGE ZONE (PRIMITIVE PARK ROAD)
Zone Concept	Roads that constitute the main access route, circulatory tour, or thoroughfare for park visitors include Class I Principal Park Road/Rural Parkway as defined by Director's Order 87A (DO-87A). This road type serves high volumes of park and non-park related traffic. These dual-use roads serve both park and non-park transportation needs, and also serve as extensions of the local transportation network carrying higher volumes of non-park traffic. Example of this type of corridor is the current US Highway 375 which bisects the Park.	Roads that provide access within a park to areas of scenic, scientific, recreational, or cultural interest include Class II Connector Park Road/Public Use Park Roads, as defined by Director's Order 87A. Public use roads within the secondary passage zone are specifically designed and engineered for scenic automobile touring at slow travel speeds and not for the utilitarian transportation needs of non-park roads. Example of this type of corridor is the current South Dakota State Highway 87.	Roads that provide circulation through remote areas and/or access to primitive and undeveloped areas include Public and Administrative Class IV, V & VI Park Roads as defined by Director's Order 87A. This road type consists of all public and non-public roads and may include roads intended to be used principally for administrative purposes. Includes roads servicing employee residential areas, maintenance areas, and other administrative developments such as utility areas, as well as restricted administrative roads. Example of this type of corridor is the current Park Roads 5 and 6.
General Management Zone Characteristics	Primary passage or principal Park roads provide reasonable, leisurely, and safe visitor access to natural, scenic, historic, and recreational features and on facilitating the administration and protection of park resources. Principal Park roads are hard surfaced, all weather roads. Alignment of the primary Park road is subtly configured to showcase the Park landscape in the most attractive and engaging manner while at the same time serving the practical need for providing safe access and circulation into and through the Park. Often connecting exterior federal, state and/or county roads or highways, the purpose of park roads remains in sharp contrast to that of the federal and state highway systems as this road type will be carefully designed to protect important natural and cultural resources of Wind Cave National Park. The principal Park road within the primary passage zone is neither intended nor designed as continuations of the state and federal aid network and therefore should not be designed or designated to serve as connecting links to those systems and do not have to be constructed to normal highway standards [DO 87A].	Secondary passage or scenic Park roads provide calm, accessible scenic driving routes through dramatic and spectacular topography where the roadway is incorporated into the natural landscape in a more organic manner that engages and maintains the motorist's interest more than standard engineered thoroughfares. Scenic park roads are hard surfaced or surface-prepared all weather roads. This type of roadway is specifically designed with narrow travel lanes, tight curves, steep grades, and winding routes through a variety of natural settings such as rolling grasslands, forests, and rocky areas, with numerous scenic vistas and vantage points requiring slower travel speeds and that encourage visitors to experience the natural setting, scenery, and wildlife within the surrounding landscape. Compared to the primary passage zone, the secondary passage zone has no utilitarian purpose beyond accessible automobile tourism within scenic areas of the Park. Zone may further provide an extended scenic driving experience, connecting and incorporating Wind Cave roads into the larger system of historic roads originally designed to facilitate scenic automobile tourism within the Black Hills.	Tertiary passage or primitive Park roads provide limited access to remote areas of the Park on improved surface, light duty roads Zone is characterized by the most narrow travel lanes requiring the slowest speeds within the Park road system Loose-surface roads that generally qualify as all-weather roads and paved roads not included in a higher road class are included within this zone, although either type of road may include sections of roadway that are passable only in fair or dry weather Resource protection requirements and desired type and intensity of use will ultimately determine the surface treatment of roads within this zone (i.e., paved or loose surface gravel) These roads frequently have no minimum design standards and their use may be limited to specially equipped vehicles (although maximum design standards will maintain these roads as primitive)

TABLE 2. TRANSPORTATION CORRIDORS

RESOURCE CONDITION	PRIMARY PASSAGE ZONE (PRINCIPAL PARK ROAD)	SECONDARY PASSAGE ZONE (SCENIC PARK ROAD)	TERTIARY PASSAGE ZONE (PRIMITIVE PARK ROAD)
Natural Resources (General)	Natural resources may be highly modified and manipulated to accommodate and withstand maintenance and high levels of visitor use. Tolerance for resource modifications is moderate to high. Primary Park roads are constructed only where necessary and only as necessary to provide access for the protection, use, and enjoyment of the resources for which the Park was designated to preserve in perpetuity. Primary Park roads are planned, designed, and constructed to preserve integrity of surroundings, respect and protect natural and ecological processes, provide the highest visual quality standards, and meet engineering and safety standards commensurate with the intended use to ensure a fully rewarding and safe visitor experience. Where resource preservation issues relating to construction, reconstruction, rerouting, or resurfacing precludes application of an appropriate design standard based on existing traffic uses, an alternative is restriction of use to a level consistent with the roadway geometrics which can be developed without adversely affecting resource preservation.	Natural resources may be modified and manipulated to accommodate and withstand maintenance and moderate levels of visitor use. Tolerance for resource modifications is high, based on the formal design intent of the scenic roadway. Natural features adjacent to and through which the roadway passes may be extensively manipulated to achieve a variety of designed scenic roadway effects compatible with the purpose of the Park. Trees, shrubs, and distinctive rock formations are permitted to remain much closer to the road prism than along conventional roadways. Selective cutting and clearing of trees and shrubs may be employed to enhance scenic vistas, create forested "rooms" and shrub bays, or to alternate narrow wooded aisles and undulating tree line edges.	Natural resources may be modified and manipulated to accommodate and withstand maintenance and low levels of visitor use Tolerance for resource modifications is low Primitive Park roads manipulate natural resources only to the extent necessary to ensure minimally adequate travel surface and corridor Road shoulders are generally non-existent Travel corridors are located in such a manner as to cause the least amount of impact to Park biological and physical processes and resources
Cave Protection	The protection of natural processes in cave ecosystems, within karst landscapes is a fundamental requirement for all roadway design. Local and regional hydrological systems resulting from karst processes can be directly influenced by surface land use practices. If existing or proposed developments do or will significantly alter or adversely impact karst processes, these impacts will be mitigated. Where practicable, these developments will be placed where they will not have an effect on the karst system. Surface water quality, quantity, and infiltration rates will be strictly managed in identified cave and karst areas to ensure resources are protected and simulate conditions that are within the natural range of variability. BMPs for stormwater runoff from roadways will be employed to protect water quality, quantity, and infiltration rates in designated cave and karst protection areas, including establishment and implementation of total maximum daily loads of contaminants and suspended solids resulting from roadway runoff and altered natural systems. Contamination and accelerated sheet flow from roadways are of primary concern with regard to receiving surface and groundwater bodies within delineated sensitive cave and karst areas. Any hazardous substance, hazardous material, or hazardous waste that requires placarding, as defined in 49 CFR Subtitle B, is prohibited. In locations outside of delineated sensitive cave and karst areas, the superintendent may issue permits for local bulk deliveries of gasoline, fuel oil, and LP gas and the transportation of such substance or combination of substances, including hazardous waste, in emergencies, and may issue permits when such transportation is necessary for access to lands within or adjacent to the park area to which access is otherwise not available as provided in 36 CFR 5.6.		
Vegetation	Vegetation along primary transportation corridor consists of native species and may be heavily modified. Manipulation of vegetation with regard to proximity of roadway to tall woody species may be more strictly controlled and altered for vehicle safety purposes. Vegetation management strives to maintain natural appearances and density, with efforts made to detect, prevent, and control invasions of invasive species.	Vegetation along secondary transportation corridor consists of native species and may be heavily modified. Vegetation associated with cultural resource area corridors may include native and/or noninvasive nonnative/compatible species appropriate to the cultural resource context the road crosses. Vegetation may be actively manipulated for scenic design purposes, and vegetation management strives to maintain natural and culturally scenic appearances and density, with efforts made to detect, prevent, and control invasive species.	Vegetation along tertiary transportation corridor consists of native species and may be modified. Vegetation management strives to maintain natural appearances and density, with efforts made to detect, prevent, and control invasive species.
Wildlife	Vehicle transportation corridors are designed, constructed, and managed to avoid, minimize, and mitigate direct and indirect impacts on Park wildlife, such as road kill, habitat loss, and habitat fragmentation. Roadway mitigation for wildlife protection may employ numerous BMP techniques such as installing culverts for wildlife crossings, diverting traffic to other routes, traffic calming techniques, and cautionary signage.		

TABLE 2. TRANSPORTATION CORRIDORS

RESOURCE CONDITION	PRIMARY PASSAGE ZONE (PRINCIPAL PARK ROAD)	SECONDARY PASSAGE ZONE (SCENIC PARK ROAD)	TERTIARY PASSAGE ZONE (PRIMITIVE PARK ROAD)
Fire	Park's fire management program continues a program of prescribed fires used for fuel reduction throughout the Park, as well as to achieve resource management goals. Fire suppression continues as in the past, with natural ignitions being generally suppressed. Prescribed fire generally is limited along transportation corridors, although roads may be used as fire breaks and visitation may be strictly controlled during fire activities.		
Soundscape	Natural sounds may occur during low use periods, but are generally not likely along road corridors. The sounds of other park visitors and traffic is often present.	Natural sounds may occur during low use periods but are generally not likely along road corridors. The sounds of other park visitors and traffic is often present. The use of quiet pavement may be explored in areas where soundscape protection and road corridors intersect and soundscape is adversely impacted.	Natural sounds may be more common in this zone compared to other park roads, but is limited due to vehicular use. The sounds of other park visitors and traffic is limited with seasonal variations.
Visitor Experience			
Overall Visitor Experience and the Level of Interaction with Resources	Visitors can enjoy the Park through transportation which allows for a safe, relaxing, meandering tour route for vehicles and bicycles, with opportunities to stop along the route for sightseeing, wildlife viewing, picnicking, or interpretive opportunities. Primary Park Roads provide broader level of service than other Park roads, since they serve as attractive, landscaped gateways into and through the Park. While not to the same standards as federal and state highways outside of the Park, Primary Park roads share many similarities, such as higher speeds and higher traffic volume characteristics.	Visitors can enjoy the Park through transportation which allows for less interaction with traffic compared to the primary corridor and provides a slow, safe, relaxing, meandering tour route for vehicles and bicycles, multiple opportunities to stop along the route for sightseeing, wildlife viewing, picnicking, or interpretive opportunities. Secondary Park Roads provide unique scenic viewing opportunities compared to the Primary Park Roads.	Visitors can enjoy the park through transportation which allows for less interaction with traffic compared to the primary and secondary corridors and provides a slow, safe, relaxing, meandering tour route for vehicles and bicycles, with multiple opportunities to stop along the route for sightseeing and wildlife viewing.
Interpretation and Education	Visitors primarily enjoy seeing resources and have opportunities for interaction with park resources, primarily along the most traveled road.	Visitors primarily enjoy seeing resources and have opportunities for visual experiences and broad contextual perspectives of park resources, primarily along moderately traveled roads	Visitors enjoy seeing resources and have opportunities for interaction with park resources, primarily along the least traveled roads
Activities and Uses	Typical activities include motorized touring, sightseeing, bicycling, running, and walking. This zone is for day use, and vehicles are required to stay on the road corridor.	Typical activities include motorized touring, sightseeing, bicycling, running, and walking. This zone is for day use, and vehicles are required to stay within the road corridor.	Typical activities include motorized touring, sightseeing, bicycling, running, and walking. This zone is for day use, and vehicles are required to stay on the road corridor. Visitor attractions off Tertiary roads is limited, with Tertiary roads sometimes being closed to visitor vehicle use and access when designated as an administrative road.
Use Levels and Density/Encounters	Visitation levels are high. Encounters with other visitors are generally high, particularly at pulloffs, overlooks, interpretive exhibits, and waysides.	Visitation levels are moderate to high. Encounters with other visitors are generally moderate, particularly at pulloffs, overlooks, interpretive exhibits, and waysides, but use levels might vary seasonally.	Visitation levels are moderate. Encounters with other visitors are generally low along road ways and low to moderate at limited pulloffs, overlooks, interpretive exhibits, and waysides, but use levels might vary seasonally.

TABLE 2. TRANSPORTATION CORRIDORS

RESOURCE CONDITION	PRIMARY PASSAGE ZONE (PRINCIPAL PARK ROAD)	SECONDARY PASSAGE ZONE (SCENIC PARK ROAD)	TERTIARY PASSAGE ZONE (PRIMITIVE PARK ROAD)
Skills, Risk, and Time Requirements	Visitors of all levels of physical ability can enjoy this zone. Knowledge of outdoor skills and self-sufficiency is not needed. Time commitment is generally less than 1 hour to experience this zone.	Visitors of all levels of physical ability can enjoy this zone. Knowledge of outdoor skills and self-sufficiency is not needed. Time commitment is 1 to 2 hours to experience this zone.	Visitors of all levels of physical ability can enjoy this zone. Knowledge of outdoor skills and self-sufficiency is not needed. Time commitment is a minimum of 1.5 to 2 hours to experience this zone as driving speeds are the slowest within the Park.
Levels of Development			
Types of Facilities, Design Standards and Characteristics of Development	In addition to the primary roadway, pullouts, scenic overlooks, and parking areas that provide access to attractions and trailheads may be located in this zone. Facilities include information kiosks, visitor contact stations, wayside exhibits, and ancillary support buildings. Toilet facilities may be permitted for visitor comfort and/or if needed for resource protection reasons. Visitor contact stations and associated facilities are permitted. Due to the nature of traffic use on primary park roads, a higher standard of design is necessary than is required for most other park roads. The basic criteria for primary park roads must be consistent with the purpose and intent for establishing Wind Cave National Park. Planning, design, operation, and maintenance of primary Park roads must consider traffic safety while at the same time protecting and enhancing the Park landscape, scenic, environmental, and cultural characteristics and values that significantly distinguish primary Park roads from adjacent and connecting exterior highways and roads. Primary Park roads must be considered as a whole system and all design elements such as landscaping, signs, guardrails, shoulder design, curbing, etc. must be considered as elements of the entire system. The provision of any facility, structure, or service must take into account the appropriate location, design, construction materials, and compatibility of each with the perpetuation and protection of Park resources and values, including scenery, and the maintainability of the roadway and roadside.	Facilities include designated trailheads and associated parking lots, pullouts, scenic overlooks, wayside exhibits, visitor contact stations. Toilet facilities may be permitted if needed for resource protection reasons. Using the principals of scenic engineering and design, secondary or scenic Park roads are carefully designed and constructed to harmonize with the surrounding landscape. The roadway itself and associated features are sculptural elements that interface with the surrounding landscape by following organic design principals. Distinctive bridgework and smaller bridge designs that respond to, blend in, and harmonize with the site specific, characteristic elements of the natural landscape will be used rather than typical bridge design standards. Use and incorporation of locally obtained materials such as stone and timber will be employed for structures and facilities along this roadway type. In some cases, more elaborate structures and facilities may be permitted if such design is in keeping with the overall purpose and intent of the Park and in keeping with the roadway design character. Generally, facilities along the secondary transportation corridor have a smaller footprint compared to those of the primary transportation corridor.	Facilities include designated trailheads and associated parking areas, pullouts, and wayside exhibits. Toilet facilities may be permitted if needed for resource protection reasons. Minimal facilities are located within the tertiary travel corridor or primitive Park road. The roadway itself and associated features are the minimum necessary to accomplish the roadway purpose and protection of Park resources. Facilities and roadway infrastructure are designed to be unobtrusive, with cuts and fills as travel lanes within this passage zone are the narrowest and could in places be single lane to avoid the need for excessive landscape modifications. Generally, facilities along the tertiary transportation corridor are minimal to non-existent, and when present, have the smallest footprint compared to the primary and secondary transportation corridors.
Roads and Parking	Access is by paved two-lane roadway with fully developed road shoulders in most locations. Considerations for roads may need to include cross-section, lane width, number of lanes, shoulder width, surface type, surface crown, roadside slopes and drainage, guardrails, curbs, traffic volume (average daily traffic), design speed, grades, curvature and sight distance, vertical and horizontal alignment including super-elevation, minimum radius and maximum degree of curve, grades, vertical curves, sight distance, minimum corner sight distance, stopping sight distance, bridges and other structures, signing and marking, maintenance.	Access is by paved or unpaved two-lane road, with roads through park including minimal shoulders. Considerations for roads may need to include cross-section, lane width, number of lanes, shoulder width, surface type, surface crown, roadside slopes and drainage, guardrails, curbs, traffic volume (average daily traffic), design speed, grades, curvature and sight distance, vertical and horizontal alignment including super-elevation, minimum radius and maximum degree of curve, grades, vertical curves, sight distance, minimum corner sight distance, stopping sight distance, bridges and other structures, signing and marking, maintenance.	Access is by unpaved road surfaces primarily although paved surfaces may be used when necessary (see "General Zone Characteristics" description), with roads through park generally not including shoulders. Considerations for roads may need to include cross-section, lane width, number of lanes, shoulder width, surface type, surface crown, roadside slopes and drainage, guardrails, curbs, traffic volume (average daily traffic), design speed, grades, curvature and sight distance, vertical and horizontal alignment including super-elevation, minimum radius and maximum degree of curve, grades, vertical curves, sight distance, minimum corner sight distance, stopping sight distance, bridges and other structures, signing and marking, maintenance.
Campgrounds and Campsites	New campgrounds and campsites are not permitted.		

TABLE 2. TRANSPORTATION CORRIDORS

RESOURCE CONDITION	PRIMARY PASSAGE ZONE (PRINCIPAL PARK ROAD)	SECONDARY PASSAGE ZONE (SCENIC PARK ROAD)	TERTIARY PASSAGE ZONE (PRIMITIVE PARK ROAD)
Types/Character of Access Routes	Highly developed road (paved) corridor.	Moderately developed road corridor with paved or unpaved surfaces and a very narrow and winding roadway.	Less than moderately developed with infrequent use of unpaved surfaces and the narrowest roadway.
Amount and Character of Signs	Regulatory, directional, safety, and interpretive signs are permitted.	Regulatory, directional, safety, and interpretive signs are permitted and are responsive to visual/scenic quality in design and placement.	Minimal signage is permitted for safety only.
Trail Type	Trailheads provide access to designated park trails; trailheads and associated parking lots adjacent to primary roads are permitted and ensure accessibility is provided and maintained according to the ABAAS and universal design, where feasible and in consideration of park resources. Trailheads may also be utilized for access to overlooks, pullouts, and waysides.	Trailheads provide access to designated park trails; trailheads and associated parking lots adjacent to primary roads are permitted and ensure accessibility is provided and maintained according to the ABAAS and universal design, where feasible and in consideration of park resources. Trailheads may also be utilized for access to overlooks, pullouts, and waysides.	Trailheads provide access to designated park trails; trailheads and associated parking lots adjacent to primary roads are permitted and ensure accessibility is provided and maintained according to the ABAAS and universal design, where feasible and in consideration of park resources. Trailheads may also be utilized for access to overlooks, pullouts, and waysides.
Management Activities			
Resource Management and Visitor Protection Activities	Management activities include road patrol, resource impact mitigation, snow removal and interpretive and education activities/services. Any road closure for visitor protection will be in compliance with the Manual on Uniform Traffic Control Device (MUTCD) as required by the Federal Highway Administration. Planned closures are not expected to exceed 30 minutes.	Management activities include road patrol, resource impact mitigation, snow removal and interpretive and education activities/services. Possible temporary or extended road closures for visitor and resource protection may be necessary per safety evaluations and for wildlife control/movement during particular months. Closures may occur for: maintenance, wildlife, safety, cultural and natural resource protection/mitigation, fire, seasonal conditions, or as deemed necessary in the Superintendent's Compendium. Any road closure for visitor protection will be in compliance with the Manual on Uniform Traffic Control Device (MUTCD) as required by the Federal Highway Administration.	Management activities include road patrol, resource impact and mitigation services, but snow removal is not completed on the tertiary roads. Possible temporary or extended road closures for visitor and resource protection may be necessary per safety evaluations and for wildlife control/movement during particular months. Closures may occur for: maintenance, wildlife, safety, cultural and natural resource protection/mitigation, fire, seasonal conditions, or as deemed necessary in the Superintendent's Compendium. Any road closure for visitor protection will be in compliance with the Manual on Uniform Traffic Control Device (MUTCD) as required by the Federal Highway Administration.
Visitor Management	High degree of physical controls (e.g., fencing, barriers) are placed on visitor movement and access.	Moderate degree of physical controls (e.g., fencing, barriers) are placed on visitor movement and access.	Low degree of physical controls (e.g., fencing, barriers) are placed on visitor movement and access.

TABLE 3. CONDITIONS COMMON TO ALL MANAGEMENT ZONES

RESOURCE CONDITION	VISITOR EXPERIENCE	LEVEL OF MANAGEMENT AND FACILITIES
Cultural Resources		
Archeological resources, historic structures, cultural landscapes, ethnographic resources, and identified traditional cultural properties are documented, evaluated for national register eligibility, protected, and preserved, restored, or rehabilitated following approved treatment documents. Should appropriate environmental analysis, compliance, and consultation with state and tribal offices and other stakeholders determine that adverse impacts/disturbance is unavoidable, mitigation and documentation of significant resources will be undertaken according to approved guidelines and standards before any action or undertaking takes place. Park will continue to consult with affiliated American Indian tribes to identify undisclosed ethnographic resources in order to develop respect of the culture, beliefs and traditions, and other ancestral connections to park lands.	Visitors have opportunities to learn about, see, and experience the cultural resources of the Park. Resources include structures, landscapes, and archeological sites and traditional uses.	Inventories are maintained and conducted to identify and evaluate cultural resources and nominate appropriate sites to the National Register of Historic Places per the National Historic Preservation Act section 110. Monitoring sensitive and vulnerable cultural resources might result in documentation, stabilization, or hazard abatement, and required compliance with section 106 of the National Historic Preservation Act would be met for all undertakings. Approved treatment plans guide rehabilitation and adaptive reuse of historic structures and cultural to accommodate visitor or administrative support uses.
Active Resource Management Area (Parkwide)		
Resources may be actively and aggressively manipulated within this area to meet Park goals and objectives related to adjacent land management issues.	Evidence of Park management activities may be more prevalent within this area.	This area is within a quarter-mile of the Park boundary where active management of resources is permitted regardless of what management zone this area may overlap, and activities include fire suppression, mechanical vegetation treatment, chemical spraying, and other nonnative plant control techniques.

NO-ACTION ALTERNATIVE

Under the no-action alternative, the Park's existing management zones would remain as they were from the 1994 GMP. The no-action alternative is included in this EA for two reasons, (1) to describe current or existing park unit management and, (2) to provide a baseline for comparison. Currently, the Park is managed under two management zones, "natural" and "park development."

NATURAL ZONE

The natural zone includes 27,292 acres and is managed to conserve the natural resources and processes of the park while accommodating uses that do not adversely affect those resources and processes. Facilities in this zone are dispersed and limited to those that have little effect on scenic quality and natural resources. Wind Cave is managed as natural zone even though a portion of the cave underlies the development zone. Pets are not permitted throughout the natural zone.

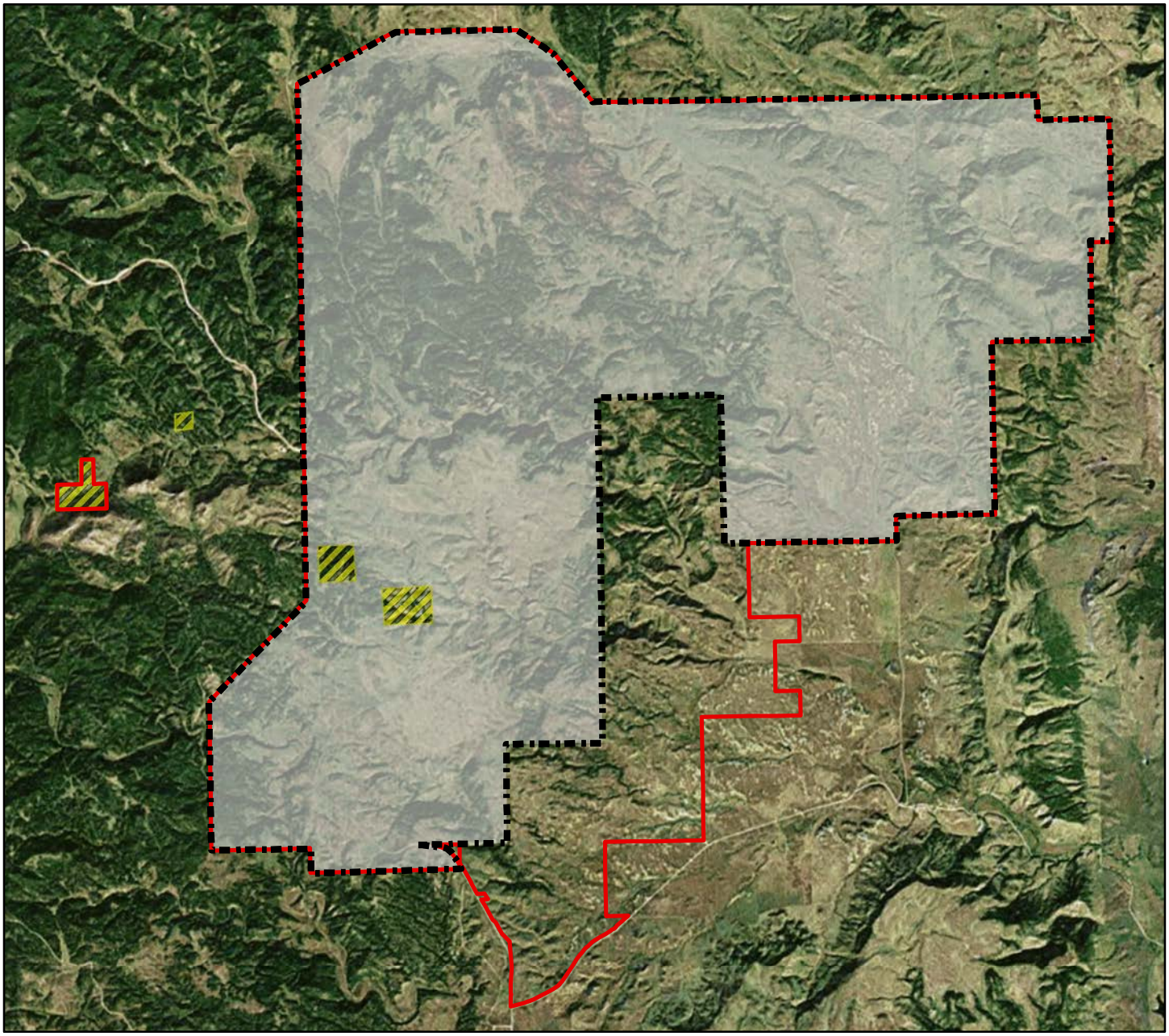
PARK DEVELOPMENT ZONE

The Park development zone classifies up to 1,000 acres and includes the Elk Mountain Campground, visitor center / administrative offices, parking, access roads, employee quarters, maintenance facilities, the corral/pasture area, and the well site. The exact delineation of areas zoned for park development was never clearly identified in previous planning efforts and as part of this management zoning planning effort, an attempt to identify these areas was made using Geographic Information System (GIS) mapping software to georectify the previous management zone map in order to compare the delineated Park development zone with actual on-ground development. The actual acreage of the illustrated development zone as delineated in 2014 is approximately 563 acres. Also included in the development zone is the 100-acre detached unit containing the spring that serves as the Park's backup water supply. For locations where pets are permitted please see the Superintendent's Compendium, as amended and updated.

Since the 1994 GMP the Park officially acquired the title to the 5,556 acre Casey Property in 2011 along the southeastern boundary. As a result, under the no-action alternative the Casey Property does not have prescribed management zones that outline the desired resource conditions, associated management requirements, or the appropriate types and intensities of visitor use and development.

The existing management zones do not provide adequate detailed direction with regard to allowable uses and future desired conditions throughout the Park. Some existing Park uses are not in harmony with the limited direction that was provided by the 1994 management zones.

Wind Cave National Park No-Action Alternative (1994 General Management Plan)



1978 Park Boundary

Current Park Boundary

Miles

0 0.5 1 2 3

No Action Alternative (1994 General Management Plan)

Development Zone

Natural Zone

Coordinate System: NAD 1983 UTM Zone 13N
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

PROPOSED MANAGEMENT ZONING ALTERNATIVES

Management zoning alternatives allocate different management zones to different geographical areas to provide solutions to defined management issues. Alternatives were developed in order to appropriately explore different sets of desired conditions using the zones described in the Matrix Table (not all management zone categories have been applied in each alternative). As stated previously, ways of achieving established desired future conditions adopted in this plan are deferred to subsequent implementation level planning efforts.

Alternative configurations were determined through a number of suitability analyses and based on issues identified by Park managers regarding necessary future management direction. The suitability analysis process used GIS mapping software to develop layers for various Park resources and indicate how suitable or unsuitable certain actions are for different areas of the Park as well as identifying areas where overlapping or potentially conflicting resource requirements or opportunities are co-located. The suitability analysis process can be used to provide direction in terms of what actions are appropriate in different geographic areas of the Park and help to ensure resource protection. For example, a resource layer created to examine cave and geologic feature protection would indicate that it is least suitable or desirable to develop facilities and associated infrastructure directly above the known cave extent. See appendix F for information regarding the suitability analyses.

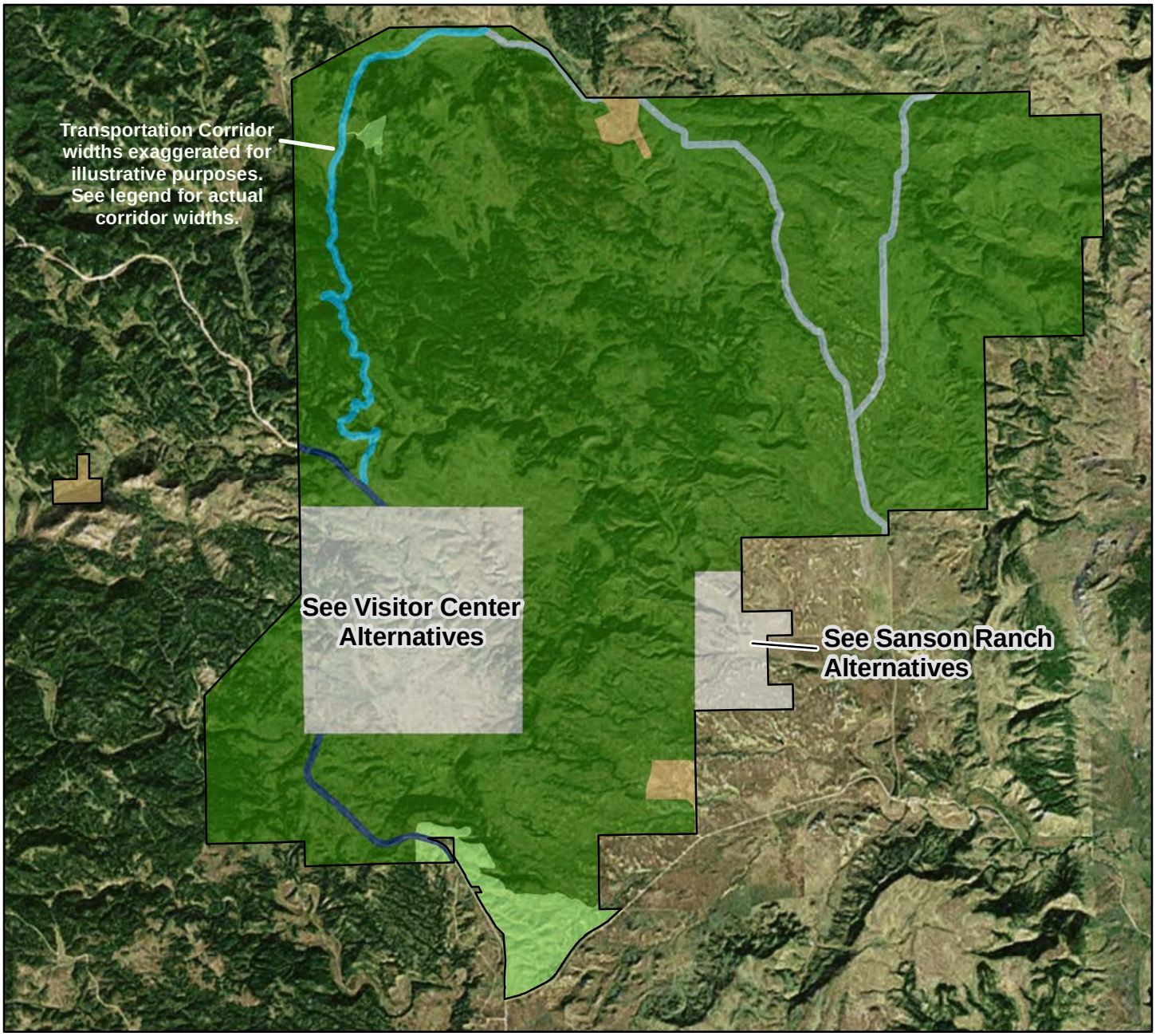
These proposed alternatives focus on what resource conditions, visitor uses, and experiences/opportunities could be at the park rather than on details of how these conditions and uses/experiences would be achieved. The implementation of any proposed alternative depends on future funding, staffing, and later specific environmental compliance. This plan does not guarantee that money will be forthcoming. The plan establishes a vision for management direction throughout the Park. The ultimate Park vision will take years to realize, and this management plan provides the long-range vision and necessary guidance and parameters for future implementation level planning efforts that will be used to achieve the outlined future desired conditions.

Independent alternatives in this document are presented for three geographic areas: the Greater Park, the visitor center, and the Sanson Ranch. There are three alternatives for the Greater Park, three alternatives for the visitor center, and four alternatives for the Sanson Ranch. There are also conditions that are common to all possibilities, described in “Parkwide Desired Conditions by Resource Topic” (see appendix C).

GREATER PARK ALTERNATIVES

Proposed management zones for the entire Park (33,923 acres), except the visitor center area and the newly acquired Sanson Ranch (a subset of the 2011 Addition Lands). This includes the transportation corridors throughout the park, US Highway 385, State Highway 87, and NPS Roads 5 and 6.

Wind Cave National Park
Greater Park Area Alternative 1



Park Boundary

Park Greater Area Alternative 1

Park Zoning Subsets

ADMINISTRATIVE SERVICES ZONE

PRIMARY PASSAGE ZONE

SECONDARY PASSAGE ZONE

TERTIARY PASSAGE ZONE

FRONTCOUNTRY (NATURAL) ZONE

REMOTE (NATURAL) ZONE

Miles

0 0.5 1 2 3

TRANSPORTATION CORRIDOR WIDTHS:
Transportation corridor widths exaggerated for illustrative purposes on the map. Actual corridor widths are listed below.

PRIMARY: 50ft on each side of road centerline

SECONDARY: 50ft on each side of road centerline

TERTIARY: 30ft on each side of road centerline

Coordinate System: NAD 1983 UTM Zone 13N

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

ALTERNATIVE 1 SUMMARY

Under this alternative, the administrative services zone would provide for continued park operations at the existing bison corral. Opportunities to relocate some park support functions such as maintenance facilities and operations to the newly acquired bison corral on the Casey Property would also be provided under this alternative. This location would also serve as a needed second future bison corral at the southern end of the Park as its location provides easy access to the southern end of the Park in a visually nonintrusive location. The water supply units to the west of the Park would also be zoned for administrative services. The southern entrance along US Highway 385 would be zoned frontcountry natural to provide a transitional area from the more developed areas adjacent to the Park boundary to the natural park setting. This location provides greater suitability for development and provides a good location for the initial introduction to the Park environment for visitors entering from the south. Rankin Ridge would also be zoned frontcountry natural to continue to provide interpretive trail and scenic vista experiences for park visitors. The majority of the Park would be zoned remote natural to continue fulfilling the overall desired natural setting for wildlife, scenery, and opportunities for remote natural visitor experiences.

Alternative 1 zones road corridors in a configuration which is essentially equivalent to the existing experience, where US Highway 385 is a primary state highway, State Highway 87 is a secondary scenic byway, and NPS Roads 5 and 6 are primitive, graded, gravel access roads.

Remote Natural Zone

Alternative 1 primarily zones most areas of the Park as remote natural to provide visitors with an undeveloped, primitive, and self-directed experience within a natural setting. Facilities within this zone, as applied to the majority of the greater Park area, would generally be limited except for those required for resource protection or for visitor safety.

Frontcountry Natural Zone

Two distinct areas, the southern Park entrance adjacent to US Highway 385 and the developed area at Rankin Ridge would be zoned frontcountry natural under this alternative. The frontcountry natural zone is considered a transitional zone that is intended to connect the primary developed visitor service areas and primary roadways to the more remote natural areas in a functional, safe, and enjoyable manner. Facilities throughout the frontcountry natural zone would be relatively limited when compared to facilities permitted in the more developed areas and considerably greater when compared to those permitted in the remote natural zone. Appropriate facilities such as visitor contact stations, accessible trail developments, interpretive facilities, and visitor comfort facilities would all be permitted within this zone.

Administrative Services Zone

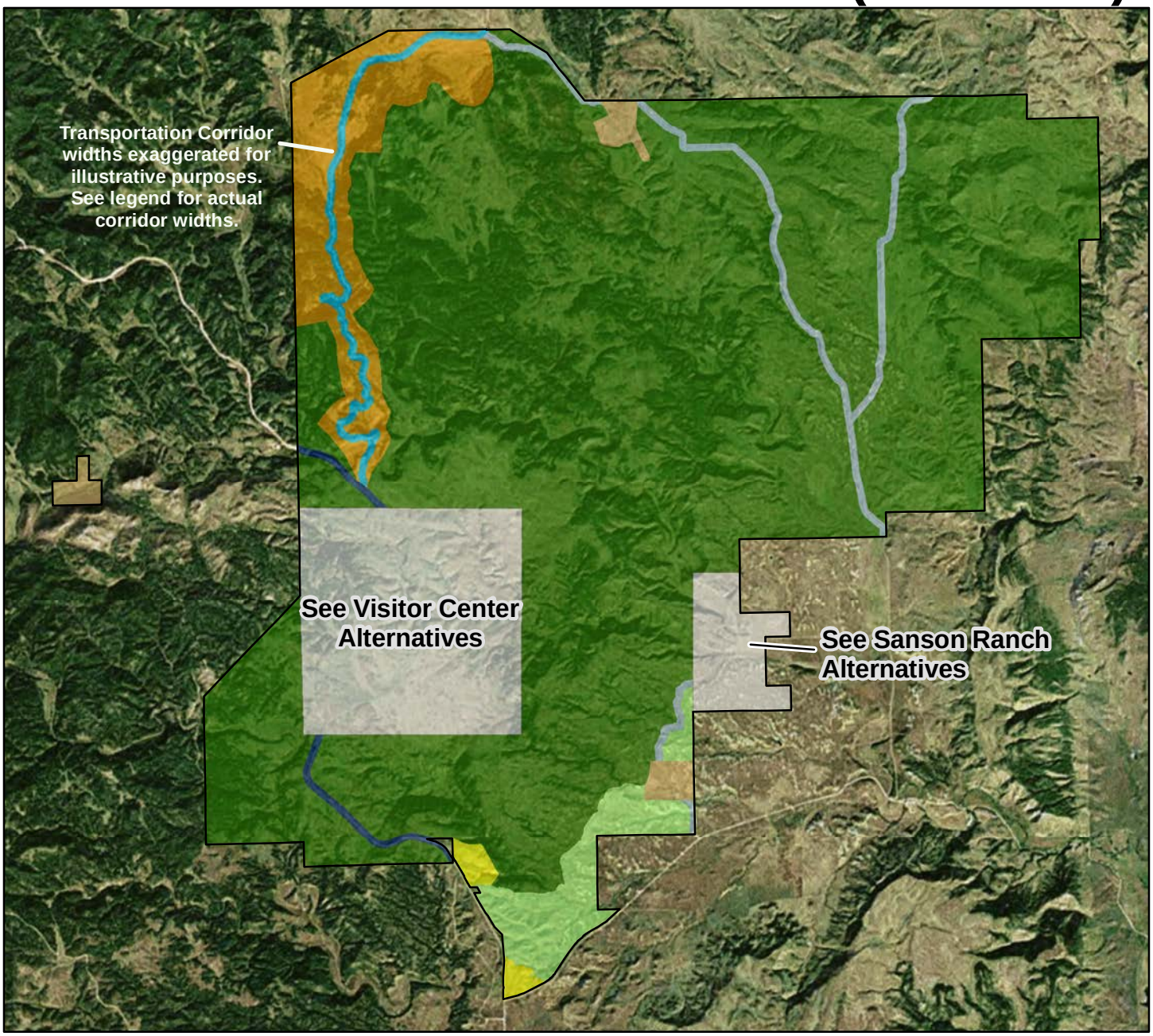
Three distinct areas, the former bison corral on the recently acquired Casey Property, the existing bison corrals, and the water supply units to the west of the main park boundary would be zoned for administrative services. This management zone is designated primarily for park administration and maintenance functions necessary to support resource management and visitor services associated with operating the National Park.

Transportation Corridors

In addition to developed and natural area zones this alternative includes three transportation corridors. Each transportation zone describes an overall desired roadway character and is designed to accommodate varying levels of use and the associated visitor and/or motorist experiences within the Park.

- US Highway 385 would be zoned as a primary transportation corridor, and would continue to support a Park highway thoroughfare type experience and setting.
- State Highway 87 would be zoned as secondary transportation corridor and would continue to function as a scenic automobile touring road.
- NPS Roads 5 and 6 would be zoned as tertiary transportation corridors and would remain as minor, backcountry access roads to more primitive settings within the Park, supporting limited transportation use only.

Wind Cave National Park
Greater Park Area Alternative 2 (Preferred)



Park Boundary

Park Greater Area Alternative 2

Park Zoning Subsets

HISTORIC ZONE

ADMINISTRATIVE SERVICES ZONE

PRIMARY VISITOR SERVICE DEVELOPMENT ZONE

PRIMARY PASSAGE ZONE

SECONDARY PASSAGE ZONE

TERTIARY PASSAGE ZONE

FRONTCOUNTRY (NATURAL) ZONE

REMOTE (NATURAL) ZONE

Miles

0 0.5 1 2 3

TRANSPORTATION CORRIDOR WIDTHS:
Transportation corridor widths exaggerated for illustrative purposes on the map. Actual corridor widths are listed below.

PRIMARY:	50ft on each side of road centerline
SECONDARY:	50ft on each side of road centerline
TERTIARY:	30ft on each side of road centerline

Coordinate System: NAD 1983 UTM Zone 13N
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

ALTERNATIVE 2 SUMMARY (PREFERRED)

This alternative would zone two areas adjacent to US Highway 385 at the southern entrance as primary visitor services. These locations provide opportunities to create an initial introduction to the Park environment for visitors entering from the south and would allow for the greatest level of development.

Under this alternative State Highway 87 corridor is zoned as Historic in recognition of this potentially eligible historic district. The historic zone would emphasize future landscape treatments to restore this historic transportation corridor to an appearance resembling the original designed scenic road that predates the 1946 Park expansion that incorporated this segment of roadway into the expanded Park boundary. The road was designed as a scenic drive to incorporate Wind Cave within a larger system of roads developed by the South Dakota State Highway Commission to facilitate automobile tourism in the Black Hills. The vision for the historic zone is to emphasize the greater continuity of this historic, scenic road with the northern segments outside of the Park boundary, and to emphasize desired treatment prescriptions for this historic resource.

The area along the southern boundary of the Park would be zoned frontcountry natural to provide development opportunities between the primary visitor services development zones along the US Highway 385 entrance area and the Sanson Ranch visitor service developments. The majority of the Park would be zoned remote natural to continue fulfilling the overall desired natural setting for wildlife, scenery, and opportunities for remote natural visitor experiences.

The existing bison corrals and the water supply units to the west of the Park would be zoned for Administrative Services. Opportunities to relocate some park support functions such as maintenance facilities and operations to the newly acquired bison corral on the Casey Property would be provided under this alternative. This location would also potentially serve as a needed second future bison corral at the southern end of the Park as its location provides easy access to the southern end of the Park in a visually nonintrusive location.

Alternative 2 zones road corridors in a configuration which is essentially equivalent to the existing experience, where US Highway 385 is a primary state highway, State Highway 87 is a secondary scenic byway and NPS Roads 5 and 6 are primitive, graded, gravel access roads. Additionally, the existing two-track road that begins at County Road 7/11 and bisects the Casey Addition (including the Sanson Ranch) would be zoned as tertiary. The tertiary road would initiate at County Road 7/11 and conclude at the Sanson Ranch/266th Street. The tertiary road would be a minimally improved two-track road for public use and would be characterized by loose-surface road such as gravel and would be subject to closure during weather events or as needed for park operations. Upgrades and improvements would be allowed and may include similar construction standards to those of the Custer County Road Specifications. As such, the access road would be maintained as a minor, backcountry access road to the more primitive setting of the Sanson Ranch structures, thus supporting limited transportation use only.

Remote Natural Zone

Alternative 2 primarily applies the remote natural zone to most areas of the Park to provide visitors with an undeveloped, primitive, and self-directed experience within a natural setting. Facilities within the majority of the greater Park area within this zone would generally be limited to those required for resource protection or for visitor safety.

Frontcountry Natural Zone

Under this alternative, the areas along the southern Park entrance adjacent to US Highway 385 extending along the Park boundary northeast towards the Sanson Ranch would be zoned frontcountry natural. The frontcountry natural zone is considered a transitional zone that is intended to connect the primary developed visitor service areas and primary roadways to the more remote natural areas in a functional, safe, and enjoyable manner. Facilities throughout the frontcountry natural zone would be relatively limited when compared to facilities permitted in the more developed areas, although they would be considerably greater when compared to those permitted in the remote natural zone. Appropriate facilities such as visitor contact stations, accessible trail developments, interpretive and visitor comfort facilities would all be permitted within this zone.

Primary Visitor Service Development Zone

Two distinct, relatively confined areas adjacent to US Highway 385 would be zoned for primary visitor service development under this alternative. The primary visitor service development zone provides visitor education, interpretation, orientation, parking, and customary visitor service amenities. Facilities throughout the primary visitor service development zone could include primary visitor centers and associated administrative functions (such as those housed within the existing visitor center).

Administrative Services Zone

Three distinct areas, the former bison corral on the recently acquired Casey Property, the existing bison corrals, and the water supply units to the west of the main Park boundary would be zoned for administrative services. This management zone is designated primarily for park administration and maintenance functions necessary to support resource management and visitor services associated with operating the National Park.

Historic Zone

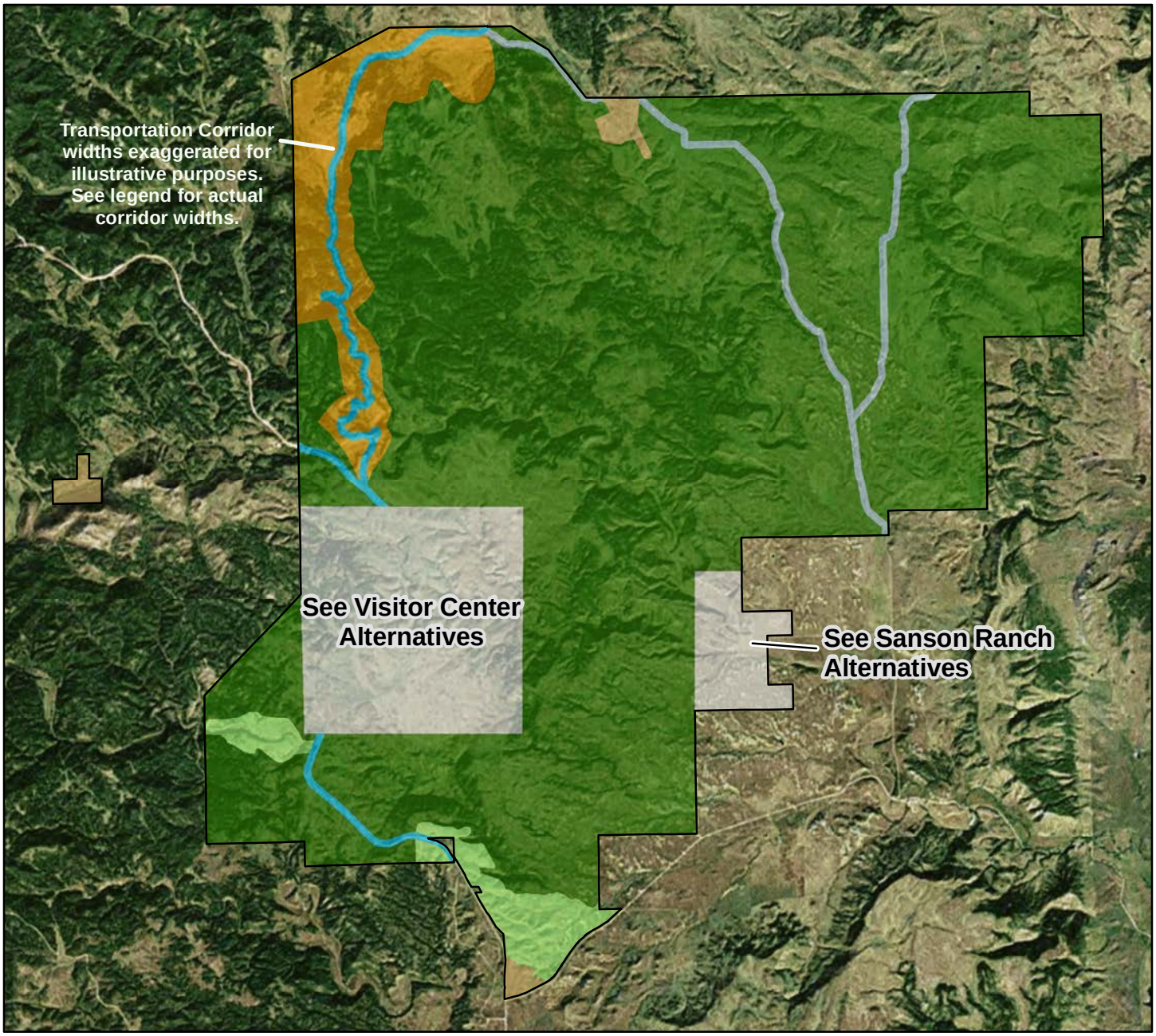
Within the larger corridor through which State Highway 87 passes within the Park, this area would be zoned for historic resources under this alternative. The historic zone enhances the visitor's historic resource experience and generally corresponds with the potentially eligible historic district. The vision for this zone is to emphasize the continuity of this historic, scenic road with the northern segments outside of the Park boundary and to emphasize desired treatment prescriptions for this potentially eligible historic resource.

Transportation Corridors

In addition to developed and natural area zones this alternative includes three transportation corridors. Each transportation zone describes an overall desired roadway character and is designed to accommodate varying levels of use and the associated visitor and/or motorist experiences within the Park.

- US Highway 385 would be zoned as a primary transportation corridor, and would continue to support a Park highway thoroughfare type experience and setting.
- State Highway 87 would be zoned as secondary transportation corridor and would continue to function as a scenic automobile touring road.
- NPS Roads 5 and 6 would be zoned as tertiary transportation corridors and would remain as minor, backcountry access roads to more primitive settings within the Park supporting limited transportation use only.
- The existing two-track road that begins at Country Road 7/11 and bisects the Casey Addition (including the Sanson Ranch) would be zoned as tertiary. The tertiary road would initiate at County Road 7/11 and conclude at the Sanson Ranch/266th Street.

Wind Cave National Park
Greater Park Area Alternative 3



Park Boundary

Park Greater Area Alternative 3

- Park Zoning Subsets
- HISTORIC ZONE
- ADMINISTRATIVE SERVICES ZONE
- SECONDARY PASSAGE ZONE
- TERTIARY PASSAGE ZONE
- FRONTCOUNTRY (NATURAL) ZONE
- REMOTE (NATURAL) ZONE

Miles

0 0.5 1 2 3

TRANSPORTATION CORRIDOR WIDTHS:
Transportation corridor widths exaggerated for illustrative purposes on the map. Actual corridor widths are listed below.

PRIMARY: 50ft on each side of road centerline
SECONDARY: 50ft on each side of road centerline
TERTIARY: 30ft on each side of road centerline

Coordinate System: NAD 1983 UTM Zone 13N
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

ALTERNATIVE 3 SUMMARY

This alternative would zone the State Highway 87 corridor as Historic in recognition of this potentially eligible historic district. The Historic Zone would emphasize future landscape treatments to restore this historic transportation corridor to an appearance resembling the original designed scenic road that predates the 1946 Park expansion that incorporated this segment of roadway into the expanded Park boundary. The road was designed as a scenic drive to incorporate Wind Cave within a larger system of roads developed by the South Dakota State Highway Commission to facilitate automobile tourism in the Black Hills. The vision for the Historic zone is to emphasize the greater continuity of this historic, scenic road with the northern segments outside of the Park boundary, and to emphasize desired treatment prescriptions for this historic resource. The southern entrance along US Highway 385 would be zoned frontcountry natural to provide a transitional area from the more developed areas adjacent to the Park boundary to the natural park setting. This location provides greater suitability for development and provides a good location for the initial introduction to the park environment for visitors entering from the south. A corridor west of US Highway 385 around the Cold Brook Canyon Trail and extending to the Park boundary would also be zoned frontcountry natural to permit moderately developed opportunities for natural immersion experiences (see examples below in "Frontcountry Natural Zone") for visitors. The majority of the Park would be zoned Remote Natural to continue fulfilling the overall desired natural setting for wildlife, scenery, and opportunities for remote natural visitor experiences. The existing bison corrals and the water supply units to the west of the Park would be zoned for Administrative Services. In addition, where US Highway 385 and County Road 7/11 converge would be zoned for Administrative Services as this would provide an opportunity to place park support functions at a strategic location out of the known cave extent area.

Alternative 3 would zone State Highway 87 as a secondary scenic byway and NPS Roads 5 and 6 as primitive, graded, gravel access roads, generally as a continuation of the existing conditions. US Highway 385 would be zoned as a Secondary Transportation Corridor in conjunction with Park and Regional efforts to relocate hazardous materials transportation and commercial traffic to a more suitable alternative route that would not risk contaminating subsurface cave/karst resources. Under this alternative, the vison for the existing US Highway 385 corridor would be comparable to the scenic driving route on State Highway 87. This would be a future change to the existing highway driving experience through the Park.

Remote Natural Zone

Alternative 3 primarily applies the remote natural zone to most areas of the Park to provide visitors with an undeveloped, primitive, and self-directing experience within the natural setting. Facilities within the majority of the greater Park area would generally be limited except those required for resource protection or for visitor safety.

Frontcountry Natural Zone

Two distinct areas, the area west of US Highway 385 (Cold Brook Canyon Trail corridor), and the southern Park entrance adjacent to US Highway 385 would be zoned frontcountry natural under this alternative. The frontcountry natural zone is considered a transitional zone that is intended to connect the primary developed visitor service areas and primary roadways to the more remote natural areas in a functional, safe, and enjoyable manner. Facilities throughout the frontcountry natural zone would be relatively limited when compared to facilities permitted in the more

developed areas and considerably greater when compared to those permitted in the remote natural zone. Appropriate facilities such as visitor contact stations, accessible trail developments, interpretive and visitor comfort facilities would all be permitted within this zone.

Historic Zone

Within the larger corridor through which State Highway 87 passes within the Park, this area would be zoned for historic resources under this alternative. The historic zone enhances the visitor's historic resource experience and generally corresponds with the potentially eligible historic district. The vision for this zone is to emphasize the continuity of this historic, scenic road with the northern segments outside of the Park boundary and to emphasize desired treatment prescriptions for this potentially eligible historic resource.

Administrative Services Zone

The existing bison corrals and the water supply units to the west of the main Park boundary would be zoned Administrative Services for Park support functions. Additionally, the area where US Highway 385 and County Road 7/11 converge would be zoned for administrative services as this would provide an opportunity to place park support functions out of the known cave extent area. This management zone is designated primarily for park administration and maintenance functions necessary to support resource management and visitor services associated with operating a public national park.

Transportation Corridors

In addition to developed and natural area zones this alternative includes two transportation corridors. Each transportation zone is designed to accommodate varying levels of use and the associated visitor and/or motorist experience within the Park.

- US Highway 385 and State Highway 87 would be zoned as secondary transportation corridors. State Highway 87 would continue to function as a scenic automobile touring road, while the potential relocation of commercial and hazardous waste transportation traffic off of US Highway 385 to another route would change the overall character and use of this road to that of a scenic automobile touring road.
- NPS Roads 5 and 6 would be zoned as tertiary transportation corridors and would remain as minor, backcountry access roads to more primitive settings within the Park supporting limited transportation use only.

SPECIFIC AREA MANAGEMENT ZONE ALTERNATIVES

Alternatives for the Visitor Center Area (A, B, and C) and Sanson Ranch Area (i, ii, iii, iv) were developed separately from the Greater Park alternatives as these locations are more complex and greater detail is necessary to illustrate proposed management zoning alternatives.

Wind Cave National Park
Visitor Center Alternative A

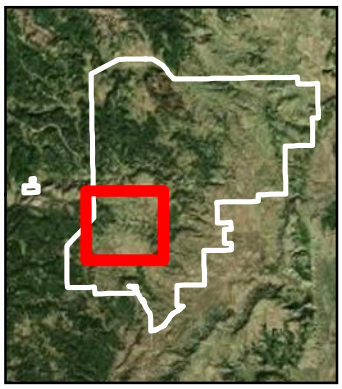
Park Boundary

Visitor Center Alternative A

- Greater Park Area
- PRIMARY VISITOR SERVICE DEVELOPMENT ZONE
- PRIMARY PASSAGE ZONE
- REMOTE (NATURAL) ZONE

Miles

0 0.1 0.2 0.4 0.6



TRANSPORTATION CORRIDOR WIDTHS:
Transportation corridor widths exaggerated for illustrative purposes on the map. Actual corridor widths are listed below.

PRIMARY: 50ft on each side of road centerline
SECONDARY: 50ft on each side of road centerline
TERTIARY: 30ft on each side of road centerline

Coordinate System: NAD 1983 UTM Zone 13N
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

VISITOR CENTER ALTERNATIVE A SUMMARY

Under this alternative, most of the existing Park headquarters and Visitor Center Service area would be zoned for primary visitor services development for a future condition that is generally comparable to the existing conditions. The remaining area would be zoned remote natural.
Alternative A applies three zones: primary visitor services development, remote natural, and primary passage corridor.

Primary Visitor Service Development Zone

Under this alternative, the majority of the existing visitor center area would be zoned for primary visitor services to provide visitor education, interpretation, orientation, parking, and customary amenities. Facilities throughout the primary visitor service development zone would include existing and potentially expanded visitor center facilities and associated administrative functions (such as those housed within the existing visitor center). This zone permits the greatest levels and intensities of development and use within the Park.

Remote Natural Zone

The area adjacent to the primary visitor services would be the remote natural zone, which provides visitors with an undeveloped, primitive, and self-directing experience within the natural setting. Facilities within the majority of the greater Park area would generally be limited except those required for resource protection or for visitor safety. The remote natural zone would serve as a continuation to the proposed remote natural zone as described in the Greater Park alternatives.

Primary Passage Zone

US Highway 385 would be zoned as a primary transportation corridor and would continue to support a Park highway thoroughfare type experience and setting.

Wind Cave National Park
Visitor Center Alternative B (Preferred)

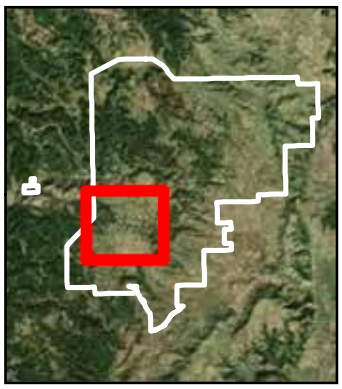
Park Boundary

Visitor Center Alternative B

- Greater Park Area
- HISTORIC ZONE
- ADMINISTRATIVE SERVICES ZONE
- PRIMARY VISITOR SERVICE DEVELOPMENT ZONE
- PRIMARY PASSAGE ZONE
- REMOTE (NATURAL) ZONE
- RESOURCE PROTECTION ZONE

Miles

0 0.1 0.2 0.4 0.6



TRANSPORTATION CORRIDOR WIDTHS:
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PRIMARY: 50ft on each side of road centerline
SECONDARY: 50ft on each side of road centerline
TERTIARY: 30ft on each side of road centerline

Coordinate System: NAD 1983 UTM Zone 13N
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

VISITOR CENTER ALTERNATIVE B SUMMARY (PREFERRED)

This alternative would provide greater emphasis on the historic resources in the existing visitor center area and the need to carefully manage surface activities directly above Wind Cave. This alternative allows for relocation of certain facilities, functions and park operation or visitor service activities not required to be directly above the cave to other more suitable locations. Specifically, this would apply to noncontributing structures and infrastructure not necessary to be located directly above this fundamental resource to more suitable locations within the Park. Example activities and functions that could potentially be relocated in the future include maintenance and administrative functions. This alternative also provides emphasis on continued use and possible restoration of historic structures and the cultural landscape surrounding the existing visitor center area. The Elk Mountain Campground would be zoned primary visitor services development as a continuation of existing conditions in the immediate campground area only and would permit future modification and facility improvements as needed. The wastewater lagoons would be zoned administrative services in continuation of the existing function.

Alternative B applies six zones: primary visitor services development, historic, administrative services, resource protection, remote natural, and primary passage corridor.

Primary Visitor Service Development Zone

The primary visitor service development zone would encompass the existing Elk Mountain Campground. This zone provides visitor education, interpretation, orientation, parking, and customary amenities, such as the existing, formal campground. Under this alternative, it is the intent to maintain the developed character of the existing campground, as a campground and not to expand visitor service functions, activities, and uses beyond those directly associated with the existing campground.

Historic Zone

The existing visitor center and surrounding Park housing and facilities would be zoned to emphasize historic resources. The historic zone emphasizes the historic resources, specifically the Civilian Conservation Corps designed and constructed buildings and landscape, and generally corresponds with the associated historic district. The purpose of this zone is to actively use and protect historic buildings and the cultural landscape. Noncontributing facilities and landscape elements that are complementary and/or compatible with the zone's cultural context, setting, and resource character may be permitted, noncontributing facilities and landscape elements would be carefully considered on a case-by-case basis. As in all other areas of the Park, identification, treatment, and use of cultural resources will follow the National Historic Preservation Act (NHPA) and "The Secretary of the Interior's Standards for the Treatment of Historic Properties" (and other specific standards) to accommodate visitor services and/or Park operations, provided that alterations do not destroy character-defining features.

Resource Protection Zone

Under this alternative, the area surrounding the historic zone would be managed under the resource protection zone. This zone is applied to the area directly above the known Wind Cave extent (not

including the historic zone). This management zone addresses the cave resources that are sensitive to a variety of activities and emphasizes the need for heightened surface protection measures and use activities. All management actions would be closely examined and monitored within this zone to ensure enhanced protection of the cave resources. Any future development would be as minimal as needed (smallest footprint, minimum size, etc.) to accommodate park visitors in a manner that protects sensitive resources. Even greater emphasis and additional constraints may be employed by park management regarding the types, intensities, and levels of development permitted and would permit managers to relocate many of the associated functions, activities, and facilities to other more suitable locations in the Park to avoid impacting cave and karst resources.

Administrative Services Zone

The existing wastewater lagoons would be zoned for Administrative Services for Park support functions. This management zone is designed primarily for park administrative and maintenance functions necessary to support resource management and visitor services associated with operating a public National Park.

Remote Natural Zone

Surrounding the previously mentioned four zones would be the remote natural zone, which provides visitors with an undeveloped, primitive, and self-directing experience within the natural setting. Facilities within the majority of the greater Park area would generally be limited except those required for resource protection or for visitor safety. The remote natural zone would correspond with the adjacent remote natural area as zoned in the Greater Park alternatives.

Primary Passage Zone

US Highway 385 would be zoned as a primary transportation corridor and would continue to support a Park highway thoroughfare type experience and setting.

Wind Cave National Park
Visitor Center Alternative C

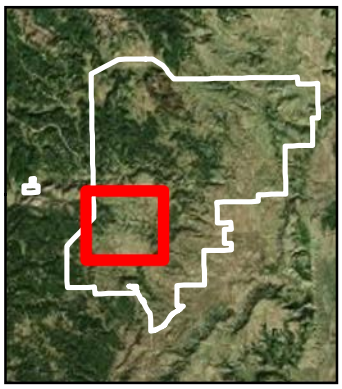
Park Boundary

Visitor Center Alternative C

- Greater Park Area
- PRIMARY VISITOR SERVICE DEVELOPMENT ZONE
- SECONDARY PASSAGE ZONE
- REMOTE (NATURAL) ZONE
- RESOURCE PROTECTION ZONE

Miles

0 0.1 0.2 0.4 0.6



TRANSPORTATION CORRIDOR WIDTHS:
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PRIMARY: 50ft on each side of road centerline
SECONDARY: 50ft on each side of road centerline
TERTIARY: 30ft on each side of road centerline

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VISITOR CENTER ALTERNATIVE C SUMMARY

In this alternative the entire area directly above the known cave extent would emphasize Wind Cave and the need to carefully manage all above ground uses and activities. This concept would permit future park managers the opportunity to relocate current ancillary visitor services and park operations. Specifically, this would apply to noncontributing structures and infrastructure that are not necessary to be located directly above this fundamental resource to more suitable locations within the Park. The Park recognizes such a transition would be a slow and gradual process that may take decades to implement. The Elk Mountain Campground would be zoned primary visitor services development as a continuation of existing conditions and would permit future modification and facility improvements as needed.

Alternative C applies four zones: primary visitor services development, resource protection, remote natural, and secondary passage corridor.

Primary Visitor Service Development Zone

The primary visitor service development zone would encompass the existing Elk Mountain Campground. This zone provides visitor education, interpretation, orientation, parking, and customary amenities, such as the existing, formal campground. Under this alternative, it is the intent to maintain the developed character of the existing campground, and not to expand visitor service functions, activities, and uses beyond those directly associated with the existing campground.

Resource Protection Zone

Under this alternative, the area directly above the known cave extent, including all existing infrastructure and development, would be managed under the resource protection zone. This management zone addresses cave resources that are sensitive to a variety of activities and emphasizes the need for heightened surface protection measures and use activities. All management actions would be closely examined and monitored within this zone to ensure enhanced protection of the cave resources. Any future development would be as minimal as needed (smallest footprint, minimum size, etc.) to accommodate Park visitors in a manner that protects sensitive resources. Greater emphasis and additional constraints may be employed by park management regarding the types, intensities, and levels of development permitted on the surface area directly above the known cave extent. Managers could relocate many of the associated functions, activities, and facilities to other more suitable locations in the Park in the future.

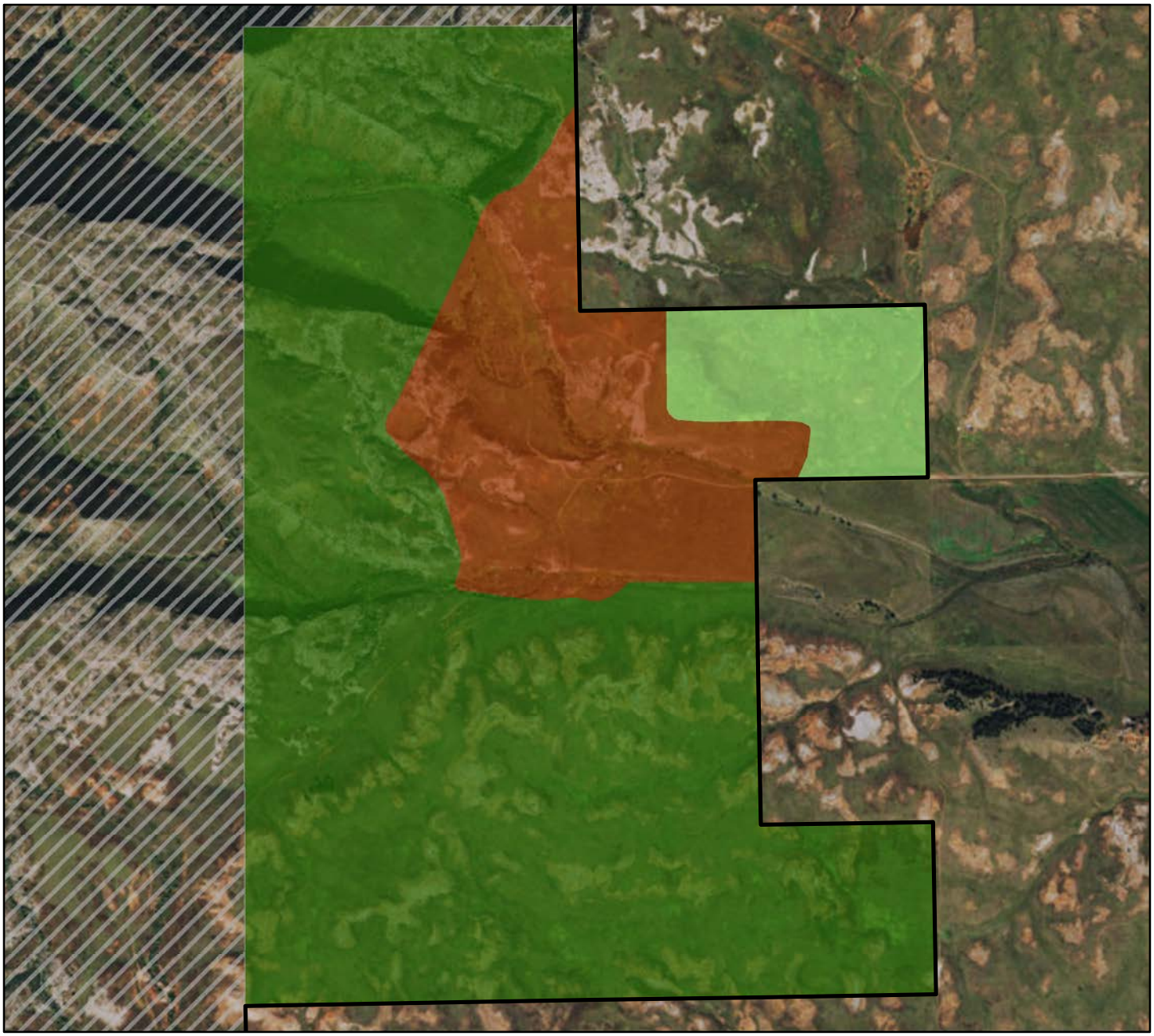
Natural Remote Zone

The area surrounding the primary visitor service development and resource protection zones would be zoned as remote natural. This zoned area would provide visitors with an undeveloped, primitive, and self-directing experience within the natural setting. Facilities within the majority of the greater Park area would generally be limited except those required for resource protection or for visitor safety. The remote natural zone to correspond with the adjacent remote natural area as zoned in the Greater Park alternatives.

Secondary Passage Zone

US Highway 385 would be zoned as a secondary transportation corridor and would function as a scenic automobile touring road.

Wind Cave National Park
Sanson Ranch Alternative i



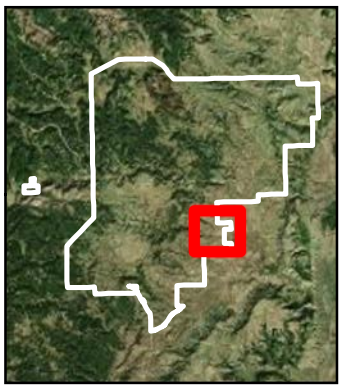
Park Boundary

Miles

0 0.1 0.2 0.4 0.6

Sanson Ranch Alternative i

- Greater Park Area
- FRONTCOUNTRY (NATURAL) ZONE
- REMOTE (NATURAL) ZONE
- RESOURCE PROTECTION ZONE



Coordinate System: NAD 1983 UTM Zone 13N
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SANSON RANCH ALTERNATIVE I SUMMARY

The core Sanson Ranch area and Buffalo Jump site would be zoned resource protection in this alternative as these resources warrant heightened resource protection emphasis. The area immediately adjacent and north of the main entrance to this site would be zoned frontcountry natural to provide opportunities for moderate levels of development to accommodate public visitation to this site. The remainder of this alternative would be zoned remote natural to correspond with the adjacent remote natural area as zoned in the Greater Park alternatives. Alternative i applies three management zones: remote natural, frontcountry natural, and resource protection.

Remote Natural Zone

Under this alternative, the area surrounding the frontcountry natural and resource protection zones would be zoned remote natural to correspond with the adjacent remote natural area as zoned in the Greater Park alternatives. The remote natural zone provides visitors with an undeveloped, primitive, and self-directed experience within a natural setting. Facilities would generally be limited in this zone to those required for resource protection or for visitor safety.

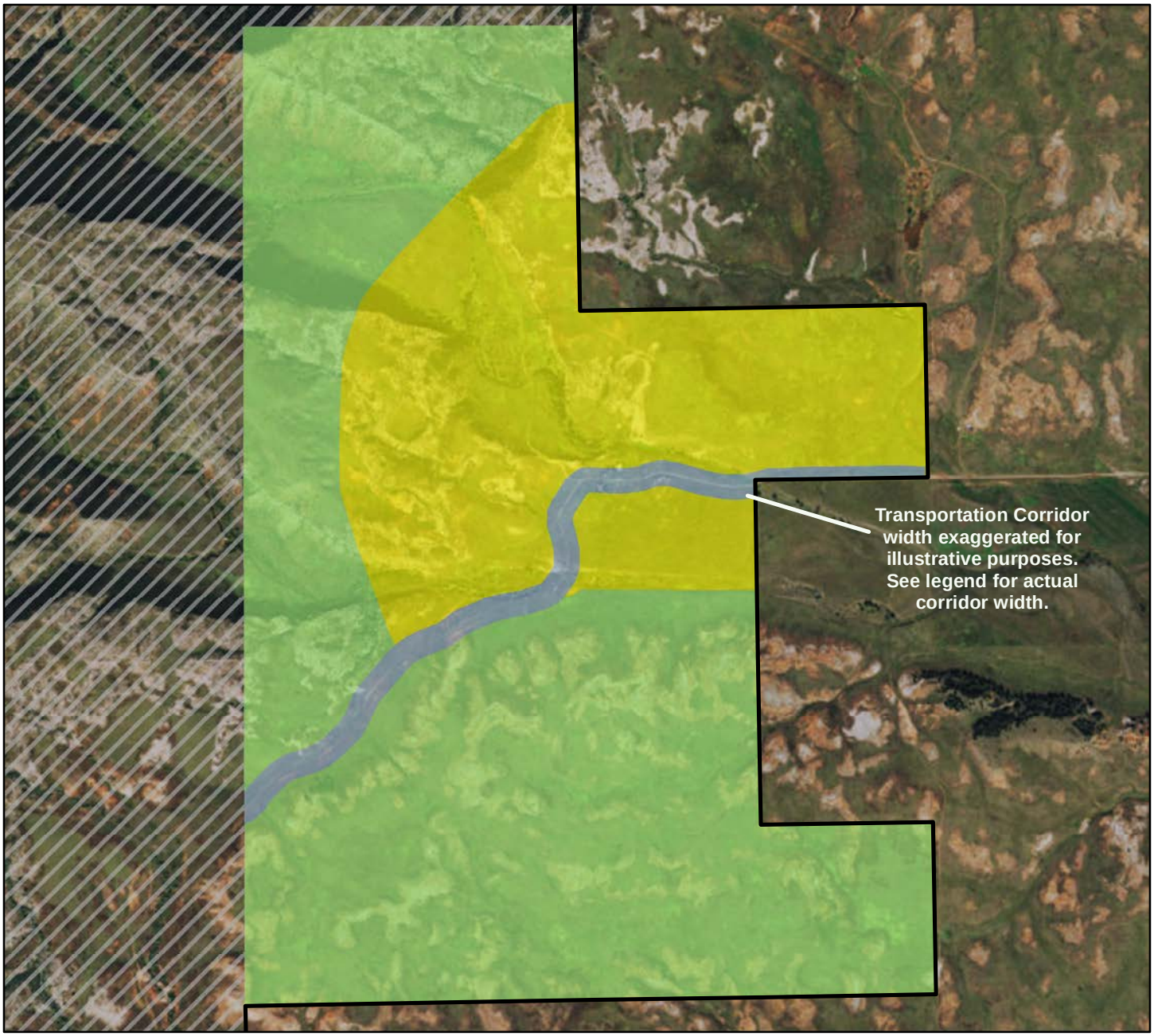
Frontcountry Natural Zone

The existing gated entrance and surrounding area would be zoned frontcountry natural under this alternative. The frontcountry natural zone is considered a transitional zone that is intended to connect the primary developed visitor service areas and primary roadways to the more remote natural areas in a functional, safe, and enjoyable manner, and in this case, the Park boundary is adjacent to private property. Facilities permitted within the frontcountry natural zone would be relatively limited when compared to facilities permitted in the more developed areas, while at the same time could be considerably greater when compared to those permitted in the remote natural zone. Appropriate facilities such as visitor contact stations, accessible trail developments, interpretive and visitor comfort facilities would all be permitted within this zone.

Resource Protection Zone

The Buffalo Jump site and Sanson Ranch would be zoned for resource protection in this alternative as these resources warrant heightened resource protection emphasis. All management actions would be closely examined and monitored within this zone to ensure enhanced protection of the Buffalo Jump site and Sanson Ranch resources. Any future development would be as minimal as needed (smallest footprint, minimum size, etc.) to accommodate park visitors in a manner that protects sensitive resources. Visitor use in this zone would be highly directed and controlled and could employ the use of ranger led tours, similar to how cave tours or cultural resource tours in other national parks are conducted to help ensure resource protection.

Wind Cave National Park
Sanson Ranch Alternative ii



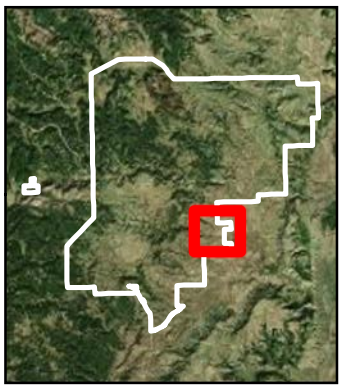
Park Boundary

Sanson Ranch Alternative ii

- Greater Park Area
- PRIMARY VISITOR SERVICE DEVELOPMENT ZONE
- TERTIARY PASSAGE ZONE
- FRONTCOUNTRY (NATURAL) ZONE

Miles

0 0.1 0.2 0.4 0.6



TRANSPORTATION CORRIDOR WIDTHS:
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SANSON RANCH ALTERNATIVE II SUMMARY

This alternative would allow for greater development of facilities and infrastructure. Alternative ii applies three management zones: frontcountry natural, primary visitor service development, and tertiary passage corridor. This zone configuration has the most contrast with the proposed zone configurations in the Greater Park alternatives.

Primary Visitor Service Development Zone

Under this alternative, the core Sanson Ranch and Buffalo Jump site would be zoned for primary visitor service development. The primary visitor service development zone provides visitor education, interpretation, orientation, parking, and customary amenities. This zone permits the highest level of development, use, and visitor service facilities. Facilities throughout the primary visitor service development zone could include visitor centers and associated administrative functions (such as those housed within the existing visitor center).

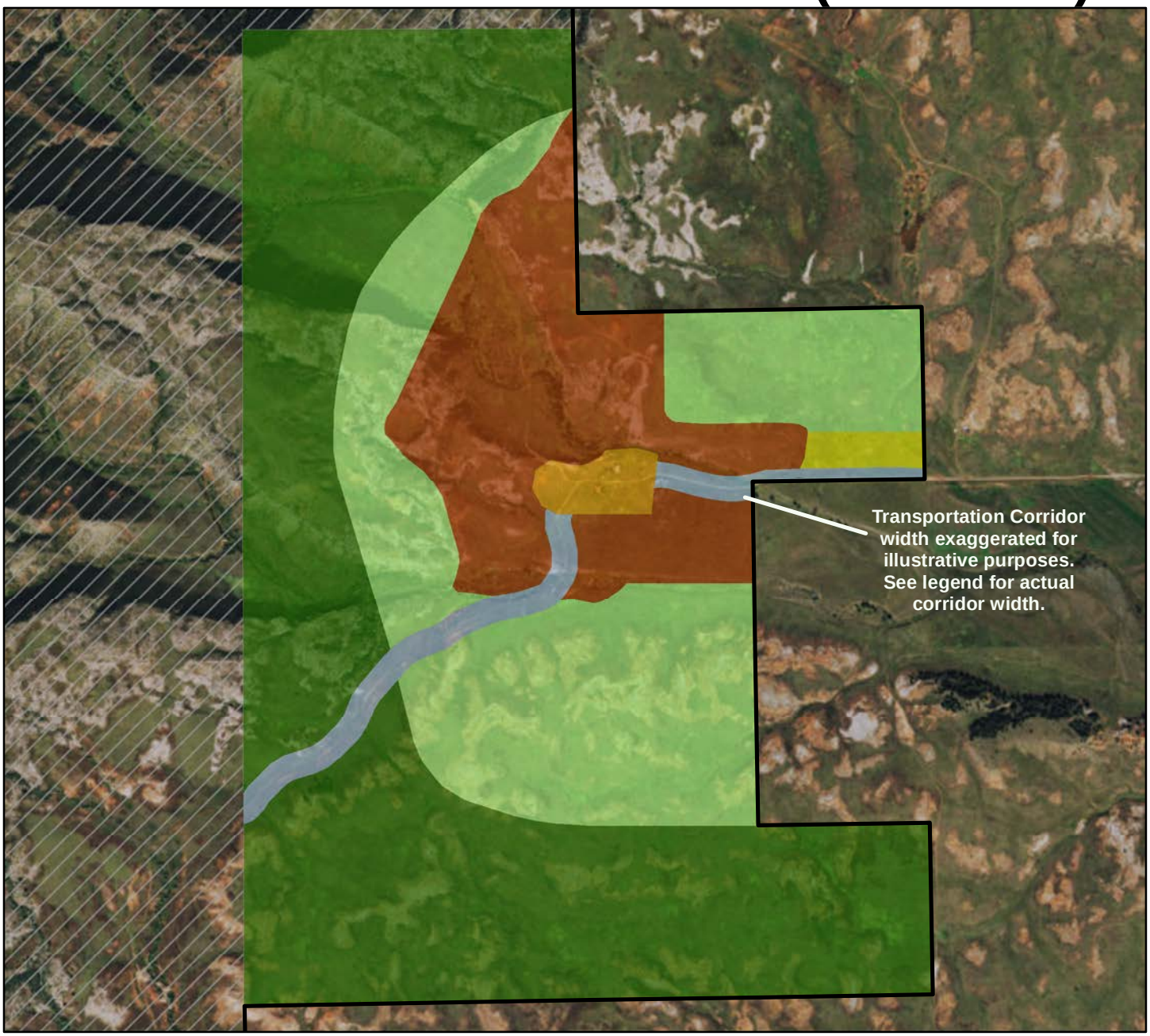
Frontcountry Natural Zone

The area surrounding the primary visitor service zone would be zoned frontcountry natural. The frontcountry natural zone is considered a transitional zone that is intended to connect the primary developed visitor service areas and primary roadways to the more remote natural areas in a functional, safe, and enjoyable manner. Facilities throughout the frontcountry natural zone would be relatively limited when compared to facilities permitted in the primary visitor service development zone and considerably greater when compared to those permitted in the remote natural zone. Appropriate facilities such as visitor contact stations, accessible trail developments, interpretive and visitor comfort facilities would all be permitted within this zone.

Transportation Corridor – Tertiary Passage Zone

The existing two-track road which bisects the Sanson Ranch through the primary visitor service development and frontcountry natural zones would be zoned as a tertiary passage corridor. The tertiary road would be a minimally improved two-track gravel road for public use and would be subject to closure from weather events or as needed for park operations. Upgrades and improvements would be allowed and may include similar construction standards to those of the Custer County Road Specifications. The access road would be maintained as a minor, backcountry access road to more primitive settings, the Sanson Ranch structures, supporting limited transportation use only.

Wind Cave National Park
Sanson Ranch Alternative iii (Preferred)



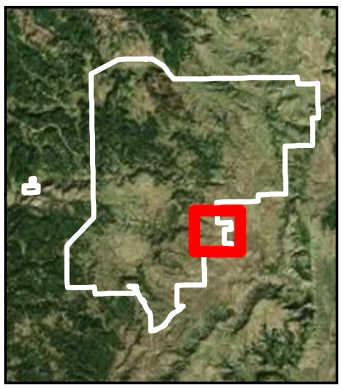
Park Boundary

Sanson Ranch Alternative iii

- Greater Park Area
- HISTORIC ZONE
- PRIMARY VISITOR SERVICE DEVELOPMENT ZONE
- TERTIARY PASSAGE ZONE
- FRONTCOUNTRY (NATURAL) ZONE
- REMOTE (NATURAL) ZONE
- RESOURCE PROTECTION ZONE

Miles

0 0.1 0.2 0.4 0.6



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SANSON RANCH ALTERNATIVE III SUMMARY (PREFERRED)

This alternative emphasizes continued use and reuse, including possible restoration, of the historic Sanson Ranch. The Buffalo Jump site would be zoned resource protection to emphasis the sensitive cultural resources. The primary visitor service development zone would include the relatively confined area immediately adjacent to and just north of the main entrance road between the Park boundary and the dry wash of Beaver Creek and would permit considerable development for visitor service purposes. The area surrounding the resource protection zone would be zoned frontcountry natural to provide opportunities for moderate levels of development to accommodate public visitation to this site. The remainder of this alternative is zoned remote natural to correspond with the adjacent remote natural area as zoned in the Greater Park alternatives. Alternative iii applies six zones: remote natural, frontcountry natural, historic, resource protection, primary visitor service development, and a tertiary transportation corridor.

Historic Zone

The core Sanson Ranch, including associated historic buildings and structures, would be zoned for historic resource emphasis. The purpose of this zone is to actively use and protect historic buildings and the cultural landscape. Noncontributing facilities and landscape elements that are complementary and/or compatible with the zone's cultural context, setting, and resource character may be permitted. Treatment options for noncontributing facilities and landscape elements would be carefully considered on a case-by-case basis. This zone promotes public access and the active use (including adaptive reuse) of listed and/or eligible resources, including historic facilities, cultural landscapes, and compatible resources.

Resource Protection Zone

The Buffalo Jump site and surrounding area would be zoned for resource protection as these resources warrant heightened resource protection emphasis. All management actions would be closely examined and monitored within this zone to ensure enhanced protection of the Buffalo Jump site resources. Any future development would be as minimal as needed (smallest footprint, minimum size, etc.) to accommodate Park visitors in a manner that protects sensitive resources. Management actions would be closely examined and monitored to ensure protection of the sensitive resources. Visitor use in this zone could be highly directed and controlled and could employ the use of ranger led tours, similar to how cave tours or cultural resource tours in other National Parks are conducted to help ensure resource protection.

Frontcountry Natural Zone

Under this alternative, the area surrounding the resource protection zone would be zoned as frontcountry natural. The frontcountry natural zone is considered a transitional zone that is intended to connect the primary developed visitor service areas and primary roadways to the more remote natural areas in a functional, safe, and enjoyable manner. Facilities throughout the frontcountry natural zone would be relatively limited when compared to facilities permitted in the more developed areas and considerably greater when compared to those permitted in the remote natural zone. Appropriate facilities such as visitor contact stations, accessible trail developments, interpretive and visitor comfort facilities would all be permitted within this zone.

Primary Visitor Service Development Zone

The area adjacent to the main east-west access road (266th Street) off NPS Road 5 that serves as the primary entrance to the historic Sanson Ranch would be zoned for primary visitor service development. The primary visitor service development zone provides visitor education, interpretation, orientation, parking, and customary amenities. Facilities throughout the primary visitor service development zone could include visitor centers and associated administrative functions (such as those housed within the existing visitor center).

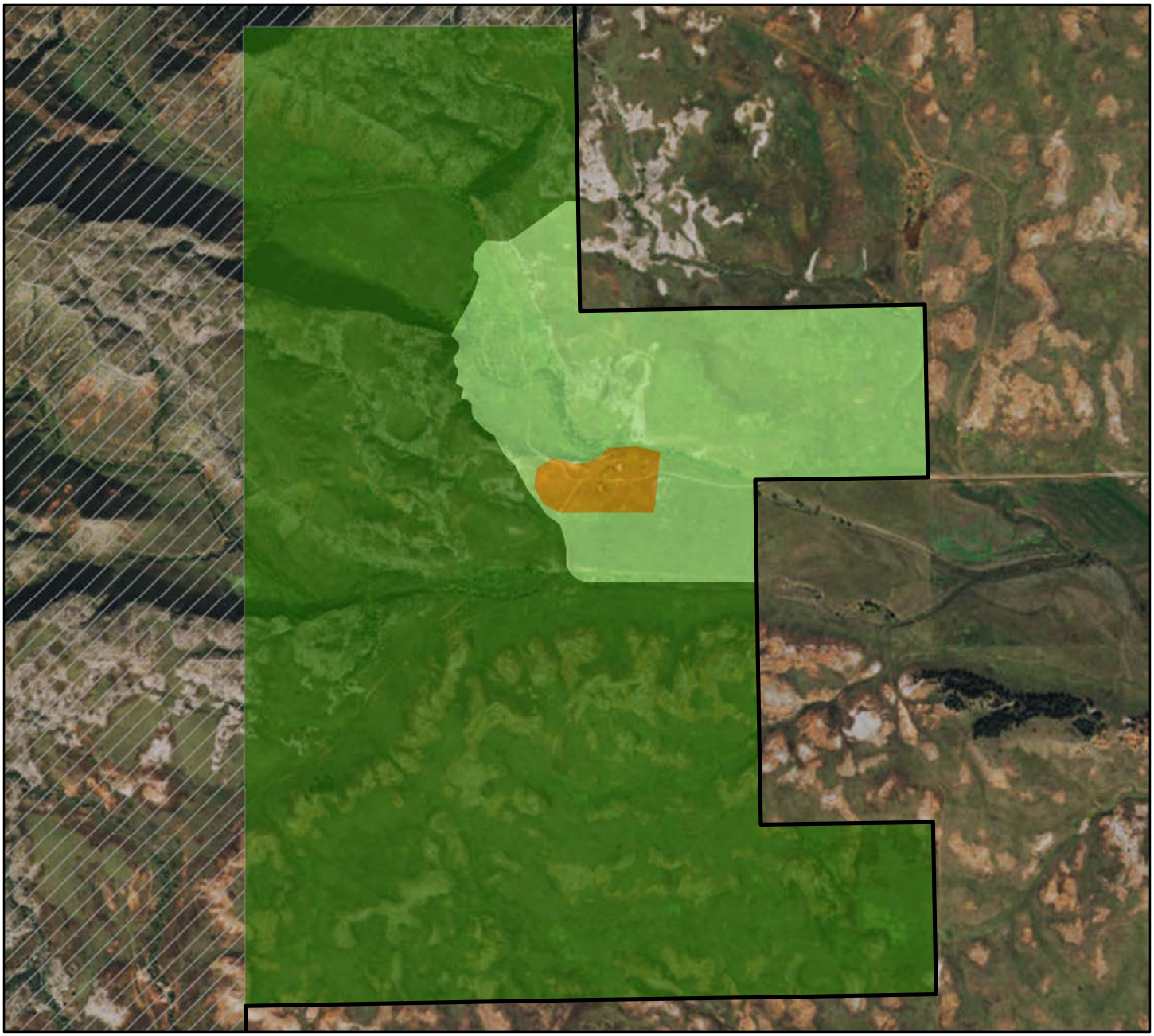
Remote Natural Zone

Under this alternative, the area surrounding the frontcountry natural zone would be zoned remote natural to correspond with the adjacent remote natural area as zoned in the Greater Park alternatives. The remote natural zone provides visitors with an undeveloped, primitive, and self-directed experience within a natural setting. Facilities would generally be limited in this zone to those required for resource protection or for visitor safety.

Transportation Corridor – Tertiary Passage Zone

The access road between the area zoned as primary visitor service development through the historic zone that encompasses the core historic Sanson Ranch grounds, buildings and structures and the frontcountry natural and remote natural zones would be zoned as a tertiary passage corridor. The tertiary road would be a minimally improved gravel two-track road for public use and would be subject to closure due to weather events or as needed for park operations. Upgrades and improvements would be allowed and may include similar construction standards to those of the Custer County Road Specifications. The access road would be maintained as a minor, backcountry access road to more primitive settings, the Sanson Ranch structures, thus supporting limited transportation use only.

Wind Cave National Park
Sanson Ranch Alternative iv



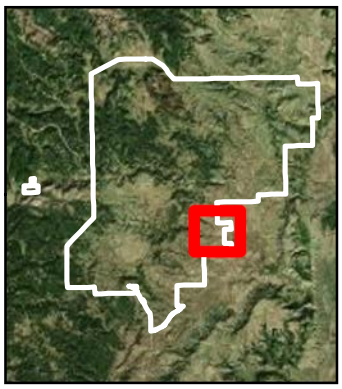
Park Boundary

Sanson Ranch Alternative iv

- Greater Park Area
- HISTORIC ZONE
- FRONTCOUNTRY (NATURAL) ZONE
- REMOTE (NATURAL) ZONE

Miles

0 0.1 0.2 0.4 0.6



Coordinate System: NAD 1983 UTM Zone 13N
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

SANSON RANCH ALTERNATIVE IV SUMMARY

This alternative provides for the least development of this site. The core Sanson Ranch, including associated historic buildings and structures, would be zoned for historic resource emphasis. The area immediately adjacent and north of the main entrance to this site and the Buffalo Jump site would be zoned frontcountry natural to provide opportunities for moderate levels of development to accommodate public visitation to this site. The remainder of this alternative is zoned remote natural to correspond with the adjacent remote natural area as zoned in the Greater Park alternatives. Alternative iv applies three zones: remote natural, historic, and frontcountry natural.

Remote Natural Zone

Under this alternative, the area surrounding the frontcountry natural and historic zones would be zoned remote natural to correspond with the adjacent remote natural area as zoned in the Greater Park alternatives. The remote natural zone provides visitors with an undeveloped, primitive, and self-directed experience within a natural setting. Facilities would generally be limited in this zone to those required for resource protection or for visitor safety.

Historic Zone

The core Sanson Ranch, including associated historic buildings and structures would be zoned for historic resource emphasis. The purpose of this zone is to actively use and protect historic buildings and the cultural landscape. Noncontributing facilities and landscape elements that are complementary and/or compatible with the zone's cultural context, setting, and resource character may be permitted. Treatment options for noncontributing facilities and landscape elements would be carefully considered on a case-by-case basis. This zone promotes public access and the active use (including adaptive reuse) of listed and/or eligible resources, including historic facilities, cultural landscapes, and compatible resources.

Frontcountry Natural Zone

The area adjacent to the main east-west access road off NPS Road 5, from the existing gated entrance, up to and surrounding the historic zone as delineated under this alternative, and the Buffalo Jump site would be zoned as frontcountry natural under this alternative. The frontcountry natural zone is considered a transitional zone that is intended to connect the primary developed visitor service areas and primary roadways to the more remote natural areas in a functional, safe, and enjoyable manner. Facilities throughout the frontcountry natural zone would be relatively limited when compared to facilities permitted in the primary visitor service development zone and considerably greater when compared to facilities permitted in the remote natural zone. Appropriate facilities such as visitor contact stations, accessible trail developments, interpretive and visitor comfort facilities would all be permitted within this zone.

ENVIRONMENTALLY PREFERABLE ALTERNATIVE

According to CEQ regulations implementing the National Environmental Policy Act (43 CFR 46.30), the environmentally preferable alternative is the alternative "…that causes the least damage to the biological and physical environment and best protects, preserves, and enhances historical, cultural, and natural resources. The environmentally preferable alternative is identified upon consideration and weighed by the Responsible Office of long-term environmental impacts against short-term impacts in evaluating what is the best protection of these resources. In some situations, such as when different alternatives impact different resources to different degrees, there may be more than one environmentally preferable alternative."

Greater Park alternative 3, visitor center alternatives B and C, and Sanson Ranch alternative i are the environmentally preferable alternative.

GREATER PARK ALTERNATIVE 3

Proposed management zones and transportation corridor overlays generally provide the most protection to cave/karst resources, vegetation, scenery, archeological resources, cultural landscape / historic structures, and ethnographic resources.

VISITOR CENTER ALTERNATIVE B AND C

Both alternative B and C provide management zone overlays that emphasize natural and cultural resource protection/preservation.

SANSON RANCH ALTERNATIVE I

Management zone overlays limit allowable uses and focus on resource protection over expanded visitor experiences.

This alternative configuration will cause the least damage to the biological and physical environment while it also best protects and preserves historical, cultural, and natural resources.

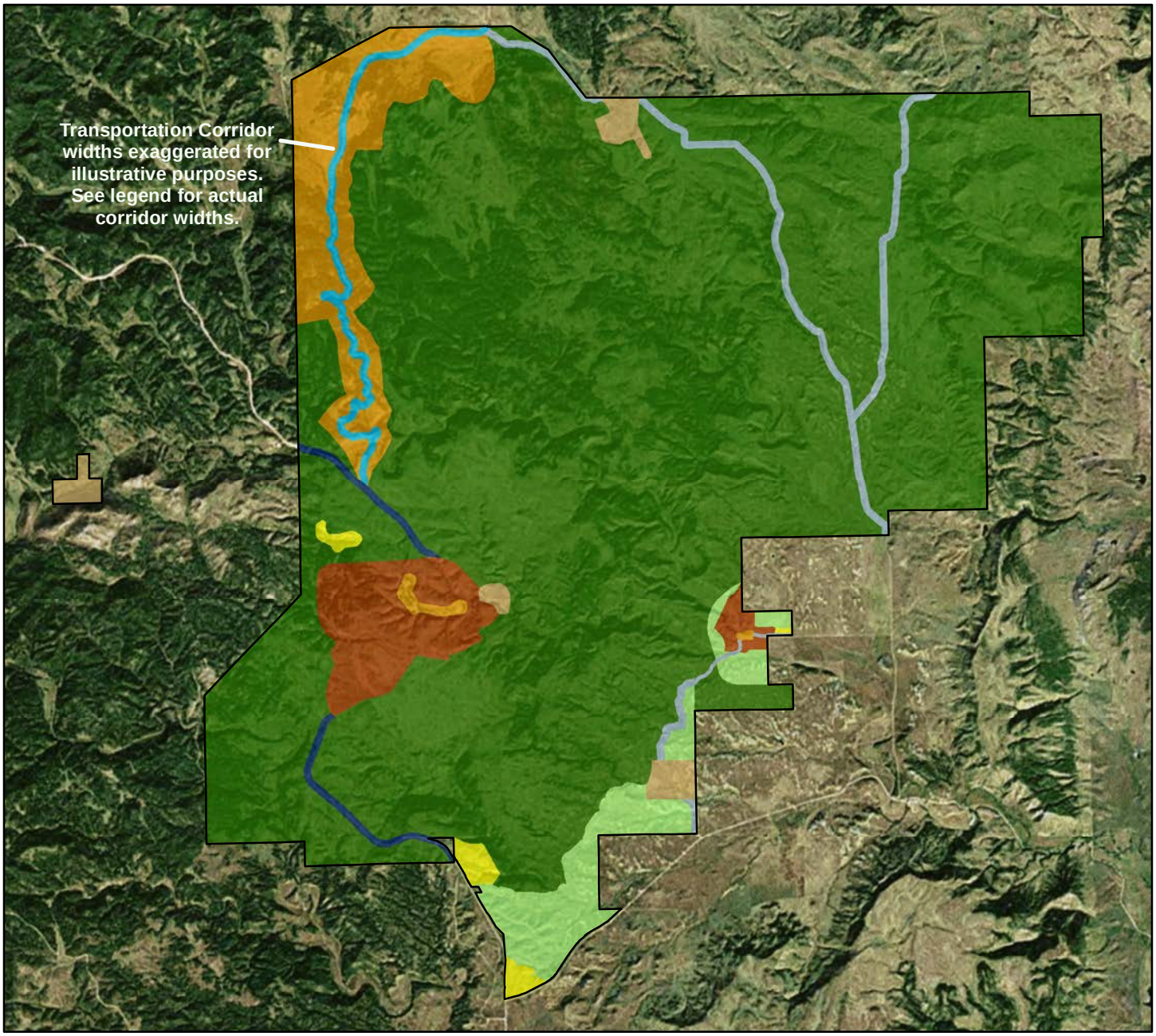
AGENCY PREFERRED ALTERNATIVE

The National Park Service has identified a preferred alternative for the future management zoning of the Park.

The recommended preferred alternative for the Zoning Management Plan / General Management Plan Amendment / Environmental Assessment is Greater Park alternative 2, visitor center alternative B, and Sanson Ranch alternative iii. This alternative configuration would ensure protection of park fundamental resources and values while providing and identifying appropriate areas of use and restricting areas based on suitability analysis.

Wind Cave National Park

Agency Preferred Alternative



Park Boundary

Preliminary Preferred Alternatives

- HISTORIC ZONE
- RESOURCE PROTECTION ZONE
- ADMINISTRATIVE SERVICES ZONE
- PRIMARY VISITOR SERVICE DEVELOPMENT ZONE
- PRIMARY PASSAGE ZONE
- SECONDARY PASSAGE ZONE
- TERTIARY PASSAGE ZONE
- FRONTCOUNTRY (NATURAL) ZONE
- REMOTE (NATURAL) ZONE

Miles

0 0.5 1 2 3

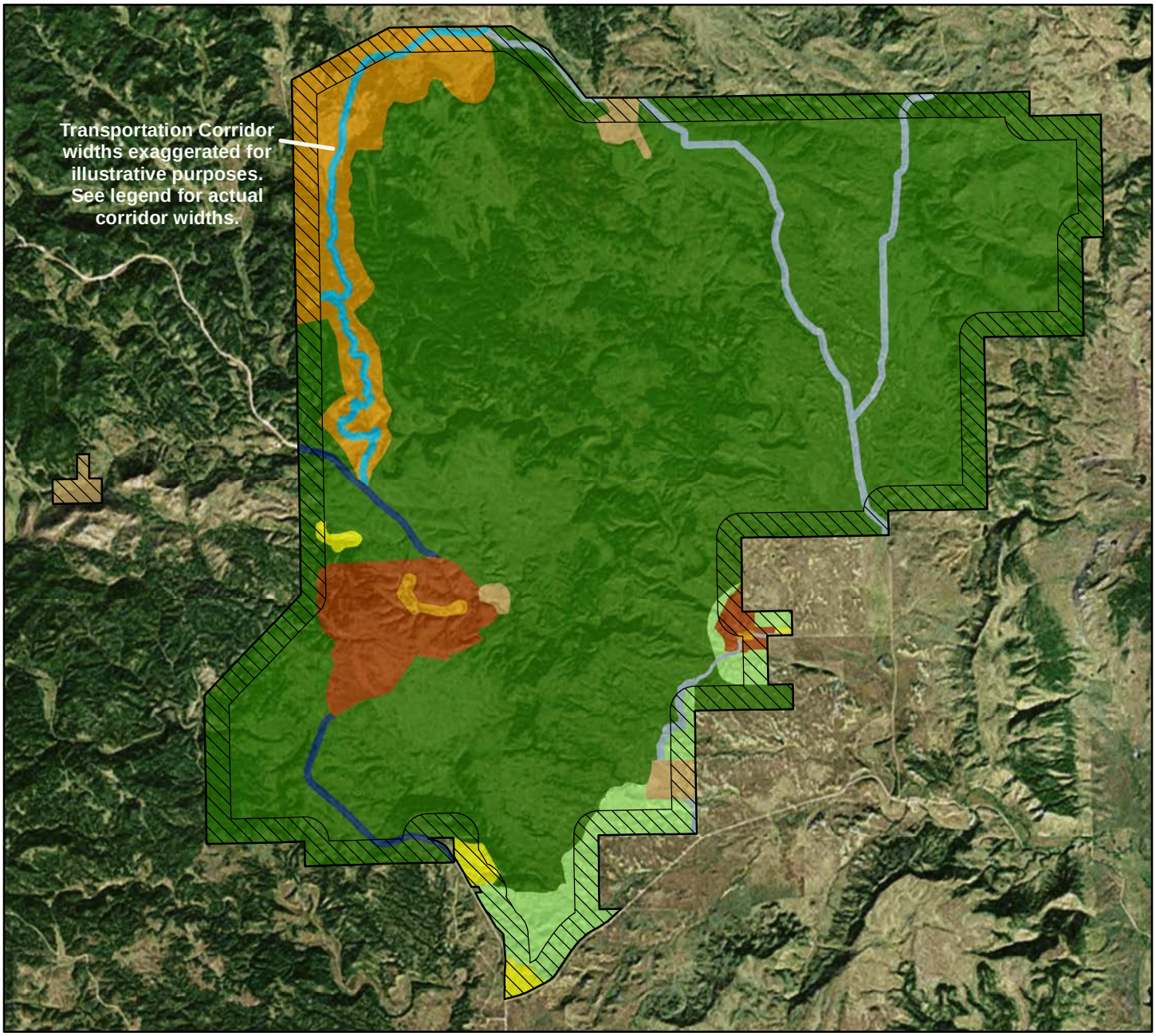
TRANSPORTATION CORRIDOR WIDTHS:
Transportation corridor widths exaggerated for illustrative purposes on the map. Actual corridor widths are listed below.

PRIMARY:	50ft on each side of road centerline
SECONDARY:	50ft on each side of road centerline
TERTIARY:	30ft on each side of road centerline

Coordinate System: NAD 1983 UTM Zone 13N
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Wind Cave National Park

Active Resource Management Zone



Park Boundary &
Active Resource Management Zone

Preliminary Preferred Alternatives

- HISTORIC ZONE
- RESOURCE PROTECTION ZONE
- ADMINISTRATIVE SERVICES ZONE
- PRIMARY VISITOR SERVICE DEVELOPMENT ZONE
- PRIMARY PASSAGE ZONE
- SECONDARY PASSAGE ZONE
- TERTIARY PASSAGE ZONE
- FRONTCOUNTRY (NATURAL) ZONE
- REMOTE (NATURAL) ZONE

Miles

0 0.5 1 2 3

TRANSPORTATION CORRIDOR WIDTHS:

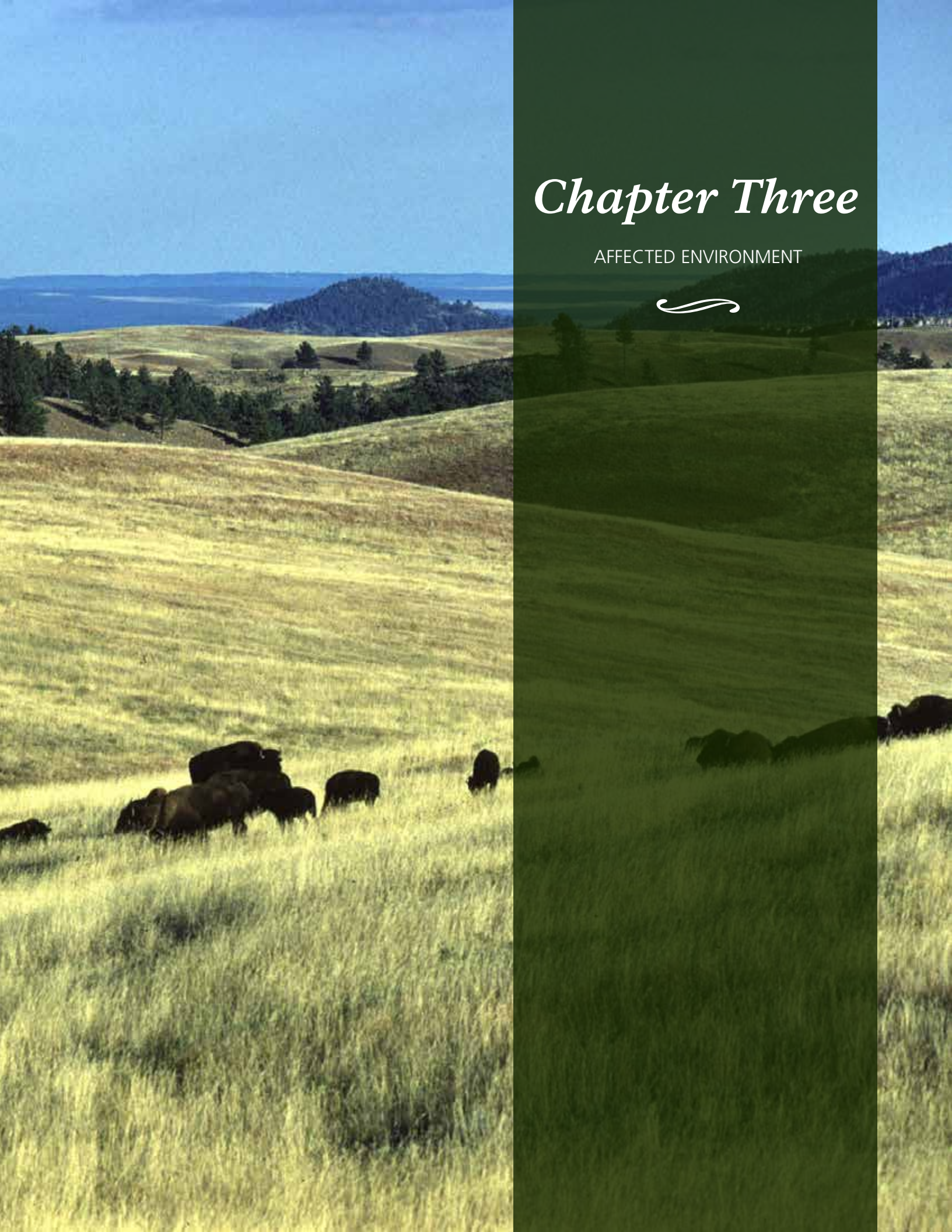
Transportation corridor widths exaggerated for illustrative purposes on the above map. Actual corridor widths are listed below.

PRIMARY: 50ft on each side of road centerline
SECONDARY: 50ft on each side of road centerline
TERTIARY: 30ft on each side of road centerline

Active Resource Management Zone is 1/4 mile buffer from Park boundary

Coordinate System: NAD 1983 UTM Zone 13N

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



Chapter Three

AFFECTED ENVIRONMENT

INTRODUCTION

This chapter summarizes relevant resource components of the existing environment in the Park. In this plan the project area is the entire Park. It describes environmental components that would be affected by the alternatives if they were implemented, and provides a baseline against which environmental consequences of the Zoning Management Plan can be compared. The Zoning Management Plan includes three distinct geographic alternative areas, Greater Park, visitor center, and Sanson Ranch. Zones were developed through a suitability analysis process, or desired future conditions. Several of the desired conditions of the resources are not in conflict with one another; however, where resource conflict occur the development of alternatives is created for those particular areas. Areas where resource conflicts are not at issue will be managed under a parkwide desired conditions by resource topic management approach (see appendix C). Additional material, specifically related to impacts and effects of the alternatives, is included in chapter 4, "Environmental Consequences."

CAVE/KARST RESOURCES (GREATER PARK AND VISITOR CENTER ALTERNATIVES)

Cave and karst features are managed in accordance with the *Federal Cave Resources Protection Act of 1988,* (43 CFR 37) *Cave Management,* and NPS *Management Policies 2006*. Karst features, such as caves and springs, are found throughout exposures of the Madison Limestone (locally called the Pahasapa Limestone) in the western portion of the Park. Cave watersheds adjacent to these karst areas are a part of the whole cave and karst system. Surface processes and activities in these karst areas and watersheds are intimately tied to and impact the caves found below. Currently, there are 43 known caves within Park boundaries, including Wind Cave. Wind Cave is one of the oldest caves in the world, as it was probably formed during Paleocene/Eocene times (50–55 million years ago), and certainly after the Laramide uplift of the Black Hills (60–70 million years ago).

The cave intersects one of the world's best examples of paleofill, which are ancient sediment-filled caves and sinkholes. Wind Cave is the world's best known example of a multi-level rectilinear maze cave. The cave is one of the world's premier maze caves, with anywhere from one to eight interconnecting levels at any given point. More than 143 miles of passages have been explored and mapped to date, making Wind Cave one of the longest cave surveys in the world (currently sixth). Studies of the airflow for which the cave is named suggest that only a tiny fraction of the cave's potential extent has been surveyed (Conn 1966). A passage density model has recently determined that at least 250 miles of humanly-enter-able passage should exist within the current footprint or boundaries of the cave (Horrocks 2009). If the cave extends outside of these boundaries, it may be much longer. Wind Cave's age, length, and passage density are enough to list it in the ranks of world-class caves, but the cave is significant for many other reasons; the best known of these is boxwork. Boxwork is rarely found in other caves but is found in Wind Cave in quantities and qualities that are unparalleled in all of the world's known caves. The cave is known for its rare and unusual variety of minerals and speleothems, which include helictite bushes, quartz formations, large clusters of frostwork, and fragile growths of gypsum. The ongoing survey project continually makes new discoveries of unusual features in the cave. Several formation types were first identified, described, and named from Wind Cave, including boxwork, frostwork, and helictite bushes. The cave has a simple, but highly specialized ecosystem that operates independently of photosynthesis (Moore 1996). More than 200 microbe species have been identified to date, 60 of which are new to science (Barton 2012). Finally, the lakes in Wind Cave are the best known access point for humans to interact with the Madison aquifer, which stretches across five states.

The developed area (park headquarters) lies directly above Wind Cave, and has resulted in adverse impacts to the cave and karst resources in the Park. This human-caused impact primarily resulted from tour route development, much of it prior to 1940. Impacts include: artificial entrances, concrete paving, asphalt from previous trail surfaces, discarded wood from past construction, artificial roof supports, electrical systems, algae from lights, blasted sections, displaced sediment and rock, and trail construction debris blocked side passages and pits, among other things. The presence of ongoing tours continues to impact cave resources.The developed corridor includes five tour routes, the Natural Entrance, Garden of Eden, Fairgrounds, Blue Grotto Loop, and Candlelight Tour Routes. The most impacted areas occur on and immediately adjacent to these developed trails. Generally, the degree of impact diminishes the farther one travels away from these trails. Impacts include: wax drippings, vandalism, foreign debris and waste from visitors, and tracked and displaced dust.

Outside of the Historic Section, much of the off-trail sections of Wind Cave show little evidence of human-caused change, except for minor impact along the flagged travel corridors. Materials left

behind by early explorers in the Historic Section include string, candles, wax drippings, signatures, vandalized formations, newspaper, and miscellaneous trash items. These early explorers heavily damaged some off-trail areas during the pursuit of mineral specimens to sell. They also left behind large amounts of the newspaper that was used to protect these specimens for removal from the cave. These early explorers left signatures on cave surfaces using several methods, including candle soot, scratching, pencil, indelible ink, and finger rubbing.

Caving affects cave resources. Permitted activities such as, cave rescues, recreation trips, research, and survey trips have all had or do have impacts. Cavers compact sediment as well as disturb loose sediment, which may become airborne and settle on cave surfaces. Although this is an especially serious problem along the Wild Cave Tour Route, due to the high number of people, it is also a problem with cavers traveling along all the flagged trails. In some areas cave floor crusts have been broken, causing increased dust production. Any time a caver enters an unexplored area, some impact occurs. These impacts become more pronounced as traffic to these areas significantly increases. If a caver drops food crumbs, mold may grow. These crumbs provide unnatural food sources for biota. Cavers also shed lint, hair, and skin cells, which become more noticeable along heavily traveled routes.

Backcountry caves have remained relatively un-impacted. However, the entrance to Elk Antler Cave was modified and a trench was dug into the hillside in an attempt to dig into Salamander Cave in the early 20th century. Other early 20th century impact includes graffiti in Stacked Shack Shelter and a still that was abandoned in Vultures Lair. Cave gates were installed in Coyote Cave during the 1990s and Persistence Cave in 2014 in order to protect cave resources. In addition, park-approved paleontological excavations have been conducted in Beaver Creek Shelter, Salamander, Graveyard, and Persistence Caves.

VEGETATION (GREATER PARK AND SANSON RANCH ALTERNATIVES)

GREATER PARK AREA

Native plant communities are a significant resource in the Park; along with water, they form the ecological foundation for wildlife and many of the natural processes occurring within the Park (NPS 2011).

The Park's vegetation is not the best representation of a Northern Great Plains Prairie; rather, it represents its own unique ecotone between the Northern Great Plains and Black Hills ecoregions. According to a Black Hills Community Inventory (based of US National Vegetation Classifications), the park contains 22 plant community types, nine of which are considered rare (i.e., NatureServe Global ranks of G1 to G3). Two-thirds of the Park is covered by mixed-grass prairie, consisting primarily of blue grama, western wheatgrass, little bluestem, and threadleaf sedge. Ponderosa pines dominate the forest cover and, in some areas, ponderosa pine is found in conjunction with Rocky Mountain juniper. Deciduous tree species in the park include paper birch, plains cottonwood, aspen, bur oak and American elm (NPS 2010). Wooded draws and riparian vegetation represent a small proportion of the park landscape, but are integral to ecosystem function.

The spread of nonnative and noxious weeds continues to be the major natural resource issue at the park. Nonnative plants are a concern because they are so well represented. Species of particular concern at the park include Canada thistle, leafy spurge, and spotted knapweed. Common invasive plants include goat's beard or Western salsify, common mullein, dandelion, smooth brome, Japanese brome, cheatgrass, Kentucky bluegrass, Russian thistle, crested wheatgrass, yellow sweet clover, white clover, musk thistle, bull thistle, scotch thistle, yellow toadflax, Dalmatian toadflax, field bindweed, houndstongue, poison hemlock, European buckthorn, and Siberian elm.

SANSON RANCH AREA

Plants found within the Sanson Ranch area are typical of the larger park's plant communities described earlier in this chapter. Very little ponderosa pine forests are present in this area. Instead, the area is mostly composed of grasslands and deciduous vegetation.

Deciduous vegetation, as in the larger park, is generally concentrated in floodplains, drainage bottoms and the lower portions of slopes within the developed areas. Deciduous trees include the green ash, box elder, and bur oak, American elm, and paper birch. Shrubs typically found in these riparian areas include golden currant, Rocky Mountain sumac, Western snowberry, common chokecherry, and American plum. Boxelder/chokecherry vegetation occurs most commonly in drainages, as does the plains cottonwood and Western snowberry. The area also includes upland shrub communities of mountain mahogany and side-oats grama.

Upland grassland areas include such graminoid and herbaceous species as big bluestem, little bluestem, western wheatgrass (of the green needlegrass and Kentucky bluegrass types), and introduced weedy graminoid species.

Many of the same invasive plants discussed previously in the greater park landscape section are found within Sanson Ranch areas, although to a lesser extent. These plants thrive on sites disturbed by human activity and thus are concentrated around the Sanson House. Common invasive plants

include common mullein, Canada thistle, cheatgrass, Kentucky bluegrass, Russian thistle, crested wheatgrass, yellow sweet clover, and white clover.

FLOODPLAINS (SANSON RANCH ALTERNATIVES)

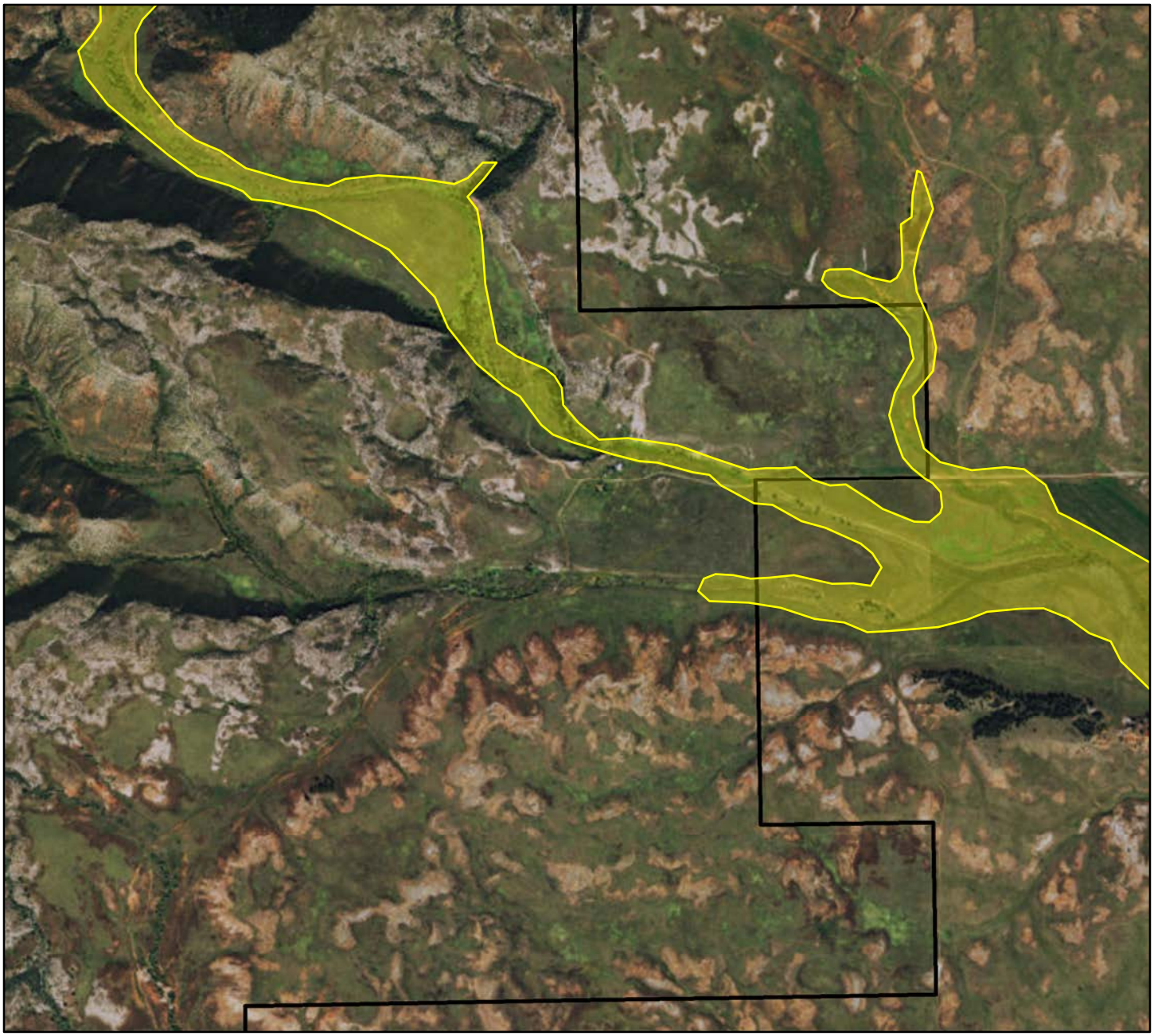
The Sanson Ranch portion of the Beaver Creek floodplain has never been evaluated to determine the nature or extent of flooding within that drainage. Beaver Creek through Sanson Ranch is classified as a Special Flood Hazard Area, which is equivalent to a 100-year floodplain, according the Federal Emergency Management Agency (FEMA) and NPS Water Resources Division. Beaver Creek drains an area of approximately 46 square miles, with most of its watershed found outside of park boundaries. It starts south of the town of Custer and flows south to Pringle then east into the park. It continues flowing east through the park and Sanson Ranch and then southeast to join the Cheyenne River east of Buffalo Gap. Due to the flat-bottomed drainage in that area, flooding certainly could impact the valley bottom. Today, Beaver Creek flow rarely makes it out of the park, as it typically loses its entire flow when it reaches the outcrops of the Madison formation (known locally as Pahasapa Limestone/formation), located upstream of the ranch. This process plays a very important role in recharging the Madison aquifer. The flow for Beaver Creek averages 1.2 cubic feet per second (cfs). It is only when the stream flow is more than 3.68 cfs that the stream flows beyond the loss zone and reaches the Sanson Ranch. However, heavy spring snowmelt or storm events do create significant stream flows in Beaver Creek that reach the Sanson Ranch area on an annual to biannual basis (NPS 2012).

There are a 30 reported stock dams located within the Beaver Creek drainage upstream (to the west) of the park. The effects of these impoundments on stream flow or on sediment load levels in the park are unknown, but the potential is significant.

VISITOR CENTER

A portion of the Park Headquarters that includes the visitor center and park administrative building is located in a floodplain. Alternatives do not propose any new structures. Some action alternatives give options of removing certain Administrative park functions from the existing headquarters. As a result, floodplains will not be included as an impact topic for the visitor center alternatives because the zoning plan does not anticipate any action that would impact the floodplain.

Wind Cave National Park
FEMA Flood Hazard Zones

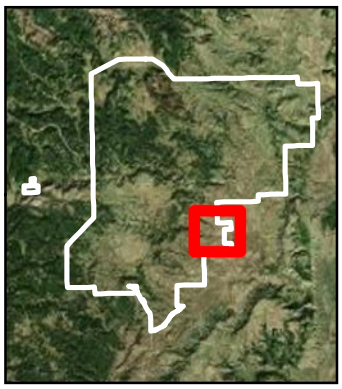


Park Boundary

FEMA Flood Hazard Zones

Miles

0 0.1 0.2 0.4 0.6



Coordinate System: NAD 1983 UTM Zone 13N
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

SCENERY (GREATER PARK, VISITOR CENTER, AND SANSON RANCH ALTERNATIVES)

SETTING

As an outlier to the Middle Rocky Mountains ecoregion, the Black Hills are an uplifted, low mountain range that emerge from and tower above the surrounding Northwestern Great Plains. The "Black Hills" derives its name from the characteristic western conifers, primarily ponderosa pines that grow in this elevated montane environment, that when viewed from far distances across the open plains creates a contrasting dark color compared to the lighter color of the surrounding open grassland plains. The Black Hills were formed by a tertiary mountain building episode associated with the formation of the Rocky Mountains that created an upwelling or uplift of ancient Precambrian granite, pegmatite, and metasedimentary rocks from under the more recent overlying Paleozoic, Mesozoic, Cenozoic, and sedimentary rocks. In the Northern Black Hills, volcanic activity accompanied this event. The resulting physiography of the Black Hills is that of a giant dome with older and taller, hard crystalline rocks in the interior and younger, uplifted sedimentary rocks that ring and slope away from the highland interior.

Located in the Southern Black Hills, the Park straddles portions of three distinct ecoregions within the Black Hills, including the Foothills, the Limestone Plateau, and the Core Highlands. Within the Park are several distinct settings that correspond to the ecoregions and associated landscapes for which the biological and physical elements influence and establish the primary landscape character attributes. First established in 1903 to preserve and protect "Wind Cave," the 1916 National Park Service Organic Act further clarified that scenery in the aboveground landscape was as an integral component of the Park's established purpose. Congressional authorizations in 1979 and 2005 to expand the Park boundary further amended and clarified scenery conservation as being part of the Park purpose.

While this plan addresses land use management zoning within the Park, it is important to recognize that much of the scenic landscape setting within the Park includes lands and resources that are visible from within Park but extend beyond the Park boundary and occur on adjacent lands. This is particularly evident with regard to the Hogback Ridge to the South and East of the Park that includes the prominent break in the ridgeline known as Buffalo Gap. In these instances, the National Park Service will initiate separate planning efforts to engage adjacent property owners and public land management agencies to develop appropriate agreements to ensure compatible land uses shall continue in a mutually beneficial manner that takes into consideration sensitive resources and scenic views that are part of the Park visitor experience. In 1980, four preliminary integral vistas from within the Park were identified and included views to Buffalo Gap, the Badlands and Grasslands to the east and south of the Park, the Seven Sisters Range to the south and Harney Peak to north and west of the Park.

LANDSCAPE CHARACTERISTICS OF THE STUDY AREA – EXISTING CONDITIONS

The unique combination and visual arrangement of various landscape features and elements, such as landforms, rock outcrops, vegetation, water features, and constructed buildings and structures, make up the characteristic landscape. The visual diversity of scenery or scenic/visual resources is derived

from the abundance and variety of landscape features and elements and can be defined in terms of form, line, color, and texture.

There are several characteristic landscapes found in the Southern Black Hills and within the park, with each dependent on the specific location and location of viewpoint(s), although "panoramic" landscapes are the most prevalent, followed closely by "enclosed" landscapes. The relatively open, rolling mixed grass prairies where more expansive vistas exist and especially when viewed from higher relative elevations and/or superior angles of observation provide remarkable panoramic landscape characteristics for the viewer. These open, expansive landscape vistas that characterize the "panoramic" type landscape include some of the most memorable and photographed landscape scenes within the "above ground portions" of the Park. The steep slopes and vertical cliffs that create long continuous walls along the various canyons and valleys within this region and Park, especially when viewed from a lower or mid slope elevation, create a landscape that can be characterized as "enclosed" in certain locations. The height and density of ponderosa pine stands tends to limit views within the forested areas to the immediate foreground area, although at transitional edges between forest and prairie, especially where fire has been more frequent, a partially enclosed "canopy view," providing a directional panorama, is often created and views may extend to middle or background when looking out to the prairie from within these open forested stands.

The steep hillsides and cliffs, especially in the more sparsely vegetated areas, on both sides of regional canyons and valleys create long, axial views up and down valley and canyon both. Because of the relatively uniform tilting slope of the canyon rims combined with the increasing depth of canyon bottoms as the stream channels dissect the Limestone Plateau between the outer Red Valley and the Crystalline Bedrock Interior; these features create walls that enframe the view. This enframement of the scene further strengthens the axial nature of these linear views up and down canyon by drawing the viewers' eyes in those directions.

In some locations, "focal" landscapes occur, primarily where "panoramic" and "enclosed" landscapes interface and/or converge. Focal landscapes are frequently found in this region at viewpoints located on canyon rims where both open panoramic landscapes and enclosed canyon or valley landscapes occur and where strongly convergent lines and forms, when looking up or down canyon or valley, strongly draw or pull the viewers' eye to a created focal point in the distance. One such example is found at the view up canyon from the top of the canyon rim at the Buffalo Jump site within the new addition lands, and another example can be found in numerous locations that provide a view into the Red Valley where the undulating lines created by the hogback ridge all converge to the break in this ridgeline at Buffalo Gap.

An important consideration for scenery conservation within these characteristic landscapes is that because of the generally "seamless" nature of the landscape topographic and physiographic features, as well as general land uses, regardless of ownership, the scenic resources and characteristic landscapes are integrally connected. As such, an activity in one location by a land owner or public land manager may affect the scenic quality of another area. The Hogback Ridge and Buffalo Gap are very important to consider within this scenario, as both of these dominate scenic features, viewed from many locations within the Park, and that create the physical enclosure of the scenic viewshed and backdrop, are not publically owned, and yet have a profound effect on the scenic experience within the Park.

LANDFORM – LAND AND WATER

Two contrasting landscapes known as the Dakota Sandstone Hogback Ridge and the Red Valley (or Racetrack), comprise the Foothills ecoregion and together these two distinct landscapes form a

remarkably consistent concentric ring around the mountainous core of the Black Hills. The hogback ridge is distinguished by a more gradual slope that transitions into the surrounding plains on the outside edge of the black hills, and a steep precipice often of near vertical cliffs that plunges to the Red Valley moving towards the interior of the Black Hills. The Limestone Plateau emerges from the Red Valley as a gradually tilting sedimentary plain that is regularly dissected by steep canyons that were formed primarily by erosional processes over time. Within this portion of the Park are Limestone Plateau Table Tops (Custer Boundary), Limestone Plateau side slopes and intervening canyons, Greater Bison Flats Prairie, and Cold Brook Canyon. From beneath the Limestone Plateau the more sharply tilted metamorphic rock and low elevation granitic outcrops emerge giving way to a more mountainous appearance. Within this western portion of the Park, the highest elevations occur within the Rankin Ridge low mountains and long interior upland valleys (below Rankin Ridge) occur between the low mountain ridges.

The dominant lines in this landscape again depend on location and viewing distance. Within the open expanses, the dominant lines within the foreground and middle ground and are created by the pronounced smooth rolling grass covered hills. To the south and east the undulating ridgeline of the hogback creates a horizon line in the mid to background, and when visible, an even further distant smooth and faint horizon line is formed in the distant plains. To the North and West, a jagged horizon line is formed by the mountainous topography against the sky.

Subtle to bold diagonal lines are found throughout all landscapes within the Park and are created by the hill slope and numerous ravines. Within the Canyons and Valleys, horizontal bedding planes of the sedimentary rock layers that have been uplifted and tilted create long, dipping “stripes” where sedimentary rock layers are exposed. In other locations, lines created by rock outcrops when viewed within the immediate foreground tend to have a more jagged appearance.

Land color varies within each of the three distinct ecoregions found within the Park. Within the Foothills, the Hogback tends to have more pale buffs, beiges, greys, and cool tans, while the “Red” Valley derives its name from the rich and boldly contrasting red soils. Within the Limestone Plateau exist a remarkable range of colors created by the rocks and soils and include reds, pinks, yellows, pale buffs, and off whites, tans, and beiges. Within the Core Highlands, the colors tend to be more medium to dark grey with darker brown soils. Soil color is often exposed in prairie dog towns from these burrowing animals, along stream banks, and at bison wallows and often provides a remarkable contrast to the adjacent vegetation, especially where the ground is covered by grasslands.

The texture of the landform depends on location and/or viewing distance, although in general the landform texture can be described as smooth in most cases, with a coarse to even rough texture found within the core highlands. In locations where sedimentary rock outcrops exist throughout the region, the texture can range from smooth on the shear cleaved cliff planes to moderately coarse where bedding planes are less homogenous/more pronounced and crumble along exposed precipices at the edges of canyons and ravines.

The visitor center area is located within a winding, gently sloping, shallow canyon, with gently undulating lines, grey and reddish brown earth colors and mostly smooth textures aside from occasional blocky rock outcrops. Two distinct landforms are included within the Sanson Ranch area, the area within the canyon, and the area outside of the canyon where the historic ranch buildings and structures are located. The landform outside of the canyon is broad and expansive where an undulating, relatively steep slope at approximately 14° is very pronounced and noticeably dissected by parallel canyons. Outside of the Canyon, colors tend to be pinkish, white, and brown with traces of red. The landform texture and lines tend to be smooth and undulating. Within the Canyon, the classic “canyon walls” include low cliffs and gently sloping talus slopes at the bottom of the canyon, gradually increasing in height as the canyon extends upstream. The cliff faces creates dominant

sloping, nearly horizontal undulating lines where bold red exposed siltstone and pinkish grey limestone dominate as colors with traces of grey, tan, and purple in the soil and rocks.

VEGETATION

The two primary native plant communities (vegetation) within the Park include mixed-grass prairie that covers approximately two-thirds of the Park, and coniferous, evergreen forest, dominated by ponderosa pine in conjunction with Rocky Mountain Juniper, covers approximately one-third of the Park. Small stands of deciduous tree species are found throughout the Park and are typically found intermixed in ponderosa forest stands, wooded draws, and riparian areas. The transition between the Northern Great Plains and Black Hills ecoregions creates a unique ecotone within the Park that in turn also creates a bold scenic transition between the visually contrasting Prairie and Ponderosa Forest plant communities.

The crest of the Hogback Ridge is characteristically covered by mixed Ponderosa woodlands while the slopes of the Hogback and the Red Valley are more characteristically occupied by mixed prairie grasslands. A mix of prairie grasslands, deciduous and evergreen shrub lands, and ponderosa woodlands of various densities occupy this landscape. Mixed-grass prairies occupy the broader valley bottoms within this landscape while ponderosa woodlands and limited occurrences of spruce, birch, and aspen occupy the slopes and steeper moist ravines in the southern portion of the Black Hills. Additional deciduous tree species in the park include plains cottonwood, bur oak, and American elm.

Tree cover along transitional edges between prairie and forest tends to be more open and sparse creating enclosed meadows of various sizes that provide varied patterns in the landscape. The transitional edges between forest and prairie are variable depending on location and landscape condition, and are noticeably affected by the time intervals between fire events. The vegetation cover within the transitional edges is composed of the same vegetation forms but is more broken as sections of forest are discontinuous and mixed with grassland patches. Despite the dominant vegetation type in the park being mixed-grass prairie, the large, woody evergreen trees create visually dominating vegetative forms within the landscape, individually appearing as rounded or conical forms in lone settings and groves, or collectively forming dense, nearly continuous “mats” of vegetation within the forested stands.

Lines created by vegetation generally relate directly to plant structure and physical topography and vary based on scale and distance. Individual plant structures introduce lines within closer proximity to the viewer, while vegetative massing creates lines when viewed further away or smaller scale vegetative forms, such as within the mixed-grass prairies. In some cases, such as within the mixed-grass prairies, long continuous and undulating lines are created where wildlife have made paths and thus broken in a linear pattern an otherwise continuous cover of grass. The regular and repetitive sequencing and massing of vertical ponderosa trunks, especially when contrasted with adjacent grass prairies, creates dominant vertical lines in the foreground that gradually transition into the middle ground before receding from prominence. The transitional edges between coniferous forest and prairie grassland create an intricate, undulating band between lower and higher elevations. Within the higher elevation mountainous Park areas, jagged horizon lines are accentuated by the conical forms of ponderosa tree crowns on mountain ridges.

In some locations bold lines with contrasting colors and textures are created between prairie edge and evergreen forest, especially where forest stands are dense along these edges. In other locations, interlocking “digitate” edges or transitional “banding” between these two vegetation types create a more complex edge. In other locations still, a softer, “diffuse” edge is formed between prairie and

ponderosa forest stands where trees gradually transition from being spaced widely apart from one another in a relatively open grassy meadow setting to being spaced very closely to one another in a dense forest setting. The vegetative lines created by each of these different transitional edges create a visual diversity and are a dominant component of the characteristic landscapes within the Park.

Variation in vegetation color is limited by season due to the dominant evergreen composition of Park forests. Trunks and branches range from reddish browns to greys and the dominant ponderosa pines provide a consistent deep green year round. While seasonal variations within the evergreen forest stands are minimal, variations within the mixed-grass prairie, tend to respond to seasonal and weather related changes more conspicuously. Deciduous species provide additional seasonal color variations in certain areas throughout the Park where these species occur and are visible.

Prairie colors created by grasses and herbaceous plants cover a wide range of values and hues of greens, yellows, oranges, reds, and browns depending on the season and moisture regime. Flower buds and blossoms provide even further variation in the palette of colors created by the herbaceous plants with pinks, purples, pale greens, and yellows more prominently featured. While grasses and herbaceous ground covers provide some of the boldest and widest ranging color variations within Park vegetation, due to the short height of this vegetation type, color variations tend to create a more subtle effect on the overall scene. The color contrast between grasses and evergreen trees tends to always be relatively bold.

The texture of the vegetative cover is moderately coarse due to the highly crenulated canopy with the greatest coarseness occurring in the foreground where individual trees are visible. As the distance increases, individual details of trees and shrubs fade in clarity and appear smaller in scale, giving the appearance of a smooth or fine texture. The mixed grass prairie tends to be dominated by short grass species with mixed, smaller herbaceous species. Except in poor soil areas, areas with thin soil cover and locations frequented by wildlife, especially prairie dogs, the mixed grass prairie tends to form a continuous, smooth, rolling mat or carpet across the open landscape giving the appearance of a fine texture, even within close proximity.

Vegetation within the visitor center area is primarily composed of grassy slopes between bare limestone outcrops with scattered ponderosa pine stands on hillsides and within the shallow canyon bottom. Occasional bushy junipers are present and patches of shrubby vegetation also occur on hillsides and the canyon floor. The vertical trunks of the ponderosa pines create the most dominant lines within the vegetation component of the scene while the texture has a moderately coarse, crenulated quality. Vegetation color in grasses depends on moisture regime, although is most often a light tan, while the evergreen trees include occasional olive green juniper to deeper green ponderosa pine, with all woody vegetation having grey bark. Vegetation at the Sanson Ranch area is predominantly mixed-grass prairie with pockets of scattered shrubs, including a much thicker shrub layer on the North Slope of the canyon hillside. Further upstream deciduous trees occur along with ponderosa and juniper at higher elevations. Lines within the grass cover tends to form where vehicles and animals have cut through the vegetation to bare ground; otherwise, edge effects created by grass and shrub stand interfaces create mottled linear patterns along these transitional edges. Colors tend to be similar to those described at the visitor center with a more pronounced greyish red from the thicker stands of mountain mahogany shrubs. The texture appears generally smooth with a moderately coarse to prickly spongey appearances in shrub stands.

STRUCTURES AND THE EXISTING BUILT ENVIRONMENT

Active management of vegetation communities and wildlife populations has successfully simulated a largely natural appearing scene that displays minimal visual disruption in the form of human

modifications, ongoing activities, or development. This condition provides a distinctly different scenic setting when comparing Park landscapes to adjacent private lands where landscape modification and modern human development is more prevalent or in some cases dominates the landscape setting. Visible human disturbance within the Park is generally limited in most cases to areas along Park Roads and at primary visitation locations. While Park management activities within the Park are in fact relatively extensive, especially with regard to prescribed fire as a resource management tool, management activities successfully maintain a landscape that gives an appearance of being affected primarily by the forces of nature.

Some of the most extensive human modifications present within the Park landscape are the paved and unpaved roads and parking areas, including the associated cuts, fills and grading, as well as limited bridges, culverts and guard rails. Informational and safety signage along roadways and wayside educational exhibits and signs at roadside pullouts and scenic overlooks are also typical. Above and below ground utilities, trails, and fences are present primarily along the Park boundary and at developed areas. Structures and buildings within the Park are generally limited to those facilities and related infrastructure necessary to accommodate visitors and associated administrative functions. Within the Park, most buildings and facilities are situated in such a manner and in specific locations that the rolling nature of the topography usually prevents visibility of these elements from most locations beyond the immediate foreground surrounding these sites. The one highly visible exception to this condition is the Rankin Ridge lookout tower that by design is sited in a position that is visible from most locations within the Park.

Of notable mention with regard to human modifications within the landscape is South Dakota State Highway 87. This road was constructed between the years 1926 and 1930 as part of a larger network of scenic roads that were being developed within the Southern Black Hills. The southern terminus of Highway 87 provided a direct connection to the main Park road at the original northern boundary of Wind Cave National Park. First begun in 1919, this system of scenic roads was initiated to promote and facilitate automobile tourism within the region and includes famous roads such as the earlier Needles Highway and the later Iron Mountain Road. This road system ultimately provided continuous scenic driving routes between Wind Cave National Park and Mount Rushmore National Memorial through Custer State Park and Harney National Forest (contemporary Black Hills National Forest). The portion of South Dakota State Highway 87 that is currently located within Wind Cave National Park was incorporated into the Park following the 1946 boundary expansion, and since that time has been maintained by the National Park Service as a scenic road in a manner that has largely preserved the original roadway design and natural setting.

Although this road was neither originally constructed by the National Park Service nor located within the Park, the design principles employed incorporated the same principles that were subsequently adopted by the agency with regard to rustic design principles and scenic parkway design. This type of road design intentionally employed the use of curvilinear alignments to provide enjoyable, winding routes across the more dramatic topography in order to capitalize on exceptional scenic vistas and natural landforms. Introduced features and design elements such as bridges, culverts, and retaining walls not only were designed to be aesthetically pleasing structures that fit into the natural setting, but also used natural materials and design elements that harmonized with the surrounding landscape or that helped to accentuate dramatic natural landforms in a compatible manner through the choice of appropriate materials, scale, and site selection.

The primary scenic resource related to State Highway 87 is the natural corridor through which it travels, especially Reaves Gulch, although the road itself, including the Beaver Creek Bridge and the Pigtail Bridge, even prior to having attained historic significance, accentuate the natural scenery within each landscape setting. The scenic roadway design features and elements not only support

Park purpose with regard to visitor enjoyment of the associated scenery, but also represent a remarkably intact, well preserved and iconic example of 1920s–1930s scenic park roadway design.

Immediately outside of the Park, especially South along Highway 385, human development is considerably more prevalent primarily in the form of residential and agricultural uses with limited occurrences of commercial land uses. The most visible locations outside of the Park boundary that are visible from with the Park are to the South and East along Highway 385, the Hogback Ridge and Red Valley along County Road 7/11. Visible structures include isolated ranches, associated buildings and fencing, residential homes within medium to low density subdivisions and homes set further apart on large lots, paved and unpaved roads and driveways as well as above and below ground utilities. Residential homes and ranch buildings tend to be one to two stories at most. Boxy single family homes represent the greatest number of buildings within the viewshed to the south of the Park entrance. While the overall scale of buildings and structures to the south of the Park and on surrounding hillsides is generally subordinate to the scale of the landform, due to the predominant open grassland character of the surrounding landscape, these constructed elements tend to contrast in a relatively bold visible manner when not located within stands of trees or in less conspicuous positions within the topographic setting.

The need to preserve the natural scenic qualities at the south entrance and in the southern area of the park was documented as far back as the 1961 Master Plan. A similar boundary adjustment to the one enacted in 1978 was proposed in 1964. The 1964 proposal recognized the visual impacts that developments in that area would have on the park scene. It also noted the need to move the boundary wildlife fence to a less conspicuous location. The 2005 authorized boundary expansion also identified the need to preserve Park scenery as a primary justification for boundary expansion as the potential for residential development within these lands posed a potentially significant threat. A variety of lines created by structures are present within the viewshed. Small scale horizontal and vertical lines outlining the edges of buildings as well as matching diagonal lines from various roof tops are present throughout the scene. Roadway lines are also present within the scene. Power lines create thin, sweeping catenary curves where these structures exist. Structure colors range from tans, browns, and greys on many of the buildings to more striking whites on trim outlining windows and doors. The texture on most structures is smooth and blocky when compared to the surrounding landscape. Often dictated by distance from viewer, the larger the size and scale of these structures, the greater the smoothness appears.

Overall, human modifications that constitute the built environment, especially to the south, outside of the Park boundary, tend to be highly visible. In each instance, visibility depends on siting and location of constructed elements, the degree of landscape disturbance, and how well the form, line, colors, and textures of built forms repeat those same elements that are found within the surrounding natural landscape, including the use of vegetative screening.

The greatest concentration of buildings and structures within the Park are located in the visitor center area, based on historic development at this location, directly above the entrance(s) of the preeminent Park resource, Wind Cave. Facilities include paved parking areas, sidewalks, educational signs, buildings, and associated structures including stone retaining walls. The overall scale and stature of facilities within the visitor center area were intentionally designed to be relatively low so as to better fit into the surrounding natural landscape. While the constructed forms are boxy and distinctly visible in the immediate foreground, the use of locally quarried sandstone, heavy vertical timbers, and color choices for roofs and stucco walls, especially on the historic CCC era buildings and structures, and on some newer additions, help to repeat some of the forms, lines, colors, and textures of the adjacent natural scenery. The use of vegetation, especially the larger ponderosa pines, additionally helps to screen these introduced human elements. The overall design principles employed in the visitor center area, while representing a specific historic Park architectural style that

is recognized as a historically significant district, also harmonize relatively well with the surrounding landscape in this specific location.

Human modifications at the Casey Ranch site are generally more conspicuous than at the visitor center area due to the location and landscape position of related development. Some elements, such as the root cellar and stone covered cistern, blend in better than the historic ranch buildings, although most buildings and structures are relatively small scale relative to the surrounding landscape. The boxy forms of the buildings contrast with the relatively smooth open expanse of the surrounding grassland, although trees and vegetation planted immediately adjacent to the buildings helps soften the hard edges of these constructed elements. Two track vehicle ruts leading to the ranch buildings and up the canyon, as well as the bold vertical lines created by wooden power line poles and fence posts starkly contrast the natural forms and lines within the landscape. Piles of structural materials from old pens, windmills, and other ranch uses also contrast with the natural landscape. Newer, "thin" metal fence poles are visible in the immediate foreground as a contrasting linear element, primarily due to the light galvanized color, however, these elements are less visible than wooden poles, and recede from view between foreground and middle ground viewing distances depending on lighting conditions. The woven wire fence is generally not visible beyond approximately 300 feet.

SCENERY/VISUAL RESOURCE INVENTORY CLASSES

Scenic/visual resource inventory classes are assigned through the inventory process based on a combination of scenic quality, sensitivity level, and distance zones. Each of these three analyses is mapped as an individual spatial layer and the combined overlay, based on the categorization of each establishes the inventory class as described in appendices G. Inventory Classes are informational in nature and provide the basis for considering visual values in the Park zoning management process. Inventory classes do not establish management direction and should not be used as a basis for constraining or limiting management actions or activities related to Park purpose.

SCENERY CONSERVATION MANAGEMENT CLASSES

Scenery Conservation Management classes are assigned through the Park management zoning process. The assignment of visual management classes is ultimately based on the management decisions made in the management zoning process. Scenery and visual values must be considered throughout the management zoning process. All actions proposed during the management zoning process that would result in surface disturbances must consider the importance of the scenic values and the impacts the project may have on these values. Management decisions in the management zoning process must reflect the value of Park scenery. The proposed Scenery Conservation Management Classes have taken into consideration Scenic Inventory Classes in conjunction with other Park resource protection needs and resource suitability opportunities.

OBJECTIVES FOR SCENERY CONSERVATION MANAGEMENT CLASSES

The following Scenery Conservation Objectives are the base objectives for the Park to be managed in such a manner that will protect the quality of Park scenery. Scenery Management Class Objectives have been developed based on a comprehensive inventory, evaluation and classification of the scenic values and desired conditions of distinct areas/zones within and viewed from specific locations

within the Park. Some locations may require specific objectives in addition to the base objectives, and in these cases, such specific objectives will be just that, additions to rather than substitutions for base objectives. Clean Air Act Class I visibility objectives and integral vista identification processes will be considered separately.

- **Class I Objective:** The objective of this class is to preserve and enhance the existing character of the landscape to meet Park purpose. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

- **Class II Objective:** The objective of this class is to retain the existing character of the landscape. The level of change to the landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line color, and texture found in the predominant natural features of the characteristic landscape.

- **Class III Objective:** The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention within the foreground, but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

A Visual Contrast Rating Process will evaluate all proposed actions/activities for potential effects to Park scenery and to ensure Scenery Management Class Objectives are upheld.

THREATS AND STRESSOR FACTORS

Human development (e.g., cell phone towers, transmission lines, housing development) appears to pose the greatest threat to viewshed quality near the park. The scenic inventory process, with particular emphasis on visibility and the sensitivity level analysis within the inventory process, is a valuable tool for identifying important scenic areas that represent integral vistas and that may be more vulnerable with regard to human disturbances and development.

OVERALL CONDITION

The overall condition and quality of Park scenery is remarkable with regard to the desired condition of a “natural appearing landscape” although in several locations, the background scenery on adjacent lands outside of the Park has deteriorated due to increasing levels of development in less than ideal specific locations. Within the Park, it will be important that all activities and potential future development consider scenery conservation principles in order to maintain the overall scenic qualities. The Park continues to make improvements on Park lands that enhance the overall scenic character, especially with regard to appropriate choice of materials and site locations for human modifications within the Park landscape that help reduce unnecessary and incompatible visual contrasts.

Because observing wildlife within a natural appearing landscape is one of the primary activities visitors enjoy at the Park, continued monitoring of development in the context of scenery

conservation will continue to be an important aspect of Park resource management. Overall, the condition of viewsheds from within the Park looking out is of moderate concern.

CULTURAL RESOURCES

The National Park Service considers all cultural resources to be eligible for the National Register of Historic Places until determined otherwise in consultation with the South Dakota State Historic Preservation Office. Cultural resources include archeological sites, ethnographic resources, historic structures, cultural landscapes, and museum collections. Public access, erosion, prairie dog colonies, and bison all have the potential to adversely affect cultural resources still in situ.

ARCHEOLOGICAL RESOURCES

Federal land managers are required under section 110 of the National Historic Preservation Act, as amended, to determine the nature and extent of archeological resources on lands under their control by developing plans for and conducting archeological surveys. Section 106, as amended, provides the framework for federal review and protection of cultural resources, and ensures they are considered during federal project planning and execution.

Although a comprehensive survey of archeological resources has not been conducted in the Park, only 14% of the park has been intensively inventoried to date, 116 archeological sites have been recorded within the Park boundaries. Of these 69 are in good condition, 24 are in fair condition, and 6 are considered to be in poor condition. The remaining 30 sites have not recently been revisited to assess their condition and are considered to have an unknown condition. These sites are typical of the sites found on the northern plains. Prehistoric sites include lithic scatters, stone circles, rock shelters, and habitation sites. Historic sites include building foundations or depressions and historical debris.

Based on one type of projectile point found near the Sanson Ranch Buffalo Jump this site may date to as much as 4,000 years old. Radiocarbon dates from two hearth features and bison bone found at the site indicate occupation of the area from approximately 1,200 to 700 years ago. Given the archeological history of the larger region the Park may contain sites as old as 10,000 years. Since 2012 the Midwest Archeological Center has been inventorying portions of the 2011 Addition. These results have aided the Zoning Plan and Casey Visitor Use Plan on identifying areas to avoid due to the presence of archeological resources.

Rangers, working in conjunction with staff from the Midwest Archeological Center, monitor the condition of cultural sites in the park and check for vandalism or other threats to the sites.

No resource stewardship strategy exists for Park archeological resources and the 1994 resource management plan provides only limited direction for these resources. The 2005 cultural landscape report discusses archeological resources but does not provide a treatment plan for these resources.

ETHNOGRAPHIC RESOURCES

For thousands of years, many different American Indian groups have had varying degrees of historical and cultural affiliation with the Black Hills in the vicinity of Wind Cave. According to Albers et al. (2003), many other tribes have historical connections to the Black Hills. These groups include the Arikaras, Comanches, Crows, Hidatsas, Kiowas, Mandans, Plains Apaches, and Poncas (Albers et al. 2003, ii). Please see chapter 5 and appendix F for a current list of tribes consulted for this assessment.

The Black Hills is a resource-rich landscape that has sustained human settlement for thousands of years with its abundant springs, vegetation, stone, and wildlife (Spence 2011, 29–57). In part because of this wealth of resources, the Black Hills as a whole and much of the landscape in and around Wind Cave National Park, both below and above ground, has long been considered sacred by the Lakota and the Cheyenne as a site of genesis (Albers et al. 2003, 1). These two tribes have a long standing relationship to this area of the Black Hills and as a result, many significant ethnographic resources, both known and unidentified, exist throughout the larger Black Hills landscape.

Bison and other game were hunted in the park and in the vicinity. Seasonal (usually winter) camps and hunting grounds were located in the area. The people who hunted and foraged in this area shared an intimate knowledge of the landscape and a rich oral history of its features and their sacred associations (Albers et al. 2003, ix). Springs, caves, stones and stone outcrops, and other natural features often are considered to have sacred properties representing some of the many different beliefs associated with the Black Hills landscape and with Wind Cave. Common themes in Cheyenne and Lakota beliefs related to these resources include bison and bison spirits, female and regenerative spirits, and natural forces such as the winds, the sun, and the stars, all of which form part of a rich cosmological tapestry (Albers et al. 2003, v-vii).

Ethnographic resources within the Park include an origin site, Buffalo Jump, multiple sacred sites, habitation sites, and subsurface American Indian cultural resources identified archeologically (see archeological resources section for more information). In addition, the larger landscape has been identified by tribal representatives as having potential significance as a traditional cultural property, as “a location where a community has traditionally carried out economic, artistic, or other cultural practices important in maintaining its historic identity” (NPS 1990, 1). They also mentioned several sacred sites in the Park, such as possible burials and sacred stones (NPS 2014a).

The Arapaho are known to have inhabited the general area historically, but their association to resources is not clearly established in published sources (Albers et al. 2003, ii). According to Albers et al., the Arapaho were connected to the Black Hills under US treaty law, having arrived in the area from sometime before 1750 until the US government seized their lands in 1877 (Albers et al. 2003, ii).

The National Park Service recognizes four categories of cultural landscapes: historic designed landscapes, historic vernacular landscapes, historic sites, and ethnographic landscapes. Ethnographic resources (such as a site, structure, landscape, or natural resource feature assigned traditional legendary, subsistence religious or other significance) and traditional cultural properties exist in the area and are generally acknowledged as part of the historical territory of the Lakota branch of the Sioux.

CULTURAL LANDSCAPES AND HISTORIC STRUCTURES

The cultural landscapes and historic structures of the park are integrated with one another; as a result, these resources will be analyzed together.

GREATER PARK

Wind Cave was originally established as part of a greater plan to introduce recreation and tourism in the Black Hills in 1890. Development was focused on accommodating visitors to natural resource attractions such as the nearby hot springs and Wind Cave. By 1898, the US Geological Society had surveyed the cave, which had been become the center of a long ownership dispute. In 1901, the US Government temporarily took charge of the cave and by 1902 the park was established. Auto touring ushered in a new frontier for tourism in the Black Hills starting in 1907 with road and facility improvements that also benefited the park.

South Dakota politician Peter Norbeck envisioned a system of scenic roads that would not only get people between the state's attractions, but would also showcase the area's scenic beauty. As a result care was taken to align the roads and design the bridges in a way that showcased the views and vistas to natural wonders such as the Black Hills and eventually to the built environment such as Mount Rushmore. Wind Cave benefited from these unique road alignments and bridge improvements with each boundary increase.

South Dakota Highway 87 was built between 1926 and 1930 by the South Dakota State Highway Commission, the US Bureau of Public Roads, and the National Park Service. This stretch of SD 87 traversed portions of what was then the Harney National Forest and had its southern terminus at the original northern boundary of the Park. The highway was subsequently incorporated into the national park in 1946 when Wind Cave was expanded from 11,718 to 28,059 acres.

Traveling north from the Park headquarters area, drivers reach the junction of US Highway 385 and SD Highway 87 after approximately 1.4 miles. While US Highway 385 continues in a northwesterly route toward Pringle, SD Highway 87 heads almost due north. After .5 miles, the road passes over the Norbeck Dam then makes a sharp westerly turn and climbs toward the Beaver Creek Bridge.

Beaver Creek Bridge was listed in the National Register of Historic Places in 1993. The 225-foot long open spandrel reinforced concrete bridge spans a 115 feet deep gorge. It was built in 1929 and is the only structure of its kind in the Black Hills. After crossing the bridge the road ascends into the most rugged and heavily forested sections of the national park, and passes a number of scenic vistas that overlook the rolling country to the east. Approximately three miles north of the junction with US Highway 385, the road comes to the Pigtail Bridge, where travelers cross a short span then descend through a tight 270 degree counter-clockwise turn that loops under the bridge. This unique structure is also in the National Register of Historic Places, listed in 1993.

Completed by early 1930, it may have served as the prototype for similar bridges on the Iron Mountain Road in Custer State Park. From the Pigtail Bridge, SD Highway 87 continues to descend toward Reaves Gulch where it then regains elevation as it passes through a mile-long ravine. The road then reaches more open grasslands, interspersed with forests and rocky ground, and passes along the west flank of Rankin Ridge. Approximately five miles north of the US Highway 385 junction, SD Highway 87 passes the intersection to Rankin Ridge Road. Following level, mostly open

terrain the road bends eastward then makes a sharp turn to the north where it crosses a cattle guard into Custer State Park.

The construction of this portion of SD Highway 87 was originally intended to incorporate Wind Cave within a larger system of roads developed by the South Dakota State Highway Commission to facilitate automobile tourism in the Black Hills. These included the famous Needles Highway, which was constructed between 1921 and 1922, and the growing network of roads around the State Game Lodge in Custer State Park. At the time the route to Wind Cave was being laid out, preliminary plans were also underway for construction of the Iron Mountain Road across some of the highest portions of the Black Hills to Mount Rushmore National Memorial. While Mount Rushmore would eventually become the most visited site in the Black Hills, Wind Cave National Park was still the region's most popular tourist destination in the 1920s and early 1930s. As two links in a grand design that sought to create an integrated experience for auto tourists traveling from Wind Cave to the State Game Lodge, and up into the high points of the Black Hills, the Iron Mountain Road and the stretch of SD Highway 87 that is now within the Park utilized common design elements. These included routes that followed the dramatic contours of the landscape, provided scenic vistas, and utilized distinctive bridgework that blended with and augmented elements of the natural landscape. One of the most striking design elements used on both roads are the heavy timber pigtail bridges, which have since become signature features of the Black Hills and only exist on the Iron Mountain Road and the stretch of SD Highway 87 within the Park.

Like the Needles Highway and the Iron Mountain Road, the portions of SD Highway 87 that ran through Custer State Park and down to the Park had no utilitarian purpose beyond automobile tourism. They were not designed for the efficient movement of goods and people, they did not follow any preexisting travel routes, and they did not connect or pass through any areas with even minimal residential or commercial development. Besides the tourist destinations of Wind Cave, Mount Rushmore, and a few points in between, the road itself was the attraction. SD Highway 87 was part of an important new movement in transportation and recreation that shaped the Black Hills and redefined how Americans experienced western national parks and other scenic landscapes throughout the country. SD Highway 87 would retain these qualities and experiences through the post-World War II era as the scenic stretch of highway became a central focus of recreation and interpretation within the expanded national park.

The park has a potentially eligible cultural landscape for the route of SD Highway 87 from its junction with US Highway 385 to the border with Custer State Park. The proposed cultural landscape for SD Highway 87 revolves around its original intent to incorporate Wind Cave within a larger system of roads developed by the South Dakota State Highway Commission to facilitate automobile tourism in the Black Hills.

The entire Park has been initially surveyed for historic structures per section 110 of the National Historic Preservation Act, with the exception of those found in the vicinity of the Casey Pole Barn, which requires additional research to date and determine the origin and significance of the building and structure. A parkwide cultural landscape inventory exists in draft form with additional resources still requiring some research. The 2005 cultural landscape report prescribes a rehabilitation treatment strategy for only two landscapes, the Historic District at the Park Headquarters and the SD Highway 87 corridor. Both landscapes are maintained in good condition (no clear evidence of major disturbance and deterioration by natural and/or human forces – no immediate corrective action needed to maintain current conditions). While not all identified historic structures and cultural landscape resources have an approved treatment document, they are maintained in stable condition in that there are no identified impacts that need to be immediately addressed until final treatment is determined for the resources.

The 2005 cultural landscape report identified SD Highway 87 as potentially eligible cultural landscape. This included treatment concept recommendations. The primary treatment recommendations included rehabilitation of the historic road corridor to support current and future levels of vehicular, pedestrian, and bicycle traffic and manage for natural resource values while preserving the historic character and significant features that make this resource unique. This includes the historical road alignments, both vertical and horizontal road widths, retaining the current wayside and pull-off configurations. Where possible within SD Highway 87 corridor, contributing resources need to be protected with particular attention paid to the retention of the scenic and natural resources and the roadway and associated bridges and waysides.

VISITOR CENTER AREA

The cultural landscape associated with the development of the park and recognized as a historic district is primarily located in and around the visitor center. The 1995 national register multiple property (MPD) nomination identifies three relevant contexts of significance—Recreation and Tourism in the Black Hills and at Wind Cave, 1890–1945; Development and Administration of Wind Cave National Park, 1903–1945; and NPS Rustic Architecture and Public Works Construction, 1933–1942. These contexts document the people, places, and events associated with the tangible resources present today; why they were created, and who was associated with their design and development. The buildings and landscape are the result of the New Deal Programs of 1933–1939, reflecting the philosophy, layout, and architectural style of the Department of the Interior established around 1918. Commonly referred to as the rustic style, the buildings and the landscape blend together through design, engineering, and native materials.

The cultural landscape of the Park's historic district was shaped by the rustic design style implemented by the Civilian Conservation Corps based on the NPS plans to "impose a unified architecture" at the park. Located in the valley and the sloping hillsides of the meadow park land, the site consists of 21 acres. The structures blend into the surroundings through their scale, materials, design style, and location within the landscape without the appearance of massive development. The contours of the hillside were utilized in a way that nestles the cluster of buildings down the hillside presenting a tiered appearance from the housing to the visitor center to the maintenance and utility buildings at the base of the hill. The 1995 MPD nomination lists 20 eligible features; 17 of the features are buildings within the visitor center area, one feature represents miscellaneous landscape features, and two bridges. In keeping with the plan for unified architecture, all the structures were built of frame or masonry tile and covered in stucco. Most are trimmed with reddish-brown sandstone and bear the architectural details of the English Vernacular Revival applied to the rusticated style.

The landscape is documented in the 2005 cultural landscape report. The period of significance for the corresponding cultural landscape is from the creation of the park in 1903 until the closing of the Civilian Conservation Corp (CCC) camp in 1942. Some treatment recommendations have been incorporated into the planning process to move them towards completion. Currently, the cultural landscape of the developed area is in good condition, per definitions in the Cultural Landscape Inventory Professional Procedure Guide. A historic structure report for many of the buildings in the district was initiated in November of 2014. This report will provide needed information about the condition and treatment options for six CCC/WPA buildings involved.

SANSON RANCH

The Sanson Ranch was determined eligible for the national register by the State Historic Preservation Office in 2010 as part of a utility right of way study. While a nomination has not yet been prepared, initial research indicates that the property falls within the early context documented for the park: Early History of the Black Hills, Prehistory–1900 for the Buffalo Jump and the expansive collection of projectile points found on the Sanson holdings; Mining in the Black Hills which brought August Sanson to the area in 1878; and Open Ranching and Homesteading 1870–1900.

Additional agricultural context and significance are possible due to August and Carl Sanson's involvement in local and state organizations and their contributions to ranching and agriculture. The ranch remained under Sanson family ownership until 1987. Few physical changes occurred with subsequent owners who primarily used the land for livestock production. The National Park Service acquired 5,556 acres in 2011 including the Sanson Ranch house and ancillary buildings and structures. Planning and treatment for the resources of the site are in progress.

Due to the survival of features from the defined Period of Significance, the Sanson Ranch exhibits integrity in each of the seven Aspects of Integrity identified by the National Register of Historic Places. The aspects of integrity are defined as: location, setting, feeling, association, material, workmanship, and design. This includes the historic core of the Sanson Ranch in 1882, vernacular landscape and architecture, Sanson Ranch nexus of two geographical landforms (Black Hills and Great Plains), and retention of the materials (stone, sod, and timber). The retention of key landscape features, such as the farmhouse and ancillary structures serves as testament to the materiality as well as the workmanship used to construct these structures.

The Sanson Ranch was recognized in 1985 as the oldest ranch owned and operated by the same family in Custer County (NPS 2014b). The period of significance for the cultural landscape stretches through the Sanson family's ownership, from 1882 to 1987. The ranch straddles the area where the Black Hills and the Great Plain ecosystems meet, resulting in varied topography and vegetation within the landscape. A wide variety of grasses, including mixed grass and shortgrass prairie, sustained the ranch's livestock, as did mountain mahogany and yucca (which unlike grass, grew above the snow, providing forage in the winter). Along drainages were woody plants, such as pine and spruce, and wildflowers of many kinds. Cultivated vegetation, such as deciduous shade trees (cottonwood, elm, honey locust) and ornamental and garden plants were grown around the house and buildings. The open ranch lands with fenced pastures are identified as representative of a cultural tradition associated with ranching culture. The open ranching landscape, together with the closely spaced cluster of buildings and structures forming the ranch headquarters, are the character defining features of this vernacular, agricultural landscape (NPS 2014b). The landscape's features collectively tell the story of its consistent use for livestock ranching throughout the period of significance.

At the ranch headquarters cluster, most of the existing buildings and structures have been standing since before 1920, including the house, barn, chicken coop, dugout (second garage), garage, and shed. Most of these are constructed with local wood and stone, and are minimally altered (although the house was re-roofed). All of the structures in the Sanson Ranch area, except the shed, have been determined eligible for listing in the National Register of Historic Places. Ranch roads radiating out from the headquarters, primarily unpaved two-tracks, and footpaths, are also considered contributing features of the cultural landscape. Constructed water features were developed over the ranch's history to support the watering of livestock and irrigation of crops, and include a cistern, livestock watering tanks, a covered well with hand pump, and later electric well pumps. These features help tell the story of how evolving technology was used to sustain ranching operations over

more than a century of use by the Sanson family. Numerous small-scale landscape features from the period of significance are apparent in the ranch headquarters area and scattered through the landscape. These include decorative, functional, and day-to-day features such as a wooden archway and gate, a fallen stone wall, a covered well with hand pump, watering devices, cistern, stone paving, garage foundation, a fire vault with smoking refrigerator, and fences. Some other small-scale features have been documented as noncontributing, including an old laundry machine, metal mattress frame, metal gate, and two large stones in front of the house. Both contributing and noncontributing small-scale features show how the Sanson family lived and how the ranch operated.

Currently, the Park is finalizing the draft Sanson Ranch cultural landscape inventory. In accordance with the Cultural Landscape Inventory Professional Procedures Guide the Park works with the Midwest Regional Office to document cultural landscapes per section 110 of the National Historic Preservation Act. The draft cultural landscape inventory will be finalized when the cultural landscape report is completed.

Identified historic structures and cultural landscape resources that do not have an approved treatment document are maintained in stable condition in that there are no identified impacts that need to be immediately addressed until final treatment is determined for the resources. The Sanson Ranch structures are in fair condition. The Park will be initiating a cultural landscape report and historic structures report for the Sanson Ranch in 2015.

VISITOR EXPERIENCE

The Black Hills area of South Dakota, where the park is are located, is a major recreation area within the state. The park is located 10 miles north of Hot Springs, South Dakota, and immediately south of Custer State Park. The park received more than 516,000 visitors in 2013 (NPS 2014c) and includes both below ground and above ground recreation opportunities. Below the surface, the park includes many caves, including one of the world's longest caves, Wind Cave. Cave tours are a popular activity in the park and allow visitors to experience the amazing boxwork and other unique resources located in the caves. Above ground, the park includes a visitor center, picnic area, 30 miles of hiking trails, including three nature trails and a year-round campground (Elk Mountain Campground). Several of the hiking trails were established on two-track roads. Park trails throughout the greater park area are not heavily used, however, these provide visitors with opportunities to experience the park's backcountry and view wildlife away from travel corridors.

The park provides opportunities for hiking, horseback riding, camping, wildlife viewing, nature observation, scenic driving, backcountry camping, photography, and picnicking (NPS 2014d). There are also many opportunities for interpretation and education at the park, particularly at the visitor center, on ranger-led programs/tours, and on the park's three nature trails. Interpretation at the park currently focuses on the exploration of Wind Cave, cave resources and features, and the mixed-grass prairie ecosystem and transition to Black Hills forests. To a limited extent, interpretation focuses on prehistoric and historic occupation of the area, early inhabitant cultures, and interactions with settlers (NPS 2002).

Currently, about 93% of Park visitation comes between May 1 and September 30 with 87% of visitors never having previously visited the Park. The top five states visitors were from in a 2010 survey conducted during July were, in decreasing order, Minnesota, Nebraska, Illinois, Colorado, and Iowa. Approximately 500,000 people visit the Park annually for recreation visits, including 100,000 to tour Wind Cave. Other popular visitor activities include wildlife viewing, camping, hiking, and otherwise enjoying the area for its natural values.

The primary visitor experience includes wildlife viewing along Highways 385 or 87, and NPS Roads 5 and 6, a stop at the visitor center, and a tour of Wind Cave. Recently installed waysides along Highways 385 and 87 provide interpretive messages to the 80% of park visitors who do not stop at the visitor center. In 2014, there were approximately 3,500 ranger-led tours of the cave for 95,000 visitors. A typical one-day visit lasts less than four hours. The Elk Mountain Campground is open year-round. There is running water in the restrooms during the warmer months of the year and vault toilets available the rest of the year. Rangers present evening campfire programs during the summer months.

In 2011, the park, in conjunction with the Friends of Wind Cave National Park, solicited comments concerning the Visitor Use Plan for the Casey Addition, while offering tours of the ranch and Buffalo Jump. During the summers of 2013 and 2014, there were weekly tours offered of the Sanson Ranch and nearby Buffalo Jump during June and July. These programs began at the visitor center and then car-caravanned out to the site. These tours provided the public with controlled, but limited, access to the area. Implementation of any long-term plan, including expanded access and uses is dependent on the Zoning Management Plan for the Sanson Ranch and in conjuncture with the visitor use plan, which includes all of the Casey Addition.

Chapter Four

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter analyzes the potential environmental consequences, or impacts, that would occur as a result of implementing the Zoning Management Plan, including the no-action alternative. Topics analyzed in this chapter include cave/kart, vegetation, archeology, historic structures, cultural landscape, ethnography, floodplains, scenery, and visitor experience.

GENERAL METHODOLOGY FOR ANALYZING IMPACTS

In accordance with the 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 for each resource may vary; therefore, these methodologies are described under each impact topic.

Type of impact describes the classification of the impact as either *beneficial* or *adverse*, *direct* or *indirect*. The terms "impact" and "effect" are used interchangeably throughout this assessment.

- *Beneficial*: An impact that would result in a positive change to the resource when compared to the existing conditions.
- *Adverse*: An impact that causes an unfavorable result to the resource when compared to the existing condition.
- *Direct*: Impacts that would occur as a result of the proposed action at the same time and place of implementation (40 CFR 1508.8).
- *Indirect*: Impacts that would occur as a result of the proposed action, but later in time or farther in distance, but still reasonably foreseeable from the action (40 CFR 1508.8).

CUMULATIVE IMPACT SCENARIO

CEQ regulations require the assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are 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 both the no-action and action alternatives.

Cumulative impacts were determined by combining the impacts of the action alternatives (implementation of the Zoning Management Plan) with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other ongoing or reasonably foreseeable future projects at the Park and, if applicable, the surrounding region. For the purposes of most impact topics in this analysis, the cumulative impact analysis area was the 15-mile area surrounding the Park. The time horizon for the cumulative impact analysis depends on the impact topic under consideration, but in most cases, plus or minus five years. These actions are evaluated in conjunction with the impacts of the alternatives to determine if they have any cumulative effects on a particular natural or cultural resource, and visitor experience.

PAST AND PRESENT ACTIONS (NPS AND NON-NPS)

Past cumulative effects on Park resources include those impacts to the cave. Some factors affecting the cave environment are not known. Ongoing exploration has increased the length of the cave survey to 143 miles as of 2014. Development and application of the Passage Density Model determined that there could be as much as 250 miles of passage within the current footprint of Wind Cave. The current length of the survey is 57% of that projected length and could also extend beyond the current boundaries, and could be much larger than the projected 250 miles (Horrocks 2009). The

extent of Wind Cave is not fully understood (it may extend beyond the park boundaries) or what biotic and geologic resources are present in all of the cave's passageways. It is known, however, that the cave has been affected by the accumulation of lint, blasting (which opened up portions of the cave in the past and closed certain passageways), algae, the seepage of pollutants from the parking lot (trace amounts of chloroform, caffeine, toluene, acetone, benzene, ethyl benzene, and heavy metals have been found in the drip water), historic privies, sewage lines, modification of surface drainage (which affect the hydrology of the cave and Park surface resources), fire suppression actions, and modification of the surface entrances (which has changed the cave's microclimate). These actions have added energy and materials to what formerly was an energy-poor environment.

Wind Cave, like all caves, is very sensitive to modifications of surface drainages and subsurface hydrology. The subsurface flow makes the cave vulnerable to effects from developments and activities within and adjacent to the Park. Most of the Park's watersheds originate outside the Park's boundary, as a result, adjacent land uses can impact park resources including cave/karst resources. Activities such as mining, sand and gravel excavation, applications of pesticides, fertilizers, contaminated water, road salt, logging, irrigation, drilling of wells, and stock diversions (30 reported within the Beaver Creek drainage) around the Park may all be affecting surface and subsurface flows that enter the park, which in turn could be affecting how water enters and travels through the cave. Park actions that could have cumulative impacts on Park resources include existing management plans that continue to provide direction on resource management until amended or updated. These include the natural resource condition assessment (2011), elk management plan (2009), cave/karst management plan (2007), black-footed ferret reintroduction plan (2007), bison management plan (2006), black-tailed prairie dog management plan (2006), parkwide cultural landscape report (2005), fire management plan (2005), headquarters parking lot pollution prevention plan (2002), and the general management plan (1994).

The completion of the parking lot pollution prevention plan allowed the Park to address some of the ongoing impacts to the cave and water resources that were occurring in the headquarters area. This included improvements to stormwater collection and treatment in the parking lot and use of long-last, low-maintenance surface materials. Implementation of this plan has eliminated a number of ongoing impacts that were occurring, such as leaching of hydrocarbons from the parking lot.

Within and adjacent to the Park, wildland fire suppression and prescribed fire is used as a tool to restore natural ecosystems. Due to the lack of wildfire in many areas of the Park, ponderosa pine is more widespread than it was historically. Anecdotal evidence indicates that a mature ponderosa may use hundreds of gallons of water a day if it is available. Most of this water would then be lost to the atmosphere through the process of evapotranspiration. This could potentially result in ongoing cumulative impacts to the cave/karst as a result of water reduction and subsequent reduction in the amount of water entering the cave. The Park's existing fire management plan is currently in the process of being updated and will provide direction on automatic wildfire suppression. This includes allowing non-suppression of wildland fires in certain circumstances.

The Park currently uses manual, mechanical, biological, prescribed fire, and chemical treatments to control nonnative plant and insect species within the Park. Due to the potential for impacts to park resources resulting from chemical applications, the Park developed a pesticide spray model in 2006 to indicate resource areas most sensitive to chemical control methods. Pesticide use within and outside the Park can have cumulative impacts to water, cave, and karst resources.

The Black Hills National Forest, which is adjacent to the Park, does not do clear cutting, only stand density reduction. Those areas logged will have lower density but not complete removal. Other ongoing planning efforts by the national forest include a landscape restoration strategy, "An Island in the Plains," a 10-year strategy for ecological restoration. Implementation of this plan could have

long-term cumulative impacts on resources within the ecosystem. In addition, the national forest recently completed a transportation management plan in 2010. The plan's focus was reduction in cross-country motorized travel and motorized use of unauthorized routes. Several unauthorized routes adjacent to the Park have been eliminated. The reduction of roads within the Park's watershed allows for natural processes such as stormwater runoff and infiltration to exist.

Other cumulative impacts include the construction of the Southern Black Hills Water System waterline, a portion of which bisects the 2011 Addition Lands. Wells connected to nearby aquifers (Madison aquifer) could contribute to the cumulative impacts to the Park's cave and karst resources. The US Geological Survey (USGS) report (forthcoming) will provide appropriate, additional direction for standards and guidelines related to groundwater resources.

FUTURE ACTIONS (NPS AND NON-NPS)

Adjacent development south and east of the park has increased, and it is reasonably foreseeable that this trend will continue. The Southern Black Hills Water System pipeline encourages further development. Ongoing and continued development south and east of the park could contribute to cumulative impacts on park water, cave, scenery, cultural, and wildlife habitat resources.

Other reasonably foreseeable cumulative impacts include increased public visitation to the Casey Addition (Sanson Ranch) as a result of the Casey Addition visitor use plan that will be completed at the conclusion of the Zoning Management Plan. If determined to allow for increased uses on the lands this will likely result in increased volume of visitors and traffic to that portion of the park. As part of the Casey Addition Plan, park officials have stated the possibility of restoring, preserving, or rehabilitating historic structures and landscapes, upgrading the wildlife capture facility, improvement of roads, use of prescribed burns, and removing noncontributing structures.

ASSESSING IMPACTS USING CEQ CRITERIA

The impacts of the alternatives are assessed using the CEQ definition of "significantly" (1508.27), which requires consideration of both context and intensity:

- **Context:** Significance varies with the physical setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend on the effects in the locale, rather than in the world as a whole. This means that the significance of any action may be analyzed within the appropriate context, such as society as a whole (human, national), the affected region, or the locality. Both short-term and long-term effects are relevant and are often characterized as <u>duration</u>.
  - Duration:
    1. *Short-term*: impacts generally last only during the initiation and implementation of the project, and the resources resume their pre-project conditions following the implementation of the project.
    2. *Long-term*: impacts last beyond the initiation and implementation of the project, and the resources may not resume their pre-project conditions for a longer period of time.
- **Intensity:** this refers to the severity of the 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 with significant effects or represents a decision in principle about a future consideration.
- Whether the action is related to other actions with 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 of Historic Places 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 the protection of the impact.

For each impact topic analyzed, an assessment of the potential significance of the impacts according to context, intensity, and duration is provided in the "conclusion" section that follows the discussion of the impacts under each alternative. Intensity of the impacts fully considers the relevant factors from the list above. Intensity factors that do not apply to a given resource topic and/or alternative are not discussed.

ASSUMPTIONS

Proposed management zones have different levels of allowable uses and prescriptions. All subsequent actions would require their own compliance process to determine potential environmental consequences prior to implementation.

GREATER PARK ALTERNATIVES – IMPACT ANALYSIS

CAVE/KARST RESOURCES

The impact scenario for cave and karst resources within this plan for the greater Park area and the existing visitor center and headquarters area is based on several broad level assumptions and policy direction:

1. Wind Cave is the premier resource for which this Park was first established to protect in 1903 and as such, degradation to this fundamental resource would constitute an adverse effect on an integral Park resource.

2. Local and regional hydrological systems resulting from karst processes can be directly influenced by surface land use practices. If existing or proposed developments do or will significantly alter or adversely impact karst processes, these impacts will be mitigated. Where practicable, these developments will be placed where they will not have an effect on the karst system. (NPS *Management Policies 2006,* 4.8.1.2)

3. No developments or uses, including those that allow for general public entry, such as pathways, lighting, and elevator shafts, will be allowed in, above, or adjacent to caves until it can be demonstrated that they will not unacceptably impact natural cave conditions, including sub-surface water movements. Developments already in place above caves will be removed if they are impairing or threatening to impair natural conditions or resources. (NPS *Management Policies 2006,* 4.8.2.2)

4. In Wind Cave Canyon, much of the park's infrastructure was constructed directly above Wind Cave and on top of the Madison Limestone. Direct correlations have been established for impacts on cave resources resulting from facility development, land uses, and surface activities located directly above the cave. Subsequent surface level actions have been employed to mitigate some of these identified and associated impacts.

5. Engineered solutions to mitigate actual and existing impacts or to prevent potential future impacts related to surface land use practices and activities can be successful. However, avoidance and relocation of unnecessary and/or potentially harmful surface development and activities is generally more sustainable and more successful than reliance on engineered and constructed solutions that require ongoing maintenance, monitoring, and ultimate replacement.

6. The best way to avoid altering or adversely impacting cave and karst processes by surface level development and activities is to situate land uses that are potentially incompatible or not necessary to be located within direct proximity to these resources in more suitable locations.

7. Known surface activity threats include, but are not limited to: parking lot runoff, hazardous material transportation via park roads, resurfacing park roads with oil-based products, sewage line and lagoon leakage, chemical exotic weed control, new construction, and expansion of the pine forest. (2007 Cave and Karst resource management plan)

8. Several practices adopted by the Park with regard to avoiding adverse impacts to Cave and Karst resources, as outlined in the 2007 Cave and Karst resource management plan, include

the following:

a. Evaluate use at existing infrastructure before considering new construction.
b. Develop a comprehensive ten-year facility needs assessment that supplements the general management plan.
c. Consider the possibility of moving functions/infrastructure before seeking funding for new infrastructure directly above Cave and Karst resources.

No-Action Alternative

Impacts — Under the no-action alternative, localized adverse impacts that may continue to occur include the introduction of pollutants and contamination to the cave and karst features, such as hydrocarbons, gases, antifreeze, heavy metals, and sediment into nearby water sources. Wind Cave and karsts can be impacted by surface management actions, particularly above the Madison Limestone formation. These types of contaminates can have long-term adverse impacts on cave/karst natural processes.

The existing management zones would continue to provide limited direction on allowable uses. For the greater park area this primarily includes the natural zone which is managed to conserve the natural resources and processes of the park while accommodating uses that do not adversely affect those resources and processes. Facilities in this zone are permitted in a dispersed manner and are limited to those facilities that have little effect on natural resources. Portions of Wind Cave located below or down dip from drainages that have cut downward into the Minnelusa Formation, occasionally exposing the Madison Limestone formation, have been impacted by past and existing surface activities.

Conclusion — Continued adverse impacts to cave/karst resources would be expected under the no-action alternative. Existing park management zones provide little direction for proposed future development and generally do not address necessary resource suitability requirements for cave and karst systems.

Greater Park Alternative 1

Impacts — Cave and karst resources could be impacted in localized areas under Greater Park Alternative 1, primarily from development or improvement of facilities and visitor services as permitted by the management zone overlay.

Adverse impacts that may occur include the introduction of pollutants and contamination to the cave and karst features, such as hydrocarbons, gases, antifreeze, heavy metals, and sediment into nearby water sources. Wind Cave and karsts can be impacted by surface management actions, particularly above the Madison Limestone formation. These types of contaminates can have long-term adverse impacts on cave/karst natural processes. However, potential future development as zoned in this alternative utilized suitability analysis approach in an effort of avoidance on where to and not to develop. As a result, these long-term, direct adverse impacts should be limited. Where development and alterations to the existing footprint are permitted (frontcountry natural, administrative services zones, and transportation corridors), the use of best management practices would be utilized such as a catchment basin, staging areas, treatment of first flush runoff, and other stormwater management practices.

Conclusion — Greater Park alternative 1 provides three management zone overlays and three transportation corridors. The potential exists for adverse impacts to cave and karst features where the zone or transportation corridor allows for ground disturbing actions such as the frontcountry natural, administrative services or primary transportation corridor. Any foreign intrusion from surface management actions could have long-term adverse impacts. Although adverse, actions and subsequent planning and best management practices would be utilized to reduce overall impacts. Greater Park alternative 1, compared to other Greater Park alternatives, has the least amount of potential adverse impacts to cave and karst features based on the likelihood that development and land use practices would occur in more suitable locations if management prescriptions are followed.

Greater Park Alternative 2

Impacts — Cave and karst resources could be impacted in localized areas under Greater Park alternative 2, primarily from development or improvement of facilities and visitor services as permitted by the management zone overlay.

Potential adverse impacts are similar to those of Greater Park alternative 1, including the introduction of pollutants and contamination to the cave and karst features, such as hydrocarbons, gases, antifreeze, heavy metals, and sediment into nearby water sources. Wind Cave and karsts can be impacted by surface management actions, particularly above the Madison Limestone formation. These types of contaminates can have long-term, direct adverse impacts on cave/karst natural processes. However, potential future development as zoned in this alternative utilized suitability analysis approach in an effort of avoidance on where to and not to develop. As a result, these long-term adverse impacts should be limited. Where development and alterations to the existing footprint are permitted (primary visitor service development, frontcountry natural, administrative services zones, and transportation corridors), the use of best management practices would be utilized such as a catchment basin, staging areas, treatment of first flush runoff, and other stormwater management practices. The use of best management practices would be most important where the greatest development is permitted; primary visitor services zone and where the transportation corridor allows for potential upgrades, a departure from the existing use of the road.

A primary component of this alternative zones the State Highway 87 corridor as historic. Potential direct and indirect adverse impacts to cave and karst features could result from management actions related to road realignment if it was determined necessary to more closely resemble the historic alignment of the roadway. Impacts could result in contamination to known/unknown cave and karst features. If this action were implemented, subsequent compliance would be required and could include best management practices such as a storm water pollution prevention plan to mitigate runoff and first flush risks.

Conclusion — Greater Park alternative 2 provides five management zone overlays and three transportation corridors. The potential exists for adverse impacts to cave and karst features where the zone or transportation corridor allows for ground disturbing actions such as the primary visitor service development, frontcountry natural, administrative services zones, and primary and secondary transportation corridors. Any foreign intrusion from surface management actions could have long-term adverse impacts on cave and karst resources. Although adverse, actions and subsequent planning and best management practices would be utilized to reduce overall impacts, Greater Park alternative 2, compared to other Greater Park alternatives has the greatest potential for long-term adverse impacts to cave and karst features based on the likelihood that development and land use practices would be permitting in more locations.

Greater Park Alternative 3

Impacts — Cave and karst resources could be impacted in localized areas under Greater Park alternative 3, primarily from development or improvement of facilities and visitor services as permitted by the management zone overlay.

Potential adverse impacts are similar to those of Greater Park alternatives 1 and 2, including the introduction of pollutants and contamination to the cave and karst features, such as hydrocarbons, gases, antifreeze, heavy metals, and sediment into nearby water sources. Wind Cave and karsts can be impacted by surface management actions, particularly above the Madison Limestone formation. These types of contaminates can have long-term, direct adverse impacts on cave/karst natural processes. However, potential future development as zoned in this alternative utilized suitability analysis approach in an effort of avoidance on where to and not to develop. As a result, these long-term adverse impacts should be limited. Where development and alterations to the existing footprint are permitted (frontcountry natural, administrative services, historic zones, and transportation corridors), the use of best management practices would be utilized such as a catchment basin, staging areas, treatment of first flush runoff, and other stormwater management practices.

A primary component of this alternative zones the State Highway 87 corridor as historic. Potential direct and indirect adverse impacts to cave and karst features could result from management actions related to road realignment if it was determined necessary to more closely resemble the historic alignment of the roadway. Impacts could result in contamination to known/unknown cave and karst features. If this action were implemented, subsequent compliance would be required and recommendation to develop a storm water pollution prevent plan to mitigate runoff and first flush risks.

A primary component of the transportation corridor would zone US Highway 385 as a secondary corridor in an effort to change the overall character and use of this road to a condition similar to State Highway 87. A separate process to eliminate commercial and hazardous waste transportation through the Park will be undertaken by the Park with close coordination with federal, state, and local agencies. No adverse impacts to cave and karst would be expected from restricting commercial and hazardous wastes. Restrictions of hazardous waste traffic would provide a long-term beneficial impact as the potential for an accidental release of hazardous waste would be considerably reduced, especially at the location on Highway 385 on the road bend directly above the cave.

Conclusion — Greater Park alternative 3 provides four management zone overlays and two transportation corridors. The potential exists for adverse impacts to cave and karst features where the zone or transportation corridor allows for ground disturbing actions such as the frontcountry natural, administrative services zones, and secondary transportation corridors. Any foreign intrusion from surface management actions could have long-term adverse impacts. Although adverse, actions and subsequent planning and best management practices would be utilized to reduce overall impacts, including beneficial impacts as a result of restricting hazardous waste on US Highway 385. Greater Park alternative 3 is comparable in potential adverse impacts to Greater Park alternative 1 and would be expected to have fewer impacts as compared to Greater Park alternative 2 to cave and karst features based on the likelihood that development and land use practices would occur in more suitable locations if management prescriptions are followed.

Cumulative Impacts Conclusions

Past, ongoing, and reasonably foreseeable cumulative impacts would likely continue to impact Wind Cave. Cumulative effects on Park cave and karst resources from human generated actions, activities, and practices are a primary concern for Park managers tasked with preserving and protecting these fundamental resources.

The extent to which human development, activities, actions, land and resource uses have affected Wind Cave, the associated cave environment and the natural karst processes over time is not fully understood, although impacts from surface uses, activities and development are known to have occurred, have been documented, and in some cases may still be affecting cave and karst systems within the Park. Further complicating the understanding of impacts to the cave and karst systems is the fact that the full extent of the cave has yet to be determined and evidence suggests that Wind Cave likely extends beneath the surface beyond the existing Park boundaries.

Cumulative impacts and effects on cave and karst resources can be divided into two broad categories; direct actions and effects on cave resources, including those associated with providing access and use of the developed and undeveloped sections of Wind Cave and those direct and indirect effects on cave and karst systems created by surface and subsurface land uses and activities both within and outside of the Park boundary. Management zoning primarily addresses issues related to land use practices as the surface landscape, the watersheds encompassing cave and karst areas and the associate groundwater resources are all part of the entire cave and karst system.

Because cave resources and karst processes can be directly influenced by surface land use practices, current NPS policy directs that no development or uses, including those that allow for general public entry, will be allowed in, above, or adjacent to caves until it can be demonstrated that they will not unacceptably impact natural cave conditions, including subsurface water movements. Because of the inherent risk that any constructed system, facility, and surface land use activity to affect cave and karst systems, agency prescribed best management practices (BMPs) direct that when practicable, surface development, land uses and activities will be located where they will not have an effect on cave and karst systems.

Although the Park was first established to protect Wind Cave from blatant resource damage and exploitation associated with unregulated private tourism development, some of the past development constructed under the direction of the National Park Service to facilitate visitor enjoyment of the resource also impacted cave and karst resources, despite the best intentions to provide public access into the cave. Based on contemporary knowledge and emerging scientific research on the relative sensitivity of cave resources and karst processes (as well as policy) and the interrelated effects of human actions and activities on these systems, much of the past development, actions, and land use practices above and adjacent to Wind Cave would likely be implemented in different manners and/or in different locations if such endeavors were initiated today.

The effects of visitation and visitor management would continue (accumulation of lint, debris, algae growth, theft, etc.), modification of surface drainage and groundwater diversion (which affect the hydrology of the cave and park surface resources), fire suppression actions, and existing modifications of the surface entrances (which has changed the cave's microclimate) all have cumulative effects on cave/karst resources.

Cave and karst systems are integrally connected with surface and groundwater systems and flow patterns. Surface drainage networks within karst landscape areas are characteristically disrupted with streams frequently being diverted and "sinking" into underground flow conduits and complicated subsurface drainage networks. Surface and subsurface drainage patterns and flow

routes, while being interrelated and interconnected, often follow distinctly different paths from one another. Locations below or down dip from surface drainage networks that have cut downward into or through the Minnelusa Formation often provide infiltration conduits for surface water to recharge the Madison aquifer, especially in locations where Madison Limestone is exposed. Cold Spring Creek joins Beaver Creek shortly after it enters the Park and much of the flow of Beaver Creek is lost underground at Beaver Creek Cave, where it enters the Madison aquifer. The entire surface flow of Highland Creek sinks into the subsurface within the Park. The Beaver Creek and Cold Spring Creek watersheds are extensive, the majority of which are located outside of the Park boundaries. The Highland Creek watershed lies primarily within the Park, with the remainder located in Custer State Park.

Groundwater studies within this region indicate that recharge zones and cave dependent subsurface groundwater flow appears to extend a considerable distance beyond the Park boundaries although the interconnectivity of groundwater systems and exact flow patterns within the Southern Black Hills are not fully understood or defined. Because Karst processes can be directly influenced by surface land use practices, Wind Cave, like all caves, is potentially vulnerable to the effects of existing and past land uses and associated activities as well as changes in land uses within the larger upstream watersheds and groundwater flow paths. Any modification of surface drainage patterns or actions that may affect subsurface hydrology has the potential to adversely impact cave resources and karst processes (Alexander, 1989).

Constructed facilities and infrastructure throughout the Park have altered and modified surface drainage patterns and infiltration rates above the cave and currently affect natural cave hydrologic processes as does groundwater withdrawal and surface water impoundments. Continued growth of ponderosa pines planted by the Civilian Conservation Corps, combined with expanded forest land cover across the Southern Black Hills due to past and ongoing fire suppression practices, reduces infiltration of water into the cave and karst systems in these areas as water uptake and evapotranspiration rates can be considerable. Reduced infiltration rates lower the natural input of carbon and nitrogen from meteoric waters into the cave and karst system and causes secondary cave formations to dry out and desiccate as calcite deposition ceases (Heakin, 2004).

The location of infrastructure and some land use practices above the cave have introduced pollutants and contaminants into the cave and karst groundwater systems from a variety of surface land uses, practices, and activities occurring within and adjacent to the Park. Sources of past introduced pollutants and contaminants from surface activities that impact cave and karst systems include, but are not limited to, parking lot runoff, resurfacing park roads with oil-based products, sewage line and lagoon leakage, new construction, and use of chemical nonnative weed and pest control methods.

Historic and existing roadway runoff, including runoff within the visitor center parking lot prior to 2005, are the likely sources for high nitrate levels and trace amounts of chloroform, caffeine, toluene, acetone, benzene, ethyl benzene, meta and para-xylene, ortho-xylene, methyl isobutyl ketone, and styrene that have been detected in cave drip waters below primary Park infrastructure and parking lots. Hydrocarbons have also been detected within Wind Cave and while most contaminants including hydrocarbons generally appear to be associated with surface water infiltration percolating into the ground as part of ground water recharge processes, the extent to which these components result from air pollution deposition and the potential introduction of air pollutants into the cave from air emissions being drawn into the cave as part of the natural barometric pressure air exchange characteristic of this cave is unknown (NPS, 1992a).

Rerouting hazardous waste transportation and commercial use traffic to alternate routes away from the designated US Highway 385 transportation corridor to eliminate these additional potential contaminant sources from operating above Wind Cave has been discussed within the agency, but no

action has been taken related to these permitted transportation uses within the Park. The continued use of US Highway 385 as a transportation corridor for hazardous materials directly above Wind Cave creates an unnecessary risk of catastrophic contamination of cave and karst resources from a potential spill.

Due to invasive species and to the potential for adverse impacts to park resources resulting from chemical applications, a chemical spray model was developed in 2006 to delineate the relative sensitivity levels of different areas within the Park to various chemical control methods. The model established three zones: restricted spray zone, limited spray zone, and spray zone with corresponding allowances, stipulations, and restrictions for use of various chemicals within each of these zones. Theoretically, these chemical spray zones should protect subsurface cave resources and karst processes, although as new information about cave and karst resources continues to emerge, the chemical spray model parameters have necessarily had to be adjusted based on potential impacts to these resources.

Past and existing activities outside Park boundaries such as mining, sand and gravel excavation, applications of pesticides, herbicides, fertilizers, and road salt, logging, drilling and use of wells, agricultural and residential irrigation practices, surface water diversions, impoundments and water developments for livestock use around the Park may all be affecting surface and subsurface flows that enter the Park. These past and ongoing actions are likely affecting how water enters and travels through the cave. Contaminated waters from outside the Park may also be infiltrating the cave and causing unknown damage. Past studies of Beaver Creek surface waters identified caffeine, *E. coli* and coliform bacteria in the stream, indicating septic system contamination from outside of the park boundaries. These contaminants have the potential to affect Park groundwater and water supply wells.

The significance and magnitude of these past and present cumulative effects as well as the relationship and compounded impacts to other resources and processes is not fully understood although these past and existing impacts are measureable, have been documented, and continue to be monitored.

Land use practices and activities that continue to present potential threats to cave and karst systems include hazardous material storage and transportation on park roads, resurfacing park roads with oil-based products, chemical nonnative weed and pest control, new construction, routine maintenance operations, and expansion of the pine forest land cover.

Potential impacts originating from outside of the Park boundaries are expected to continue as land use activities increase and requires close collaboration between the National Park Service, adjacent land owners, and land management entities to ensure that ongoing and potential future impacts are minimized, mitigated, and/or avoided. A comprehensive inventory and study of the effects of land use practices on Park cave and karst systems, particularly in regard to the location of present or planned surface developments, is also needed to ensure that the cave is adequately protected from surface development uses and activities that occur outside of the Park.

Water supply wells that draw water from the cave and karst aquifers both within and adjacent to the Park have the potential to further impact cave and karst processes, especially if water removal outpaces groundwater recharge rates. Future Use Water Permit applications have been filed for several wells in the Madison aquifer surrounding the Park, and it is anticipated that additional permits will be issued as development continues to increase in the lands adjacent to the Park. Because of the close hydrologic connection between underground lakes and nearby wells, any development within and use of the Madison aquifer including drawdown produced by pumping

wells in the vicinity of the Park, has the potential to adversely impact the underground water dependent resources and features within Wind Cave (Black 2011).

Continuation of land use practices that affect cave and karst systems within and adjacent to the park, combined with potential future development, new activities and/or incompatible land use practices or changes in land use, could adversely affect cave resources and karst processes and would cumulatively add to past effects.

Because of this relatively straight forward impact scenario, the Park has adopted National Park Service BMPs related to appropriate facility siting, land use practices, and activities above the cave. The National Park Service is committed to continuing to permit only those uses necessary to be located directly above the cave such as providing visitor access to the primary cave resource, while all other land uses, practices, and development will be gradually and systematically relocated to appropriate locations that will not affect cave and karst systems. Following the publication of this plan, a comprehensive facility needs assessment and development concept plan is needed to evaluate existing infrastructure and uses to determine appropriate locations of future surface facilities and associated land uses. A phased implementation plan is also needed to outline and guide future actions related to moving existing functions and infrastructure above the cave to appropriate locations before seeking funding for maintenance or expansion of existing or construction of any future facilities and infrastructure.

The potential for future impacts similar to past impacts from uses and activities associated with facilities and infrastructure located above the cave will depend on how proactively the agency engages in relocating inappropriate and/or unnecessary land uses, facilities, and infrastructure that are currently sited directly above the cave, to locations that will not affect these resources. Beneficial cumulative effects on cave resources and karst systems will depend on how well past impacts are mitigated including when and if facilities and infrastructure above the cave are removed and the natural systems and site conditions are restored and natural functions improved.

VEGETATION

No-Action Alternative

Impacts — Under the no-action alternative, no long-term adverse impacts to vegetation would be expected. The existing management zones would continue to provide limited instruction on allowable uses. For the greater park area this primarily includes the natural zone which is managed to conserve the natural resources and processes of the park while accommodating uses that do not adversely affect those resources and processes. Facilities in this zone are permitted in a dispersed manner and are limited to those facilities that have little effect on scenic quality and natural resources, including vegetation.

Conclusion — No long-term adverse impacts to vegetation would be expected under the no-action alternative. Proposed development or alteration of the vegetation would be limited and require adherence to the existing park management zones.

Greater Park Alternative 1

Impacts — Vegetation would be lost or altered in local areas under Greater Park alternative 1, slightly from the development or improvement of facilities and visitor services and more so from actions related to wildlife grazing regimes, fire management activities, and invasive/nonnative species. Three distinct areas, the former bison corral on Casey Addition, the existing bison corrals, and the water supply units on the exterior of the main park boundary would be zoned for administrative services. Within the administrative service zoned areas no long-term adverse impacts would be expected to occur as these facilities currently exist. However, those actions that may have adverse impacts include any improvements/upgrades to those facilities. Any improvements would strive to use existing footprints to reduce potential impacts to vegetation.

Two distinct areas are zoned frontcountry natural, the southern park entrance adjacent to US Highway 385 and the developed area at Rankin Ridge. Short-to-long-term adverse impacts to vegetation within frontcountry natural zoned areas could arise as a result of the moderate level of development allowed, including overlooks, benches, wayside exhibits, parking areas, natural and hardened trails, and visitor entrance stations. These allowable uses, if implemented, could result in the removal of the vegetation within the footprint of development or along a trail corridor.

Greater Park alternative 1 is primarily zoned remote natural. Adverse impacts to vegetation would be minimal within this zone. Those impacts that result would be short-term. Development and allowable uses would be limited in context of ground disturbing activities. The placement of trails would be allowed, however, only natural surface trails would be permitted, if needed. Generally, trails would not be present except where needed for resource protection and in specific cases where long-distance trails cross this zone. Trails would also strive to use existing disturbed areas such as wildlife paths.

Any permitted developed or alterations to the vegetation within Greater Park alternative 1 as well as introductions of species from visitor uses could result in the introduction of nonnative species. The introduction of nonnative species could result in a short-to-long-term, indirect adverse impact to vegetation. The implementation of any action would require best management practices to reduce the likelihood of nonnative species.

Conclusion — Greater Park alternative 1 provides three management zone overlays and three

transportation corridors. The potential exists for adverse impacts to vegetation where the zone or transportation corridor allows for ground disturbing actions such as the frontcountry natural, administrative services zones, or along the transportation corridors. This impact would be most intense and long-term as it pertains to the footprint of proposed development. Although adverse, actions and subsequent planning and best management practices would be utilized to reduce overall impacts. Greater Park alternative 1, compared to other Greater Park alternatives, has the least amount of potential adverse impacts to vegetation.

Greater Park Alternative 2

Impacts — Vegetation would be lost or altered in local and regional areas under Greater Park alternative 2, partially from the development or improvement of facilities and visitor services and more so from actions related to wildlife grazing regimes, fire management activities, and invasive/nonnative species. Three distinct areas, the former bison corrals on the Casey Addition, the existing bison corrals, and the water supply units on the exterior of the main park boundary would be zoned for administrative services. Within the administrative service zoned areas no long-term adverse impacts would be expected to occur as these facilities currently exist. However, those actions that may have adverse impacts include any improvements/upgrades to those facilities. Any improvements would strive to use existing footprints to reduce potential impacts to vegetation.

The southern entrance adjacent to US Highway 385 extending along the park boundary northeast towards the Sanson Ranch is zoned frontcountry natural. Short-to-long-term adverse impacts to vegetation within frontcountry natural zoned areas could arise as a result of the moderate level of allowed development, including overlooks, benches, wayside exhibits, parking areas, natural and hardened trails, and visitor entrance stations. These allowable uses, if implemented, could result in the removal of the vegetation within the footprint of development or along a trail corridor.

A primary component of this alternative zones the State Highway 87 corridor as historic in recognition of setting encompassing this potentially eligible historic district. Within the historic zoned corridor, negligible adverse impacts may occur to vegetation as a result of management manipulation (mowing, controlled burns, nonnative control, small-scale restoration for disturbed areas, etc.) needed to reflect vegetation conditions common to the period of significance. No realigning to the roadway would be permitted unless it was to more closely resemble the historic alignment of the roadway.

Two distinct, relatively confined areas, adjacent to US Highway 385 would be zoned for primary visitor service development under Greater Park alternative 2. Adverse impacts to vegetation would be greatest in this zone. Long-term adverse impacts to vegetation would arise from heavy development. Facilities allowed within this zone include visitor centers, entrances/kiosks/stations, trailheads, parking lots, administrative activities, and concentrated campgrounds. Direct impacts would arise in the footprints of facilities and indirectly in the immediately adjacent areas as a result of large groups of visitors/staff this zone would expect to accommodate.

Greater Park Alternative 2 is primarily zoned remote natural. The remote natural zone has similar impacts as those described in Greater Park alternative 1 remote natural zone. Please see the descriptions above of potential impacts.

Long-term adverse impacts could result to vegetation if upgrades were to occur along the existing two-track road (tertiary corridor). This could result in further removal of vegetation in the footprint of road improvements. These activities could result in the permanent removal or alteration of

vegetation, a long-term adverse impact.

Any permitted developed or alterations to the vegetation within Greater Park alternative 2 as well as introductions of species from visitor uses could result in the introduction of nonnative species. The introduction of nonnative species could result in a short-to-long-term, indirect adverse impact to vegetation. The implementation of any action would require best management practices to reduce the likelihood of nonnative species.

Conclusion — Greater Park alternative 2 provides five management zone overlays and three transportation corridors. The potential exists for adverse impacts to vegetation where the zone or transportation corridor allows for ground disturbing actions such as the primary visitor service development, frontcountry natural, administrative services, historic zones, and the transportation corridors. Although adverse, actions and subsequent planning and best management practices would be utilized to reduce overall impacts. Greater Park alternative 2, compared to other Greater Park alternatives has the greatest amount of potential adverse impacts to vegetation.

Greater Park Alternative 3

Impacts — Vegetation would be lost or altered in local areas under Greater Park alternative 3, slightly from the development or improvement of facilities and visitor services and more so from actions related to wildlife grazing regimes, fire management activities, and invasive/nonnative species. Three distinct areas, the existing bison corrals, water supply units on the exterior of the main park boundary, and where US Highway 385 and County Road 7/11 converge, would be zoned for administrative services. Within the administrative service zoned areas short-term adverse impacts would be expected to occur in the newly proposed administrative area, however, not in the water supply or existing bison corral areas as these facilities currently exist. Actions that may have adverse impacts include any improvements/upgrades to those facilities. Any improvements would strive to use existing footprints to reduce potential impacts.

A primary component of this alternative zones State Highway 87 corridor as historic in recognition of setting encompassing this potentially eligible historic district. Within the historic zoned corridor, negligible adverse impacts may occur to vegetation as a result of management manipulation (mowing, controlled burns, nonnative control, small-scale restoration for disturbed areas, etc.) needed to reflect vegetation conditions common to the period of significance. No realigning to the roadway would be permitted unless it was to more closely resemble the historic alignment of the roadway.

Two distinct areas are zoned frontcountry natural, the southern entrance adjacent to US Highway 385 and the area west of US Highway 385 (Cold Brook Canyon Trail corridor). Similar impacts could potentially result as those described in Greater Park alternative 1, frontcountry natural zone. In addition, the Cold Brook Canyon Trail corridor could allow for improved trail development, resulting in long-term, adverse impacts, if implemented. This could include improvement/upgrading the existing trail surface to a hardened surface.

Greater Park alternative 3 is primarily zoned remote natural. The remote natural zone has similar impacts as those described in Greater Park alternative 1, remote natural zone. Please see description above of potential impacts.

Any permitted developed or alterations to the vegetation within Greater Park alternative 3 as well as introductions of species from visitor uses could result in the introduction of nonnative species. The

introduction of nonnative species could result in a short-to-long-term, indirect adverse impact to vegetation. The implementation of any action would require best management practices to reduce the likelihood of nonnative species.

Conclusion — Greater Park alternative 3 provides four management zone overlays and two transportation corridors. The potential exists for adverse impacts to vegetation where the zone or transportation corridor allows for ground disturbing actions such as the frontcountry natural, administrative services zones, and the transportation corridors. Although adverse, actions and subsequent planning and best management practices would be utilized to reduce overall impacts. Greater Park alternative 3 is comparable in potential adverse impacts to Greater Park alternative 1 and would expect to have fewer impacts as compared to Greater Park alternative 2 to vegetation.

Cumulative Impacts Conclusions. Cumulative impacts associated with the alternatives include the possibility of further spreading invasive species and damage to vegetation from proposed/allowed development. Continued use of prescribed burns as allowed by the fire management plan would help reduce invasive spreading while encouraging native species. The use of best management practices would be employed for subsequent actions calling for development and other land disturbing activities.

SCENERY

The scenic quality of a "naturally appearing landscape" is impacted by human generated surface disturbances, as disturbances can create unnatural visual contrasts within the natural landscape setting. Because the overall desired condition for scenic resources within the Park is that of an "undeveloped and natural Park experience," all proposed management zoning alternatives have the potential to adversely impact scenic quality within the Park depending on the level and extent of subsequent uses, activities, human caused disturbance, and development as permitted within each management zone. Within developed areas and with regard to scenery conservation, the overall Park objective and intent is that cultural modifications are to appropriately and safely provide necessary visitor services without dominating the natural setting. In general, the greater the extent of human generated disturbance, the greater the potential chance that scenic quality and resources will be adversely impacted. Appropriately applying design fundamentals and strategies based on scenery conservation principles can considerably offset, mitigate, and in some cases improve Park scenic resource conditions.

Because determining or assigning values to "scenery" can be a subjective process as evidenced by the concept of "beauty being within the eye of the beholder," land use managers have sought a more objective and consistently repeatable method for assessing the scenic quality of a given landscape and potential impacts to scenic values.

Process for Evaluation/Methodology

I. As described in the affected environment section, every landscape can be evaluated based on the fundamental design elements of form, line, color, and texture. Modifications in a landscape which repeat these basic landscape elements are said to be in harmony with their surroundings. Modifications which do not harmonize often look out of place and are said to contrast or stand out. Construction projects must first avoid creating impacts to resource values and second, if complete avoidance is not possible, must minimize, ameliorate, and

eliminate all direct and adverse effects on these resources and values. Changes to the characteristic landscape should not be seen and must not attract attention of the casual observer.

How well human modifications fit into the landscape and minimize impacts to scenic values depends on the degree of visual contrast created by the proposed activity and associated development. The most important concept regarding scenery conservation related to a national park is how the human modifications, activities, constructed elements, and development avoid introducing contrasting elements that adversely impact the characteristic scenic values by visually blending into the landscape. Because of this, the aesthetic qualities of individually designed buildings and structures are generally not in question when considering scenery conservation principles. Regardless of how "aesthetically pleasing" a building or structure might be based on specific design, any introduced elements should be designed to reduce unnecessary visual contrasts in order to better harmonize with the surrounding landscape.

Reducing contrasts between the proposed activity or development and the characteristic landscape by repeating the fundamental design elements is the primary method used to avoid creating direct visual impacts to the scenic values of the Park. The use of existing landforms, vegetation patterns, natural lines in the landscape, etc., can further integrate the design, development, and associated activities into the landscape or visual "scene." By "playing off" of these naturally occurring elements, any proposed development will be in closer harmony with the natural landscape.

II. In addition to repeating the fundamental design elements of form, line, color and texture, human modifications to the characteristic landscape must consider how introduced elements and modifications will interact with focal areas created by the landscape type, visual dominance principles, and other variables specific to the project setting.

A. **Landscape type** is described from a specified vantage point or multiple vantage points and is defined by the physical arrangement, scale, and relative proportion of land, topography, water, sky, and vegetation within the frame of view also referred to as the "scene." Primary types of landscape scenes include panoramic, enclosed, feature, focal, and canopied views.

B. The **visual dominance principles** of contrast, dominance and codominance, sequence, axial sight lines, convergence, and enframement are similarly based on the physical arrangement of landscape elements and can intentionally or unintentionally create emphasis or focus on certain features and locations within the field of view. Projects should avoid locations that draw viewer attention by carefully assessing and responding to these dominance principles. If a different location is not feasible, the use of appropriate design fundamentals and strategies can be employed to mitigate impacts as listed below.

C. **Other dynamic variables** affecting visibility include relative size or scale of project, distance from project, angle of observation, length of time the project is in view, spatial relationships between landscape components and project elements, degree of disturbance and associated recovery time, season of use, lighting conditions, atmospheric conditions, and motion.

III. **Design fundamentals** are general design principles that can be used for all forms of activity or development, regardless of the resource value being addressed. Applying these three

fundamentals will help solve most visual design problems:

- Proper siting or location
- Reducing unnecessary disturbance
- Repeating the elements of form, line, color, and texture

IV. **Design strategies** are more specific activities that can be applied to address visual design problems. Not all of these strategies will be applicable to every proposed project or activity:

- Color selection
- Earthwork
- Vegetative manipulation
- Structures
- Reclamation/restoration
- Linear alignment design considerations

While construction and development within the Park will always present a design and engineering challenge in terms of scenery conservation due to the overall natural appearance of the Park setting, following appropriate design fundamentals and strategies that take into consideration landscape type, visual dominance principles, and other dynamic landscape variables will help ensure that future managers may be able to continue conserving Park scenery while at the same time providing for visitor enjoyment of the Park's natural setting.

General Overview of Impacts to Park Scenery

Effects to scenery depend on several factors, including the types and general intensities of development as development relates to the character of the natural environment, and the specific project design considerations employed to minimize visual contrast regarding introduced elements or landscape modifications. The degree to which individual management zones, as prescribed in the various alternatives, have the potential to adversely affect scenic resources depends on the permitted uses, activities, and development within each zone, taking into consideration the established scenery conservation management classes.

Potential direct future impacts to Park scenery are primarily applicable at the project implementation level depending on specific future proposed actions and will employ a visual resource contrast rating process as outlined below in the "Scenery Conservation Management Class Objectives –Additional Stipulations" section. The degree to which future development and landscape modifications must harmonize with the natural landscape will therefore depend on the established scenery conservation management class where a specific proposed project is located. As part of future site specific project planning efforts, design fundamentals and strategies to mitigate potential adverse effects to scenic resources would be identified and recommended prior to project implementation.

Scenery Conservation Management Class Objectives – Additional Stipulations

1. The visual resource contrast rating process, as adopted and outlined in Bureau of Land Management Manual #8431, would be utilized as a guide to analyze potential visual impacts of any future landscape modifications including facility design and placement. Future landscape modifications and proposed facilities must be designed to mitigate impacts and conform to the assigned scenery conservation management class objective. Appropriate application of the scenery conservation system process should significantly minimize any future potential adverse effects to Park scenery, if properly applied.

2. When performing environmental analyses for implementation level projects, the visual resource contrast rating system will be utilized, as a guide, to analyze potential visual impacts of the proposal. The degree to which a management activity has the potential to affect the scenic quality of a landscape depends on the visual contrast created between a project and the existing landscape. Projects would be designed to resolve and minimize potential impacts and meet or exceed the Scenery Conservation Management class objectives. Some types of projects such as rights-of-way requests, valid existing rights, or ingress to private land may be allowed on a case by case basis in class II or III areas. Impacts to Park scenery in these instances could be minimized by such measures, but not limited to screening, painting, project design, relocation, or reclamation.

3. The Park superintendent may allow temporary projects, such as research projects, to exceed Scenery Conservation Management Class standards in class II–III areas, if the project terminates within two years of initiation. Rehabilitation begins at the end of the two year period. During the temporary project, the superintendent may require phased mitigation to better conform to prescribed Scenery Conservation Management Class standards.

4. Scenery Conservation Management classes acknowledge existing visual contrasts. Existing facilities or visual contrasts will be brought into Scenery Conservation Management class conformance as the need or opportunity arises (i.e., utilities rights-of-way or easement renewals, modifications or improvements, facility, structure, or building improvements, or relocations, etc.).

General Impacts to Park Scenery Related to Alternative Management Zone Configurations — With regard to effects on scenery created by this plan, no direct effects to scenery are anticipated as this plan provides for general, programmatic level prescriptive guidance, rather than specific, direct proposed actions. Direct effects to scenery will be considered at project implementation level planning stages on a case-by-case basis.

The following outlined potential future actions illustrate potential impacts to Park scenery that must be addressed and would need to employ the visual resource contrast rating system as a guide to analyze potential visual impacts to Park scenery and appropriate design strategies to minimize adverse effects and potentially improve scenic quality at project implementation level actions. These outlined potential future actions will be compared on a relative basis with regard to potential effect between management zoning alternatives considering the extent to which each management zone type is applied in each alternative within the Park.

Construction of facilities ranging from small recreational sites such as trailheads, trails and footbridges, interpretive sites, parking areas, pullouts and restrooms to larger visitor center facilities and administrative facility developments, developed campgrounds, and designated picnic areas all create surface disturbance and effect Park Scenery. Design and construction of any of these type facilities, including improvements and modifications to existing developed sites, have both the potential to create adverse effects that could detract from the scenic quality or that could potentially improve the scenic quality, depending on how each development or improvement is implemented.

Visitor site facilities generally concentrate visitors within specific developed sites. Projected increases in use within these areas would likely increase impacts to scenic quality as increased visitor use tends to increase the proliferation of litter, and exacerbates erosion and damage to vegetation. Group size, although not a principal factor impacting scenic quality, could be an impact to other visitors if large groups concentrate in areas of high scenic value including effects to the setting, visibility, and specific scenic features where crowding creates additional traffic and congestion.

The construction, maintenance, and subsequent use of new water developments, such as spring developments, troughs, pumps, pipelines, and impoundments, have the potential to adversely impact scenic quality. These impacts would occur primarily through surface disturbing activities related to the construction and use (or maintenance of existing) water developments that create visual contrasts with the characteristic landscape, including visual contrasts in vegetation associated with the concentration of use in the immediate vicinity of water developments. Construction of new water developments to replace existing water developments that currently contrast with the landscape, if appropriately implemented could improve scenic quality. New water developments and improvements to existing water developments would be designed to mitigate visual impacts and to conform to the assigned Scenery Conservation Management Class objective.

Research uses in the Park could adversely impact scenic quality where research activities cause surface disturbance. Research design proposals would be required to mitigate impacts to scenic quality and conform to the assigned Scenery Conservation Management Class objective.

General Impacts to Park Scenery based on Fire Management Activities — Scenery influences the quality of visitor experiences and enjoyment of the Park, as well as the general perceptions of the health of the landscape. Although certain activities such as prescribed fire, when used as a management tool for Park resources, may in the short term have adverse effects on Park scenery with regard to minor tree scorching, understory vegetation loss and a general blackened landscape appearance, the long-term effects of this activity are generally beneficial as this management technique is an effective method to simulate natural conditions and processes, both desired conditions for Park scenery.

While the Park has been highly proactive and successful in reestablishing fire within the Park landscape through planned prescriptive fire management activities in recent decades, several locations within the Park remain overdue for more frequent low to moderate intensity fires that are generally characteristic of the natural fire cycle within this ecoregion. Within these areas, especially with regard to ponderosa pine germination, stand densities are quite dense and represent a differing condition than would naturally occur with more frequent low to moderate intensity fires.

Unnatural stand density adversely affects Park scenery and the overall landscape character in several ways. Dense forest stands with thick understory vegetation not only tends to appear monotonous, providing little visual variety for the viewer, but also significantly hinders visibility of the greater landscape by preventing visibility into and through these unnaturally dense forest stands.

Additionally, overly crowded ponderosa pine forest stands within the Black Hills have experienced an unprecedented epidemic of mountain pine beetle infestation that is killing large swathes of forests. The overall “unnatural” stand densities combined with drought conditions has generally been attributed to increased vulnerability of ponderosa forests falling prey to this “natural” pest infestation. Large stands of dying trees that become a discolored brown before dropping needles, create a condition that is generally considered “unsightly and unhealthy” by visitors to the Park and Black Hills. Standing dead timber, combined with drought conditions, also significantly increases the potential for catastrophic wildfire that would likely create long-term adverse effects to the natural processes, scenic qualities, and landscape character of the Park and adjacent landscapes.

In addition to serving other park resource management objectives, vegetation management activities such as thinning and prescribed fires can be used to improve scenic resources by creating conditions that are generally considered preferable to visitors with regard to settings with open vistas more reminiscent of conditions within the Southern Black Hills prior to extensive fire suppression activities having been initiated in the past century. By improving forest conditions to accommodate

frequent, low to moderate intensity fires, the overall effect on scenery (as well as natural processes) would be beneficial.

No-Action Alternative

Impacts — Under the no-action alternative, potential impacts to Park scenery would continue to stem from a general lack of specific methodology with regard to Park scenery conservation. That said, the designated natural zone, as described in the 1994 GMP specifically prescribes that "the natural zone would be managed to conserve the natural resources and processes of the park while accommodating uses that do not adversely affect those resources and processes," and that "Facilities in this zone would be dispersed and limited to those that have little effect on scenic quality and natural resources" (NPS 1994). In general, Park management has maintained and improved scenic resources throughout the landscape, even without a specific methodology, although without a prescribed methodology to evaluate and mitigate surface disturbing activities, there is greater potential to create adverse effects to Park scenery. Additionally, the recent 2011 land acquisition is not currently zoned, rendering an uncertain future with regard to scenery conservation principles.

The Park is divided into two zones, (1) natural, and (2) park development. The natural zone (27,292 acres, [excluding additions since 1994]) would be managed to conserve the natural resources and processes of the park while accommodating uses that do not adversely affect those resources and processes. Facilities in this zone would be dispersed and limited to those that have little effect on scenic quality and natural resources. The cave is managed as natural zone even though a portion of the cave underlies the development zone.

The park development zone (about 1,000 acres [less than 1,000 acres based on 2014 calculations]) includes the Elk Mountain campground, visitor center / administrative offices, parking, access roads, employee quarters, maintenance facilities, the corral/pasture area, and the well site. Also included in this zone is the 100-acre detached unit containing the spring that serves as the park's backup water supply.

Conclusion — Without specific methodology with regard to Park scenery conservation, the potential exists for inadvertent adverse effects to scenic resources in the existing zoned Park boundaries and within recently acquired lands.

Greater Park Alternative 1

Impacts — This alternative potentially represents the least amount of change to the greater Park area, although an exact correlation cannot be made as the new plan proposes management zones not currently in use and at a level of detail far greater than existing management zones. Most of the Park is zoned "Remote Natural" and as outlined, this management zone would likely present the greatest protection to scenic resources. Along US Highway 385 and County Road 7/11 at the southern entrance to the Park, the frontcountry natural zone has been applied. Because this zone permits limited development, depending on how well design fundamentals and strategies are employed, especially with regard to project siting, this area has a potential to be adversely affected by future project development.

The former bison corral site facility within the 2011 addition lands would be zoned for administrative services, as would the existing Park corrals at the north end of the Park adjacent to the

NPS 5 gravel road. Both of these zones would represent the existing land use character although neither had been previously "zoned" for this use. The former bison corral site facility is situated in such a manner that it is generally less visible from other areas within the Park and surrounding landscape. The proposed scenery conservation management class for this area is class III and so any future management activities or development should be easy to meet class III scenery conservation objectives and therefore would likely have negligible affects to Park scenery.

The corrals at the northern end of the Park are currently located in a highly scenic area of the Park, however are only visible from certain viewpoints, and while noticeable, especially within the immediate foreground, the facility generally does not attract attention to the casual observer. Being located within a proposed scenery conservation management class I area, any future modifications to this facility, including routine maintenance activities, will require careful consideration and application of design fundamentals and strategies to better blend this facility into the landscape so that it does not attract attention in order to avoid creating future adverse effects to the scenic character of this area. In general, the facility is currently located moderately well with regard to existing topography and the color, texture, and linear features of structural components are all relatively comparable to adjacent colors, textures, and lines in the landscape, especially the adjacent pines, including downed trees. Some of the driveline fences have been effectively erected in less visible locations while others are more conspicuous. Any potential future new alignments or relocations of corral structures and fences should carefully consider site location options in addition to material choices and design to improve existing impacts to Park scenery.

The small area zoned frontcountry natural on Rankin Ridge represents a future condition that is comparable to current land use with regard to the Rankin Ridge loop trail. Associated activities and landscape modifications within this zone would need to carefully consider class I scenery conservation management objectives to ensure that uses, activities, and development do not attract attention to the casual observer in order to avoid creating adverse effects to scenery.

Conclusion — The greatest potential changes to the greater Park area introduced by this alternative is the southern entrance area along highway 385 that is zoned frontcountry natural; most other locations do not propose changes to any great extent with regard to scenery conservation. Within the proposed frontcountry natural zone at the southern entrance, special care would be required to ensure Park scenery is not adversely affected prior to initiating any allowable use, activity, or development within this management zone that meets the proposed scenery conservation management objectives.

Greater Park Alternative 2

Impacts — This alternative potentially represents the most amount of change within the greater Park area and specifically within the 2011 addition lands as the proposed zoning would permit the greatest amount of development and intensity of land use compared to existing conditions although an exact correlation cannot be made as the new plan proposes management zones not currently in use within the new addition lands.

This alternative delineates the primary visitor service development zone at the intersection of US Highway 385 and County Road 7/11 and adjacent to the existing developed inholding along Highway 385, just below Gobbler Ridge. While these locations make sense with regard to a variety of resource protection considerations and visitor accessibility factors, prescription of this management zone within these locations presents the most significant challenges for scenery conservation as this

zone permits the greatest intensity of land use, development, and activities. Potential adverse effects to scenery would be the greatest within this zone with regard to proposed future visitor services development and so in order to avoid adversely affecting Park scenery it will be critical that any future development affectively employ appropriate design fundamentals and strategies that meet class II scenery conservation management objectives within these areas.

For the remaining areas along US Highway 385 and County Road 7/11 at the southern entrance to the Park and southeastern boundary of the 2011 addition lands, up to the Sanson Ranch area, the frontcountry natural zone has been applied. Because this zone permits limited development, depending on how well design fundamentals and strategies are employed, especially with regard to project siting, this area also has a potential to be adversely affected by future project development.

The former bison corral site facility within the 2011 addition lands and the corrals at the northern end of the Park are both zoned the same as in alternative 1 and so the impacts would likely also be the same as described in alternative 1.

This alternative zones South Dakota State Highway 87 valley corridor as historic in recognition of the setting encompassing this potentially eligible historic district. Zoning this area historic would likely provide beneficial effects to Park scenery as the emphasis on the eligible historic resources and/or district would be elevated. Given the fact that "scenery" and "scenic design" was the fundamental, historic purpose for constructing this road, any subsequent implementation level historic treatment actions would by necessity be required to address "historic integrity" for which natural and cultural scenic elements are fundamental.

Most of the remaining greater Park area is zoned remote natural and as outlined, this management zone would likely present the greatest protection to scenic resources.

Conclusion — The greatest potential change to the greater Park area introduced by this alternative is at the southern entrance area along Highway 385 that is zoned for primary visitor service development and within this same area, extending up to the Sanson Ranch area along County Road 7/11 at the southern entrance to the Park and southeastern boundary of the 2011 addition lands that is zoned Frontcountry Natural. These proposed management zones present the greatest challenges to Park scenery conservation requirements. Within the proposed primary visitor service development and frontcountry natural zones at the southern entrance, special care would be required to ensure Park scenery is not adversely affected prior to initiating any allowable use, activity or development within these management zones that meets the proposed scenery conservation management objectives. Zoning SD Highway 87 corridor historic would provide opportunities for enhanced beneficial effects to Park scenery as the emphasis on the "historically scenic" natural setting would be elevated. Most other locations do not propose changes to any great extent with regard to scenery conservation.

Greater Park Alternative 3

Impacts — This alternative represents a potentially moderate amount of change within the greater Park area including areas within the 2011 addition lands as proposed management zones would permit limited to more significant development and intensity of land use compared to existing conditions (although an exact correlation cannot be made as the new plan proposes management zones not currently in use within the new addition lands).

Along Highway 385 and portions of County Road 7/11 at the southern entrance to the Park, the frontcountry natural zone has been applied. The Cold Brook Canyon area immediately west of Highway 385 is also zoned Frontcountry Natural. Because this zone permits limited development, depending on how well design fundamentals and strategies are employed, especially with regard to project siting, this area has a potential to be adversely affected by future project development. Within the Cold Brook Canyon area, except immediately adjacent to the road, visibility is more confined and so likely impacts from potential future development in this location would likely be considerably minimized compared to locations adjacent to the southern entrance of the Park.

This alternative also delineates an administrative services development zone at the intersection of Highway 385 and County Road 7/11. While this location makes sense with regard to a variety of resource protection considerations and is in an accessible location strategically between the cave entrance and the Sanson Ranch site, prescribing this management zone at this location presents the most significant challenges for scenery conservation as this zone permits the greatest intensity of land use, development, and activities. Potential adverse effects to scenery would be the greatest within this zone with regard to proposed future administrative development and so in order to avoid adversely affecting Park scenery it will be critical that any future development affectively employ appropriate design fundamentals and strategies that meet class II scenery conservation management objectives within this area.

The former bison corral site facility within the 2011 Addition Lands would be zoned remote natural, indicating a potential future restoration of site to more natural condition. This potential future scenario would likely create beneficial effects to scenery, although because this site is situated in such a manner that it is generally less visible from other areas within the Park and surrounding landscape and the proposed scenery conservation management class for this area is class III, the beneficial effects would likely at best only represent a minor beneficial improvement.

This alternative zones South Dakota State Highway 87 valley corridor as historic in recognition of the setting encompassing this potentially eligible historic district. Zoning this area historic would likely provide beneficial effects to Park scenery as the emphasis on the eligible historic resources and/or district would be elevated. Given the fact that “scenery” and “scenic design” was the fundamental, historic purpose for constructing this road, any subsequent implementation level historic treatment actions would by necessity be required to address “historic integrity” for which natural and cultural scenic elements are fundamental.

Most of the remaining greater Park area is zoned remote natural and as outlined, this management zone would likely present the greatest protection to scenic resources.

Conclusion — The greatest potential change to the greater Park area introduced by this alternative is at the southern entrance area within the 2011 addition lands. Within this area the intersection of Highway 385 and County Road 7/11 is zoned for administrative services development and surrounding that same location and the Cold Brook Canyon area is zoned frontcountry natural. These proposed management zones present challenges to Park scenery conservation requirements, especially the administrative services development zoned location. Within these proposed zoned areas at the southern entrance, special care would be required to ensure Park scenery is not adversely affected prior to initiating any allowable use, activity, or development within these management zones that meets the proposed scenery conservation management objectives. Zoning the Highway 87 corridor historic would provide opportunities for enhanced beneficial effects to Park scenery as the emphasis on the “historically scenic” natural setting would be elevated. Most other locations do not

propose changes to any great extent with regard to scenery conservation.

Cumulative Impacts Conclusions. Any project that occurs within or adjacent to the Park has the potential to have an effect on the scenery of the park. Past development outside the park has impacted park scenery as many of the scenic resources seen from within the Park are actually located outside of the designated Park boundaries. If development to the east and south of the park continues without consideration to scenery conservation objectives, this could result in additional impacts to scenery both within the Park and within adjacent lands. It is not anticipated that implementation of the Zoning Management Plan and subsequent development within the Park would result in measurable impacts to park scenery. Subjecting any future development to additional compliance and mitigation is intended to prevent this from happening. Implementation of the Zoning Management Plan with regard to the greater Park area alternatives would not likely create additional adverse cumulative effects to scenic resources of the park and adjacent lands.

CULTURAL RESOURCES

Advisory Council on Historic Preservation (ACHP) regulations for implementing section 106 require that effects on historic properties be identified and evaluated by determining the area of potential effects (APEs); identifying APE cultural resources that are either listed in or eligible for listing in the national register; applying the criteria of adverse effect on these historic properties; and considering ways to avoid, minimize, or mitigate adverse effects on them.

Under ACHP regulations a determination of no historic properties affected, no adverse effect, or adverse effect must be made for national register-listed or national register-eligible historic APE properties. A determination of no historic properties affected is made when it is found that historic properties are present or there are no historic properties present, but the undertaking would have no effect on them. A determination of no adverse effect results when there is an effect on a resource but it would not diminish the characteristics of the historic property that qualify it for inclusion in the national register. An adverse effect occurs when an impact alters any characteristic of an historic property that qualifies it for inclusion in the national register in a manner that would diminish the integrity of its location, design, setting, materials, workmanship, feeling, or association. (36 CFR 800.5(a)(1)).

In addition to the NHPA analysis, the National Park Service is required to analyze impacts to cultural resources under the National Environmental Policy Act. Under this act, impacts to cultural resources are assessed as either adverse or beneficial. NHPA section 106 requires assessments of effects as either adverse or not adverse (see above discussion). Under both laws, adverse effects are those that negatively affect the integrity of elements important to the significance of a cultural resource. An impact on a cultural resource under NEPA regulations is not necessarily equivalent to an effect on a historic property under NHPA regulations. In this section, discussion of *impacts* is specific to NEPA regulations, while that of *effects* is specific to section 106 of the NHPA regulations.

ARCHEOLOGICAL RESOURCES

No-Action Alternative

Impacts — Under the no-action alternative, there would be no new management zones, resulting in periodic archeological surveying based on actions related to development or for general research

purposes. The existing management zones would continue to provide instruction on allowable uses. For the greater park area this primarily includes the natural zone, which is managed to conserve the resources and processes of the park while accommodating uses that do not adversely affect those resources and processes. Facilities in this zone are permitted in a dispersed manner and are limited to those facilities that have little effect on park resources. Adherence to the NHPA regulations and *Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation* and Director's Order 28: *Cultural Resource Management* would continue to be required. No long-term adverse impacts to archeological resources would be expected.

Conclusion — The no-action alternative would result in no additional adverse impacts to the archeological resources. Proposed development would be limited and require adherence to the existing park management zones and applicable law and policy.

Greater Park Alternative 1

Impacts — Under Greater Park alternative 1, management zone and transportation corridor overlays would not have any impact on archeological resources of the park; however, allowable uses within these overlays, if implemented, could have long-term direct adverse impacts.

Majority of the park would be zoned remote natural. Adverse impacts to archeological resources would be minimal within this zone. Development and allowable uses would be limited in context of ground disturbing activities. The placement of trails would be allowed, however, only natural surface trails would be permitted, if needed. Generally, trails would not be present except where needed for resource protection and in specific cases where long distance trails cross this zone. Trails would also strive to use existing disturbed areas such as wildlife paths.

Two distinct areas are zoned frontcountry natural, the southern park entrance adjacent to US Highway 385, and the developed area at Rankin Ridge. Long-term direct adverse impacts to archeological resources could result within frontcountry natural zoned areas as a result of the moderate level of development allowed, including overlooks, benches, wayside exhibits, parking areas, natural and hardened trails, and visitor entrance stations. These allowable uses, if implemented, could impact unknown archeological resources.

Three distinct areas, the former bison corral on Casey Addition, existing bison corrals, and the water supply units on the exterior of the main park boundary would be zoned for administrative services. Within the administrative service zoned areas long-term adverse impacts would not be expected to occur as these facilities currently exist. However, those actions that may have adverse impacts include any improvements/upgrades to those facilities. Any improvements would strive to use existing footprints to reduce potential impacts to avoid impacting unknown or known archeological resources.

In addition to the management zone overlays Greater Park alternative 1 includes three transportation corridors, US Highway 385 would be zoned as a primary corridor, State Highway 87 would be zoned as secondary corridor, and NPS Roads 5 and 6 would be zoned as tertiary corridors. These configurations would match how each of these transportation corridors currently functions within the park. No adverse impacts to archeological resources throughout the transportation corridors are expected.

To complete any of the allowable actions as it pertains to ground disturbing activities without causing severe damage to known and unknown archeological resources, qualified archeologists

would be needed to survey/inventory the proposed area of development for possible resources. Archeological resources in the proposed developed location(s) would be identified and delineated for avoidance prior to project work. If surveying is not possible prior to construction activities, an archeologist could monitor the site during construction. Any resources collected would be required to comply with the *Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation* and Director's Order 28: *Cultural Resource Management*.

Conclusion — Greater Park alternative 1 provides three management zone overlays and three transportation corridors. The potential exists for adverse impacts to known and unknown archeological resources where the zone or transportation corridor allows for ground disturbing actions such as the frontcountry natural, administrative services zones, or primary and secondary transportation corridors. Potential future development as zoned in this alternative utilized suitability analysis approach in an effort of avoidance on where to and not to develop. As a result, these long-term adverse impacts should be limited. Impacts would be most intense and long-term as it pertains to the footprint of proposed development. Prior to implementation of any action, subsequent planning (site specific) and best management practices such as surveying by a qualified archeologist would be utilized to reduce overall impacts. Greater Park alternative 1, compared to other Greater Park alternatives has the least amount of potential adverse impacts to archeological resources.

Greater Park Alternative 2

Impacts — Under Greater Park alternative 2, management zone and transportation corridor overlays would not have any impact on archeological resources of the park; however, allowable uses within these overlays, if implemented, could have long-term direct adverse impacts.

Majority of the park would be zoned remote natural. Adverse impacts to archeological resources would be minimal within this zone. The remote natural zone has similar impacts as those described in Greater Park alternative 1 remote natural zone. Please see description above of potential impacts.

Two distinct, relatively confined areas, adjacent to US Highway 385 would be zoned for primary visitor service development under Greater Park alternative 2. Facilities allowed within this zone include visitor centers, entrances/kiosks/stations, trailheads, parking lots, administrative activities, and concentrated campgrounds. Direct long-term adverse impacts would arise in the footprints of facilities and indirectly in the immediately adjacent areas as a result of large groups of visitors/staff this zone would expect to accommodate. However, potential future development as zoned in this alternative utilized suitability analysis approach in an effort of avoidance on where to and not to develop. As a result, adverse impacts should be limited. Impacts are of most concern to unknown archeological resources.

A primary component of this alternative zones the State Highway 87 corridor as historic in recognition of setting encompassing this potentially eligible historic district. Within the historic zoned corridor, no adverse impacts would be expected. Any realigning to the roadway would ensure archeological surveying/inventorying prior to implementation.

The southern entrance adjacent to US Highway 385 extending along the park boundary northeast towards the Sanson Ranch is zoned frontcountry natural. Long-term direct adverse impacts to archeological resources could result within frontcountry natural zoned areas as a result of the moderate level of development allowed, including overlooks, benches, wayside exhibits, parking areas, natural and hardened trails, and visitor entrance stations. These allowable uses, if implemented, could impact unknown archeological resources.

Three distinct areas, the former bison corral on Casey Addition, existing bison corrals, and the water supply units on the exterior of the main park boundary would be zoned for administrative services. Within the administrative service zoned areas long-term adverse impacts would not be expected to occur as these facilities currently exist. However, those actions that may have adverse impacts include any improvements/upgrades to those facilities. Any improvements would strive to use existing footprints to reduce potential impacts to avoid impacting unknown or known archeological resources.

In addition to the management zone overlays Greater Park alternative 2 includes three transportation corridors, US Highway 385 would be zoned as a primary corridor, state highway 87 would be zoned as secondary corridor, and NPS Roads 5 and 6 would be zoned as tertiary corridors. These configurations would match how each of these transportation corridors currently functions within the park. No adverse impacts to archeological resources throughout the existing transportation corridors are expected. Additionally, the existing two-track road that begins at County Road 7/11 to the Sanson Ranch/266th Street would be zoned as tertiary. Impacts to archeological resources could result if upgrades were to occur along the existing two-track road (tertiary corridor). This could result in adverse impacts to known or unknown archeological resources; however, previous archeological surveys were completed in 2010 for the Southern Black Hills Water System waterline. These surveys included a 200-foot wide corridor from the pipeline (100 feet on each side of centerline) and encompassed a majority of the existing two-track road (Calhoun and Flesh 2010). Those areas not surveyed previously would require additional surveys prior to any improvement of the two-track road. If the proposed road changes were implemented, long-term direct adverse impacts could result from the presence of archeological resources being within the area of development.

To complete any of the allowable actions as it pertains to ground disturbing activities without causing severe damage to known and unknown archeological resources, qualified archeologists would be needed to survey/inventory the proposed area of development for possible resources. Archeological resources in the proposed developed location(s) would be identified and delineated for avoidance prior to project work. If surveying is not possible prior to construction activities, an archeologist could monitor the site during construction. Any resources collected would be required to comply with the *Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation* and Director's Order 28: *Cultural Resource Management*.

Conclusion — Greater Park alternative 2 provides five management zone overlays and three transportation corridors. The potential exists for adverse impacts to archeological resources where the zone or transportation corridor allows for ground disturbing actions such as the primary visitor service development, frontcountry natural, administrative services, and all transportation corridors. Potential future development as zoned in this alternative utilized suitability analysis approach in an effort of avoidance on where to and not to develop. As a result, adverse impacts should be limited. Impacts would be most intense and long-term as it pertains to the footprint of proposed development. Prior to implementation of any action, subsequent planning (site specific) and best management practices such as surveying by a qualified archeologist would be utilized to reduce overall impacts. Greater Park alternative 2, compared to other Greater Park alternatives has the greatest amount of potential adverse impacts to archeological resources.

Greater Park Alternative 3

Impacts — Under Greater Park alternative 3, management zone and transportation corridor overlays would not have any impacts on archeological resources of the park, however, allowable uses within these overlays, if implemented, could have long-term direct adverse impacts.

The majority of the park would be zoned remote natural. Adverse impacts to archeological resources would be minimal within this zone. The remote natural zone has similar impacts as those described in Greater Park alternatives 1 and 2. Please see description above of potential impacts.

Three distinct areas, the existing bison corrals, water supply units on the exterior of the main park boundary, and where US Highway 385 and County Road 7/11 converge, would be zoned for administrative services. Within the administrative services zoned areas long-term adverse impacts could result in the newly proposed administrative area, however, not in the water supply or existing bison corral areas as these facilities currently exist. Actions that may have adverse impacts include any improvements/upgrades to those facilities. Any improvements would strive to use existing footprints to reduce potential impacts.

A primary component of this alternative zones State Highway 87 corridor as historic in recognition of setting encompassing this potentially eligible historic district. Within the historic zoned corridor, no adverse impacts would be expected. Any realigning to the roadway would ensure archeological surveying/inventorying prior to implementation.

Two distinct areas are zoned frontcountry natural, the southern entrance adjacent to US Highway 385, and the area west of US Highway 385 (Cold Brook Canyon Trail corridor). Long-term direct adverse impacts to archeological resources could result within frontcountry natural zoned areas as a result of the moderate level of development allowed, including overlooks, benches, wayside exhibits, parking areas, natural and hardened trails, and visitor entrance stations. These allowable uses, if implemented, could impact unknown archeological resources.

In addition to the management zone overlays Greater Park alternative 3 includes two transportation corridors, US Highway 385 and State Highway 87 would be zoned as a secondary, and NPS Roads 5 and 6 would be zoned as tertiary transportation corridors. Portions of these configurations match how these transportation corridors currently functions within the park, however, zoning US Highway 385 to secondary corridor in an effort to eliminate commercial and hazardous waste transportation would change the overall character and use of this road. Implementation of this action would require close coordination with federal, state, and local agencies. No adverse impacts to archeological resources would be expected from restricting commercial and hazardous wastes. Archeological resources could be adversely impacted from road maintenance operations including resurfacing, upgrades, snow removal or the construction of pullouts, overlooks, trailheads, and corresponding parking areas.

To complete any of the allowable actions as it pertains to ground disturbing activities without causing severe damage to known and unknown archeological resources, qualified archeologists would be needed to survey/inventory the proposed area of development for possible resources. Archeological resources in the proposed developed location(s) would be identified and delineated for avoidance prior to project work. If surveying is not possible prior to construction activities, an archeologist could monitor the site during construction. Any resources collected would be required to comply with the *Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation* and Director's Order 28: *Cultural Resource Management*.

Conclusion — Greater Park alternative 3 provides four management zone overlays and three transportation corridors. The potential exists for adverse impacts to archeological resources where the zone or transportation corridor allows for ground disturbing actions such as the frontcountry natural, administrative services zones, and the secondary transportation corridor. Potential future development as zoned in this alternative utilized suitability analysis approach in an effort of avoidance on where to and not to develop. As a result, adverse impacts should be limited. Impacts would be most intense and long-term as it pertains to the footprint of proposed development. Prior to implementation of any action, subsequent planning (site specific) and best management practices such as surveying by a qualified archeologist would be utilized to reduce overall impacts. Greater Park alternative 3 is comparable in potential adverse impacts to Greater Park alternative 1 and would expect to have fewer impacts as compared to Greater Park alternative 2 to archeological resources.

Cumulative Impacts Conclusions. The full extent of the archeology potential in the southern Black Hills is not known, nor has the archeology of the park been fully inventoried. Any project that occurs within the Park has the potential to have an effect on archeological resources. If development to the east and south of the park continues this could result in further cumulative impacts to archeological resources of the region. It is not anticipated that implementation of the Zoning Management Plan and subsequent development would result in impacts to park archeological resources. Subjecting any future development to additional compliance and mitigation is intended to prevent this from happening. Therefore, implementation of the Zoning Management Plan would not likely have cumulative effects to archeological resources in the Southern Black Hills.

ETHNOGRAPHIC RESOURCES

Common to All. Ethnographic resources, such as sites, structures, landscapes, stone features, prayer places, gathering locations, traditional and natural significant places exist in the area and are generally acknowledged as part of the ancestral and original territory of the Lakota and the Cheyenne (Albers et al. 2003). Additionally, several other tribes have varying degrees of historical and cultural affiliation with the Black Hills in the vicinity of Wind Cave.

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 statute and regulations.

No-Action Alternative

Impacts — Under the no-action alternative, there would be no new management zone overlays, resulting in no direct or adverse impacts to ethnographic resources and sacred sites. The existing management zones would continue to provide instruction on allowable uses. For the greater park area this primarily includes the natural zone, which is managed to conserve the resources and processes of the park while accommodating uses that do not adversely affect those resources and processes. Facilities in this zone are permitted in a dispersed manner and are limited to those

facilities that have little effect on park resources. Adherence to the NHPA regulations and *Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation* and Director's Order 28: *Cultural Resource Management* would continue to be required. No long-term adverse impacts to ethnographic resources throughout the greater park would be expected.

Conclusion — Park management would continue to consult with affiliated tribes to ensure proper protection of ethnographic resources. Existing management zones would continue to be utilized. No long-term adverse impacts to ethnographic resources throughout the greater park would be expected.

Greater Park Alternatives 1, 2, and 3

Impacts — Potential impacts to ethnographic resources as a result of the various proposed management zone overlays in the action alternatives would be barely perceptible and would likely not alter resource conditions, such as traditional access or site preservation, nor alter the relationship between the resource and the affiliated group's body of practices and beliefs. Appropriate environmental compliance and consultation with tribal offices would be completed prior to any allowable action as prescribed in the management zone overlay.

To complete any of the allowable actions as it pertains to ground disturbing activities without causing severe damage to ethnographic resources, affiliated tribes / associated Tribal Historic Preservation Offices (THPOs) would need to survey/inventory the proposed area of development for possible resources. Ethnographic resources in the proposed developed location(s) would be identified and delineated for avoidance prior to project work. If surveying is not possible prior to implementation of ground disturbing activities, an affiliated THPO/tribal representative(s) could monitor the site during construction. Any resources collected would be required to comply with the *Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation* and Director's Order 28: *Cultural Resource Management.*

Conclusion — Ethnographic resources in the Greater Park alternatives would be delineated by affiliated tribes/ associated THPOs for avoidance prior to implementation of any action. Any resources collected would be required to comply with the *Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation and Director's Order 28: Cultural Resource Management*. As a result, potential adverse impacts would be limited and or avoided.

Cumulative Impacts Conclusions. Ethnographic resources within and adjacent to the park in the southern Black Hills have not been fully disclosed or formally documented. It is not the intent of this plan to identify specific ethnographic resources in the park. American Indians desiring privacy for religious activities would continue to be disrupted occasionally by such things as presence of other visitors. Any project that occurs within the Park has the potential to have an effect on ethnographic resources. Subsequent compliance (site specific) and consultation with associated American Indian tribes would prevent/reduce potential impacts from implementation of actions associated with the Zoning Management Plan. Therefore, implementation of the Zoning Management Plan would not likely have cumulative impacts to ethnographic resources.

CULTURAL LANDSCAPE / HISTORIC STRUCTURES

No-Action Alternative

Impacts — Under the no-action alternative, there would be no new management zones. The existing management zones would continue to provide instruction on allowable uses. For the greater park area this primarily includes the natural zone, which is managed to conserve the resources and processes of the park while accommodating uses that do not adversely affect those resources and processes. Facilities in this zone are permitted in a dispersed manner and are limited to those facilities that have little effect on park resources. Greater park structures and State Highway 87 cultural landscape have no clear evidence of major disturbance and deterioration by natural and/or human forces. Modifications have been minor to ensure the resource integrity is maintained in good condition. Adherence to the NHPA regulations and *Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation* and Director's Order 28: *Cultural Resource Management* would continue to be required. No long-term adverse impacts to the potentially eligible cultural landscape (Highway 87 corridor) or historic structures throughout the greater park would be expected.

Conclusion — The no-action alternative would result in no additional adverse impacts to the potentially eligible cultural landscape (Highway 87 corridor) or historic structures throughout the greater park. Proposed development would be limited and require adherence to the existing park management zones and applicable law and policy.

Common to All (Greater Park Alternatives 1–3). All management zones as proposed would not diminish the characteristics of eligible or listed structures and landscapes. Historic structures and cultural landscapes location, design, setting, materials, workmanship, feeling, and association would not be impacted. An assessment of effect determination as part of NHPA section 106 will be completed with the South Dakota SHPO.

The implementation of any allowable use would require adherence to the NHPA and *Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation* and Director's Order 28: *Cultural Resource Management*. All subsequent actions would require their own compliance process to determine potential environmental consequences prior to implementation.

Greater Park Alternative 1

Impacts — Under Greater Park alternative 1, management zones and transportation corridor overlays would not likely have adverse impacts on the cultural landscape and historic structures. Greater Park alternative 1 provides three management zone overlays and three transportation corridors. The majority of the park would be zoned remote natural. Other zones include frontcountry natural, administrative services, and primary, secondary, and tertiary transportation corridors. Please see previous resource topics and chapter 2 for a description of specific locations.

The secondary transportation corridor which overlays State Highway 87 allows for some modifications and upgrades to the roadway, however, the focus on this roadway is an emphasis on scenic automobile tourism at slow travel speeds and not for the utilitarian transportation needs of nonpark roads. This was the original intent behind the construction of State Highway 87 and a primary theme of why it is a potential cultural landscape.

The potentially eligible cultural landscape along Highway 87 and the NRHP-listed Pigtail and Beaver

Creek Bridges would not be adversely impacted from the proposed management zone overlays. Any alteration to the listed bridges or potentially eligible road corridor (State Highway 87) would require consultation to ensure any action would not adversely affect the setting, materials, feeling, and association of the resources.

Other potentially eligible roads and homestead sites would not be adversely impacted by prescribed uses per zone. No alterations to structures or cultural landscapes are permitted within this alternative. Nothing is prescribed in the management zone and transportation corridors that would have an effect on these resources.

Conclusion — Greater Park alternative 1 provides three management zone overlays and three transportation corridors. No adverse impacts on the listed or eligible structures and landscapes are expected. Management zone and transportation overlays prescribe for minimal uses that could impact known structures and landscapes. Greater Park alternative 1, compared to other Greater Park alternatives has minimal level of potential adverse impacts to cultural landscapes and historic structures.

Greater Park Alternative 2

Impacts – Under Greater Park alternative 2, management zones and transportation corridor overlays would not likely have an adverse impact on the cultural landscape and historic structures. Greater Park alternative 2 provides five management zone overlays and three transportation corridors. Majority of the park would be zoned remote natural. Other zones include primary visitor services, frontcountry natural, administrative services, historic, and primary, secondary, and tertiary transportation corridors. Please see previous resource topics and chapter 2 for a description of specific locations.

The secondary transportation corridor which overlays State Highway 87 allows for some modifications and upgrades to the roadway, however, the focus on this roadway is an emphasis on scenic automobile tourism at slow travel speeds and not for the utilitarian transportation needs of nonpark roads. This was the original intent behind the construction of State Highway 87 and a primary theme of why it is potentially eligible cultural landscape.

A primary component of this alternative zones the State Highway 87 corridor as historic in recognition of the setting encompassing this potentially eligible historic district. Within the historic zoned corridor, no adverse impacts would be expected. Further, the cultural landscape would be the emphasis as it pertains to the implementation of any action. Road realigning and alterations would strictly follow the 2005 cultural landscape report treatment recommendations, including, but not limited to, rehabilitation of the historic road corridor to support current and future levels of vehicular, pedestrian, and bicycle traffic and manage for natural resource values while preserving the historic character and significant features that make this resource unique. This includes the historical road characteristics, vertical and horizontal road widths, retaining the current wayside and pull-off configurations. The historic zoned corridor along State Highway 87 corridor would have beneficial impacts on the cultural landscape.

The potentially eligible cultural landscape along Highway 87 and the NRHP-listed Pigtail and Beaver Creek Bridges would not be adversely impacted from the proposed management zone overlays (historic zone). Any alteration to the listed bridges or potentially eligible road corridor (State Highway 87) would require consultation to ensure any action would not adversely affect the setting, materials, feeling, and association of the resources. The Historic zoned corridor along State Highway

87 corridor will have beneficial impacts on the cultural landscape and structures as they will be the emphasized resource.

Other potentially eligible roads and homestead sites are not likely to be adversely impacted by prescribed uses per zone. No alterations to structures or cultural landscapes are permitted within this alternative. Nothing is prescribed in the management zone and transportation corridors that would have an effect on these resources.

Conclusion – Greater Park alternative 2 provides five management zone overlays and three transportation corridors. No adverse impacts to the listed or eligible structures and landscapes are expected. Management zone and transportation overlays prescribe for minimal to heavy uses that could impact known structures and landscapes such as the primary visitor services development, frontcountry natural zoned areas. Greater Park alternative 2 allows for the most development, however, using suitability analysis identified area where this is appropriate in an effort to reduce and avoid impacts to cultural landscapes and historic structures.

Greater Park Alternative 3

Impacts — Under Greater Park alternative 3, management zones and transportation corridor overlays would not likely have adverse impacts on the cultural landscape and historic structures. Greater Park alternative 3 provides four management zone overlays and two transportation corridors. The majority of the park would be zoned remote natural. Other zones include historic, frontcountry natural, administrative services, and secondary and tertiary transportation corridors. Please see previous resource topics and chapter 2 for a description of specific locations.

The secondary transportation corridor which overlays State Highway 87 allows for some modifications and upgrades to the roadway, however, the focus on this roadway is an emphasis on scenic automobile tourism at slow travel speeds and not for the utilitarian transportation needs of nonpark roads. This was the original intent behind the construction of State Highway 87 and a primary theme of why it is potentially eligible cultural landscape.

A primary component of this alternative zones State Highway 87 corridor as historic in recognition of the setting encompassing this potentially eligible historic district. Within the Historic zoned corridor, no adverse impacts would be expected. Further, the cultural landscape would be the emphasis as it pertains to the implementation of any action. Road realigning and alterations would strictly follow the 2005 cultural landscape report treatment recommendations, including, but not limited to, rehabilitation of the historic road corridor to support current and future levels of vehicular, pedestrian, and bicycle traffic and management for natural resource values while preserving the historic character and significant features that make this resource unique. This includes the historical road characteristics, vertical and horizontal road widths, retaining the current wayside and pull-offs configurations. The historic zoned corridor along State Highway 87 corridor will have beneficial impacts on the cultural landscape.

The potentially eligible cultural landscape along Highway 87 and the NRHP-listed Pigtail and Beaver Creek Bridges would not be adversely impacted from the proposed management zone overlays. Any alteration to the listed bridges or potentially eligible road corridor (Highway 87) would require consultation to ensure any action would not adversely affect the setting, materials, feeling, and association of the resources.

Other potentially eligible roads and homestead sites would not be adversely impacted by prescribed

uses per zone. No alteration to structures or cultural landscapes would be permitted within this alternative. Nothing is prescribed in the management zone and transportation corridors that would have an effect on these resources.

Conclusion — Greater Park alternative 3 provides four management zone overlays and two transportation corridors. No adverse impacts to the listed or eligible structures and landscapes are expected. Management zone and transportation overlays allow for minimal levels of use/development that could impact known structures and landscapes. Greater Park alternative 3 is comparable in potential adverse impacts to Greater Park alternative 1.

Cumulative Impacts Conclusions. Any project that occurs within or adjacent to the Park has the potential to have an effect on cultural landscapes and historic structures. Not all areas within and outside the park have been inventoried for resources of these types that are eligible for the National Register of Historic Places. However, the known eligible/listed cultural landscape (Highway 87 corridor) and historic structures (bridges) within the greater park area would not incur further impacts for the proposed management zones. If development to the east and south of the park continues this could result in impacts to cultural landscapes and historic structures that have yet to be evaluated outside the park. It is not anticipated that implementation of the Zoning Management Plan and subsequent development would result in impacts to uninventoried cultural landscapes, historic structures, and associated features within the park. Subjecting any future development to addition compliance and mitigation is intended to prevent this from happening. Therefore, implementation of the Zoning Management Plan would not likely have cumulative effects to cultural landscapes and historic structures in the region.

VISITOR EXPERIENCE

No Action Alternative

Impacts — Under the no-action alternative, there would be no long-term adverse or beneficial impacts to the visitor experience. No actions are proposed to reduce or expand the visitor experience. The existing management zones would continue to provide instruction on allowable uses. For the greater park area this primarily includes the natural zone, which is managed to conserve the natural resources and processes of the park while accommodating uses that do not adversely affect those resources and processes. Facilities in this zone are permitted in a dispersed manner and are limited to those facilities that have little effect on natural resources.

Conclusion — No short-to-long-term adverse impacts to the visitor experience would be expected under the no-action alternative. No actions are proposed to reduce or expand the visitor experience in the greater park area.

Greater Park Alternative 1

Impacts — Under Greater Park alternative 1 there would be negligible adverse and beneficial impacts to the visitor experience. The majority of the park would be zoned remote natural, where visitors would have opportunities for primitive recreation with some solitude, adventure, self-discovery, and self-directed learning. Generally, there would be no substantial change to the visitor experience from the existing visitor experience.

Two distinct areas are zoned frontcountry natural, the southern park entrance adjacent to US Highway 385 and the developed area at Rankin Ridge. Long-term direct beneficial impacts to the visitor experience could result within Frontcountry Natural zoned areas could arise as a result of the moderate level of development allowed, including overlooks, benches, wayside exhibits, parking areas, natural and hardened trails, and visitor entrance stations. These allowable uses, if implemented could enhance the existing visitor experience. Those areas identified for development would not take away from visitors wanting experiences of solitude and remoteness.

Three distinct areas, the former bison corral on Casey Addition, existing bison corrals, and the water supply units on the exterior of the main park boundary would be zoned for administrative services. Visitors use would be discouraged in the administrative zoned areas. Any use would be incidental, as the function of this zone is to support park operations. Restricted access in the administrative zone could be foreseen as an adverse impact.

In addition to the management zone overlays Greater Park alternative 1 includes three transportation corridors, US Highway 385 as primary corridor, State Highway 87 as secondary corridor, and NPS Roads 5 and 6 as tertiary corridors. These configurations would match how each of these transportation corridors currently functions within the park. There would be no adverse impacts to the visitor experience throughout the transportation corridors.

Conclusion — Greater Park alternative 1 provides three management zone overlays and three transportation corridors. Generally, there would be no substantial changes to the visitor experience from the existing visitor experience. No long-term adverse impacts to the visitor experience are expected. Increased visitor uses would be available within the frontcountry natural zoned areas, resulting in long-term beneficial impacts to the visitor experience. Adverse impacts to the visitor experience are only anticipated where visitor use is restricted, throughout the administrative service zoned areas. Those areas identified for development would not take away from visitors wanting experiences of solitude and remoteness.

Greater Park Alternative 2

Impacts — Under Greater Park alternative 2 there would be beneficial and adverse impacts to the visitor experience. The majority of the park would be zoned remote natural, where visitors would have opportunities for primitive recreation with some solitude, adventure, self-discovery, and self-directed learning. Generally, there would be no substantial changes to the visitor experience from the existing visitor experience.

Two distinct, relatively confined areas, adjacent to US Highway 385 would be zoned for primary visitor service development. Facilities allowed within this zone include visitor centers, entrances, kiosks, contact stations, trailheads, parking lots, administrative activities, and concentrated campgrounds. Primary visitor service zoned areas would enhance and increase visitor opportunities, resulting in long-term direct beneficial impacts. The southern entrance adjacent to US Highway 385 extending along the park boundary northeast towards the Sanson Ranch would be zoned frontcountry natural. Long-term direct beneficial impacts to the visitor experience could result within frontcountry natural zoned areas as a result of the moderate level of development allowed, including overlooks, benches, wayside exhibits, parking areas, natural and hardened trails, and visitor entrance stations. These allowable uses, if implemented, could enhance the existing visitor experience. Those areas identified for development would not take away from visitors wanting experiences of solitude and remoteness.

A primary component of this alternative zones State Highway 87 corridor as historic in recognition of setting encompassing this potentially eligible historic district. Within the historic zoned corridor, beneficial impacts would result from enhanced interpretative opportunities of the historic road corridor. Visitors would have the opportunity to learn about the role of automobile tourism in the Black Hills. No adverse impacts to the visitor experience would result in the historic zone.

Three distinct areas, the existing bison corrals, water supply units on the exterior of the main park boundary, and north of the 7/11 County Road along the park boundary would be zoned for administrative services. Visitors use would be discouraged in the three identified administrative zoned areas. Any use would be incidental, as the function of this zone is to support park operations. Restricted access in the administrative zone could be foreseen as an adverse impact.

In addition to the management zone overlays Greater Park alternative 2 includes three transportation corridors, US Highway 385 as a primary corridor, State Highway 87 as secondary corridor, NPS Roads 5 and 6 as tertiary corridors. These configurations would match how each of these transportation corridors currently functions within the park. No adverse impacts to the visitor experience would result. The existing two-track road that begins at County Road 7/11 to the Sanson Ranch/266th Street would be zoned as tertiary. This could result in long-term beneficial impacts to the visitor experience. Zoning and subsequently improving the two-track road for visitor use would provide additional opportunities for visitors to experience the newly acquired Casey Addition. This is especially true for visitors who are unable to hike on backcountry trails. This road would add to the overall scenic driving experiences at the Park for visitors.

Conclusion — Greater Park alternative 2 provides five management zone overlays and three transportation corridors. If implemented, management zone overlays allow for moderate to major levels of development, aimed at increased visitor opportunities. This includes various types of trails, overlooks, contact stations, and visitor centers. All would have direct, long-term beneficial impacts on the park's visitor experience. Adverse impacts on the visitor experience are only anticipated where visitor use is restricted, throughout the administrative service zoned areas. Increased visitor uses would be available within the frontcountry natural and primary visitor service developed zoned areas. Those areas identified for development would not take away from visitors wanting experiences of solitude and remoteness.

Greater Park Alternative 3

Impacts — Under Greater Park alternative 3 there would be beneficial and adverse impacts to the visitor experience. Majority of the park would be zoned remote natural, where visitors would have opportunities for primitive recreation with some solitude, adventure, self-discovery, and self-directed learning. Generally, there would be no substantial changes to the visitor experience from the existing visitor experience.

Three distinct areas, the existing bison corrals, water supply units on the exterior of the main park boundary, and where US Highway 385 and County Road 7/11 converge would be zoned for administrative services. Visitors would be discouraged in the three identified administrative zoned areas. Any use would be incidental, as the function of this zone is to support park operations. Restricted access in the administrative zone could be foreseen as an adverse impact.

A primary component of this alternative zones State Highway 87 corridor as historic in recognition of setting encompassing this potentially eligible historic district. Within the historic zoned corridor,

beneficial impacts would result from enhanced interpretative opportunities of the historic road corridor. Visitors would have the opportunity to learn about the role of automobile tourism in the Black Hills.

Two distinct areas are zoned frontcountry natural, the southern entrance adjacent to US Highway 385 and the area west of US Highway 385 (Cold Brook Canyon Trail corridor). Long-term direct beneficial impacts to the visitor experience could result within these areas as a result of the moderate level of development allowed, including overlooks, benches, wayside exhibits, parking areas, and visitor entrance stations. In addition, the Cold Brook Canyon Trail corridor could allow for improved trail development, allowing for more accessibility trail experience. These allowable uses, if implemented could enhance the existing visitor experience.

In addition to the management zone overlays Greater Park alternative 3 includes two transportation corridors, the US Highway 385 and State Highway 87 as a secondary corridor and NPS Roads 5 and 6 as tertiary corridors. Portions of these configurations match how these transportation corridors currently function within the Park, however, zoning US Highway 385 to secondary corridor in an effort to eliminate commercial and hazardous waste transportation would change the overall character and use of this road. Implementation would likely enhance the visitor experience as reduced traffic patterns would allow for visitors to experience the scenery and surroundings in a safe manner.

Conclusion — Greater Park alternative 3 provides four management zone overlays and two transportation corridors. If implemented, management zone overlays allow for moderate to major levels of development, amid at increased visitor opportunities. This includes varies types of trails, overlooks, contact stations, and visitor centers. All would have direct, long-term beneficial impacts on the park's visitor experience. Adverse impacts to the visitor experience are only anticipated where visitor use is restricted, throughout the administrative service zoned areas. Increased visitor uses would be available within the frontcountry natural and historic zoned areas. Those areas identified for development would not take away from visitors wanting experiences of solitude and remoteness.

Cumulative Impacts Conclusions. Any action taken within or adjacent to the Park has the potential to have an effect on the visitor experience. Past, ongoing, and reasonably foreseeable future actions both inside and outside of the Park continue to provide differing visitor experiences. Implementation of the Zoning Management Plan, in combination with the impacts previously described, would continue to add to the diverse opportunities for unique recreational experiences within the Park when compared to recreational experience opportunities provided in lands outside of the Park.

VISITOR CENTER ALTERNATIVE IMPACT ANALYSIS

CAVE/KARST RESOURCES

No-Action Alternative

Impacts — Under the no-action alternative, ongoing and/or periodic adverse impacts to cave/karst resources would be expected to potentially continue. While many previous impacts to cave and karst resources created by surface disturbances are typically indirect and direct correlation and magnitude is often not clearly defined or understood, in several instances direct correlation has been established. Maintaining the area as a development zone would likely perpetuate the potential for periodic adverse impacts to Wind Cave especially related to the impermeability roads, buildings, structures, pollution, and sedimentation resulting from storm water runoff and leaking sewer lines. Past and existing impacts are more fully discussed in the cumulative impacts section below.

Conclusion — Potential adverse impacts to cave and karst resources under the no-action alternative would persist based on existing and customary/typical intensities of land uses, facility development, and associated activities permitted within this area directly above Wind Cave.

Visitor Center Alternative A

Impacts — Potential impacts to cave and karst resources within the visitor center and headquarters area associated with alternative A would generally be expected to be similar to potential impacts outlined in the no-action alternative. An exact correlation is not possible as the existing delineated "development" zone (as mapped at 563 acres) is far smaller than the stated 1,000 acres and permitted activities and uses in the existing development zone are minimally detailed compared to the far more detailed proposed primary visitor service development zone as outlined in this plan. Additionally, as delineated in alternative A, the primary visitor service development zone would occupy 1,253 acres and would therefore expand the area of development within the area directly above the cave. Because this zone permits the greatest intensity of land use, development and activities, the potential to generate adverse effects to cave and karst resources would be the greatest within this zone and subsequently the greatest of all proposed alternatives, including the no-action alternative.

Conclusion — Potential adverse impacts to cave and karst resources under this alternative as management zones have been prescribed and delineated would be the greatest compared to all proposed alternatives, including the no-action alternative.

Visitor Center Alternative B

Impacts — The application of the resource protection zone in alternative B would provide greater emphasis on evaluating existing and potential future land uses, management activities, and infrastructure directly above the cave that have the potential to impact cave and karst resources. This increased emphasis would further encourage and promote more assertive strategies to remove or mitigate sources of potential adverse impacts to cave and karst resources within this zone. Specifically, this zone would encourage the possibility of relocating functions or facilities to more suitable locations before seeking funding to construct new or to expand existing facilities within this location. Gradual removal and relocation of administrative facilities, activities, and land uses

occurring directly above the cave within this area to another more suitable location would greatly reduce the potential risk of adverse impacts to cave and karst resources

Prescription of the resource protection zone in tandem with the historic zone would provide additional emphasis and management direction to carefully evaluate uses of existing buildings and infrastructure before considering new construction within this area. Indirect potential beneficial effects to cave and karst resources related to the prescription of the historic zone within this area could result from the potential removal of nonhistoric or noncontributing buildings and structures within the historic district related to any potential future historic restoration treatment actions. While the primary goal of such actions would likely be related to historic preservation within this area, cave and karst resources would also benefit from the removal of unnecessary (nonhistoric and noncontributing) buildings, paved surfaces, and associated infrastructure above the cave.

Conclusion — Alternative B would likely generate beneficial effects on cave and karst resources as the emphasis on direct resource protection within the resource protection zone, and potential indirect resource protection benefits within the historic zone could be achieved.

Visitor Center Alternative C

Impacts — Potential impacts related to management zone configurations in alternative C would likely be comparable to potential impacts described for alternative B, although the primary distinction would relate to greater emphasis of cave and karst resources as the resource protection zone is the largest under this alternative.

Conclusion — Alternative C would likely generate the greatest level of beneficial effects on cave and karst resources as the emphasis on direct resource protection would be the primary focus of management activities and visitor use within this alternative.

Cumulative Impacts Conclusions. Past, ongoing, and reasonably foreseeable cumulative impacts could continue to affect Wind Cave. In Wind Cave Canyon, much of the park's infrastructure was constructed directly above and into Wind Cave. Documented impacts to the cave have occurred in the past related to and stemming from surface level development, associated land uses, and activities. Past impacts to the cave and karst system directly from development includes construction and the associated effects of opening the "walk in" entrance next to the natural cave entrance, constructed trails and pathways within the cave, and the construction of the elevator shaft and elevator. In addition to these actions directly impacting the physical cave resources, these constructed changes also affect the cave microclimate by altering natural air flow exchange between the interior cave and exterior atmosphere. The addition of air locks have been introduced to attempt to mitigate the effects of altered air flow exchanges in order to help better maintain the cave's natural environment and air flow exchange rates.

The effects of visitation and visitor management would likely continue (lint, debris, algae growth, theft, etc.), and modification of surface drainage and groundwater diversion (which affect the hydrology of the cave and park surface resources), fire suppression actions, and modification of the surface entrances (which has changed the cave's microclimate) have cumulative effects on cave/karst resources.

Constructed facilities and infrastructure have also altered and modified surface drainage patterns and infiltration rates above the cave and currently affect natural cave hydrologic processes.

Continued growth of ponderosa pines planted by the Civilian Conservation Corps combined with past and ongoing fire suppression practices reduces infiltration of water into the cave and karst systems in this area as water uptake and evapotranspiration rates can be considerable.

The location of infrastructure and some land use practices above the cave have introduced pollutants and contaminants into the cave and karst groundwater systems from a variety of surface land uses, practices, and activities occurring in this area. Sources of past introduced pollutants and contaminants from surface activities that impact cave and karst systems include, but are not limited to parking lot runoff, resurfacing park roads with oil-based products, sewage line and lagoon leakage, and new construction.

In 1995, numerous breaks in the sewer system within the historic district were discovered and in 2001, the sewer lines in the park were replaced with dual walled high-density polyethylene lines with detection ports to minimize potential future leaks. Shortly thereafter, the sewage lagoons supporting the visitor center and park headquarters were removed and reconstructed at a location further downstream and not directly above the cave. The use of historic privies has long been curtailed and the privies sealed and/or removed, although these sources likely also contributed contaminants into the cave and kart system in the past.

Historic and existing roadway runoff, including runoff within the visitor center parking lot prior to 2005, are the likely sources for high nitrate levels and trace amounts of chloroform, caffeine, toluene, acetone, benzene, ethyl benzene, meta and para-xylene, ortho-xylene, methyl isobutyl ketone, and styrene that have been detected in cave drip waters below primary Park infrastructure and parking lots. Hydrocarbons have also been detected within Wind Cave and while most contaminants including hydrocarbons generally appear to be associated with surface water infiltration percolating into the ground as part of groundwater recharge processes, the extent to which these components result from air pollution deposition and the potential introduction of air pollutants into the cave from air emissions being drawn into the cave as part of the natural barometric pressure air exchange characteristic of this cave is unknown.

The “Mixing Circle” is an open-air storage area used for miscellaneous supplies and equipment, winter storage of excess vehicles, and for the temporary storage of garbage and road-building supplies. Some materials discarded at the Mixing Circle have been dumped directly into the Cottonwood Creek drainage, an intermittent flowing stream. A slash burn pile is located adjacent to the drainage. Historically, treated fence posts were also burned at this site. Although burning of fence posts has been stopped, wind throw and slash are still burned at slash burn pile site located adjacent to the Cottonwood Creek drainage channel. Water-quality testing revealed that pentachlorophenol, chromium, copper, and arsenic from historic post treatment processes were detected in cave water at two sites down dip from the Mixing Circle.

The temporary and ongoing storage of garbage, hazardous materials and chemicals, and construction materials in karst areas is generally considered an inappropriate and risk-prone practice. The 1994 General Management Plan recommended that use of this site and associated practices in this location cease and for the materials and functions to be removed and relocated to a suitable site not above the cave, although to date, this task has yet to be accomplished. Accidental and/or unreported spills of hazardous materials and pollutants have and/or likely have occurred in the past and remain a risk. In 2002 several gallons of diesel fuel was spilled in the visitor center parking lot where the fuel entered a storm water drain that emptied into Wind Cave Canyon, directly above the cave and reportedly seeped into the ground and was not recovered before entering the subsurface cave and karst system.

The significance and magnitude of these past and present cumulative effects as well as the

relationship and compounded impacts to other resources and processes is not fully understood although these past and existing impacts are measureable, have been documented and continue to be monitored.

While many of the identified and documented impacts have been mitigated, the continued use of facilities and related activities directly above the cave will always pose a potential threat to cave and karst resources as all human constructed systems are prone to potential or eventual failure. Efforts to resolve the various sewage problems and the reconstruction of the visitor parking area to capture contaminated surface storm water have significantly minimized the potential for ongoing impacts to the cave and karst systems to originate from these sources. The continued use and presence of facilities and infrastructure directly above the cave requires enhanced scrutiny as well as perpetual monitoring and maintenance to ensure that cave resources and karst processes are not adversely impacted by these constructed systems and land uses. Given the fact that impacts from previous "appropriately designed" and constructed infrastructure has occurred in the past, it is realistic to consider that the chance of future, similar impacts is entirely possible. The continuation of existing land use practices, including the use and/or expansion of existing facilities and/or the construction of new facilities directly above the cave that can be sited in other more suitable locations that do not affect cave and karst resources, therefore unnecessarily risks impacting and potentially impairing fundamental cave resources and karst processes.

While the parking lot storm water runoff system and historic sewage lines and lagoon leaks have been redesigned to mitigate past impacts from these sources, the potential for future system and infrastructure failure is always present as long as these systems are in use. The potential for catastrophic contamination also remains possible and could be caused by land use practices such as hazardous material and fuel leaks or spills in locations where materials are transported, stored, managed, used or handled directly above the cave and karst systems. Contamination caused by structural fires in locations where buildings exist is also possible. Maintaining existing facilities within this location would continue to alter drainage patterns and natural infiltration patterns, and would therefore continue to have an adverse impact on a small portion of the cave, adding to past impacts.

Because of this relatively straight forward impact scenario, the Park has adopted National Park Service BMPs related to appropriate facility siting, land use practices, and activities directly above the cave. The National Park Service is committed to continuing to permit only those uses necessary to be located directly above the cave such as providing visitor access to the primary cave resource, while all other land uses, practices, and development will be gradually and systematically be relocated to appropriate locations that will not affect cave and karst systems. Following the publication of this zoning plan, a comprehensive facility needs assessment and development concept plan is needed to evaluate existing infrastructure and uses to determine appropriate locations of future surface facilities and associated land uses. A phased implementation plan is also needed to outline and guide future actions related to moving existing functions and infrastructure above the cave to appropriate locations before seeking funding for maintenance or expansion of existing or construction of any future facilities and infrastructure.

The potential for future impacts similar to past impacts from uses and activities associated with facilities and infrastructure located directly above the cave will depend on how proactively the agency engages in relocating inappropriate and/or unnecessary land uses, facilities and infrastructure that are currently sited directly above the cave, to locations that will not affect these resources. Beneficial cumulative effects on cave resources and karst systems will depend on how well past impacts are mitigated including when and if facilities and infrastructure above the cave are removed and the natural systems and site conditions are restored and natural functions improved.

SCENERY/VIEWSHED

No-Action Alternative

Impacts — In general, impacts to Park scenery within the visitor center and park headquarters area have been minimal as most human modifications have typically and carefully considered scenery with regard to facility designs, scale, materials, forms, and colors. Modifications, changes, and expansion of the visitor center and administrative facilities have steadily continued within this area since the Park was first established. Most modifications within this setting, especially the 1930s CCC/WPA development represent a sympathetic use of materials and forms that reflect or are generally visually compatible with the surrounding landscape.

Under the no-action alternative, this area is designated as a development zone, although the exact parameters related to allowable uses and intensity of development within this zone are not fully outlined. While visual impacts to Park scenery within this area can generally be characterized as minimal, the lack of defined permitted levels and intensities of development, uses and activities combined with a lack of scenery conservation management objectives within this specific location creates an ongoing potential risk that scenery could be adversely affected. The greatest protection to scenery within this immediate area stems from the fact that much of the visitor center and headquarters area is a national register listed historic district providing some protection with regard to the historic setting and potential future impacts. Although the historic district provides some ancillary protection to scenic resources within this specific location, a steadily increasing human population along with the corresponding increase in Park visitation renders a situation that requires gradual changes to accommodate larger crowds. While the Park is to be commended for appropriate and careful changes and facility expansions at this site, especially with regard to maintaining historic integrity of the listed district, it is the gradual and steady changes that present the greatest risks to impacting Park scenery in this immediate setting.

The “natural” or “walk-in” entrance will be used to illustrate this issue. The natural or walk-in entrance has been redesigned and reconstructed several times since the cave was first developed as a tourist feature and then as a National Park. While the need to maintain an airlock to simulate conditions that might be or might have been “more natural” with regard to air flow is critical for this fundamental resource, the more recent designs have not always best addressed scenery conservation management principles and the visual appearance of this entrance. In no way should it be construed that natural cave functions and processes should be subverted by any perceived need to elevate scenic resources, but rather that both resources must be appropriated addressed and protected before taking any future actions.

While the “natural” walk-in entrance *as constructed* in the 1930s perhaps blended in best with the surrounding landscape, it did not provide an adequate air seal. The revolving door installed in the early 1990s attempted to provide a better air seal, but visually contrasted with the surrounding landscape and in time did not affectively control air flow. The most recent entrance completed in 2014, was constructed to improve the air seal and was designed to partially blend in with the natural setting. This current entrance makes use of large stone boulders and bermed earth that repeat similar characteristics of the surrounding landscape to a limited extent, and also uses a stone veneer that while being *similar* to stone work in adjacent buildings and structures is noticeably different. The newly constructed entrance would likely have created fewer visual contrasts, especially related to the very sharp angles and straight faces of the boxy, stone veneered wall, and would have blended in better by repeating the forms of the *natural* setting, rather than attempting to mimic or duplicate historic stone walls within the immediate historic setting. Comparing the design and appearance of

the 1930s "natural" walk-in entrance with the 1990 and 2014 entrances provides an effective illustration related to how modifications that repeat the landscape's basic elements can harmonize (1930s) or look out of place and contrast in varying degrees with the natural surroundings (1990 and 2014). While neither the 1990 nor 2014 constructed entrances would constitute significant adverse impacts to Park scenery, incremental changes and modifications to the landscape setting such as these, including the gradual accumulation of differing materials, forms, and design styles present the greatest, albeit subtle, ongoing risk for generating adverse impacts to Park scenery.

Conclusion — Without specific methodology with regard to Park scenery conservation, the potential exists for inadvertent adverse effects to scenic resources in the Park.

Visitor Center Alternative A

Impacts — Alternative A applies three zones: primary visitor services development, remote natural, and primary passage corridor.

Under this alternative, the majority of the existing Park headquarters and visitor center service area would be zoned for primary visitor services development to continue providing visitor education, interpretation, orientation, parking, and customary amenities in a manner that would be generally comparable to existing conditions. The greatest concentration of buildings and structures within the Park are currently located in the visitor center area directly above the entrance(s) to Wind Cave.

Historically, site facilities were constructed directly above the cave to provide direct access and to be within close proximity to the primary cave resource. However, the fact that the natural entrance to the cave also happened to be situated in a "lower" topographic position within a shallow canyon provided additional opportunities for the historic developments to be constructed in less visible locations within the landscape. From a scenery conservation standpoint, constructing facilities within this canyon was an effective design principle to avoid adversely affecting scenery within the greater Park area. Additionally, the overall scale and stature of facilities within the visitor center area were intentionally designed to be relatively low profile and made use of similar or compatible building materials so as to better fit into the surrounding natural landscape. The design principles employed in the visitor center area, while representing a specific historic Park architectural style now recognized as a historically significant district, generally harmonize well within the immediate surrounding landscape. Facilities throughout the primary visitor service development zone would likely continue to include existing visitor center facilities and could also continue to provide associated administrative functions, such as those currently housed within the existing visitor center.

Because the primary visitor service development zone would permit the greatest intensity of site facility development and associated activities for public visitation and use of this area, including additional opportunities to potentially expand the existing footprint of visitor use and administrative facilities, potential adverse effects to scenery would be the greatest within this zone. While the historic district buildings and structures generally harmonize well with the surrounding landscape, construction of additional facilities, as in the case of later "Mission 66" developments, runs the risk of introducing elements that could potentially contrast both with the immediate surrounding landscape, and with the established historic district in a discordant manner. Potential adverse effects to scenery would be the greatest within this zone with regard to any additional future visitor services development, and so in order to avoid adversely affecting Park scenery it will be critical that any future development affectively employ appropriate design fundamentals and strategies that meet class II scenery conservation management objectives within this area. For many of the same scenery conservation reasons this site was historically selected for primary visitor facilities as it is situated

within a less visible topographic position, this location would continue to provide opportunities for class II scenery conservation management objectives to be effectively achieved with regard to potential future management activities or development.

The remaining area would be zoned remote natural, and would provide visitors with undeveloped, primitive, and self-directing experiences within a natural setting. Facilities within this zone would generally be limited to those required for resource protection or for visitor safety. The remote natural zone as applied in this alternative would correspond with and serve as a continuation to the proposed adjacent remote natural zone as described in the Greater Park alternatives.

As outlined, this management zone would likely provide the greatest protection to scenic resources as developed facilities would generally be absent except those necessary for resource protection. Permitted ground disturbing activities would be limited. Visitor uses would be primarily self-directed with associated use levels likely being relatively low and characterized by more primitive and solitary natural experiences. Unpaved trails and associated structures such as footbridges or boardwalks in sensitive resource areas would be permitted within this zone on a limited basis and would be constructed in a manner that would harmonize with the natural setting. Following these prescribed conditions and associated scenery conservation management zone class objectives would likely generate minimal to negligible adverse impacts to Park scenery within this zone.

The primary passage corridor zone along Highway 385 would generally not change roadway existing conditions in any measureable manner and thus associated impacts to scenery would likely be negligible.

Conclusion — The greatest potential change to the visitor center area introduced by this alternative is the extent of the zoned primary visitor service development area and this proposed management zone would present the greatest challenge to Park scenery conservation requirements. Within the proposed primary visitor service development zone, special care would be required to ensure Park scenery is not adversely affected prior to initiating any allowable use, activity, or development within these management zones that meets the proposed scenery conservation management objectives.

Visitor Center Alternative B

Impacts — Application of the historic zone immediately surrounding and encompassing the listed visitor center and park headquarters historic district, would emphasize restoration or rehabilitation and reuse of these buildings, structures, and immediate cultural landscape and would likely provide enhanced future preservation opportunities for identified historic resources. While specific details of any potential future effects would be possible only to determine as part of implementation level planning efforts, a process of mutual inclusivity regarding both scenery conservation and historic preservation practices, should generally and without significant exception provide beneficial effects for both resource categories. The underlying premise for scenery conservation and historic preservation with respect to each of these two resource types must necessarily be grounded in a solid understanding of Park purpose and individual resource protection objectives. The combined consideration of potential future, and formally approved, implementation level historic resource treatments and class II Scenery Conservation Management objectives, if properly performed, would likely generate beneficial effects to Park scenery while at the same time providing improved preservation conditions for identified historic resources.

The resource protection zone prescribed in this alternative would emphasize protection of Wind Cave proper as this zone is delineated directly above the known cave extent. The resource protection

zone includes both class I and class II scenery conservation management areas. From a scenery conservation standpoint, any potential future development or modifications to existing development would be more appropriate and would likely create fewer adverse effects for actions taken within class II areas compared to locations within class I areas within this zone. The resource protection zone permits minimal development as may be necessary to accommodate Park visitors in a manner that would protect identified sensitive resources. Potential impacts to scenery within this zone would primarily be limited to new development that could be implemented for accessibility or for Resource Protection purposes. Although trails would not generally be constructed within this zone, in limited instances designated trails may be necessary to ensure protection of sensitive resources or to meet appropriate accessibility standards. Any introduced elements or landscape modifications, including parking areas, new buildings or trails, have a potential to adversely affect the scenic quality of this natural and historic setting. Particular emphasis on scenery conservation principles (in addition to other resource protection considerations) would be required prior to establishing any formal paths, trails, informational exhibits, or associated infrastructure within this zone.

Under this alternative, the Elk Mountain Campground would be zoned for primary visitor services development to continue providing developed camping opportunities for visitors, including education and interpretation programs and customary amenities in a manner that would be generally comparable to existing conditions. Because the primary visitor service development zone would permit the greatest intensity of site facility development and associated activities for public visitation and use of the campground, including additional opportunities to potentially expand services within the existing campground footprint, potential adverse effects to scenery would be the greatest within this zone.

While the existing the campground is generally less visible within the surrounding landscape, construction of additional facilities runs the risk of introducing elements that could potentially contrast with the immediate surrounding landscape, in a discordant manner. Potential adverse effects to scenery would be the greatest within this zone with regard to any additional future visitor services development and so in order to avoid adversely affecting Park scenery it will be critical that any future development affectively employ appropriate design fundamentals and strategies that meet class II scenery conservation management objectives within this area.

The existing wastewater lagoons would be zoned for administrative services for Park support functions. This management zone is designed primarily for park administrative and maintenance functions necessary to support resource management and visitor services associated with operating a public national park. As situated in the lower Prairie Dog Canyon, behind a low ridge, the wastewater lagoons are generally not visible from key view points within the Park and adverse impacts to Park scenery are currently negligible. Potential future actions that could have adverse impacts would include any changes or upgrades to those facilities although it is anticipated that associated future impacts would likely remain negligible. Any improvements would strive to use existing footprints and appropriate design fundamentals and strategies to minimize potential impacts to scenery.

The primary passage corridor zone along Highway 385 would generally not change roadway existing conditions in any measureable manner and thus associated impacts to scenery would likely be negligible.

The remaining area would be zoned remote natural, and would provide visitors with undeveloped, primitive, and self-directing experiences within a natural setting. Potential impacts would likely be the same as those identified in alternative A

Conclusion — The greatest potential change to the visitor center area introduced by this alternative is the historic zone and the surrounding resource protection zone. These zone configurations are not

likely to adversely impact the visitor center scenic resources and most likely would present opportunities for beneficial effects to Park scenery within this location. Within the other proposed zones, especially the Elk Mountain Campground primary visitor service development and administrative zoned areas, special care would be required to ensure Park scenery is not adversely affected prior to initiating any allowable use, activity or development within this management zone that meets the proposed scenery conservation management objectives.

Visitor Center Alternative C

Impacts — Management zones configured in alternative C are similar to those in alternative B with the exception that the entire area above the known cave extent is zoned for resource protection without application of the historic and administrative services zones.

The resource protection zone prescribed in this alternative would emphasize protection of Wind Cave proper as this zone is delineated directly above the known cave extent. The resource protection zone includes both class I and class II scenery conservation management areas. From a scenery conservation standpoint, any potential future development or modifications to existing development would be more appropriate and would likely create fewer adverse effects for actions taken within class II areas compared to locations within class I areas within this zone. The resource protection zone permits minimal development as may be necessary to accommodate park visitors in a manner that would protect identified sensitive resources. Potential impacts to scenery within this zone would primarily be limited to new development that could be implemented for accessibility or for resource protection purposes. Although trails would not generally be constructed within this zone, in limited instances designated trails may be necessary to ensure protection of sensitive resources or to meet appropriate accessibility standards. Any introduced elements or landscape modifications, including parking areas, new buildings, or trails have a potential to adversely affect the scenic quality of this natural and historic setting. Particular emphasis on scenery conservation principles (in addition to other resource protection considerations) would be required prior to establishing any formal paths, trails, informational exhibits, or associated infrastructure within this zone.

Under this alternative, the Elk Mountain Campground would be zoned in the same configuration as alternative B for primary visitor services development to continue providing developed camping opportunities for visitors, including education and interpretation programs and customary amenities in a manner that would be generally comparable to existing conditions. The management zone configuration and potential impacts in this alternative would be the same as described in alternative B.

The primary passage corridor zone along Highway 385 would generally not change roadway existing conditions in a measureable manner and thus associated impacts to scenery would likely be negligible.

The remaining area would be zoned remote natural, and would provide visitors with undeveloped, primitive, and self-directing experiences within a natural setting. Potential impacts would likely be the same as those identified in alternative A

Conclusion — The greatest potential change to the visitor center area introduced by this alternative is the resource protection zone. This zoning configuration would not likely adversely impact the visitor center scenic resources. Within the other proposed zones, especially the Elk Mountain Campground primary visitor service development zoned area, special care would be required to ensure Park scenery is not adversely affected prior to initiating any allowable use, activity, or

development within this management zone that meets the proposed scenery conservation management objectives.

Cumulative Impacts Conclusions. Any project that occurs within and adjacent to the Park has the potential to have an effect on the scenery of the park. However, the visitor center area is located in a shallow canyon with vegetation primarily composed of grassy slopes and scattered ponderosa pine stands on hillsides. These features largely protect it from outside views beyond the immediate foreground. It is not anticipated that implementation of the zoning management plan and subsequent development would result in measurable impacts to park scenery within the existing visitor center and headquarters area. Additional compliance and mitigation would be required for any implementation level actions and would likely prevent adverse impacts to Park scenery based on NPS initiated actions. Implementation of the zoning management plan would not likely create additional adverse cumulative effects to scenic resources of the park and adjacent lands and may in fact help provide beneficial effects to scenery within the larger context of the southern Black Hills.

ARCHEOLOGICAL RESOURCES

No-Action Alternative

Impacts — Under the no-action alternative, there would be no new management zones, resulting in periodic archeological surveying based on actions related to development or for general research purposes. The existing management zone would continue to be designated as a development zone, (approximately 563 acres) although the exact parameters related to allowable uses and intensity of development within this zone are not fully outlined.

In general, direct adverse impacts to archeological resources are negligible. Majority of the visitor center area overlay has been surveyed for archeological resources. As a result, it would be relatively simple to avoid impacts to those resources by planning around them. Future uses would be directed to areas that don't include archeological resources. Those areas that do contain archeology would require adherence to the NHPA regulations and the *Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation* and Director's Order 28: *Cultural Resource Management*. No long-term adverse impacts to archeological resources would be expected.

Conclusion — The no-action alternative would result in no adverse impacts to the archeological resources. Any ground disturbing activity would be limited and would focus on areas where no archeological resources are present.

Visitor Center Alternative A

Impacts — Under alternative A, management zone and transportation corridor overlays have the potential for adverse impacts to archeological resources. This would be most prevalent through the primary visitor services development zone. Overall impacts would be minimal as the majority of this area has been surveyed for archeology. Resources in the proposed developed locations would be identified and delineated for avoidance. Any future use would be directed to areas that don't include archeology resources. Those areas that do contain archeology would require adherence to the NHPA regulations and *Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation* and Director's Order 28: *Cultural Resource Management*. No long-term adverse impacts to archeological resources would be expected.

Conclusion — Visitor center alternative A includes two management zone overlays and one transportation corridor. Any ground disturbing action has the potential to impact known and unknown archeological resource. However, since majority of this area has been surveyed, potential impacts would be limited as any use would strive for avoiding areas that contain resources. Prior to implementation of any action, subsequent planning (site specific) and best management practices would be utilized.

Visitor Center Alternative B

Impacts — Under alternative B, management zone and transportation corridor overlays have the potential for adverse impacts to archeological resources. Impacts would be unlikely as the majority of the management zone overlays include prescriptions on reduction of development and ground disturbing activities. In addition, majority of this area has been surveyed for archeology; as a result, potential adverse impacts would be limited. Alternative B primary focus is resource protection and historic resource emphasis. This focus lends itself towards further archeological resource protection, thus having a beneficial impact. Resources in the proposed developed locations would be identified and delineated for avoidance. Any future use would be directed to areas that don't include archeology resources. Those areas that do contain archeology would require adherence to the NHPA regulations and the *Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation* and Director's Order 28: *Cultural Resource Management*. No long-term adverse impacts to archeological resources would be expected.

Conclusion — Visitor center alternative B includes five management zone overlays and one transportation corridor. Any ground disturbing action has the potential to impact known and unknown archeological resource. However, since majority of this area has been surveyed, potential impacts would be limited as any use would strive for avoiding areas that contain resources. Prior to implementation of any action, subsequent planning (site specific) and best management practices would be utilized.

Visitor Center Alternative C

Impacts — Under alternative C, management zone and transportation corridor overlays have the potential for adverse impacts to archeological resources. Impacts would be unlikely as majority of the management zone overlays includes prescriptions on reduction of development and ground disturbing activities. In addition, the majority of this area has been surveyed for archeology; as a result, potential adverse impacts would be limited. Alternative C primary focus is resource protection. This focus lends itself towards further archeological resource protection, thus having a beneficial impact. Resources in the proposed developed locations would be identified and delineated for avoidance. Any future use would be directed to areas that don't include archeology resources. Those areas that do contain archeology would require adherence to the NHPA regulations and the *Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation* and Director's Order 28: *Cultural Resource Management*. No long-term adverse impacts to archeological resources would be expected.

Conclusion — Visitor center alternative C includes three management zone overlays and one transportation corridor. Potential impacts related to management zone configurations in alternative C would likely be comparable to potential impacts described for visitor center alternative B.

Cumulative Impacts Conclusions. The full extent of the archeology potential in the southern Black Hills is not known, nor has the archeology of the park been fully inventoried. Any project that occurs within the Park has the potential to have an effect on archeological resources. If development to the east and south of the park continues this could result in further cumulative impacts to archeological resources of the region. It is not anticipated that implementation of the Zoning Management Plan and subsequent development would result in impacts to park archeological resources. Subjecting any future development to additional compliance and mitigation is intended to prevent this from happening.

Therefore, implementation of the Zoning Management Plan would not likely have cumulative effects to archeological resources in the Southern Black Hills.

ETHNOGRAPHIC RESOURCES

The Black Hills and the surrounding plains have special meaning and cultural significance for many American Indians with long standing cultural affiliations to this region. The contemporary name "Wind Cave" is derived from the winds that are generated by barometric pressure differentials between the interior and exterior cave environment and that are most conspicuous at the blowhole adjacent to the walk-in entrance near the Park visitor center.

Specifically, the cave is considered a sacred site for many American Indians and is part of a larger network of important and sacred sites within the greater area. Traditional offerings are occasionally left at the natural entrance. Because the cave is considered sacred, it is important that any future constructed modifications or other changes to this site and the immediate setting take into consideration potential effects to the cultural values associated with this site and continued or possibly restored opportunities for sacred practices related to this resource.

While no one specific management zone would likely impact ethnographic values associated with this resource and site any more than another, future implementation level actions taken within the visitor center area would require consultation with affiliated tribes as any action could have the potential to affect cultural values related to this resource.

To complete any of the allowable actions as it pertains to ground disturbing activities without causing severe damage to ethnographic resources, affiliated tribes/associated Tribal Historic Preservation Offices (THPOs) would need to survey/inventory the proposed area of development for possible resources. Ethnographic resources in the proposed developed location(s) would be identified and delineated for avoidance prior to project work. If surveying is not possible prior to implementation of ground disturbing activities, an affiliated THPO/tribal representative(s) could monitor the site during construction. Any resources collected would be required to comply with the *Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation* and Director's Order 28: *Cultural Resource Management*.

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 statute and regulations.

Conclusion — Ethnographic resources in the visitor center alternatives would be delineated by affiliated tribes/ associated THPOs for avoidance prior to implementation of any action. Any resources collected would be required to comply with the *Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation* and Director's Order 28: *Cultural Resource Management*. As a result, potential adverse impacts would be limited and or avoided.

Cumulative Impacts Conclusions. Ethnographic resources within and adjacent to the park in the southern Black Hills has not been fully documented. It is not the intent of this plan to identify specific ethnographic resources in the park. Americans Indians desiring privacy for religious activities would continue to be disrupted occasionally by such things as presence of other visitors. Any project that occurs within the Park has the potential to have an effect on ethnographic resources. Subsequent compliance (site specific) and consultation with associated American Indian tribes would prevent/reduce potential impacts from implementation of actions associated with the Zoning Management Plan. Therefore, implementation of the Zoning Management Plan would not likely further cumulative impacts to ethnographic resources.

CULTURAL LANDSCAPE AND HISTORIC STRUCTURES

No-Action Alternative

Impacts — Under the no-action alternative, there would be no new management zones, and potential impacts to the cultural landscape and historic buildings within the listed historic district would be based on potential actions related to future development or other management activities or changes in activities within this area. The existing management zone would continue to be designated as a development zone (approximately 563 acres) although the exact parameters related to allowable uses and intensity of development within this zone are not fully outlined.

There have been many changes to the immediate visitor center and headquarters area and setting, including the construction of additional buildings between 1941 and 2015, as well as expansions and modifications to historic buildings, parking areas, and other landscape features. While some of these changes and modifications have undoubtedly affected the integrity of the cultural landscape and historic buildings, in general it has been determined that the associated landscape features and land management regimes remain *substantially* unchanged from the historic character established during the 1931–1941 Park development period. For this reason, the listed historic district encompassing the visitor center area and cave entrances retains integrity.

While the historic district currently retains integrity, any *future* actions that may be proposed in this area would have the potential to adversely affect the associated cultural landscape and historic buildings. As the district is presently located within a development zone, future actions that would potentially diminish historic integrity could include construction of new facilities or alterations and additions to existing historic buildings, structures, or other features, as any of these actions risk altering qualifying historic characteristics and/or character of the historic setting. The likelihood of potential future development and associated impacts to the cultural landscape within this area would remain relatively high as the existing visitor center and headquarters area are currently zoned for development. The Elk Mountain Campground is also zoned for development and any future development could potentially affect the adjacent cultural landscape.

Any proposed future actions within the historic district would require adherence to the NHPA regulations and *Secretary of Interior's Standards and Guidelines for Historic Preservation* and Director's Order 28: *Cultural Resource Managemen*t and consultation with the South Dakota SHPO.

Conclusion — Any future changes within this area that would have the potential to adversely affect the cultural landscape and historic buildings within the listed historic district would require SHPO consultation and adherence to relevant historic preservation laws and policies. Designation as a development zone would continue to present challenges for historic preservation goals and while individual smaller actions would likely not impact these cultural resources to a considerable extent, incrementally, such actions would likely diminish historic integrity over the long term.

Common to All (Visitor Center Alternatives A–C). All management zones as proposed would not diminish the characteristics of the eligible or listed structures and landscapes. Historic structures and cultural landscapes, location, design, setting, materials, workmanship, feeling, and association would not be impacted. An assessment of effect determination as part of NHPA section 106 will be completed with the South Dakota SHPO. The implementation of any allowable use would require adherence to the NHPA regulations and *Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation* and Director's Order 28: *Cultural Resource Management.* All subsequent actions would require their own compliance process to determine potential environmental consequences prior to implementation.

Visitor Center Alternative A

Impacts — Potential impacts to the cultural landscape and historic buildings within the listed historic district associated with alternative A would likely be similar to potential impacts outlined in the no-action alternative. An exact correlation is not possible as permitted activities and uses in the existing development zone are minimally detailed compared to the far more detailed proposed primary visitor service development zone as outlined in this plan. Additionally, as delineated in alternative A, the primary visitor service development zone would occupy 1,253 acres and would therefore expand the area of development compared to the area delineated for development under the no-action alternative. Because the primary visitor service development zone permits the greatest intensity of land use, development, and activities, the potential to adversely affect the cultural landscape and historic buildings could be higher than in the no-action alternative, although this greater sized area could also present additional locations for which development could occur immediately out of view of the historic district.

Conclusion — Potential adverse impacts to the cultural landscape and historic buildings under this alternative as management zones have been prescribed and delineated would likely be similar to potential impacts outlined in the no-action alternative.

Visitor Center Alternative B

Impacts — Prescription of the historic zone in alternative B would provide additional emphasis on the cultural landscape and historic buildings within the visitor center area. This added emphasis would encourage further evaluation of uses and reuse of existing historic buildings and infrastructure before considering new construction or expansion of existing facilities within the listed historic district and at the same time would encourage the possibility of relocating functions or

facilities to more suitable locations. Gradual removal and relocation of administrative facilities, activities and land uses occurring within the existing historic district to other more suitable locations could be performed in accordance with historic treatment plans to restore past actions that have incrementally diminished the overall integrity of the historic district. The removal of nonhistoric or noncontributing buildings and structures within the historic district as part of potential future historic restoration efforts and as encouraged within this management zone would likely generate beneficial effects to historic resources within the visitor center area.

The application of the resource protection zone in alternative B would provide greater emphasis on evaluating existing and potential future land uses, management activities, and infrastructure directly above the cave and surrounding the historic district. While the increased emphasis of the resource protection zone would specifically relate to cave and karst resources, the cultural landscape and historic buildings would indirectly benefit as this zone would not permit extensive development and would thus help preserve the historic setting.

Conclusion — Alternative B would likely generate beneficial effects on the cultural landscape and historic buildings within the visitor center area as the emphasis on historic resources and opportunities for rehabilitation, restoration, and preservation treatments within the historic district would be greatly enhanced within this proposed management zone.

Visitor Center Alternative C

Impacts — Potential beneficial effects to the cultural landscape and historic buildings within the visitor center area based on management zone configurations in alternative C would likely be similar to those described for alternative B, although somewhat reduced as the resource protection zone would primary emphasize cave and karst resources rather than specifically cultural resources. While the cave and karst resources would be the primary emphasis for the resource protection actions, especially related to future development and removal of nonhistoric or noncontributing buildings and structures above the cave, following relevant historic preservation laws, policies and procedures, as would be required, cultural resources would likely indirectly benefit from such actions.

Conclusion — Alternative C would likely generate indirect beneficial effects on the cultural landscape and historic buildings within the visitor center area as the emphasis on direct resource protection would likely provide mutual benefits for both cultural and cave/karst resources within this alternative.

Cumulative Impacts Conclusions. Any project that occurs within the Park has the potential to have an effect on cultural landscapes and historic structures. Within the visitor center area the cultural landscape and historic structures have been evaluated and are listed or eligible for the National Register of Historic Places. Past actions on the cultural landscape have been slow incremental changes such as the expanded parking lot and other visitor amenities. The expansion of the area since the inception of the site still maintains a high level of integrity compared to other CCC era developments in the national park system. Those resources within the visitor center area would not incur further impacts for the proposed management zones. Development outside the park would not result in further cumulative impacts to the visitor center cultural landscape and historic structures; however, this could result in impacts to cultural landscapes and historic structures that have yet to be evaluated outside the park. It is not anticipated that implementation of the Zoning Management Plan and subsequent development would result in impacts to cultural landscapes, historic structures, and associated features within the visitor center area. Subjecting any future

development to additional compliance and mitigation is intended to prevent this from happening. Therefore, implementation of the Zoning Management Plan would not likely have cumulative effects to cultural landscapes and historic structures in the region.

VISITOR EXPERIENCE

No-Action Alternative

Impacts — Under the no-action alternative, there would be no long-term adverse or beneficial impacts to the visitor experience. No actions are proposed to reduce or expand the visitor experience. The existing management zones would continue to provide instruction on allowable uses. For the visitor center area this primarily includes the development zone, which is approximately 563 acres although the exact parameters related to allowable uses and intensity of development within this zone are not fully outlined.

Conclusion — No short-to-long-term adverse impacts to the visitor experience would be expected under the no-action alternative. No actions are proposed to reduce or expand the visitor experience in the visitor center area.

Visitor Center Alternative A

Impacts — Under visitor center alternative A there would be no adverse impacts to the visitor experience. Majority of the visitor center area would be zoned primary visitor service development which is generally comparable to existing uses. Facilities throughout the primary visitor service development zone would likely continue to include existing visitor center facilities and could also continue to provide associated administrative functions, such as those currently housed within the existing visitor center. However, this zone would provide needed detail on allowable uses/activities compared to the existing development zone. Surrounding the primary visitor service development would be zoned remote natural, where visitors would have opportunities for primitive recreation with some solitude, adventure, self-discovery, and self-directed learning.

Conclusion — Generally, there would be no substantial change to the visitor experience from the existing visitor experience under visitor center alternative A. Clearly delineated management zone prescriptions would provide long-term direction for park management.

Visitor Center Alternative B

Impacts — This alternative provides five management zone overlays, primary visitor service development, historic, resource protection, administrative services, and remote natural; and one transportation corridor, primary passage.

A portion of the visitor center area would be zoned resource protection and historic to provide greater emphasis for cultural resource and cave/karst protection. Visitor experience throughout the resource protection zone is specific to the resources (Wind Cave) being protected. Additional development of trails and other visitor amenities would generally not be permitted, unless for resource protection purposes. The increased emphasis on cave/karst resources would further encourage and promote more assertive strategies to remove or mitigate sources of potential adverse

impacts to those resources within this zone. Specifically, this zone would encourage the possibility of relocating functions or noncontributing facilities to more suitable locations before seeking funding to construct new or to expand existing facilities within this location. The visitor experience would be ancillary to the resources within this zone. There could be adverse impacts on the visitor experience if visitor services and amenities were reduced from the existing levels.

The core visitor center management zone overlay would be historic. Visitors would have opportunities that promote cultural resource education and stewardship. Visitor experiences would continue to be comparable to existing uses such as interpretation of park resources and general visitor amenities housed in the visitor center (general information, gift shop, tickets for cave tours). This would result in continued long-term beneficial impacts on the visitor experience.

Under this alternative, the Elk Mountain Campground would be zoned for primary visitor services development to continue providing developed camping opportunities for visitors, including education and interpretation programs and customary amenities in a manner that would be generally comparable to existing conditions. This zone would also allow for additional opportunities to potentially expand services within the existing campground footprint, resulting in potential long-term beneficial impacts to the visitor experience.

The remainder of this alternative would be zoned remote natural to correspond to the adjacent remote natural as zoned in the Greater Park alternatives.

Conclusion — The greatest potential change to the visitor center area introduced by this alternative is the resource protection zone. The resource protection zone could result in adverse impacts to the visitor experience if visitor amenities and experiences are reduced from existing levels; however, no adverse impacts would be expected under the historic, remote natural, and administrative zoned areas. Beneficial impacts could result in the Elk Mountain Campground if park management were to expand services.

Visitor Center Alternative C

Impacts — This alternative provides three management zone overlays, primary visitor service development, resource protection, and remote natural; and one transportation corridor, secondary passage.

Visitor experiences under this alternative would likely be similar to those described for alternative B, although somewhat reduced as the resource protection zone would primary emphasize cave and karst resources rather than specifically cultural resources. The visitor experience would be ancillary to the resources within this zone. There could be adverse impacts on the visitor experience if visitor services and amenities were reduced from the existing levels.

Under this alternative, the Elk Mountain Campground would be zoned for primary visitor services development to continue providing developed camping opportunities for visitors, including education and interpretation programs and customary amenities in a manner that would be generally comparable to existing conditions. This zone would also allow for additional opportunities to potentially expand services within the existing campground footprint, resulting in potential long-term beneficial impacts to the visitor experience.

The remainder of this alternative would be zoned remote natural to correspond to the adjacent remote natural as zoned in the Greater Park alternatives

Conclusion — The greatest potential change to the visitor center area introduced by this alternative is the resource protection zone. The resource protection zone could result in adverse impacts to the visitor experience if visitor amenities and experiences are reduced from existing levels; however, no adverse impacts would be expected under the remote natural zoned area. Beneficial impacts could result in the Elk Mountain Campground if park management were to expand services.

Cumulative Impacts Conclusions. Any action taken within or adjacent to the Park has the potential to have an effect on the visitor experience. Past, ongoing, and reasonably foreseeable future actions both inside and outside of the Park continue to provide differing visitor experiences. Implementation of the Zoning Management Plan, in combination with the impacts previously described, would continue to add to the diverse opportunities for unique recreational experiences within the Park when compared to recreational experience opportunities provided in lands outside of the Park.

SANSON RANCH ALTERNATIVE IMPACT ANALYSIS

VEGETATION

No-Action Alternative

Impacts — Under the no-action alternative, no long-term adverse impacts to vegetation would be expected. The vegetation would remain relatively unchanged because no facilities would be developed and the area would remain closed to general public use. Any impact to vegetation would be short-term from occasional park staff and visitors touring the area. This would include compaction of vegetation, no removal or alteration would be permitted. The Sanson Ranch property and surrounding area was acquired in 2011, as a result, no management zones exist.

Conclusion — There would be no visitor or administrative facility development or general public use of the area under the no-action alternative, as a result, the vegetation communities would remain relatively unchanged.

Sanson Ranch Alternative i

Impacts — Vegetation would be lost or altered in local areas under Sanson Ranch alternative i, primarily from the development or improvement of facilities and visitor services. This alternative includes three management zones, remote natural, frontcountry natural, and resource protection.

The primary theme for this alternative is resource protection to emphasize the sensitive cultural resources within the identified area. Facilities could include a small number of support structures if it is determined necessary for preservation of sensitive resource values. Trails would generally not be permitted through this zone; however, this is determined on a case-by-case basis. Designated trails may be required for resource protection purposes. Resource protection allows for minimal (smallest footprint) development to accommodate Park visitors in a manner that protects sensitive resources. Impacts to vegetation would be limited to those potential developments, resulting in short-to-long-term adverse impacts. Impacts to vegetation would include the removal of vegetation within the limited footprint of development or along a trail corridor.

The area immediately adjacent and north of the main entrance to this site would be zoned frontcountry natural to provide opportunities for moderate levels of development to accommodate public visitation to this site. Short-to-long-term adverse impacts to vegetation could arise from moderate levels of development, including overlooks, benches, wayside exhibits, small parking areas, and visitor entrance stations. These allowable uses, if implemented could result in the removal of the vegetation within the footprint of development or along a trail corridor.

The remainder of the Sanson Ranch would be zoned remote natural to correspond with the adjacent remote natural as zoned in the Greater Park alternatives. Impacts to vegetation would be minimal. Development and allowable uses would be limited in context of ground disturbing activities. The placement of trails would be allowed, however, only natural surface trails would be permitted, if needed. Generally, trails would not be present except where needed for resource protection and in specific cases where long-distance trails cross this zone. Trails would also strive to use existing disturbed areas such as wildlife paths.

Any permitted developed or alterations to the vegetation within Sanson alternative i could result in

the introduction of nonnative species. The introduction of nonnative species could result in a short-to-long-term, indirect adverse impact to vegetation. The implementation of any action would require best management practices to reduce the likelihood of nonnative species.

Conclusion — Sanson alternative i provides three management zone overlays and no transportation corridors. The potential exists for adverse impacts to vegetation where the zone allows for ground disturbing actions such as the frontcountry natural, and to a limited extent the resource protection zone. This impact would be most intense and long-term as it pertains to the footprint of proposed development. Although adverse, actions and subsequent planning and best management practices would be utilized to reduce overall impacts. Sanson Ranch alternative i, compared to other Sanson Ranch alternatives, has the least amount of potential adverse impacts to vegetation.

Sanson Ranch Alternative ii

Impacts — Vegetation would be lost or altered in local areas under Sanson Ranch alternative ii, primarily from the development or improvement of facilities and visitor services. This alternative includes two management zones and one transportation corridor, frontcountry natural, primary visitor services development, and tertiary passage.

The primary theme for Sanson Ranch alternative ii is to provide maximum latitude to park managers for intensive development, if desired. The core Sanson Ranch and Buffalo Jump site would be zoned for primary visitor service development. This zone permits the highest level of development, use, and visitor service facilities. Facilities permitted include visitor center and associated administrative functions. Adverse impacts to vegetation would be greatest in this zone. Long-term adverse impact to vegetation would arise from heavy development. Direct impacts would result in the footprints of facilities and indirectly in the immediately adjacent areas from large groups of visitors/staff this zone would expect to accommodate.

The area surrounding the primary visitor service zone would be frontcountry natural to provide opportunities for moderate levels of development to accommodate public visitation to this site. Short-to-long-term adverse impacts to vegetation could arise from moderate levels of development, including overlooks, benches, wayside exhibits, small parking areas, and visitor entrance stations. These allowable uses, if implemented, could result in the removal of the vegetation within the footprint of development or along a trail corridor.

The existing portion of the two-track road which bisects the Sanson Ranch would be zoned as tertiary passage corridor. The tertiary corridor would allow some minimal improvements allow visitors to reach the Sanson Ranch structures. Improvements would be limited in order to reduce excessive landscape modification. Impacts to vegetation would be minimal as the two-track road has reduced vegetation along the footprint. Adverse impacts from road maintenance operations including graveling would be likely.

Any permitted developed or alterations to the vegetation within Sanson alternative ii could result in the introduction of nonnative species. The introduction of nonnative species could result in a short-to-long-term, indirect adverse impact to vegetation. The implementation of any action would require best management practices to reduce the likelihood of nonnative species.

Conclusion — Sanson alternative ii provides two management zone overlays and one transportation corridor. The potential exists for adverse impacts to vegetation where the zone allows for ground disturbing actions such as the frontcountry natural and primary visitor services zone. This impact

would be most intense and long-term as it pertains to the footprint of proposed development, this is most prevalent for the primary visitor services zone. Although adverse, actions and subsequent planning and best management practices would be utilized to reduce overall impacts. Sanson Ranch alternative ii, compared to other Sanson Ranch alternatives, has the most potential for adverse impacts to vegetation as compared to the other Sanson Ranch alternatives.

Sanson Ranch Alternative iii

Impacts — Vegetation would be lost or altered in local areas under Sanson Ranch alternative iii, primarily from the development or improvement of facilities and visitor services. This alternative includes five management zones and one transportation corridor, frontcountry natural, primary visitor services development, historic, resource protection, remote natural, and tertiary passage.

This alternative would provide direction for historic resource management with an emphasis on continued use and reuse, including possible restoration, of buildings and structures and the grounds immediately surrounding the historic Sanson Ranch. The Buffalo Jump site is zoned resource protection to emphasis the sensitive cultural resources associated with this site. The primary visitor service zone would include the relatively confined area immediately adjacent to and just north of the main entrance road between the Park boundary and the dry wash of Beaver Creek and would permit considerable development for visitor service purposes. The area surrounding the resource protection zone includes the frontcountry natural zone to provide opportunities for moderate levels of development to accommodate public visitations to this site. The remainder of this alternative is zoned remote natural to correspond with the adjacent remote natural area as zoned in the Greater Park alternatives. Impacts to vegetation in the remote natural zone would be the same as those described in Sanson Ranch alternative i.

The existing two-track road which bisects the Sanson Ranch would be zoned as tertiary passage corridor. Impacts to vegetation would be similar to those described in Sanson Ranch alternative ii, vegetation analysis.

As previously analyzed, the management zones and transportation corridor prescribe for various levels of use and development. The historic zone would have the least amount of adverse impacts as the focus of the historic zone in this alternative is to actively use and protect historic buildings and the cultural landscape. Some alterations to the surrounding vegetation would be permitted. Vegetation management would strive to convey the human response to and values relative to the vegetative setting and cultural resource period of significance.

Adverse impacts to vegetation in the other management zones (primary visitor services, frontcountry natural, remote natural, resource protection, and tertiary passage zone) would arise from minimal to moderate to heavy development. Direct impacts would result in the footprints of facilities and indirectly in the immediately adjacent areas from large groups of visitors/staff these zones would expect to accommodate.

Any permitted developed or alterations to the vegetation within Sanson Ranch alternative iii could result in the introduction of nonnative species. The introduction of nonnative species could result in a short-to-long-term, indirect adverse impact to vegetation. The implementation of any action would require best management practices to reduce the likelihood of nonnative species.

Conclusion — Sanson Ranch alternative iii provides five management zone overlays and one transportation corridor. The potential exists for adverse impacts to vegetation where the zone allows

for ground disturbing actions such as the frontcountry natural and primary visitor services zone. This impact would be most intense and long-term as it pertains to the footprint of proposed development, this is most prevalent for the primary visitor services zone. Although adverse, actions and subsequent planning and best management practices would be utilized to reduce overall impacts. Sanson Ranch alternative iii, compared to other Sanson Ranch alternatives, has a moderate level of potential for adverse impacts to vegetation as compared to the other Sanson Ranch alternatives.

Sanson Ranch Alternative iv

Impacts — Vegetation would be lost or altered in local areas under Sanson Ranch alternative iv, primarily from the development or improvement of facilities and visitor services. This alternative includes three management zones, frontcountry natural, remote natural, and historic.

This alternative would provide direction for historic resource management with an emphasis on continued use and reuse, including possible restoration of buildings and structures and the grounds immediately surrounding the historic Sanson Ranch. The area immediately adjacent and north of the main entrance to this site and the Buffalo Jump site is zoned frontcountry natural to provide opportunities for moderate levels of development to accommodate public visitation to this site. The remainder of this alternative is zoned remote natural to correspond with the adjacent remote natural area as zoned in the greater park alternatives. Impacts to vegetation in the remote natural zone would be the same as those described in Sanson Ranch alternative i and iii.

The historic zone would have the least amount of adverse impacts as the focus of the historic zone in this alternative is to actively use and protect historic buildings and the cultural landscape. Some alterations to the surrounding vegetation would be permitted. Vegetation management would strive to convey the human response to and values relative to the vegetative setting and cultural resource period of significance.

The frontcountry natural zoned area could result in short-to-long-term adverse impacts to vegetation from moderate levels of development, including overlooks, benches, wayside exhibits, small parking areas, and visitor entrance stations. These allowable uses, if implemented, could result in the removal of the vegetation within the footprint of development or along a trail corridor.

Any permitted developed or alterations to the vegetation within Sanson Ranch alternative i could result in the introduction of nonnative species. The introduction of nonnative species could result in a short-to-long-term, indirect adverse impact to vegetation. The implementation of any action would require best management practices to reduce the likelihood of nonnative species.

Conclusion — Sanson Ranch alternative iv provides three management zone overlays and no transportation corridors. The potential exists for adverse impacts to vegetation where the zone allows for ground disturbing actions such as the frontcountry natural zone. This impact would be most intense and long-term as it pertains to the footprint of proposed development. Although adverse, actions and subsequent planning and best management practices would be utilized to reduce overall impacts. Sanson Ranch alternative iv, compared to other Sanson Ranch alternatives, has a moderate amount of potential adverse impacts to vegetation.

Cumulative Impacts Conclusions. Cumulative impacts associated with the alternatives include the possibility of further spreading invasive species and damage to vegetation from

proposed/allowed development. The use of prescribed burns would help reduce invasive spreading while encouraging native species. The use of best management practices would be employed for subsequent actions calling for development and other land disturbing activities.

SCENERY/VIEWSHED

As identified in the Greater Park alternative impact analysis, the relative levels of potential adverse effects to Park scenery vary based on prescribed management zones and the associated permitted intensities of land use, development, and associated activities, taking into consideration the corresponding scenery conservation management class objectives.

No-Action Alternative

Impacts — Under the no-action alternative, adverse impacts to scenery within the Sanson Ranch area would primarily be related to preexisting landscape modifications resulting from previous utilitarian land uses associated with former private ranching operations. These modifications appear to have been developed with little regard to the scenic qualities and setting of the surrounding landscape. Because this area is predominantly natural in appearance and highly scenic, most human modifications within this setting, even while being relatively limited in extent, are generally more conspicuous and stand out as highly visible elements that noticeably contrast with the characteristic elements in the surrounding natural setting.

Some constructed features, such as the stone covered cistern associated with the ranch buildings, repeat the natural visual elements of this setting and therefore better harmonize with the scenic qualities of this site. Other disturbances, modifications, and introduced elements such as the two-track vehicle ruts leading to and from the ranch buildings and up the canyon, as well as the bold vertical lines created by wooden power line poles and fence posts, starkly contrast the natural forms and lines within the landscape. These highly visible elements contrast with the scenic qualities of this setting in a generally discordant manner and thus noticeably adversely affect scenery. Regardless of the historic classification of the Casey Ranch site area, from a scenic standpoint, while some cultural features and elements visually harmonize within this setting, many other discordant cultural features and elements that have been introduced within this setting stand out in an unpleasing visual manner.

Because the Sanson Ranch property and surrounding area was acquired in 2011, no management zones currently exist. The management assumption for this area under the no-action alternative is that this site and the associated natural and cultural features and elements would be maintained and preserved in a manner akin to “mothballing.” Associated impacts would be expected to continue until an alternative management direction is taken. Any natural and cultural treatment plans would need to consider scenic qualities of this site prior to taking any further actions. Under the existing conditions, no facilities would be developed and the area would remain closed to general public use except for limited public visitation to this site under scheduled ranger guided tours.

Conclusion — Without specific methodology with regard to Park scenery conservation, the potential exists for inadvertent adverse effects to scenic resources in the Sanson Ranch area.

Impact considerations for all action alternatives within this specific area. Any future natural or cultural resource treatments and facility development within this area would be required to adhere to scenery conservation management class objectives to ensure scenery is not adversely

impacted. The level of potential future effect on scenic resources would depend on how well future modifications permitted by each zone would meet the associated scenery conservation management class objectives. Much of the site is within a class I management area and any actions taken within a class I area would be required not only to preserve but also to *enhance* the existing scenic character. This could potentially entail future actions taken to mitigate previous visual impacts. Development and management action within class II areas is generally more appropriate compared to class I areas with regard to scenery conservation requirements as the management objectives permit a greater level of changes and activities to occur, and even to be seen, provided that actions and landscape modifications do not attract attention of the casual observer.

Regardless of management zone, any new development including but not limited to constructed trails and scenic overlooks, park benches, informational exhibits, parking areas, restroom facilities, and visitor contact stations would all require careful consideration and application of appropriate design fundamentals and strategies to avoid adversely affecting Park scenery. Any changes to the existing setting resulting from management actions, including natural landscape restoration efforts or cultural resource treatments conducted to "improve" other resource conditions, could affect scenery and would be required to apply appropriate design fundamentals and strategies to avoid adversely affecting Park scenery. In most cases, mutually beneficial effects would be possible for any associated resource(s), provided scenery conservation management goals are identified and addressed as part of other implementation level planning efforts and actions.

Sanson Ranch Alternative i

Impacts — Land uses, development, and activities permitted within the three management zones prescribed in this alternative, remote natural, frontcountry natural, and resource protection, would likely generate the fewest number of potential future adverse impacts on scenery within this area when compared to all other proposed alternatives, including the no-action alternative.

The area immediately adjacent and north of the main entrance to this site would be zoned frontcountry natural to provide opportunities for moderate levels of development to accommodate public visitation to this site and would permit the greatest level of potential ancillary site facilities to be developed compared to the other two zones prescribed under this alternative. The frontcountry natural zone is situated within a class II scenery conservation management area and provided that any potential future landscape modifications or development appropriately addresses class II objectives, adverse effects to scenery would likely be minimal to negligible. The area within this zone immediately adjacent to the entrance road at the base of the hillslope may provide the most appropriate site for future management activities and development to occur as this specific location is situated in a "lower" and less visible topographic position offering greater opportunities for class II objectives to be successfully achieved.

The resource protection zone prescribed in this alternative would emphasize protection of the sensitive resources within the identified area, primarily the archeological site known as the Buffalo Jump and the associated scenery within this viewshed as these resources represent two of the fundamental purposes for acquiring this property. Views to the Buffalo Jump site from the top of the opposite canyon rim wall located just above the historic Casey Ranch building site area provide outstanding vantage points for visitors to enjoy remarkable scenic views of the canyon and specific site feature. The resource protection zone includes both class I and class II scenery conservation management areas. From a scenery conservation standpoint, any potential future development or modifications to existing development would be more appropriate and would likely create fewer adverse effects for actions taken within class II areas compared to locations within class I areas

within this zone.

The resource protection zone permits minimal development as may be necessary to accommodate park visitors in a manner that would protect identified sensitive resources. Potential impacts to scenery within this zone would primarily be limited to new development that could be implemented for accessibility or for resource protection purposes. Although trails would not generally be constructed within this zone, in limited instances designated trails may be necessary to ensure protection of sensitive resources or to meet appropriate accessibility standards.

Any introduced elements or landscape modifications, including constructed trails, have a considerably high potential to adversely affect this remarkable scenic feature and site in general, especially if located along the top edge of the cliff, along the base slope, or within the canyon valley floodplain bottom. Particular emphasis on scenery conservation principles (in addition to other resource protection considerations) would be required prior to establishing any formal paths, trails, informational exhibits, or associated infrastructure to, from, and at the primary site feature, the Buffalo Jump, as this specific site feature is located within a class I scenery conservation management area. Additionally, great caution and restraint will be important for Park management to consider with regard to any potential development at this site, as any new actions run the risk of adversely affecting the very fundamental resources and the associated scenic qualities for which these lands were acquired to protect.

The remainder of the Sanson Ranch would be zoned remote natural to correspond with the adjacent remote natural areas as zoned in the Greater Park alternatives. As outlined, this management zone would likely present the greatest protection to scenic resources as developed facilities would generally be absent except those necessary for resource protection. Ground disturbing activities would be considerably limited. Visitor uses would be primarily self-directed with associated use levels likely being relatively low and characterized by more primitive and solitary natural experiences. Unpaved trails and associated structures such as footbridges or boardwalks in sensitive resource areas would be permitted within this zone on a limited basis and would be constructed in a manner that would harmonize with the natural setting. Following these prescribed conditions and associated scenery conservation management zone class objectives would create minimal to negligible adverse impacts to Park scenery within this zone.

Conclusion — The greatest potential change to the Sanson Ranch area introduced by this alternative is the extent of management zone overlays that would allow development and ground disturbances primarily associated with the frontcountry natural zoned area. While this proposed management zone would present some challenges to Park scenery conservation requirements, it has been situated within a class II scenery conservation management area. The area within this zone immediately adjacent to the entrance road at the base of the hillslope may provide the most appropriate site for future management activities and development to occur as this specific location is situated in a “lower” and less visible topographic position offering greater opportunities for class II objectives to be successfully achieved.

Within the proposed frontcountry natural zone, special care would be required to ensure Park scenery is not adversely affected prior to initiating any allowable use, activity, or development within these management zones that meets the proposed scenery conservation management objectives. Provided that any potential future landscape modifications or development appropriately addresses class II objectives, adverse effects to scenery would likely be minimal to negligible under this alternative.

Sanson Ranch Alternative ii

Impacts — The management zones prescribed in this alternative would permit the greatest intensities of land uses, development, and activities and correspondingly would likely generate the greatest potential future adverse impacts on scenery within this area compared to all other alternatives, including the no-action alternative. This alternative would prescribe the frontcountry natural and primary visitor service development zones while the main roadway and two-track jeep trail leading further into the Park from the ranch buildings would be formally designated as a tertiary passage zone.

The core portion of this site encompassing the historic Casey Ranch site and the primary site feature, the Buffalo Jump, would be zoned for primary visitor service development. Because the primary visitor service development zone would permit the greatest intensity of land uses, development of site facilities and associated activities for public visitation and use of this site, potential adverse effects to scenery would be the greatest within this zone.

The archeological site known as the Buffalo Jump and the associated scenery within this viewshed represent two resources that were identified as being part of the fundamental purpose for acquiring this property. Views to the Buffalo Jump site from the top of the opposite canyon rim wall located just above the historic Casey Ranch building site area provide outstanding vantage points for visitors to enjoy remarkable scenic views of the canyon and specific site feature. Any introduced elements or landscape modifications as permitted by this zone, including less intensive constructed trails, have a considerably high potential to adversely affect this remarkable scenic feature and site in general, especially if located along the top edge of the cliff, along the base slope, or within the canyon valley floodplain bottom. Great caution and restraint would be imperative for Park management to consider with regard to any potential development at this site, as any new actions run the risk of adversely affecting the very fundamental resources and the associated scenic qualities for which these lands were acquired to protect. Due to the specific visual sensitivity of these fundamental resources and the configuration of the primary visitor service development zone that would encompass these sites as prescribed in this alternative, it is unclear if significant adverse effects to scenery could in fact be avoided given the permitted levels of development within this zone.

Additionally, the primary visitor service development zone as delineated in this alternative includes both class I and class II scenery conservation management areas. Any future landscape modifications or development within this area must appropriately address corresponding Scenery Conservation Management Class objectives, in order to avoid creating adverse effects to Park scenery. The degree by which adverse or beneficial effects may be potentially generated by implementation level actions would depend on how well design fundamentals and strategies are employed, especially with regard to project siting and corresponding Scenery Conservation Management Class objectives. From a scenery conservation standpoint, any potential future development or modifications to existing development within this zone would generally be more appropriate and would likely create fewer adverse effects from actions taken within class II areas compared to similar actions taken within class I areas.

Scenery Conservation Management Class I objectives are the most stringent and would be considerably more difficult to achieve with regard to any potential future land uses, development of site facilities, or associated activities as permitted within this zone. Particular emphasis on scenery conservation principles (in addition to other resource protection considerations) would be required prior to establishing any formal paths, trails, informational exhibits, or associated infrastructure to, from and at the primary site feature, the Buffalo Jump, as this specific site feature is located within a class I scenery conservation management area. Any proposed development within this zone that falls within a Scenery Conservation Management Class I area would have the greatest potential to

adversely affect Park scenery. Provided that Scenery Conservation Management Class II objectives are appropriately addressed within the primary visitor service development zone, the corresponding adverse effects to scenery would likely be minimal to moderate.

While application of the primary visitor service development zone within Scenery Conservation Class II Management Areas is appropriate, prescribing this zone within class I management areas is highly questionable and in most cases is generally not appropriate, especially considering the encompassed Buffalo Jump site. Application of this management zone, as configured within this alternative, may not be appropriate for this location with regard to scenery conservation objectives and for this reason is recommended for dismissal from further consideration.

The remainder of the entire site area would be zoned frontcountry natural, and would provide opportunities for moderate levels of development to accommodate public visitation throughout this site. While not permitting the same level and intensity of development as the primary visitor service development zone, the frontcountry natural zone would permit the next greatest level of potential ancillary site facilities to be developed within this alternative.

The frontcountry natural zone is situated primarily within class I scenery conservation management areas and any future landscape modifications or development must also appropriately address class I objectives, in order to avoid creating adverse effects to Park scenery. Potential impacts to scenery within this zone would therefore primarily stem from proposed new development and associated increases in visitation. The degree by which adverse or beneficial effects may be potentially generated by implementation level actions would depend on how well design fundamentals and strategies are employed, especially with regard to project siting and the corresponding Scenery Conservation Management Class objectives.

Application of the tertiary passage zone along the main road leading up to the historic Sanson Ranch buildings and then extending beyond the ranch site along the existing two track jeep trail could potentially create minor adverse effects to Park scenery. The existing two track jeep trail appears not to have been "developed" but rather was likely established along a path of least resistance. As such, establishing this route as a tertiary passage zone could induce future managers who may be so inclined to formally establish this route as a formal Park road thus requiring potentially extensive improvements. Recognizing typical design requirements and customary construction methods, any "improvements" to the existing conditions of this simple and rudimentary two track jeep trail would likely involve considerable changes and modifications and would likely then run the risk of adversely affecting Park scenery.

Conclusion — The greatest potential change to the Sanson Ranch area introduced by this alternative would be the proposed management zones and the associated permitted intensities of land uses, development, and activities, especially related to the primary visitor service development zone. The corresponding potential impacts would likely generate the greatest potential future long-term adverse impacts on scenery within this area. Given the potential intensity of permitted land uses, development, activities, and changes to the general character of this site under this alternative, mitigation measures would likely not eliminate adverse impacts as this zone allows for considerable alteration from existing scenic resource conditions. Other management zone overlays, frontcountry natural and tertiary passage corridor, would include uses that could have adverse impacts if not mitigated or if not possible to be mitigated based on the nature of action and associated scenery conservation management class.

While careful consideration would be required to ensure Park scenery is not adversely affected prior to initiating any allowable use, activity, or development within these management zones that meets the proposed scenery conservation management objectives, as zoned, this alternative may not be

appropriate for this location with regard to scenery conservation objectives.

Sanson Ranch Alternative iii

Impacts — Land uses, development, and activities permitted within the management zones prescribed in this alternative, would likely generate moderate potential future adverse impacts on scenery within this area.

The management zoning configuration of alternative iii, is similar to alternative i, with three notable differences. Under this alternative, the frontcountry natural zone extends across a considerably larger area surrounding the historic Casey Ranch site and the Buffalo Jump site, and the primary visitor service development zone has been prescribed in the area immediately adjacent and north of the main entrance road at the base of the hillslope. Immediately surrounding and encompassing the historic Casey Ranch site buildings and structures, the historic zone has been prescribed. The resource protection zone is configured the same as in alternative i, with the exception of the included historic zone and the roadway being zoned as a tertiary passage zone, extending across the entire area. The remainder of the Sanson Ranch would be zoned remote natural to correspond with the adjacent remote natural areas as zoned in the greater park alternatives.

The area immediately adjacent and north of the main entrance to this site, specifically at the base of the hillslope, would be zoned for primary visitor service development to provide opportunities for more intensive development for public visitation at this site. Prescription of this management zone within this location would present some challenges for scenery conservation as this zone permits the greatest intensity of land use, development of site facilities, and associated activities. This area may provide the most appropriate site for future management activities and development to occur with regard to scenery conservation as this specific location is situated in a “lower” and less visible topographic position offering greater opportunities for class II objectives to be successfully achieved. Potential adverse effects to scenery would be the greatest within this zone with regard to proposed future visitor services development and so in order to avoid adversely affecting Park scenery it will be critical that any future development affectively employ appropriate design fundamentals and strategies that meet class II scenery conservation management objectives within this area.

The remainder of the area north of the main entrance to this site would be zoned frontcountry natural, in the same configuration as alternative i to provide opportunities for moderate levels of development to accommodate public visitation to this site. Additionally, areas to the West and South of the primary resource area would also be zoned frontcountry natural. Compared to the primary visitor service development zone, the frontcountry natural zone would permit the next greatest level of potential ancillary site facilities to be developed within this alternative. Any future landscape modifications or development within this area has a potential to adversely affect Park scenery and must appropriately address corresponding Scenery Conservation Management Class objectives, in order to avoid creating adverse effects to Park scenery. The frontcountry natural zone is situated within both class I and class II scenery conservation management areas.

The degree by which adverse or beneficial effects may be potentially generated by implementation level actions would depend on how well design fundamentals and strategies are employed, especially with regard to project siting and corresponding Scenery Conservation Management Class objectives. Provided that Scenery Conservation Management Class II objectives are appropriately addressed within these areas that occur within the frontcountry natural zone, the corresponding adverse effects to scenery would likely be minimal to negligible. Any proposed development within this zone that also falls within a Scenery Conservation Management Class I area has a considerably greater

potential to adversely affect Park scenery as class I objectives are the most strict and would be considerably more difficult to achieve related to potential land uses, development of site facilities, and associated activities permitted within this zone.

Application of the historic zone immediately surrounding and encompassing the historic Casey Ranch site buildings and structures, would emphasize restoration and reuse of these buildings, structures and immediate cultural landscape and would likely provide better future preservation for identified historic resources. While the specific details of potential future effects would be possible only to determine as part of implementation level planning efforts, a process of mutual inclusivity regarding both scenery conservation and historic preservation practices, should generally and without significant exception provide beneficial effects for both resource categories. The combined consideration of potential future, and formally approved, implementation level historic resource treatments and class II Scenery Conservation Management objectives, if properly performed, would likely generate beneficial effects to Park scenery. The underlying premise for conservation and preservation of each of these two resource types must necessarily be grounded in a solid understanding of Park purpose and individual resource protection objectives.

The resource protection zone prescribed in this alternative would emphasize protection of the sensitive resources within the identified area, primarily the archeological site known as the Buffalo Jump and the associated scenery within this viewshed as these resources represent two of the fundamental purposes for acquiring this property. Views to the Buffalo Jump site from the top of the opposite canyon rim wall located just above the historic Casey Ranch building site area provide outstanding vantage points for visitors to enjoy remarkable scenic views of the canyon and specific site feature. The resource protection zone includes both class I and class II scenery conservation management areas. From a scenery conservation standpoint, any potential future development or modifications to existing development would be more appropriate and would likely create fewer adverse effects for actions taken within class II areas compared to locations within class I areas within this zone.

The resource protection zone permits minimal development as may be necessary to accommodate park visitors in a manner that would protect identified sensitive resources. Potential impacts to scenery within this zone would primarily be limited to new development that could be implemented for accessibility or for resource protection purposes. Although trails would not generally be constructed within this zone, in limited instances designated trails may be necessary to ensure protection of sensitive resources or to meet appropriate accessibility standards.

Any introduced elements or landscape modifications, including constructed trails, have a considerably high potential to adversely affect this remarkable scenic feature and site in general, especially if located along the top edge of the cliff, along the base slope or within the canyon valley floodplain bottom. Particular emphasis on scenery conservation principles (in addition to other resource protection considerations) would be required prior to establishing any formal paths, trails, informational exhibits, or associated infrastructure to, from, and at the primary site feature, the Buffalo Jump, as this specific site feature is located within a class I scenery conservation management area. Additionally, great caution and restraint will be important for Park management to consider with regard to any potential development at this site, as any new actions run the risk of adversely affecting the very fundamental resources and the associated scenic qualities for which these lands were acquired to protect.

Application of the tertiary passage zone along the main road leading up to the historic Sanson Ranch buildings and then extending beyond the ranch site along the existing two track jeep trail could potentially create minor adverse effects to Park scenery. The existing two track jeep trail appears not to have been “developed” but rather was likely established along a path of least resistance. As such,

establishing this route as a tertiary passage zone could induce future managers who may be so inclined to formally establish this route as a formal Park road thus requiring potentially extensive improvements. Recognizing typical design requirements and customary construction methods, any "improvements" to the existing conditions of this simple and rudimentary two track jeep trail would likely involve considerable changes and modifications and would likely then run the risk of adversely affecting Park scenery.

The remainder of the Sanson Ranch would be zoned remote natural to correspond with the adjacent remote natural areas as zoned in the greater park alternatives. As outlined, this management zone would likely present the greatest protection to scenic resources as developed facilities would generally be absent except those necessary for resource protection. Ground disturbing activities would be considerably limited. Visitor uses would be primarily self-directed with associated use levels likely being relatively low and characterized by more primitive and solitary natural experiences. Unpaved trails and associated structures such as footbridges or boardwalks in sensitive resource areas would be permitted within this zone on a limited basis and would be constructed in a manner that would harmonize with the natural setting. Following these prescribed conditions and associated scenery conservation management zone class objectives would create minimal to negligible adverse impacts to Park scenery within this zone.

Conclusion — The greatest potential change to the Sanson Ranch area introduced by this alternative would be the proposed management zones and the associated permitted intensities of land uses, development, and activities. Potential adverse effects to scenery would be the greatest within the frontcountry natural zoned area as this would permit the greatest level of potential ancillary site facilities within class I and class II scenery conservation management areas. The primary visitor service development zoned area is situated in a less visible topographic position, and is within a class II management area and thus potential scenery impacts would be reduced. Development of the tertiary passage corridor would require extensive improvements if park managers desired this route to become a formal park road. These improvements would involve considerable changes and modifications that could result in long-term adverse impacts on Park scenery. The remainder of the prescribed management zones as delineated would likely have beneficial impacts on park scenery as the permitted uses and associated development could generally be provided in a manner that would be in harmony with scenic resources.

Careful consideration would be required to ensure Park scenery is not adversely affected prior to initiating any allowable use, activity, or development within these management zones that meets the proposed scenery conservation management objectives in order to avoid or reduce adverse effects to Park scenery.

Sanson Ranch Alternative iv

Impacts — Land uses, development, and activities permitted within the three management zones prescribed in this alternative, remote natural, frontcountry natural, and historic, and as delineated, would likely generate limited to moderate potential future adverse impacts on scenery within this area.

The configuration of the remote natural zone as it is prescribed within alternative iv, is very similar to how that zone is delineated in alternative i, and so the potential effects to scenery would be generally the same as those described in alternative i related to the application of this zone. The configuration of the historic zone as it is prescribed within alternative iv is identical to how that zone is delineated in alternative iii, and so the potential effects to scenery would be the same as those described in

alternative iii related to the application of this zone.

The core portion of this site extending in from the main entrance and surrounding the immediate area around the historic Casey Ranch site buildings and structures that would be zoned historic, and encompassing the primary site feature, the Buffalo Jump, would be zoned frontcountry natural to provide opportunities for moderate levels of development to accommodate public visitation.

While not permitting the same level and intensity of development as the primary visitor service development zone, the frontcountry natural zone would permit the next greatest level of potential ancillary site facilities to be developed as delineated in this alternative. Because the frontcountry natural zone permits moderate levels of development, potential impacts to scenery within this zone would generally relate to any proposed new development and associated increases in visitation.

The archeological site known as the Buffalo Jump and the associated scenery within this viewshed represent two resources that were identified as being part of the fundamental purpose for acquiring this property. Views to the Buffalo Jump site from the top of the opposite canyon rim wall located just above the historic Casey Ranch building site area provide outstanding vantage points for visitors to enjoy remarkable scenic views of the canyon and specific site feature. The sensitivity of these resources and the configuration of the prescribed frontcountry natural zone in this alternative must carefully consider any potential future development with regard to protecting Park scenery. Any introduced elements or landscape modifications, including constructed trails, have a considerably high potential to adversely affect this remarkable scenic feature and site in general, especially if located along the top edge of the cliff, along the base slope or within the canyon valley floodplain bottom. Great caution and restraint will be important for Park management to consider with regard to any potential development at this site, as any new actions run the risk of adversely affecting the very fundamental resources and the associated scenic qualities for which these lands were acquired to protect.

Additionally, the frontcountry natural zone as delineated in this alternative includes both class I and class II scenery conservation management areas. Any future landscape modifications or development within this area must also appropriately address corresponding Scenery Conservation Management Class objectives, in order to further avoid creating adverse effects to Park scenery. In general and from a scenery conservation standpoint, any potential future development or modifications to existing development would be more appropriate and would likely create fewer adverse effects for actions taken within class II areas compared to locations within class I areas within this zone. Particular emphasis on scenery conservation principles (in addition to other resource protection considerations) would be required prior to establishing any formal paths, trails, informational exhibits, or associated infrastructure to, from, and at the primary site feature, the Buffalo Jump, as this specific site feature is located within a class I scenery conservation management area.

The degree by which adverse or beneficial effects may be potentially generated by implementation level actions would depend on how well design fundamentals and strategies are employed, especially with regard to project siting and corresponding Scenery Conservation Management Class objectives. Provided that Scenery Conservation Management Class II objectives are appropriately addressed within these areas that occur within the frontcountry natural zone, the corresponding adverse effects to scenery would likely be minimal to negligible. Any proposed development within this zone that also falls within a Scenery Conservation Management Class I area has a considerably greater potential to adversely affect Park scenery as class I objectives are the most strict and would be considerably more difficult to achieve related to potential land uses, development of site facilities and associated activities permitted within this zone. This is especially true for the Buffalo Jump site.

Conclusion — Land uses, development, and activities permitted within the three management

zones prescribed in this alternative, remote natural, frontcountry natural, and historic, and as delineated, would likely generate limited to moderate potential future adverse impacts on scenery within this area. The greatest potential change to the Sanson Ranch area introduced by this alternative is the frontcountry natural zoned area as this would permit the greatest level of potential ancillary site facilities within both class I and class II scenery conservation management areas. Careful consideration would be required to ensure Park scenery is not adversely affected prior to initiating any allowable use, activity, or development within these management zones that meets the proposed scenery conservation management objectives, in order to avoid or reduce adverse effects to Park scenery.

Cumulative Impacts Conclusions. Any project that occurs within or adjacent to the Park has the potential to have an effect on the Park scenery and scenery within the greater area. Past development outside the Park has impacted Park scenery and one of four primary reasons for acquiring this specific tract of land and expanding the Park boundary was to specifically protect the scenery from the adverse effects of likely future development. If land use development that would change the overall existing characteristics of the landscape to the east and south of the park continues, such actions would likely result in additional impacts to Park and regional scenery. It is not anticipated that implementation of the Zoning Management Plan and any subsequent development would result in measurable impacts to park scenery, although some allowable activities and development permitted under several action alternatives within this immediate area create questionable scenarios with regard to ongoing scenery conservation objectives, especially alternative ii. Subjecting any future development to additional compliance and mitigation is intended to prevent future impacts to Park scenery. Implementation of the preferred alternative for the historic Sanson Ranch area, as delineated in this Zoning Management Plan would likely not generate additional adverse cumulative effects to scenic resources within and adjacent to the park.

FLOODPLAIN FOR BEAVER CREEK

No-Action Alternative

Impacts — Under the no-action alternative, there would be no impacts to the 100-year floodplain of Beaver Creek through the Sanson Ranch. No development would occur under the no-action alternative. There would be no change in the ability of the floodplain to convey floodwaters, or its values and functions.

Conclusion — The no-action alternative would have no impact on the floodplains.

Sanson Ranch Alternative i

Impacts — This alternative proposes three management zones, which overlay the 100-year floodplain of Beaver Creek. Executive Order 11988, “Floodplain Management” requires federal agencies to minimize occupancy of and modification to floodplains. Specifically, the order prohibits federal agencies from funding construction in the 100-year floodplain unless there are no practicable alternatives. This alternative includes management zones (remote natural, frontcountry natural, and resource protection) that allows for minor to moderate levels of development. Director’s Order. 77-2: *Floodplain Management*, does not exempt structures in the floodplain.

Beaver Creek rarely reaches the Sanson Ranch area as it typically loses its entire flow when it reaches

the outcrops of Madison aquifer (Pahasapa Limestone), located upstream of the ranch. The flow for Beaver Creek averages 1.2 cubic feet per second (cfs). It is only when the stream flow is more than 3.68 cfs that the stream flows beyond the loss zone and reaches the Sanson Ranch. However, heavy spring snowmelt or storm events do create significant stream flows in Beaver Creek that reach the Sanson Ranch area on an annual to biannual basis.

Conclusion — Sanson Ranch alternative i could have adverse impacts on the Beaver Creek 100-year floodplain. Any action allowed within the management zone overlay will be require subsequent compliance, including the preparation of a Statement of Finding (SOF) to detail impacts to the floodplain, if no excepted action is functional. It is unforeseeable to determine the level of impacts to floodplains until detailed implementation planning is completed.

Sanson Ranch Alternative ii

Impacts — This alternative proposes two management zones, which overlay the 100-year floodplain of Beaver Creek. Executive Order 11988, "Floodplain Management" requires federal agencies to minimize occupancy of and modification to floodplains. Specifically, the order prohibits federal agencies from funding construction in the 100-year floodplain unless there are no practicable alternatives. This alternative includes management zones (frontcountry natural and primary visitor service) that allows for moderate to heavy levels of development. Director's Order 77-2: *Floodplain Management*, does not exempt structures in the floodplain.

Beaver Creek rarely reaches the Sanson Ranch area as it typically loses its entire flow when it reaches the outcrops of Madison aquifer (Pahasapa Limestone) located upstream of the ranch. The flow for Beaver Creek averages 1.2 cubic feet per second (cfs). It is only when the stream flow is more than 3.68 cfs that the stream flows beyond the loss zone and reaches the Sanson Ranch. However, heavy spring snowmelt or storm events do create significant stream flows in Beaver Creek that reach the Sanson Ranch area on an annual to biannual basis.

Conclusion — Sanson Ranch alternative ii could have adverse impacts on the Beaver Creek 100-year floodplain. Any action allowed within the management zone overlay will require subsequent compliance, including preparation of a SOF to detail impacts to the floodplain, if no excepted action is functional. It is unforeseeable to determine the level of impacts to floodplains until detailed implementation planning is completed.

Sanson Ranch Alternative iii

Impacts — This alternative proposes five management zones, which overlay the 100-year floodplain of Beaver Creek. Executive Order 11988, "Floodplain Management" requires federal agencies to minimize occupancy of and modification to floodplains. Specifically, the order prohibits federal agencies from funding construction in the 100-year floodplain unless there are no practicable alternatives. This alternative includes management zones (remote natural, frontcountry natural, resource protection, primary visitor service, and historic) that allows for minor to heavy levels of development. Director's Order 77-2: *Floodplain Management* does not exempt structures in the floodplain.

Beaver Creek rarely reaches the Sanson Ranch area as it typically loses its entire flow when it reaches the outcrops of Madison aquifer (Pahasapa Limestone), located upstream of the ranch. The flow for Beaver Creek averages 1.2 cubic feet per second (cfs). It is only when the stream flow is more than

3.68 cfs that the stream flows beyond the loss zone and reaches the Sanson Ranch. However, heavy spring snowmelt or storm events do create significant stream flows in Beaver Creek that reach the Sanson Ranch area on an annual to biannual basis.

Conclusion — Sanson Ranch alternative iii could have adverse impacts on the Beaver Creek 100-year floodplain. Any action allowed within the management zone overlay will be require subsequent compliance, including the preparation of a SOF to detail impacts to the floodplain, if no excepted action is functional. It is unforeseeable to determine the level of impacts to floodplains until detailed implementation planning is completed.

Sanson Ranch Alternative iv

Impacts — This alternative proposes three management zones, would overlay the 100-year floodplain of Beaver Creek. Executive Order 11988, "Floodplain Management" requires federal agencies to minimize occupancy of and modification to floodplains. Specifically, the order prohibits federal agencies from funding construction in the 100-year floodplain unless there are no practicable alternatives. This alternative includes management zones (remote natural, frontcountry natural, and historic) that allows for minor to moderate levels of development. Director's Order 77-2: *Floodplain Management*, does not exempt structures in the floodplain.

Beaver Creek rarely reaches the Sanson Ranch area as it typically loses its entire flow when it reaches the outcrops of Madison aquifer (Pahasapa Limestone), located upstream of the ranch. The flow for Beaver Creek averages 1.2 cubic feet per second (cfs). It is only when the stream flow is more than 3.68 cfs that the stream flows beyond the loss zone and reaches the Sanson Ranch. However, heavy spring snowmelt or storm events do create significant stream flows in Beaver Creek that reach the Sanson Ranch area on an annual to biannual basis.

Conclusion — Sanson Ranch alternative iv could have adverse impacts on the Beaver Creek 100-year floodplain. Any action allowed within the management zone overlay will be require subsequent compliance, including the preparation of a SOF to detail impacts to the floodplain, if no excepted action is functional. It is unforeseeable to determine the level of impacts to floodplains until detailed implementation planning is completed.

Cumulative Impacts Conclusions. No cumulative impacts would be expected from the Zoning Management Plan to the floodplain; however, implementation of any action as it relates to development within the floodplain would need to consider cumulative effects from such action on the chemical, physical, and biological integrity on down gradient water that could result.

ARCHEOLOGICAL RESOURCES

No-Action Alternative

Impacts — Under the no-action alternative, there would be no management zones, resulting in periodic archeological surveying based on occasional special/tribal event use. The area would be gated and would not be open to the general public. No long-term adverse impacts to archeological resources would be expected. However, due to the very limited use of the property, few park staff would be expected to be present at any time to ensure unauthorized access did not occur. As a result,

there is a small risk of illegal disturbance to archeological resources under this alternative. The risk of resource theft is limited, however, if any were to occur, it would result in long-term adverse impacts.

The Sanson Ranch property and surrounding area was acquired in 2011, as a result, no management zones exist. Adherence to the NHPA regulations and *Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation* and Director's Order 28: *Cultural Resource Management* would continue to be required.

Conclusion — There would be no visitor or administrative facility development or general public use of the area under the no-action alternative, as a result, no adverse impacts to archeological resources would be expected.

Sanson Ranch Alternative i

Impacts — Under Sanson Ranch alternative i, management zone overlays would not have any impact on archeological resources of the park, however, allowable uses within these overlays, if implemented, could have long-term direct adverse impacts. This alternative includes three management zones; remote natural, frontcountry natural, and resource protection.

The primary theme for this alternative is resource protection to emphasize the sensitive cultural resources within the identified area. Resources include the archeological resources that were one of the primary purposes for acquiring this property as well as the historic ranch structures. Facilities could include a small number of support structures if it is determined necessary for preservation of sensitive resource values. Trails would generally not be permitted through this zone; however, this is determined on a case-by-case basis. Designated trails may be required for resource protection purposes. Resource Protection allows for minimal (smallest footprint) development to accommodate park visitors in a manner that protects sensitive resources. Impacts to archeology would be limited or altogether avoided. Impacts could arise from potential small scale development, however, the focus on this zone is resource protection, and thus proposed development would be limited. Likely impacts would be beneficial as a result of ongoing survey and inventorying work by qualified archeologists.

The area immediately adjacent and north of the main entrance to this site would be zoned frontcountry natural to provide opportunities for moderate levels of development to accommodate public visitation to this site. Long-term direct adverse impacts to archeological resources could result within frontcountry natural zoned area as a result of the moderate level of development allowed, including overlooks, benches, wayside exhibits, parking areas, natural and hardened trails, and visitor entrance stations. These allowable uses, if implemented, could impact unknown archeological resources.

The remainder of the Sanson Ranch would be zoned remote natural to correspond with the adjacent remote natural as zoned in the Greater Park alternatives. Adverse impacts to archeological resources would be minimal within this zone. Development and allowable uses would be limited in context of ground disturbing activities. The placement of trails would be allowed; however, only natural surface trails would be permitted, if needed. Generally, trails would not be present except where needed for resource protection and in specific cases where long-distance trails cross this zone. Trails would also strive to use existing disturbed areas such as wildlife paths or existing two-track roads.

To complete any of the allowable actions as it pertains to ground disturbing activities without causing severe damage to known and unknown archeological resources, qualified archeologists

would be needed to survey/inventory the proposed area of development for possible resources. Archeological resources in the proposed developed location(s) would be identified and delineated for avoidance prior to project work. If surveying is not possible prior to construction activities, an archeologist could monitor the site during construction. Any resources collected would be required to comply with the *Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation* and Director's Order 28: *Cultural Resource Management*.

Conclusion — Sanson Ranch alternative i provides three management zone overlays and no transportation corridors. The potential exists for adverse impacts to known and unknown archeological resources where the zone allows for ground disturbing actions such as the frontcountry natural. Potential future development as zoned in this alternative utilized suitability analysis approach in an effort of avoidance on where to and not to develop. As a result, long-term adverse impacts should be limited. Impacts would be most intense and long-term as it pertains to the footprint of proposed development. Although adverse, actions and subsequent planning and best management practices such as surveying by a qualified archeologist would be utilized to reduce overall impacts. Sanson Ranch alternative i, compared to other Sanson Ranch alternatives, has the least amount of potential adverse impacts to archeological resources.

Sanson Ranch Alternative ii

Impacts — Under Sanson Ranch alternative ii, management zone and transportation corridor overlays would not have any impact on archeological resources of the park, however, allowable uses within these overlays, if implemented, could have long-term direct adverse impacts. This alternative includes two management zones and one transportation corridor, frontcountry natural, primary visitor services development, and tertiary passage.

The primary theme for Sanson Ranch alternative ii is to provide maximum latitude to park managers for intensive development, if desired. The core Sanson Ranch and Buffalo Jump site would be zoned for primary visitor service development. This zone permits the highest level of development, use, and visitor service facilities. Facilities permitted include visitor center and associated administrative functions.

Adverse impacts to archeological resources would be greatest in this zone. Direct long-term adverse impacts would arise in the footprints and staging areas of facilities and indirectly in the immediately adjacent areas as a result of large groups of visitors/staff this zone would expect to accommodate. Impacts are of most concern to unknown archeological resources.

The area surrounding the primary visitor service zone would be frontcountry natural to provide opportunities for moderate levels of development to accommodate public visitation to this site. Short-to-long-term adverse impacts to archeological resources could arise from moderate levels of development, including overlooks, benches, wayside exhibits, small parking areas, and visitor entrance stations. These allowable uses, if implemented, could result in the removal of the unknown archeological resources within the footprint of development or along a trail corridor.

The existing two-track road which bisects the Sanson Ranch would be zoned as a tertiary passage corridor. The tertiary corridor would permit some minimal improvements to allow visitors to reach the Sanson Ranch structures. Improvements would be limited in order to reduce excessive landscape modification and ground disturbance. Potential impacts to archeological resources could arise from road improvements, maintenance, and grading operations. Portions of this road were surveyed in 2010 by contractors on behalf of Southern Black Hills Water System, and in 2012 and 2014 by NPS

staff. All efforts would be made to avoid known archeological resources.

To complete any of the allowable actions as it pertains to ground disturbing activities without causing severe damage to known and unknown archeological resources, qualified archeologists would be needed to survey/inventory the proposed area of development for possible resources. Archeological resources in the proposed developed location(s) would be identified and delineated for avoidance prior to project work. If surveying is not possible prior to construction activities, an archeologist could monitor the site during construction. Any resources collected would be required to comply with the *Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation* and Director's Order 28: *Cultural Resource Management*.

Conclusion — Sanson Ranch alternative ii provides two management zone overlays and one transportation corridor. The potential exists for adverse impacts to archeological resources where the zone allows for ground disturbing actions such as the frontcountry natural and primary visitor services zone. Potential future development would incorporate an avoidance strategy in effort on where to and not to develop. As a result, long-term adverse impacts should be limited. Impacts would be most intense and long-term as it pertains to the footprint of proposed development, this is most prevalent for the primary visitor services zone. Although adverse, actions, and subsequent planning and best management practices would be utilized to reduce overall impacts. Sanson Ranch alternative ii, compared to other Sanson Ranch alternatives has the most potential for adverse impacts to archeological resources as compared to the other Sanson Ranch alternatives.

Sanson Ranch Alternative iii

Impacts — Under Sanson Ranch alternative iii, management zone, and transportation corridor overlays would not have any impact on archeological resources of the park, however, allowable uses within these overlays, if implemented, could have long-term direct adverse impacts. This alternative includes five management zones and one transportation corridor, frontcountry natural, primary visitor services development, historic, resource protection, remote natural, and tertiary passage corridor.

This alternative would provide direction for historic resource management with an emphasis on continued use and reuse, including possible restoration, of buildings and structures and the grounds immediately surrounding the historic Sanson Ranch. While the Buffalo Jump site is zoned resource protection to emphasis the sensitive cultural resources associated with this site. Both zones allow for minimal levels (smallest footprint) of development to accommodate park visitors in a manner that protects the sensitive resources. Impacts to archeology would be limited or altogether avoided within the historic and resource protection zones. Impacts could arise from potential small scale development, however, the focus on these zones is preservation and resource protection. Likely impacts would be beneficial as a result of ongoing survey and inventorying work by qualified archeologists.

The area surrounding the resource protection zone includes the frontcountry natural zone to provide opportunities for moderate levels of development to accommodate public visitation to this site. While the primary visitor service development zone would include the relatively confined area immediately adjacent to and just north of the main entrance road between the Park boundary and the dry wash of Beaver Creek. Considerable development for visitor service purposes would be allowed. Adverse impacts to archeological resources would be greatest in these zones. Direct long-term adverse impacts would arise in the footprints and staging areas of facilities and indirectly in the

immediately adjacent areas as a result of large groups of visitors/staff this zone would expect to accommodate. Impacts are of most concern to unknown archeological resources.

The remainder of this alternative is zoned remote natural to correspond with the adjacent remote natural area as zoned in the Greater Park alternatives. Impacts to archeological resources in the remote natural zone would be the same as those described in Sanson Ranch alternative i.

The existing two-track road which bisects the Sanson Ranch would be zoned as tertiary passage corridor. The tertiary corridor would permit some minimal improvements to allow visitors to reach the Sanson Ranch structures. Improvements would be limited in order to reduce excessive landscape modification and ground disturbance. Potential impacts to archeological resources could arise from road improvements, maintenance, and grading operations. Portions of this road were surveyed in 2010 by contractors on behalf of Southern Black Hills Water System, and in 2012 and 2014 by NPS staff. All efforts would be made to avoid known archeological resources.

To complete any of the allowable actions as it pertains to ground disturbing activities without causing severe damage to known and unknown archeological resources, qualified archeologists would be needed to survey/inventory the proposed area of development for possible resources. Archeological resources in the proposed developed location(s) would be identified and delineated for avoidance prior to project work. If surveying is not possible prior to construction activities, an archeologist could monitor the site during construction. Any resources collected would be required to comply with the *Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation* and Director's Order 28: *Cultural Resource Management*.

Conclusion — Sanson Ranch alternative iii provides five management zones and one transportation corridor, frontcountry natural, primary visitor services development, historic, resource protection, remote natural, and tertiary passage. Potential future development would incorporate an avoidance strategy in effort on where to develop and not develop. As a result, long-term adverse impacts should be limited. Impacts would be most intense and long-term as it pertains to the footprint of proposed development, this is most prevalent for the primary visitor services zone. Although adverse, actions and subsequent planning and best management practices would be utilized to reduce overall impacts. Sanson Ranch alternative iii, compared to other Sanson Ranch alternatives has a moderate level of potential for adverse impacts to archeological resources as compared to the other Sanson Ranch alternatives.

Sanson Ranch Alternative iv

Impacts — Under Sanson Ranch alternative iv, management zone overlays would not have any impact on archeological resources of the park, however, allowable uses within these overlays, if implemented, could have long-term direct adverse impacts. This alternative includes three management zones, frontcountry natural, historic, and remote natural.

The historic zone, which surrounds the Sanson Ranch, would have the least amount of adverse impacts as the focus of the historic zone in this alternative is to actively use and protect historic buildings and the cultural landscape. The historic zone allows for minimal levels (smallest footprint) of development to accommodate park visitors in a manner that protects the cultural setting. Impacts to archeology would be limited or altogether avoided within the historic zone. Impacts could arise from potential small-scale development; however, the focus on this zone is preservation and resource protection. Likely impacts would be beneficial as a result of ongoing survey and inventorying work by qualified archeologists.

The frontcountry natural zoned area which surrounds the Sanson Ranch structures and includes the Buffalo Jump could result in short-to-long-term adverse impacts to archeological resources from moderate levels of development, including overlooks, benches, wayside exhibits, small parking areas, and visitor entrance stations. These allowable uses, if implemented, could impact unknown archeological resources.

The remainder of the Sanson Ranch would be zoned remote natural to correspond with the adjacent remote natural as zoned in the Greater Park alternatives. Adverse impacts to archeological resources would be minimal within this zone. Development and allowable uses would be limited in context of ground disturbing activities. Impacts to archeological resources in the remote natural zone would be the same as those described in Sanson Ranch alternative i and iii.

To complete any of the allowable actions as it pertains to ground disturbing activities without causing severe damage to known and unknown archeological resources, qualified archeologists would be needed to survey/inventory the proposed area of development for possible resources. Archeological resources in the proposed developed location(s) would be identified and delineated for avoidance prior to project work. If surveying is not possible prior to construction activities, an archeologist could monitor the site during construction. Any resources collected would be required to comply with the *Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation* and Director's Order 28: *Cultural Resource Management*.

Conclusion — Sanson Ranch alternative iv provides three management zone overlays and no transportation corridors. The potential exists for adverse impacts to known and unknown archeological resources where the zone allows for ground disturbing actions such as the frontcountry natural. Potential future development would incorporate an avoidance strategy in effort on where to develop and not develop. As a result, long-term adverse impacts should be limited. This impact would be most intense and long-term as it pertains to the footprint of proposed development, this is most prevalent for the frontcountry natural zone. Although adverse, actions and subsequent planning and best management practices would be utilized to reduce overall impacts. Sanson Ranch alternative iv, compared to other Sanson Ranch alternatives has a moderate level of potential for adverse impacts to archeological resources as compared to the other Sanson Ranch alternatives.

Cumulative Impacts Conclusions. The full extent of the archeology potential in the southern Black Hills is not known, nor has the archeology of the park been fully inventoried. Any project that occurs within the Park has the potential to have an effect on archeological resources. If development to the east and south of the park continues this could result in further cumulative impacts to archeological resources of the region. It is not anticipated that implementation of the Zoning Management Plan and subsequent development would result in impacts to park archeological resources. Subjecting any future development to additional compliance and mitigation is intended to prevent this from happening. Therefore, implementation of the Zoning Management Plan would not likely have cumulative effects to archeological resources in the southern Black Hills.

ETHNOGRAPHIC RESOURCES

Common to All

Ethnographic resources, such as sites, structures, landscapes, stone features, prayer places, gathering locations, traditional and naturally significant places exist in the area for several tribes with varying degrees of historical and cultural affiliation with the Black Hills in the vicinity of Wind Cave.

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 statute and regulations.

No-Action Alternative

Impacts — Under the no-action alternative, there would be no new management zones, resulting in periodic consultation with affiliated tribes/associated THPOs based on actions related to occasional special event uses of the area. The area would be gated and would not be open to the general public. As a result, no long-term adverse impacts to ethnographic resources would be expected. The limitation of access to the landscape would result in beneficial impact to ethnographic resources because tribal groups would be able to access sacred sites for traditional activities in a private mode, resulting in greater protection and preservation of sacred sites. However, due to the very limited use of the property, few park staff would be expected to be present at any time to ensure unauthorized access did not occur. As a result, there is a small risk of illegal disturbance to ethnographic resources and sacred sites under this alternative. The risk of resource theft is limited; however, if any were to occur, it could result in long-term adverse impacts.

The Sanson Ranch property and surrounding area was acquired in 2011, as a result, no management zones exist. Adherence to the NHPA regulations and *Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation* and Director's Order 28: *Cultural Resource Management* would continue to be required.

Conclusion — There would be no visitor or administrative facility development or general public use of the area under the no-action alternative, as a result, no adverse impacts to ethnographic resources would be expected, however, if theft of ethnographic resources were to occur it could have long-term adverse impacts.

Sanson Ranch Alternatives i, ii, iii, and iv

Impacts — Potential impacts to ethnographic resources as a result of the various proposed management zone overlays in the action alternatives depend on the management zone allowable uses, stipulations, and on subsequent management actions and implementation plans. Appropriate environmental compliance and consultation with tribal offices would be completed prior to any allowable action as prescribed in the management zone overlay.

The actions involved in the alternatives allow for various levels of use and development. Management zone overlays remote natural, resource protection, and historic allow uses that would likely not alter resource conditions, such as traditional access or site preservation, nor alter the relationship between the resource and the affiliated group's body of practices and beliefs. However, other management zone overlays, such as frontcountry natural and primary visitor services, allow uses that could result in the introduction of modern features into the landscape, potentially within view of sacred sites and ethnographic resources, resulting in adverse impacts. The addition of moderate to major features such as visitors contact stations, visitor center, and road improvements could change the landscape and result in potential short-to-long-term adverse impacts to ethnographic resources due to the introduction of new modern features into the landscape, potentially within view of sacred sites and ethnographic resources. Any introduction of modern features would be sited to avoid directly affecting known sacred sites and other ethnographic resources.

Generally, all action alternatives compared to the no-action allow for increased access by the public. Recreation uses such as hiking, photography, and visitation of the site, are generally low impact activities and visitation is project to be relatively low under all action alternatives. However, recreation use would increase compared to existing conditions and could result in long-term adverse impacts to ethnographic resources due to greater public access to areas where there may be sacred sites.

To complete any of the allowable actions as it pertains to ground disturbing activities without causing severe damage to ethnographic resources, affiliated tribes/associated THPOs would need to survey/inventory the proposed area of development for possible resources. Ethnographic resources in the proposed developed location(s) would be identified and delineated for avoidance prior to project work. If surveying is not possible prior to implementation of ground disturbing activities, an affiliated THPO/tribal representative(s) could monitor the site during construction. Any resources collected would be required to comply with the *Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation* and Director's Order 28: *Cultural Resource Management*.

Conclusion — The potential exists for adverse impacts to sacred sites and ethnographic resources under the action alternatives. All action alternatives allow for increased access and visitation from the existing state of restricted use; this could result in adverse impact. Additionally, those alternatives that include management zones that allow for moderate to major development (tertiary passage, frontcountry natural, and primary visitor services) could result in long-term adverse impacts to ethnographic resources due to the introduction of new modern features into the landscape. Any proposed development and subsequent action would utilize mitigation measures and be designed to blend in the landscape.

Ethnographic resources in the Sanson Ranch action alternatives would be delineated by affiliated tribes/associated THPOs for avoidance prior to implementation of any action. Any resources collected would be required to comply with the *Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation* and Director's Order 28: *Cultural Resource Management*. As a result, potential adverse impacts would be limited and or avoided.

Cumulative Impacts Conclusions. Ethnographic resources within and adjacent to the park in the southern Black Hills has not been fully disclosed or formally documented. It is not the intent of this plan to identify specific ethnographic resources in the park. American Indians desiring privacy for religious activities would continue to be disrupted occasionally by such things as presence of other visitors. Any project that occurs within the Park has the potential to have an effect on

ethnographic resources. Subsequent compliance (site specific) and consultation with associated American Indian tribes would prevent/reduce potential impacts from implementation of actions associated with the Zoning Management Plan.

CULTURAL LANDSCAPE/HISTORIC STRUCTURES

No-Action Alternative

Impacts — Under the no-action alternative, there would be no management zones. There would be no cohesive long-term vision for acceptable uses and levels of development. The area would be gated and would not be open to the general public. As a result, few people would access the cultural landscape associated with the historic Sanson Ranch. This lack of use would support the preservation of the cultural landscape resources in their current state, potentially resulting in beneficial impacts to the cultural landscape. However, the lack of regular access and use could also result in long-term adverse impacts to the historic ranch structures, due to incremental loss of material integrity over time as the resources remain in a disused state. This would likely be a short-term adverse impact until the Sanson cultural landscape report (CLR) / historic structures report (HSR) (expected to initiate in 2015) was completed with treatment prescriptions.

The Sanson Ranch property and surrounding area was acquired in 2011, as a result, no management zones exist. Adherence to NHPA regulations and *Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation* and Director's Order 28: *Cultural Resource Management* would continue to be required.

Conclusion — There would be no visitor or administrative facility development or general public use of the area under the no-action alternative, as a result, no adverse impacts to the Sanson Ranch cultural landscape would be expected, however, until the Sanson Ranch CLR and HSS are completed with treatment prescriptions, the historic ranch structures would expect to have continued adverse impacts from disuse and preservation efforts.

Common to All (Sanson Ranch Alternatives i–iv). All management zones as proposed would not diminish the characteristics of the eligible or listed structures and landscapes. Historic structures and cultural landscapes, location, design, setting, materials, workmanship, feeling, and association would not be impacted. An assessment of effect determination as part of NHPA section 106 will be completed with the South Dakota SHPO. The implementation of any allowable use would require adherence to NHPA regulations and the *Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation* and Director's Order 28: *Cultural Resource Management*. All subsequent actions would require their own compliance process to determine potential environmental consequences prior to implementation.

Sanson Ranch Alternative i

Impacts — Under Sanson Ranch alternative i, management zone overlays could have negligible adverse impacts and beneficial impacts on the cultural landscape. Sanson Ranch alternative i provides three management zone overlays, remote natural, resource protection, and frontcountry natural. Please see previous resource topics and chapter 2 for a description of specific locations and the Management Zoning Matrix which details the uses and permitted activities.

The potentially eligible cultural landscape and historic structures would be zoned resource protection. All management actions would be closely examined and monitored within this zone to ensure enhanced protection of the sensitive resources. Any development would be as minimal as needed (minimum footprint) to accommodate park visitors in a manner that protects the sensitive resources. No adverse impacts to the cultural landscape and historic structures would be expected. The resource protection zone restrictions would ensure long-term beneficial impacts to the cultural landscape and structures.

The area immediately adjacent and north of the main entrance to this site would be zoned frontcountry natural to provide opportunities for moderate levels of development to accommodate public visitation to this site. Short-to-long-term adverse impacts to the cultural landscape could arise if development is not designed in a sensitive manner. This would include ensuring facilities were visually unobtrusive and the use of mitigation measures on blending into the landscape and surroundings.

The remainder of the Sanson Ranch would be zoned remote natural to correspond with the adjacent remote natural as zoned in the Greater Park alternatives. Impacts to the cultural landscape would likely be minimal. Any development would be limited in context of ground disturbing activities. The placement of trails would be allowed; however, only natural surface trails would be permitted. Generally, trails would not be present except where needed for resource protection and in specific cases where long distance trails cross this zone. Trails would also strive to use existing disturbed areas such as wildlife paths and be designed with materials to blend into the landscape.

Conclusion — Sanson Ranch alternative i provides three management zone overlays and no transportation corridors. Adverse impacts to the cultural landscape would be limited, while no adverse impacts to historic structures would be expected. Impacts would be most intense and long-term as it pertains to the footprint of proposed development (frontcountry natural). Although adverse, actions and subsequent planning and best management practices would be utilized to reduce overall impacts. Beneficial impacts to the cultural landscape and historic structures would likely result from the resource protection zone. Sanson Ranch alternative i, compared to other Sanson Ranch alternatives has the least amount of potential adverse impacts to the cultural landscape and historic structures.

Sanson Ranch Alternative ii

Impacts — Under Sanson Ranch alternative ii, management zone overlays could have adverse impacts on the cultural landscape. Sanson Ranch alternative ii provides two management zone overlays, frontcountry natural and primary visitor services; and one transportation corridor, tertiary passage zone. Please see previous resource topics and chapter 2 for a description of specific locations and the Management Zoning Matrix which details the uses and permitted activities.

The potentially eligible cultural landscape and historic structures (core Sanson Ranch, and Buffalo Jump) would be zoned primary visitor services. This would allow park managers the maximum latitude available to intensively develop facilities, if desired. Facilities permitted include visitor center and associated administrative functions. Short-to-long–term adverse impacts to the cultural landscape and historic structures could arise from the development of modern facilities. If designed in a sensitive, unobtrusive manner, minor adverse impacts would still likely occur to the cultural landscape as a result of human intrusions on the landscape; however, the intensity of this impact would be reduced.

The remainder of the Sanson Ranch site would be zoned frontcountry natural to provide opportunities for moderate levels of development to accommodate public visitation to this site. Short-to-long-term adverse impacts to the cultural landscape could arise if development is not designed in a sensitive manner. This would include ensuring facilities were visually unobtrusive and the use of mitigation measures on blending into the landscape and surroundings.

The existing two-track road that bisects the Sanson Ranch would be zoned as a tertiary passage corridor. Road improvements would be permitted although as a tertiary corridor upgrades would generally be characterized by loose-surface road such as gravel. Permitted upgrades would be similar to the construction standards to those of the Custer County Road Specifications. Impacts on historic structures would be unlikely; however, there could be short-to-long-term adverse impact on the cultural landscape if road improvements scar the landscape. As such, upgrades would ensure subsequent compliance is completed and use of mitigation measures to reduce and/or eliminate adverse impacts.

Conclusion — Sanson Ranch alternative ii provides two management zone overlays and one transportation corridor. Adverse impacts to the cultural landscape could result, while no adverse impacts to historic structures would be expected. The impact would be most intense and long-term as it pertains to the footprint of proposed development (primary visitor services, frontcountry natural, and tertiary). Long-term adverse impacts could result to the cultural landscape due to the altered circulation and addition of new visible modern facilities. Although adverse, actions and subsequent planning and best management practices would be utilized to reduce overall impacts. It is unlikely impacts could be mitigated to a level of being unnoticeable as the level of permitted development is greatest in this alternative. Sanson Ranch alternative ii, compared to other Sanson Ranch alternatives, has the most potential for adverse impacts to the cultural landscape and historic structures.

Sanson Ranch Alternative iii

Impacts — Under Sanson Ranch alternative iii, management zone overlays could have adverse and beneficial impacts on the cultural landscape and historic structures. Sanson Ranch alternative iii provides five management zone overlays, frontcountry natural, primary visitor services, resource protection, historic, remote natural; and one transportation corridor, tertiary passage zone. Please see previous resource topics and chapter 2 for a description of specific locations and the Management Zoning Matrix which details the uses and permitted activities.

The bison jump would be zoned resource protection to emphasize the sensitive cultural resources associated with the site. All management actions would be closely examined and monitored within this zone to ensure enhanced protection of the sensitive resources. Any development would be as minimal as needed (minimum footprint) to accommodate park visitors in a manner that protects the sensitive resources. No adverse impacts to the cultural landscape and historic structures would be expected. The resource protection zone restrictions would ensure long-term beneficial impacts to the cultural landscape and structures.

The core Sanson Ranch historic structures would be zoned historic. This zone would provide direction for historic resource management with an emphasis on continued use and reuse, including possible restoration, of buildings and structures and the grounds immediately surrounding the historic structures. No adverse impacts to the cultural landscape and historic structures would be expected. The historic zone restrictions would ensure long-term beneficial impacts to the cultural landscape and structures.

The area surrounding the resource protection and historic zones includes the frontcountry natural zone which provides opportunities for moderate levels of development to accommodate public visitation to this site. Short-to-long-term adverse impacts to the cultural landscape could arise if development is not designed in a sensitive manner. This would include ensuring facilities were visually unobtrusive and the use of mitigation measures on blending into the landscape and surroundings. In addition, the relatively confined area immediately adjacent to and just north of the main entrance road between the Park boundary and the dry wash of Beaver Creek would be zoned for primary visitor service development. Considerable development for visitor service purposes would be allowed. Adverse impacts to the cultural landscape would be greatest in this zone. Short-to-long–term adverse impacts to the cultural landscape and historic structures could arise from the development of modern facilities. If designed in a sensitive, unobtrusive manner, minor adverse impacts would still likely occur to the cultural landscape as a result of human intrusions on the landscape; however, the intensity of this impact would be reduced.

The remainder of the Sanson Ranch would be zoned remote natural to correspond with the adjacent remote natural as zoned in the Greater Park alternatives. Impacts to the cultural landscape in the remote natural zone would be the same as those described in Sanson Ranch alternative i.

The existing two-track road that bisects the Sanson Ranch would be zoned as a tertiary passage corridor. Road improvements would be permitted although as a tertiary corridor upgrades would generally be characterized by loose-surface road such as gravel. Permitted upgrades would be similar to the construction standards to those of the Custer County Road Specifications. Impacts on historic structures would be unlikely; however, there could be short-to-long-term adverse impact on the cultural landscape if road improvements scar the landscape. As such, upgrades would ensure subsequent compliance is completed and use of mitigation measures to reduce and/or eliminate adverse impacts.

Conclusion — Sanson Ranch alternative iii provides five management zone overlays and one transportation corridor. Adverse impacts to the cultural landscape could result, while no adverse impacts to historic structures would be expected. This impact would be most intense and long-term as it pertains to the footprint of proposed development (primary visitor services, frontcountry natural, and tertiary). Long-term adverse impacts could result to the cultural landscape due to the altered circulation and addition of new visible modern facilities. Although adverse, actions and subsequent planning and best management practices would be utilized to reduce overall impacts. It is unlikely impacts could be mitigated to a level of being unnoticeable as the level of permitted development is greatest in this alternative. Beneficial impacts to the cultural landscape and historic structures would likely result from the resource protection and historic zones. Sanson Ranch alternative iii, compared to other Sanson Ranch alternatives, allows a moderate level of development and thus potential adverse impacts; however, this development is targeted in areas that largely avoid the resources at interest and thus reduce the potential for adverse impacts.

Sanson Ranch Alternative iv

Impacts — Under Sanson Ranch alternative iv, management zone overlays could have negligible adverse impacts and beneficial impacts on the cultural landscape and historic structures. Sanson Ranch alternative iv provides three management zone overlays, remote natural, historic, and frontcountry natural. Please see previous resource topics and chapter 2 for a description of specific locations and the Management Zoning Matrix which details the uses and permitted activities.

The core Sanson Ranch historic structures would be zoned historic. This zone would provide direction for historic resource management with an emphasis on continued use and reuse, including possible restoration, of buildings and structures and the grounds immediately surrounding the historic structures. No adverse impacts to the cultural landscape and historic structures would be expected. The historic zone restrictions would ensure long-term beneficial impacts to the cultural landscape and structures.

The area surrounding the historic zone and entrance to the site would be zoned frontcountry natural. This zone provides opportunities for moderate levels of development to accommodate public visitation to this site. Short-to-long-term adverse impacts to the cultural landscape could arise if development is not designed in a sensitive manner. This would include ensuring facilities were visually unobtrusive and the use of mitigation measures on blending into the landscape and surroundings.

The remainder of the Sanson Ranch would be zoned remote natural to correspond with the adjacent remote natural as zoned in the Greater Park alternatives. Impacts to the cultural landscape in the remote natural zone would be the same as those described in Sanson Ranch alternative i and iii.

Conclusion — Sanson Ranch alternative iv provides three management zone overlays and no transportation corridors. Adverse impacts to the cultural landscape could result, while no adverse impacts to historic structures would be expected. This impact would be most intense and long-term as it pertains to the footprint of proposed development (frontcountry natural). Subsequent planning and best management practices would be utilized to reduce overall impacts. Beneficial impacts to the cultural landscape and historic structures would likely result from the historic zone. Sanson Ranch alternative iv, compared to other Sanson Ranch alternatives, allows a moderate level of develop and thus potential adverse impacts; however, this development is targeted in areas that largely avoid the resources at interest and thus reduce the potential for adverse impacts.

Cumulative Impacts Conclusions. Any project that occurs within or adjacent to the Park has the potential to have an effect on cultural landscapes and historic structures. Not all areas within and outside the park have been inventoried for resources of these types that are eligible for the National Register of Historic Places. However, the Sanson Ranch eligible resources (cultural landscape and historic structures) would not incur further impacts for the proposed management zones. If development to the east and south of the park continues this could result in impacts to cultural landscapes and historic structures that have yet to be evaluated outside the park. It is not anticipated that implementation of the Zoning Management Plan and subsequent development would result in impacts to uninventoried cultural landscapes, historic structures, and associated features within the park. Subsequent compliance and mitigation is intended to prevent this from happening. Therefore, implementation of the Zoning Management Plan would not likely have cumulative impacts to cultural landscapes and historic structures in the region.

VISITOR EXPERIENCE

No-Action Alternative

Impacts — Under the no-action alternative, there would be no management zones. There would be no cohesive long-term vision for acceptable uses and levels of development. The area would be gated and would not be open to the general public. Visitor experience on the Sanson Ranch would continue to be limited to special and tribal events and NPS-led interpretive tours during the summer.

There would be no adverse impacts and no beneficial impacts to the visitor experience due to the prohibition of general public use of the site.

Conclusion — There would be no visitor or administrative facility development or general public use of the area under the no-action alternative, as a result, no adverse or beneficial impacts to the visitor experience would be expected. Therefore, the ability of the public to experience the Sanson Ranch will continue to be limited to special and tribal events and NPS-led tours in the summer.

Sanson Ranch Alternative i

Impacts — Under Sanson Ranch alternative i there would be beneficial impacts to the visitor experience. Sanson Ranch alternative i provides three management zone overlays, remote natural, resource protection, and frontcountry natural. General recreation would be allowed under this alternative, including hiking and associated traditional park uses accessed on foot such as photography, wildlife viewing, nature observation, interpretive tours/programs. Please see the Management Zoning Matrix, which details the uses and permitted activities.

The core Sanson Ranch structures and Buffalo Jump would be zoned for Resource Protection. Visitor experience throughout the Resource Protection zone is specific to the resources (Sanson historic structure and Buffalo Jump) being showcased and protected. Visitor experiences in this zone could include guided ranger-led interpretive tours. Trails are permitted, however, specific design and type of trail would be determined on a case-by-case basis for resource protection purposes. If a resource within this zone were deemed important enough to warrant additional protection (through barriers, management oversight, etc.), visitor experience may have adverse impacts with regard to having an unrestrained access. The visitor experience would be ancillary to the resources within this zone. Please see Zoning Matrix for greater details and provisions how this resource area would be managed.

The area immediately adjacent and north of the main entrance to this site would be zoned frontcountry natural to provide opportunities for moderate levels of development to accommodate public visitation to the site, including overlooks, benches, wayside exhibits, small parking lots, and visitor entrance stations. The remainder of the Sanson Ranch would be zoned remote natural to correspond to the adjacent remote natural as zoned in the Greater Park alternatives.

Conclusion — Sanson Ranch alternative i provides three management zone overlays. All three zones provide various levels of use and corresponding visitor experiences. Although the resource protection zone does not have the same level or magnitude of uses compared to the frontcountry natural zone, it does provide access and enhance the existing visitor experiences, resulting in long-term beneficial impacts. There would likely be no adverse impacts to the visitor experience as a result of increased access; however, the resource protection zone could potentially have adverse impacts on visitors depending on future management actions for those visitors who desire unrestrained visitation access.

Sanson Ranch Alternative ii

Impacts — Under Sanson Ranch alternative ii there would be beneficial and potentially adverse impacts to the visitor experience. Sanson Ranch alternative ii provides two management zone overlays, frontcountry natural and primary visitor service development; and one transportation corridor, tertiary Passage. General recreation would be allowed under this alternative, including

hiking and associated traditional park uses accessed on foot such as photography, wildlife viewing, nature observation, interpretive tours/programs. Please see the Management Zoning Matrix which details the uses and permitted activities.

The core Sanson Ranch structures, Buffalo Jump, and entrance to the site would be zoned for primary visitor services development. This zone permits the highest level of development, use, and visitor service facilities, including visitor centers, associated administrative functions, and moderately sized parking lots. The area surrounding the primary visitor services zone would be frontcountry natural to provide opportunities for moderate levels of development to accommodate public visitation to the site, including overlooks, benches, wayside exhibits, small parking lots, and visitor entrance stations.

Both the primary visitor service and frontcountry natural management zones, and the tertiary passage corridor provide access and enhance the existing visitor experiences, resulting in long-term beneficial impacts. This alternative could result in adverse impacts to those visitors wants a more remote experience as this action alternative allows for the most development.

Conclusion — Sanson Ranch alternative ii provides two management zone overlays and one transportation corridor. All zones provide various levels of use and corresponding visitor experiences from the current restricted uses. This alternative provides access and enhancement of the visitor experience, resulting in long-term beneficial impacts. There would likely be no adverse impacts to the visitor experience as a result of increased access; however, those visitors wanting a more remote experience could have potential adverse impacts depending on future management actions.

Sanson Ranch Alternative iii

Impacts — Under Sanson alternative iii there would be beneficial and potentially adverse impacts to the visitor experience. This alternative provides five management zone overlays, frontcountry natural, primary visitor service development, historic, resource protection, and remote natural; and one transportation corridor, tertiary passage. A wide variety of recreational uses and visitor experience would be allowed under this alternative, including hiking and associated traditional park uses accessed on foot such as photography, wildlife viewing, nature observation, interpretive tours/programs. Please see the Management Zoning Matrix which details the uses and permitted activities.

The Buffalo Jump and surrounding area would be zoned for resource protection. Visitor experience throughout the resource protection zone is specific to the resources (Sanson historic structure and Buffalo Jump) being showcased and protected. Visitor experiences in this zone could include guided ranger-led interpretive tours. Trails are permitted; however, specific design and type of trail would be determined on a case-by-case basis for resource protection purposes. If a resource within this zone were deemed important enough to warrant additional protection (through barriers, management oversight, etc.), visitor experience may have adverse impacts with regard to having an unrestrained access. The visitor experience would be ancillary to the resources within this zone. Please see Zoning Matrix for greater details and provisions how this resource area would be managed.

The core Sanson Ranch structures would be zoned for historic resources. Visitors would have opportunities that promote cultural resource education and stewardship. Visitor experience in the historic zone would primarily be focused on interpretation of the ranching culture and history of the

area. This would result in long-term beneficial impacts on the visitor experience.

The entrance to the site would be zoned for primary visitor services development. This zone permits the highest level of development, use and visitor service facilities, including visitor centers, associated administrative functions, and moderately sized parking lots. The area surrounding the Sanson Ranch structures and Buffalo Jump zoned areas would be frontcountry natural to provide opportunities for moderate levels of development to accommodate public visitation to the site, including overlooks, benches, wayside exhibits, small parking lots, and visitor entrance stations. Both the primary visitor service and frontcountry natural management zones, and the tertiary passage corridor provide access and enhance the existing visitor experiences, resulting in long-term beneficial impacts. This alternative could result in adverse impacts to those visitors who want a more remote experience as this action alternative allows for the most development. The remainder of the Sanson Ranch would be zoned remote natural to correspond to the adjacent remote natural as zoned in the Greater Park alternatives.

Conclusion — Sanson Ranch alternative iii provides five management zone overlays and one transportation corridor. All zones provide various degrees of development, use, and experience. Some uses allow for widespread visitor uses (primary visitor) compared to more restrictive visitor uses (remote natural and resource protection). However, all management zone overlays enhance the existing visitor experience that is largely nonexistent. This access and various levels of visitor use and experience would result in long-term beneficial impacts.

Sanson Ranch Alternative iv

Impacts — Under Sanson Ranch alternative iv there would be beneficial impacts to the visitor experience. This alternative provides three management zone overlays, frontcountry natural, historic, and remote natural. A wide variety of recreational uses and visitor experience would be allowed under this alternative, including hiking and associated traditional park uses accessed on foot such as photography, wildlife viewing, nature observation, interpretive tours/programs. Please see the Management Zoning Matrix which details the uses and permitted activities.

The core Sanson Ranch structures would be zoned for historic resources. Visitors would have opportunities that promote cultural resource education and stewardship. Visitor experience in the historic zone would primarily be focused on interpretation of the ranching culture and history of the area. This would result in long-term beneficial impacts on the visitor experience.

The Buffalo Jump, entrance to the site and surrounding area would be zoned for frontcountry natural to provide opportunities for moderate levels of development to accommodate public visitation to the site, including overlooks, benches, wayside exhibits, small parking lots, and visitor entrance stations. The frontcountry natural management zone provides access and enhances the existing visitor experiences, resulting in long-term beneficial impacts. This alternative could result in adverse impacts to those visitors who want a more remote experience as this action alternative allows for the most development; however, frontcountry natural allows for moderate development compared to primary visitor services as described in previous action alternatives. The remainder of Sanson Ranch would be zoned remote natural to correspond to the adjacent remote natural as zoned in the Greater Park alternatives.

Conclusion — Sanson Ranch alternative iv provides three management zone overlays. All three zones provide various levels of use and corresponding visitor experiences. All zones provide various degrees of development, use, and experience. Some uses allow for moderate visitor uses

(frontcountry natural) compared to more restrictive visitor uses (remote natural). However, all management zone overlays enhance the existing visitor experience that is largely nonexistent. This access and various levels of visitor use and experience would result in long-term beneficial impacts.

Cumulative Impacts Conclusions. Any action taken within or adjacent to the Park has the potential to have an effect on the visitor experience. Past, ongoing, and reasonably foreseeable future actions both inside and outside of the Park continue to provide differing visitor experiences. Implementation of the Zoning Management Plan, in combination with the impacts previously described, would continue to add to the diverse opportunities for unique recreational experiences within the Park when compared to recreational experience opportunities provided in lands outside of the Park.

Chapter Five

CONSULTATION AND COORDINATION

SCOPING

Scoping is the initial process used to identify the affected environment that may be impacted by the proposed project, and to identify alternatives for achieving the proposed action, while minimizing the potential impacts. Internal scoping was conducted for this assessment

Scoping was conducted by an interdisciplinary team of professionals from Wind Cave National Park and the Midwest Regional Office. In April 2012, scoping was initiated in a regional and Park staff meeting. In August 2012, regional and Park staff completed the visual resources scenery evaluations. The project team conducted a scoping meeting at the park in April 2013 to determine desired resource conditions, and in May 2014, the project team conducted an alternatives development workshop. Throughout the project regional and Park team members conducted numerous phone calls.

CONSULTATION

On December 2, 2014, the National Park Service consulted with a representative of the US Fish and Wildlife Service (FWS) to evaluate the potential impacts of this project on threatened or endangered species and their habitat. The FWS has no specific concerns about the project at this time. Please see informal consultation with FWS in appendix E.

The National Park Service consulted with the South Dakota State Historical Preservation Office (SD SHPO) on December 2, 2014, regarding the Zoning Management Plan / General Management Plan Amendment. The SHPO had no concerns as the plan will meet the *Secretary of Interior's Standards for the Treatment of Historic Properties* in a January 15, 2015, letter. On January 29, 2015, the SHPO provided comments on the visitor center and Sanson Ranch alternatives. The SHPO will be sent the Zoning Management Plan / General Management Plan Amendment when it is released on public review.

On December 2, 2014, the NPS mailed consultation letters to associated tribes and Tribal Historic Preservation Offices. This included:

- Mr. Kevin Keckler, Chairman, Cheyenne River Sioux Tribe
- Mr. Eddie Hamilton, Governor, Cheyenne-Arapaho Tribes of Oklahoma
- Ms. Roxanne Sazue, Chairman, Crow Creek Sioux Tribal Council
- Mr. Anthony Reider, President, Flandreau Santee Sioux Tribe
- Ms. Tracey King, President, Fort Belknap Community Council
- Mr. Floyd Azure, Chairman, Fort Peck Tribal Executive Board
- Ms. Amber Toppah, Chairman, Kiowa Tribe of Oklahoma
- Mr. Michael B. Jandreau, Chairman, Lower Brule Sioux Tribal Council
- Mr. Denny Prescott, President, Lower Sioux Indian Community
- Mr. Harvey Spoonhunter, Chairman, Northern Arapaho Tribe
- Mr. Leroy Spang, President, Northern Cheyenne Tribal Council
- Mr. Bryan V. Brewer, President, Oglala Sioux Tribal Council
- Ms. Becky White, Chairman, Ponca Tribe of Nebraska
- Mr. Earl Howe, Chairman, Ponca Tribe of Oklahoma
- Mr. Cyril Scott, President, Rosebud Sioux Tribal Council
- Mr. Roger Trudell, Chairman, Santee Sioux Tribal Council
- Mr. Robert Shepherd, Chairman, Sisseton-Wahpeton Sioux Tribal Council
- Mr. Dave Archambault II, Chairman, Standing Rock Sioux Tribal Council
- Mr. Marcus Levings, Chairman, Three Affiliated Tribes Business Council
- Mr. Robert Flying Horse, Chairman, Yankton Sioux Tribal Business & Claims Committee
- Mr. Dana Dupris, Cultural Preservation Specialist, Cheyenne River Sioux Tribe
- Mr. Max Bean, Coordinator of Cultural and Heritage Program, Cheyenne-Arapaho Tribes of Oklahoma
- Mr. Darrell Zephier, Historic Preservation Officer, Crow Creek Sioux Tribal Council
- Mr. Sam Allen, Historic Preservation Officer, Flandreau Santee Sioux Tribe
- Mr. Michael B. Black Wolf, Historic Preservation Officer, Fort Belknap Community Council

- Mr. Curley Youpee, Cultural Resource Dept. Director, Fort Peck Tribal Executive Board
- Ms. Claire Green, Cultural Resource Officer, Lower Brule Sioux Tribal Council
- Ms. Grace Goldtooth, Historic Preservation Officer, Lower Sioux Indian Community
- Ms. Darlene Conrad, Historic Preservation Officer, Northern Arapaho Tribe
- Mr. James Walks Along, Historic Preservation Officer, Northern Cheyenne Tribe
- Mr. Randy Teboe, Historic Preservation Officer, Ponca Tribe of Nebraska
- Ms. Mona Poor Thunder, Historic Preservation Officer, Oglala Sioux Tribal Council
- Mr. Rick Thomas, Historic Preservation Officer, Santee Sioux Tribal Council
- Mr. Russell Eagle Bear, Historic Preservation Officer, Rosebud Sioux Tribe
- Ms. Dianne Desrosiers, Historic Preservation Officer, Sisseton-Wahpeton Sioux Tribal Council
- Ms. Waste' Win Young, Historic Preservation Officer, Standing Rock Sioux Tribe
- Mr. Elgin Crowsbreast, Historic Preservation Officer, Three Affiliated Tribes Business Council
- Mr. Pete Coffey Jr., Chief Compliance Officer, Three Affiliated Tribes Business Council
- Ms. Lana Gravatt, Historic Preservation Officer, Yankton Sioux Business & Claims Committee

Follow up calls were conducted by the Park's superintendent and the chief of interpretation. None of the tribes had any comments on the plan. These tribes will be sent the draft plan during the public comment period. Please see the attached correspondence in appendix E.

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GLOSSARY

Aesthetics: Relates to the pleasurable characteristics of a physical environment as perceived through the five senses of sight, sound, smell, taste, and touch.

Adverse visual impact (scenery): Any modification in land forms, water bodies, or vegetation, or any introduction of structures, which negatively interrupts the visual character of the landscape and disrupts the harmony of the basic elements (i.e., form, line, color, and texture)

Affected Environment: The existing environment conditions affected by a proposed action and alternatives at the time the project is implemented.

Alternative [40 CFR §1502.4]**:** A reasonable way to fix the identified problem or satisfy the stated need.

Ambient: The background or surrounding parameters occurring in the environment

Angle of observation: The angle, both vertical and horizontal, between a viewer's line of sight and the landscape being viewed

Aquifer: A body of rock or sediment that is capable of transmitting groundwater and yielding usable quantities of water to wells or springs. *EPA regulations define "aquifer" as follows (different regulations vary slightly in wording):* An underground geological formation, group of formations, or part of a formation that is capable of yielding a significant amount of water to wells or springs.

Area of interest or influence: Often defined in NEPA documents to prescribe the geographic extent that is being evaluated for a particular resource. It may vary among resources. Thus, the area of interest for air emissions, which may be widely dispersed, or for wildlife, which are mobile, may be larger than the area of interest for plants, which are sedentary. This term is often used in association with the consideration of project or cumulative impacts.

Archaeological Resources: These are any material remains of human life or activities which are at least 100 years of age and which are of archaeological interest.

Backcountry: As used by the NPS, this term refers to "primitive, undeveloped portions of parks" (*Management Policies 8.2.2.4*).

Background distance zone (scenery): The visible area of a landscape which lies beyond the foreground middle ground. Usually from a minimum of 3 to 5 miles to a maximum of about 15 miles from a travel route, use area, or other observer point. Atmospheric conditions in some areas may limit the maximum to about 8 miles or less.

Baseline: The existing environmental conditions against which impacts of the proposed action and its alternatives can be compared. For a specific NEPA document, a further statement can be included about the date or conditions that are considered the baseline.

Basic design elements (scenery): The four design elements (form, line, color, and texture) which determine how the character of a landscape is perceived

Benefit: Used in opposition to impacts (effects), which are typically considered as negative, to denote positive impacts (effects) of an action.

Best Management Practices: Those practices that are currently believed to provide the most effective, practicable means of preventing r reducing the likelihood for adverse impacts on resources.

Boxwork: An uncommon feature that is composed of thin blades of the mineral calcite that project from cave walls or ceilings and intersect one another at various angles, forming a box-like or honeycomb pattern. These calcite-filled veins predate the cave and were exposed by erosion when the cave formed.

Buffalo Jump: A cliff or ledge that American Indians historically used in order to hunt and kill plains bison in mass quantities.

Character-defining feature: A prominent or distinctive aspect, quality, or characteristic of a cultural landscape that contributes significantly to its physical character. Land use patterns, vegetation, furnishings, decorative details and materials may be such features.

Characteristic: A distinguishing trait, feature, or quality

Characteristic landscape (scenery): The established landscape within an area being viewed. This does not necessarily mean a naturalistic character. It could refer to an agricultural setting, an urban landscape, a primarily natural environment, or a combination of these types.

Consultation: The process of identifying and consulting with affected agencies, organizations and persons regarding the potential impacts of an undertaking.

Contrast (scenery): Opposition or unlikeness of different forms, lines, colors, or textures in a landscape

Contrast rating (scenery): A method of analyzing the potential visual impacts of proposed management activities

Contributing Resource: A building, site, structure, or object that adds to the historic significance of a property or district.

Critical habitat [US Fish and Wildlife Service, 1998]: For listed species consists of: (1) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 4 of the Act, on which are found those physical or biological features (constituent elements) (a) essential to the conservation of the species and (b) which may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 4 of the Act, upon a determination by the Secretary that such areas are essential for the conservation of the species. Designated critical habitats are described in 50 CFR §17 and §226.

Cultural affiliation: [Title 25 USC §3001(2)]: A relationship of shared group identity which can be reasonably traced historically or prehistorically between a present day Indian tribe or Native Hawaiian organization and an identifiable earlier group. Cultural affiliation is established when the preponderance of the evidence -- based on geographical, kinship, biological, archeological, linguistic, folklore, oral tradition, historical evidence, or other information or expert opinion -- reasonably leads to such a conclusion. [43 CFR §10.2 (e)]

Cultural Landscape: A cultural landscape is a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with an historic event, activity, or person, or exhibiting other cultural or aesthetic values. There are four general types of cultural landscapes, not mutually exclusive: historic sites, historic designed landscapes, historic vernacular landscapes, and ethnographic landscapes.

Cultural Landscape Inventory: A NPS documentation report that inventories and evaluates the contributing features of a landscape in a format that is then placed into a system-wide database.

Cultural modification (scenery): Any human-caused change in the land form, water form, vegetation, or the addition of a structure which creates a visual contrast in the basic elements (form, line, color, texture) of the naturalistic character of a landscape

Cultural Resources: Archeological or historic resources including prehistoric and historic districts, sites, buildings, objects, cultural landscapes, ethnographic resources, sacred sites, traditional cultural properties, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or other reasons.

Cumulative Impacts: Under NEPA regulations, the incremental environmental impact or effect of an action together with the effects of past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions.

Distance zones (scenery): A subdivision of the landscape as viewed from an observer position. The subdivision (zones) includes foreground-middle ground, background, and seldom seen.

Easement, scenic: A right to make use of land to protect the scenic values

Effects [40 CFR §1508.8]: *Effects* and *impacts*, as used in NEPA, are synonymous. Effects include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions that may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial. There are direct effects and indirect effects:

a. Direct effects are caused by the action and occur at the same time and place.
b. Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Eligible property: Property that meets the criteria for inclusion in the National Register of Historic Places but is not formally listed.

Endangered species: Plants or animals that are in danger of extinction through all or a significant portion of their ranges and that have been listed as endangered by the US Fish and Wildlife Service or the National Marine Fisheries Service following the procedures outlined in the Endangered Species Act and its implementing regulations (50 CFR §424). (See threatened species). The lists of endangered species can be found in 50 CFR §17.11 (wildlife) and 50 CFR §17.12 (plants).

Enhancement (scenery): A management action designed to improve visual quality

Ethnographic landscape: A landscape containing a variety of natural and cultural resources that associated people define as heritage resources. Examples are contemporary settlements, sacred religious sites, and massive geological structures. Small plant communities, animals, subsistence and ceremonial grounds are often components.

Ethnographic Resource: Pertaining to the systematic study of peoples and cultures. An ethnographic study is designed to explore cultural phenomena where the researcher observes society from the view of the subject of the study.

Erodible Soils: Soils that are composed of materials that are likely to be moved when exposed to water and wind runoff. Soils having a Natural Resources Conservation Service (NRCS) erosion hazard rating of "moderate" or "severe" should be considered erodible.

Erosion: The process by which the soil materials are worn away by the action of wind or water in the form of raindrops, and surface runoff.

Exotic (invasive) species: Also known as introduced species, these plants or animals have been introduced into habitats where they are not native.

Floodplains:

a. [Department of Energy, 1998] The lowlands and relatively flat areas adjoining inland and coastal waters and the flood-prone areas of offshore islands. Floodplains include, at a minimum, that area with at least a 1.0 percent chance of being inundated by a flood in any given year. The *base floodplain* is defined as the area, which has a 1.0 percent or greater chance of being flooded in any given year. Such a flood is known as a 100-year flood. The *critical action floodplain* is defined as the area, which has at least a 0.2 percent chance of being flooded in any given year. Such a flood is known as a 500-year flood. Any activity for which even a slight chance of flooding would be too great (e.g., the storage of highly volatile, toxic, or water reactive materials) should not occur in the critical action floodplain. The *probable maximum flood* is the hypothetical flood that is considered to be the most severe reasonably possible flood, based on the comprehensive hydro-meteorological application of maximum precipitation and other hydrological factors favorable for maximum flood runoff (e.g., sequential storms and snowmelts). It is usually several times larger than the maximum- recorded flood.

b. [Executive Order 11988] The lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands, including at a minimum, that area subject to a one percent or greater chance of flooding in any given year.

Foreground-middle ground distance zones (scenery): The area visible from a travel route, use area, or other observation point to a distance of 3 to 5 miles. The outer boundary of this zone is defined as the point where the texture and form of individual plants are no longer apparent in the landscape. Vegetation is apparent only in patterns or outline

Form (scenery): The mass or shape of an object or objects which appear unified, such as a vegetative opening in a forest, a cliff formation, or a water tank

Geographic Information System (GIS): Is a computer system designed to capture, store, manipulate, analyze, manage, and present all types of spatial or geographical digital data.

Groundwater: Water below the ground surface in a zone of saturation. *Related definition:* Subsurface water is all water that exists in the interstices of soil, rocks, and sediment below the land surface,

including soil moisture, capillary fringe water, and groundwater. That part of subsurface water in interstices completely saturated with water is called groundwater.

Habitat: The place where a population (e.g. human, animal, plant, microorganism) lives and its surroundings, both living and non-living.

Harmony (scenery): A combination of parts into a pleasing or orderly whole: congruity; a state of agreement of proportionate arrangement of form, line, color, and texture

Hazardous material: Any material that poses a threat to human health and/or the environment. Hazardous materials are typically toxic, corrosive, ignitable, explosive, or chemically reactive.

Historic character: The sum of all visual aspects, features, materials, and spaces associated with a cultural landscape's history, i.e. the original configuration together with losses and later changes. These qualities are often referred to as character-defining.

Historic property [30 CFR §800.16(l)]: Any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria.

Historic Treatment: Work carried out to achieve a particular historic preservation goal.
impervious surface: A hard surface area that either prevents or retards the entry of water into the sail mantle or causes water to run off the surface in greater quantities or at an increased rate of flow. Common impervious surfaces include, but are not limited to, rooftops, walkways, patios, driveways, parking lots, storage areas, concrete or asphalt paving, and gravel roads.

Interdisciplinary team: A group of individuals with different training, representing the physical sciences, social sciences, and environmental design arts, assembled to solve a problem or perform a task. The members of the team proceed to a solution with frequent interaction so that each discipline may provide insights to any stage of the problem and disciplines may combine to provide new solutions.

Interpretation: The act of explaining the meaning of something. NPS uses the term to refer to facilities, materials or activities that assist the visitor in learning about a park and its resources and history.

Key observation point (KOP) (scenery): One or a series of points on a travel route or at a use area or a potential use area, where the view of a management activity would be most revealing.

Land disturbance: Exposed soil due to clearing, grading, or excavation activities. This is also commonly referred to as ground disturbing activities.

Land use: General term used to describe how land is or may be utilized or developed, whether for industrial, commercial, residential or agricultural purposes, or as open space.

Landscape character (scenery): The arrangement of a particular landscape as formed by the variety and intensity of the landscape features and the four basic elements of form, line, color, and texture; these factors give the area a distinctive quality which distinguishes it from its immediate surroundings

Landscape features (scenery): The land and water form, vegetation, and structures which compose the characteristic landscape

Line (scenery): The path, real or imagined, that the eye follows when perceiving abrupt differences in form, color, or texture. Within landscapes, lines may be found as ridges, skylines, structures, changes in vegetative types, or individual trees and branches

Maintenance: Routine tasks in order to maintain or preserve something.

Management activity: A surface disturbing activity undertaken on the landscape for the purpose of harvesting, traversing, transporting, protecting, changing, replenishing, or otherwise using resources.

Mitigation: To rectify adverse environmental impacts resulting from human disturbance of the ecosystem.

Mitigation measures: Methods or procedures designed to reduce or lessen the adverse impacts caused by management activities.

Monitoring: Systematic gathering, comparing, and evaluation of data.

Native American Graves Protection and Repatriation Act (NAGPRA): The act requires federal agencies and institutions that receive federal funding to return Native American cultural items to lineal descendants and cultural affiliated Indian tribes and Native Hawaiian organizations. Cultural items include human remains, funerary objects, sacred objects, and objects of cultural patrimony.

National Environmental Policy Act (NEPA): The act requires federal agencies to integrate environmental values into their decision making processes by considering the environmental impacts of their proposed actions and reasonable alternative to those actions.

National Historic Preservation Act (NHPA): The act that established a program for the preservation of historic properties throughout the nation, and for other purposes, passed in 1966.

National Register of Historic Places (National Register): The official list of US historic places considered worthy of preservation. Authorized by the National Historic Preservation Act of 1966, the National Register is part of a national program managed by the NPS to coordinate and support public and private efforts to identify, evaluate, and protect America's historic and archeological resources.

Naturalistic character (scenery): A landscape setting where the basic elements are displayed in a composition that appears unaltered by man.

NPS Organic Act: In order to manage and preserve the nation's national park lands, Congress passed the National Park Service Organic Act in 1916. The Organic Act established the National Park Service as an agency under the direction of the Secretary of the Interior with the stated purpose of promoting use of national park lands while protecting them from impairment. Specifically, the Act declares that the National Park Service has a dual mission, both to conserve park resources and provide for their use and enjoyment "in such a manner and by such means as will leave them unimpaired" for future generations. 16 USC §1.

No-action alternative [40 CFR §1502.14(d)]: The alternative where current conditions and trends are projected into the future without another proposed action.

Noxious weed: Plant species identified by federal or State agencies as requiring control or eradication.

Riparian Area: A habitat that is strongly influenced by surface water and hydric soil conditions and that occurs adjacent to streams, shorelines, and wetlands.

Runoff: The portion of rainfall, melted snow, or irrigation water that flows across ground surface and is eventually returned to streams. Runoff can pick up pollutants from the air or the land and carry them to streams, lakes, and oceans.

Observer position (scenery/viewshed): The placement and relationship of a viewer to the landscape which is being viewed.

Scale (scenery): The proportionate size relationship between an object and the surroundings in which the object is placed.

Scenery: The aggregate of features that give visual character to a landscape

Scenery conservation management classes: Categories assigned to Park lands based on scenic quality, sensitivity level, and distance zones. There are three classes. Each class has an objective which prescribes the amount of change allowed within the characteristic landscape.

Scenery Conservation System: The inventory and planning actions taken to identify scenic (visual) values and to establish objectives for managing those values; and the management actions taken to achieve the scenery conservation management objectives.

Scenic area: An area whose landscape character exhibits a high degree of variety and harmony among the basic elements which results in a pleasant landscape to view.

Scenic quality: The relative worth of a landscape from a visual perception point of view.

Scenic quality evaluation key factors: The seven factors (land form, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications) used to evaluate the scenic quality of a landscape.

Scenic quality ratings: The relative scenic quality (A, B, or C) assigned a landscape by applying the scenic quality evaluation key factors; scenic quality A being the highest rating, B a moderate rating, and C the lowest rating.

Scenic quality rating unit: A portion of the landscape which displays primarily homogenous visual characteristics of the basic landscape features (land and water form, vegetation, and structures).

Scenic values: (refer to scenic quality and scenic quality ratings).

Scoping: Component of NEPA, scoping is a process with a series of activities that include solicitation of public and agency comments on the proposed action and its possible effects.

Section 106: A section of the National Historic Preservation Act of 1966 that requires Federal agencies to take into account the effects of their undertakings on historic properties, and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. Section 106 mandates the historic preservation review process.

Section 7 (Endangered Species Act): Directs all Federal agencies to work to conserve endangered and threatened species and to use their authorities to further the purpose of the Act. Section 7 is the mechanism by which Federal agencies ensure the actions they take, including those they fund or authorize, do not jeopardize the existence of any listed species.

Sediment: Eroded soil particles that are deposited downhill or downstream by surface runoff.

Seen area (scenery/viewshed): That portion of the landscape which is visible from roads, trails, rivers, campgrounds, communities, or other key observation positions.

Seldom seen distance zone (scenery/viewshed): Portions of the landscape which are generally not visible from key observation points, or portions which are visible but more than 15 miles distance.

Sensitive species (or species of concern): A species identified by a State, federal, local agency; the state heritage program, an NGO, or other organization, that is recognized to be in need of conservation management in order to maintain existing limited populations, distributions, or declining populations.

Sensitivity levels (scenery): Measures (e.g., high, medium, and low) of public concern for the maintenance of scenic quality

Suitability Analysis: In the GIS context it is a geographic or GIS-based process used to determine the appropriateness of a given area for particular uses. The basic premise of GIS suitability analysis is that each aspect of the landscape has intrinsic characteristics that are to some degree either suitable or unsuitable for the activities being planned. Suitability is determined through systematic, multi-factor analysis of the different aspects of the terrain. Model inputs include a variety of natural and cultural factors.

Surface water: All bodies of water on the surface of the earth and open to the atmosphere, such as rivers, lakes, reservoirs, ponds, seas, and estuaries.

Texture (scenery): The visual manifestations of the interplay of light and shadow created by the variations in the surface of an object or landscape.

Threatened species: Any plants or animals that are likely to become endangered species within the foreseeable future throughout all or a significant portion of their ranges and which have been listed as threatened by the US Fish and Wildlife Service or the National Marine Fisheries Service following the procedures set out in the Endangered Species Act and its implementing regulations (50 CFR §424). (See endangered species.) The lists of threatened species can be found at 50 CFR §17.11 (wildlife) and §17.12 (plants).

Traditional Cultural Properties: A significant property associated with cultural practices or beliefs of a living community that are rooted in that community or cultural groups' history and are important to maintaining the continuing cultural identity of the community.

Viewshed: The landscape that can be directly seen under favorable atmospheric conditions, from a viewpoint or along a transportation corridor.

Visual contrast: (see contrast).

Visual quality: (see scenic quality).

Visual resources: The visible physical features on a landscape (e.g., land, water, vegetation, animals, structures, and other features).

Watershed: The land area that drains water to a particular stream, river, or lake. It is a land feature that can be identified by tracing a line along the highest elevations between two areas on a map, often a ridge. Large watersheds, like the Mississippi River basin contain thousands of smaller watersheds.

Wetlands: Those areas that are inundated by surface water or groundwater with a frequency sufficient to support, and under normal circumstances do or would support, a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas (e.g., sloughs, potholes, wet meadows, river overflow areas, mudflats, natural ponds). 10 CFR §1022.4 *Jurisdictional wetlands* are those wetlands protected by the Clean Water Act. They must have a minimum of one positive wetland indicator from each parameter (i.e., vegetation, soil, and hydrology). The US Army Corps of Engineers requires a permit to fill or dredge jurisdictional wetlands.

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INDEX

A

ABAAS 38, 39, 45, 267
Air Quality 8, 26, 217, 218, 257, 258, 283
American Bison Society 226, 271
Antiquities Act 271
Architectural Barriers Act Accessibility Standards 38

B

Beaver Creek Bridge 97, 105, 348
Best Management Practices 25, 30, 118, 119, 120, 121, 125, 126, 127, 128, 139, 140, 142, 161, 170, 171, 172, 173, 186, 187, 188, 189, 193, 194, 195, 196, 246, 247
Bison ... 3, 5, 6, 7, 14, 25, 53, 56, 57, 60, 61, 94, 102, 103, 104, 114, 125, 126, 127, 133, 135, 136, 138, 140, 141, 148, 149, 194, 207, 215, 232, 233, 239, 251, 253, 267, 269, 271, 272, 302, 315
Bison Flats 94
Black Footed Ferret 21
Black Hills 2, 3, 4, 5, 7, 8, 14, 17, 22, 25, 42, 56, 60, 86, 88, 92, 93, 94, 95, 97, 104, 105, 106, 107, 108, 110, 114, 115, 122, 132, 140, 142, 143, 149, 150, 160, 162, 163, 186, 188, 189, 190, 191, 215, 216, 218, 225, 226, 227, 228, 231, 232, 240, 243, 246, 247, 251, 269, 270, 271, 272, 288, 292, 312, 314, 339
Black Hills National Forest 97
BMP 43
Boundary ... 3, 5, 6, 7, 10, 11, 17, 46, 48, 53, 56, 57, 60, 61, 72, 76, 92, 97, 98, 105, 114, 121, 125, 126, 127, 135, 138, 139, 140, 141, 148, 149, 171, 182, 187, 195, 209, 227, 229, 230, 231, 233, 237, 240, 243, 253, 255, 261, 262, 265, 271, 272, 302, 314, 315, 317, 318, 332, 340
Buffalo Gap 3, 90, 92, 93, 330
Buffalo Jump 6, 72, 74, 76, 79, 93, 103, 104, 108, 110, 170, 171, 172, 174, 175, 176, 177, 178, 179, 181, 186, 187, 189, 193, 197, 198, 199, 207, 315

C

Camping 4, 37, 39, 40, 110, 158, 159, 167, 232, 240, 267, 302
Carrying Capacity 7, 17, 272
Cave .. i, 3, 4, 5, 7, 8, 10, 11, 14, 17, 22, 35, 42, 48, 50, 60, 61, 66, 67, 69, 72, 76, 80, 86, 87, 105, 110, 112, 113, 114, 115, 117, 118, 119, 120, 121, 122, 123, 124, 133, 136, 151, 152, 153, 154, 155, 156, 157, 159, 162, 163, 165, 166, 167, 207, 215, 232, 237, 239, 240, 241, 247, 260, 261, 263, 267, 269, 270, 271, 272, 283, 286, 302, 312, 315
Cave Entrance 7, 136, 152, 269, 270, 302
CCC 4, 21, 98, 107, 155, 165, 271
Civilian Conservation Corps 4, 66, 107, 122, 153, 262, 271
Climate 17, 35, 216, 219, 237, 243, 244, 247, 253, 258, 259, 269, 318
Corral 48, 53, 56, 57, 125, 127, 133, 134, 135, 136, 138, 140, 141, 148
Cultural Landscape 4, 38, 66, 76, 79, 80, 103, 106, 107, 108, 109, 112, 114, 144, 145, 146, 147, 157, 163, 164, 165, 171, 172, 179, 188, 192, 193, 194, 195, 196, 207, 208, 210, 259, 261

D

Development i, 8, 9, 10, 11, 19, 22, 25, 26, 30, 31, 32, 33, 34, 38, 48, 53, 56, 57, 60, 64, 66, 67, 69, 72, 74, 76, 77, 79, 85, 86, 97, 98, 99, 100, 106, 107, 115, 117, 118, 119, 120, 121, 123, 124, 125, 126, 127, 128, 129, 130, 131, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 146, 147, 148, 149, 150, 151, 152, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 202, 229, 233, 235, 237, 240, 243, 247, 251, 253, 257, 258, 259, 265, 272, 283, 312, 315, 317, 322, 327, 330

E

Ecological Restoration 114, 272
Education 34, 36, 40, 45, 57, 64, 66, 69, 74, 77, 110, 156, 158, 159, 167, 198, 199, 259, 261, 267
Elk 3, 5, 6, 7, 14, 25, 114, 226, 239, 251, 253, 267, 269, 270, 271, 272, 315

Endangered Species.....9, 20, 203, 208, 213
Erosion..... 39, 102, 131, 207, 209, 237, 239, 240, 243, 244, 245, 251, 259, 268, 288

F

Fire.....7, 9, 11, 35, 43, 45, 46, 93, 95, 97, 109, 114, 121, 122, 125, 126, 127, 128, 132, 152, 153, 232, 235, 246, 247, 249, 250, 251, 255, 258, 267, 272, 283, 302
Floodplains.....22, 88, 90, 112, 182, 183, 184, 283
Forage.....25, 108, 247, 251, 253, 292

G

Geology 8, 243, 283, 286, 318
Grasslands.....5, 8, 17, 42, 88, 94, 95, 105, 269, 271, 329
Groundwater..... 12, 17, 42, 115, 121, 122, 123, 152, 153, 206, 210, 214, 237, 240, 241, 243, 244
Groundwater Recharge 240

H

Habitat Fragmentation.....43
Hiking 4, 11, 37, 40, 110, 191, 197, 198, 199, 267, 328
Historic Resources..... 38, 57, 61, 66, 135, 136, 157, 165, 179, 198, 199, 208, 249, 261, 262
Hogback 93, 94, 330
Hot Springs 105

I

Infiltration 42, 115, 122, 152, 153, 154, 240, 241, 244, 251
Infrastructure.....10, 11, 44, 50, 66, 69, 74, 97, 117, 118, 122, 124, 151, 152, 153, 154, 158, 159, 164, 165, 175, 176, 179, 181, 237, 253, 271, 290, 292, 302, 312
Interpretation ..13, 34, 36, 38, 57, 64, 66, 69, 74, 77, 106, 110, 156, 158, 159, 167, 198, 199, 204, 239, 259, 260, 261, 267, 322

K

Karst3, 10, 11, 22, 42, 60, 67, 80, 86, 114, 115, 117, 118, 119, 120, 121, 122, 123, 124, 151, 152, 153, 154, 165, 166, 167, 237, 240, 247, 283, 286

M

Maintenance 8, 10, 19, 34, 36, 38, 39, 40, 42, 44, 45, 48, 53, 56, 57, 61, 66, 67, 107, 114, 117, 123, 124, 132, 133, 134, 141, 154, 158, 170, 186, 188, 213, 226, 231, 232, 233, 244, 251, 259, 261, 302
Mining 114, 123, 269, 270

N

National Register 4, 24, 39, 46, 107, 108, 137, 155, 259, 261, 262

O

Orientation..... 34, 36, 38, 57, 64, 66, 69, 74, 77, 156

P

Parking....34, 36, 38, 44, 45, 48, 57, 64, 66, 69, 74, 77, 97, 98, 114, 117, 122, 125, 126, 131, 133, 138, 139, 141, 148, 150, 153, 154, 156, 158, 159, 163, 165, 169, 170, 172, 174, 185, 186, 189, 197, 198, 199, 210, 237, 240, 265, 267, 302, 303
Partnership.....270
Pipeline 115, 140, 231
Pollution..... 26, 27, 114, 119, 120, 122, 151, 153, 240, 257, 258, 264, 265, 318
Prairie Dog 94, 102, 114, 251, 255
Prescribed Fire 7, 114, 249, 272
Pronghorn.....3, 5, 6, 7, 14, 25, 269, 271, 272, 315
Public Safety.....249

R

Ranching....4, 108, 173, 198, 199, 261, 262
Recreation.... 4, 34, 36, 87, 105, 106, 110, 147, 148, 149, 166, 191, 197, 229, 237, 267, 303
Right-of-way 231, 232
Riparian.... 3, 14, 25, 88, 95, 243, 244, 245, 251, 265, 283, 288, 312
Runoff.... 11, 42, 115, 117, 118, 119, 120, 122, 151, 153, 154, 209, 213, 237, 240, 241

S

Scenery ...6, 9, 11, 13, 26, 42, 44, 53, 56, 60, 80, 92, 93, 97, 98, 99, 100, 112, 115, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 150, 155, 156, 157, 158, 159, 160, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 202, 206, 207, 208, 209, 210, 211, 212, 213, 265, 283, 312, 314, 317, 318, 321, 322, 324, 325, 328, 329
Scenic Byway....53, 56, 60
Scenic Resources 93, 128, 130, 132, 133, 135, 136, 137, 155, 156, 157, 159, 160, 173, 174, 175, 180, 182, 317
Section 106....23, 46, 137, 144, 164, 192, 261
Sensitive Species....243
Sinks 122
Soils 8, 25, 94, 237, 243, 244, 245, 283, 288, 292, 312, 318
Streams.... 22, 121, 212, 228, 237, 240, 243, 244, 253, 288, 290, 292, 296

T

Traffic 36, 42, 43, 44, 60, 61, 87, 107, 115, 120, 122, 131, 145, 146, 150, 237, 328
Trails 11, 34, 37, 38, 39, 45, 86, 87, 97, 110, 125, 126, 131, 138, 139, 141, 148, 149, 150, 152, 157, 158, 159, 166, 169, 174, 175, 176, 179, 180, 181, 185, 193, 213, 237, 244, 259, 261, 263, 267, 272, 295, 302, 326

U

User Capacity 10, 267

V

Vegetation ..8, 9, 22, 35, 43, 46, 80, 88, 92, 94, 95, 96, 98, 99, 104, 108, 112, 125, 126, 127, 128, 129, 131, 132, 160, 169, 170, 171, 172, 206, 207, 208, 211, 212, 214, 243, 244, 245, 246, 247, 251, 253, 255, 257, 283, 288, 318, 321, 322, 327, 329
Vehicles....42, 43, 96, 153, 263
Viewshed 6, 11, 22, 93, 98, 100, 174, 176, 179, 181, 212, 213, 265, 315, 317, 326, 327, 328, 329, 330, 332
Visitor Experience 17, 19, 31, 33, 34, 36, 37, 38, 42, 92, 110, 112, 113, 147, 148, 149, 150, 166, 167, 168, 197, 198, 199, 200, 234, 257, 258, 265, 267
Visual Intrusions 317

W

Water Quality....42, 240, 243, 251, 253, 318
Water Resources....8, 114, 240, 241, 251, 283
Watershed 90, 115, 122, 231, 237, 240, 243, 244, 246, 247, 251, 286
Wetlands.... 20, 26, 116, 212, 214, 243, 244, 283, 288, 290, 292
Wildfire 114, 132, 249
Wildlife 3, 4, 5, 8, 9, 10, 14, 17, 25, 35, 37, 39, 42, 43, 45, 53, 56, 60, 88, 95, 96, 98, 100, 104, 110, 115, 125, 126, 127, 138, 169, 185, 193, 197, 198, 199, 206, 208, 213, 218, 226, 229, 240, 243, 244, 247, 251, 253, 263, 265, 267, 272, 283, 290, 292, 318, 325

Appendices

APPENDIX A: LEGISLATION

An Act To set apart certain lands in the State of South Dakota as a public park to be known as the "Wind Cave National Park," approved January 9, 1903 (32 Stat. 765)

Be it enacted by the Senate and House of Representatives of the united States of America in Congress assembled, That there are hereby reserved from settlement, entry, sale, or other disposal, and set apart as a public park, all those certain tracts, pieces, or parcels of land lying and being situated in the State of South Dakota and within the boundaries particularly described as follows: Beginning at the southeast corner of section thirteen, township six south, range five east, Black Hills meridian, South Dakota; thence westerly, to the southwest corner of the southeast quarter of section sixteen, said township; thence northerly along the quarter-section lines to the northwest corner of the northeast quarter of section four, said township; thence easterly to the southwest corner of section thirty-four, township five south, range five east; thence northerly to the northwest corner of said section; thence easterly to the northeast corner of section thirty-one, township five south, range six east; thence southerly along the section lines to the southeast corner of section seven, township six south, range six east; thence westerly to the southwest corner of said section; thence southerly to the southeast corner of section thirteen, township six south, range five east, the place of beginning: *Provided*, That nothing herein contained shall be construed to affect any valid rights acquired in connection with any of the lands embraced within the limits of said park. (USC, title 16, sec. 141)

SEC. 2. That said park shall be known as the "Wind Cave National Park" and shall be under the exclusive control of the Secretary of the Interior, whose duty it shall be to prescribe such rules and regulations and establish such service as he may deem necessary for the care and management of the same. (USC, title 16, sec. 142)

SEC. 3. That the Secretary of the Interior be, and is hereby, authorized, in the exercise of his discretion, to rent or lease, under rules and regulations to be made by him, the cavern underlying the above-described lands, and also pieces and parcels of ground within said park for the erection of such buildings as may be required for the accommodation of visitors. (USC, title 16, sec. 143)

SEC. 4. That all funds arising from such rentals or leases shall be covered into the Treasury of the United States as a special fund to be expended in the care and improvement of said park. (USC, title 16, sec. 144)

SEC. 5. That in cases in which a tract covered by an unperfected bona fide claim or by a patent is included within the limits of this park, the settler or owner thereof may, if he desired to do so, relinquish the tract to the Government and secure other land, outside of the park, in accordance with the provisions of the law relating to the subject of such relinquishment of lands in forest reserves in the State of South Dakota. (USC, title 16, sec. 145)

SEC. 6. That all person who shall unlawfully intrude upon said park, or who shall without permission appropriate any object therein or commit unauthorized injury or waste in any form whatever upon the lands or other public property therein, or who shall violate any of the rules and regulations prescribed hereunder, shall upon conviction, be fined in a sum not more than one thousand dollars or be imprisoned for a period not more than twelve months, or shall suffer both fine and imprisonment, in the discretion of the court. (USC, title 16, sec. 146)

Agricultural Department Appropriations Act of Aug. 10, 1912 chapter 294. Wind Cave National Game Preserve establishment

For the establishment of a national game preserve, to be known as the Wind Cave National Game Preserve, upon the land embraced within the boundaries of the Wind Cave National Park, in the State of South Dakota, for a permanent national range for a herd of buffalo to be presented to the United States by the American Bison Society, and for such other native American game animals as may be placed therein. The Secretary of Agriculture is authorized to acquire by purchase or condemnation such adjacent lands as may be necessary for the purpose of assuring an adequate, permanent water supply, and to enclose the said game preserve with a good substantial fence and to erect therein all necessary sheds and buildings for the proper care and maintenance of the said animals, twenty-six thousand dollars, to be made available until expended {37 Stat.L. 223)

An Act to extend the boundaries of Wind Cave National Park, South Dakota, approved March 4, 1931 (46 Stat. 1518)

Be it enacted by the Senate and House of Representatives of the United States of American in Congress assembled, That the boundaries of Wind Cave National Park in the State of South Dakota are hereby extended to include the lands within the east half of the southwest quarter, southeast quarter section 26, south half of the section 25, east half of section 33, township 5 south, range 5 east, and south half section 30, township 5 south, range 6 east, Black Hills meridian, South Dakota, comprising in park a part of the Harney National Forest. Such lands are hereby made a part of Wind Cave National Park, and shall hereafter be subject to all laws and regulations applicable to such park. (USC, 6th supp., title 16, sec. 141a)

Excerpt from "An Act To amend the Migratory Bird Hunting Stamp Act of March 16, 1934, and certain other Acts relating to game and other wildlife, administered by the Department of Agriculture, and for other purposes," approved June 15, 1935 (49 Stat. 378, 383)

TITLE VI-TRANSFER OF WIND CAVE NATIONAL GAME PRESERVE TO THE DEPARTMENT OF THE INTERIOR.

SECTION 601. That, effective July 1, 1935, the Wind Cave National Game Preserve in the State of South Dakota; be, and the same is hereby, abolished, and all the property, real or personal, comprising the same is hereby transferred to and made a part of the Wind Cave National Park and the same shall hereafter be administered by the Secretary of the Interior as a part of said park, subject to all laws and regulations appl9cable thereto, for the purposes expressed in the Act of August 10, 1912 (37 Sta. 268-293), establishing said game preserve. (16 USC sec. 141b)

An Act To authorize the Secretary of the Interior to dispose of surplus buffalo and elk of the Wind Cave National Park herd and for other purposes, approved June 16, 1938 (52 Stat. 708)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of the Interior is authorized, in his discretion and under regulations to be prescribed by him, to sell or otherwise dispose of the surplus buffalo and elk of the Wind Cave National Park herd.

SEC. 2. All moneys received from the sale of any such surplus animals, or products thereof, shall be deposited in the Treasury of the United States as miscellaneous receipts. (16 USC sec. 141c)

An Act To revise the boundaries of Wind Cave National Park in the State of South Dakota, and for other purposes, approved August 9, 1946 (60 Stat. 970)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the boundary of the Wind Cave National Park is hereby established as follows:

Beginning at the southeast corner of section 13, township 6 south, range 5 east; thence west to the southwest corner of section 15, township 6 south, range 5 east; thence north to the west quarter corner of section 10, township 6 south, range 5 east; thence to the north quarter corner of section 10, township 6 south, range 5 east; thence to the west quarter corner of section 2, township 6 south, range 5 east; thence north to the northwest corner of the southwest quarter of the northwest quarter of section 11, township 5 south, range 5 east; thence to the north quarter corner of section 11, township 5 south, range 5 east; thence to the northeast corner of the southeast quarter of the southeast quarter of section 2, township 5 south, range 5 east, thence east to the northeast corner of the southwest quarter of the southwest quarter of section 6, township 5 south, range 6 east; thence in a southeasterly direction to the southeast corner of the northeast quarter of section 7, township 5 south, range 6 east along a line to be mutually acceptable to the South Dakota Game, Fish, and Parks Commission and the Secretary of the Interior; thence from the southeast corner of the northeast quarter of section 7, township 5 south, range 6 east; east to the northeast corner of the southwest quarter of section 12, township 5 south, range 6 east; thence south to the northeast corner of the southeast quarter of the southwest quarter of section 12, township 5 south, range 6 east; thence east to the northeast corner of the southwest quarter of the southwest quarter of setion7, township 5 south, range 7 east; thence south to the southeast corner of the southwest quarter of the southwest quarter of section 18, township 5 south, range 7 east; thence west to the northeast corner of section 24, township 5 south, range 6 east; thence south to the southeast corner of section 24, township 5 south, range 6 east; thence west to the southwest corner of section 24, township 5 south, range 6 east; thence south to the southeast corner of the northeast quarter of the southeast quarter of section 35, township 5 south, range 6 east; thence west to the southwest corner of the northwest quarter of the southwest quarter of section 35, township 5 south, range 6 east; thence south to the southeast corner of section 34, township 5 south, range 6 east; thence west to the southwest corner of the southeast quarter of the southwest quarter of section 33, township 5 south, range 6 east; thence north to the northeast corner of the northwest quarter of the southwest quarter of section 28, township 5 south, range 6 east; thence west to the northwest corner of the southwest quarter of section 29, township 5 south, range 6 east; thence west to the northwest corner of the southwest quarter of section 29, township 5 south, range 6 east; thence south to the southeast corner of section 7, township 6 south, range 6 east; thence west to the southwest corner of section 7, township 6 south, range 6 east; thence south to the southeast corner of section 13, township 6 south, range 5 east; the point of beginning, and all of those lands lying within the boundary above de3scribed, together with the south half of the northeast quarter and the west half of the northeast quarter of the northeast quarter of section 32, township 5 south, range 5 east, are hereby included in and made a part of the Wind Cave National Park and shall be subject to all laws and regulations applicable thereto. (16 USC §141a)

SEC. 2. All those lands which by section 1 hereof are excluded from eh Wind Cave national Park as heretofore constituted and those lands of the Custer Recreational Demonstration Area lying in section 2, township5 south, range 5 east, Black Hills meridian, are hereby included in and made a part of the Harney National Forest, and hereafter shall be subject to all laws and regulations applicable to the national forests.

SEC. 3. All those lands heretofore within the Custer Recreational Demonstration Area and which are not included within the Wind Cave National Park by virtue of section 1 hereof, except those lands of

the Custer Recreational Demonstration Area lying in section 2, township 5 south, range 5 east, Black Hills meridian, which are included within the Harney National Forest by virtue of section 2 hereof, shall be conveyed by the Secretary of the Interior to the State of South Dakota for addition to the Custer State Park for public park, recreational, and conservation purposes (subject, however, to a proviso that the State of South Dakota will allow a minimum of ten thousand gallons of water per day to pass from springs or streams in these lands into the lands of Wind Cave national Park as herein described) as soon as all lands owned by the State of South Dakota lying within the boundaries of the Wind Cave National Park as described in section 1 hereof are conveyed to the United Sates; and the southwest quarter of the southwest quarter of the southwest quarter of section 2, township 5 south, range 5 east, Black Hills meridian, owned by the State of South Dakota, is conveyed to the United States to be included in the Harney National Forest as provided in section 2 hereof: Provided, however, That section 25, township 5 south, range 6 east, of the Custer Recreational Demonstration Area shall be conveyed by the Secretary of the Interior to the State of South Dakota as State school lands.

An Act to authorize additional appropriations for the acquisition of lands and interests in lands within the Sawtooth National Recreation Area in Idaho (92 Stat. 3467) (PL 95-625) (Approved November 10, 1978.)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

TITLE III-BOUNDARY CHANGES

SEC. 301.The boundaries of the following units of the National Park System are revised as follows, and there are authorized to be appropriated such sums as may be necessary, but not exceed the amounts specified in the following paragraphs for acquisitions of lands and interests in lands within areas added by reason of such revisions:

(21) Wind Cave National Park, South Dakota: To add approximately two hundred and twenty-eight acres as generally depicted on the map entitled “Boundary Map, Wind Cave National Park, South Dakota”, numbered 108-80,008, and dated July 1977: $227,000.

SEC. 302. Within twelve months after the date of the enactment of this Act, the Secretary shall publish in the Federal Register a detailed map or other detailed descriptions of the lands added or excluded from any area pursuant to section 301.

SEC. 303. (a) Within the boundaries of the areas as revised in accordance with section 301, the Secretary is authorized to acquire lands and interests therein by donation, purchase with donated or appropriated funds, exchange, or transfer from any other Federal agency. Lands and interest therein so acquired shall become part of the area to which they are added, and shall be subjected to all laws, rules, and regulations applicable thereto. When acquiring any land pursuant to this title, the Secretary may acquire any such land subject to the retention of a right of use and occupancy for a term not to exceed twenty-five years or for the life of the owner or owners. Lands owned by a State or political subdivision thereof may be acquired only by donation.

(b)(1) Lands and interests therein deleted from any area pursuant to section 301 may be exchanged for non-Federal lands within the revised boundaries of such area, or transferred to the jurisdiction of any other Federal agency or to a State or political subdivision thereof, without monetary consideration, or be administered as public lands by the Secretary, as the Secretary may deem appropriate.

(2) In exercising the authority contained in this section with respect to lands and interest therein deleted from any such area which were acquired from a State, the Secretary may, on behalf of the United States, transfer to such State exclusive or concurrent legislative jurisdiction over such lands, subject to such terms and conditions as he may deem appropriate, to be effective upon acceptance thereof by the State.

(c) It is the established policy of Congress that wilderness, wildlife conservation, and park and recreation values of real property owned by the United States be conserved, enhanced, and developed. It is further declared to be the policy of Congress that unutilized, underutilized, or excess Federal real property be timely studied as to suitability for wilderness, wildlife conservation, or park and recreation purposes. To implement this policy, the Secretary, the Administrator of General Services, and the Director of the Office of Management and budget shall establish a system with appropriate procedures to permit the Secretary full and early opportunity to make such studies and propose appropriate recommendations to disposing agencies for consideration in connection with determinations of further utilization or disposal of such property under existing law. Each affected executive agency is authorized and directed to provide to the secretary such advice and information relating to such studies as the Secretary may request.

SEC. 304. The authorities in this title are supplementary to any other authorities available to the Secretary with respect to the acquisition, development, and administration of the areas referred to in section 301.

An Act to revise the boundary of the Wind Cave National Park in the State of South Dakota. (119 Stat. 2011) (PL 109-71) (Approved September 21, 2005)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SEC. 1. SHORT TITLE.
This Act may be cited as the "Wind Cave National Park Boundary Revision Act of 2005."

SEC. 2. DEFINITIONS.
In this Act:

(1) MAP.—The term "map" means the map entitled "Wind Cave National Park Boundary Revision," numbered 108/80, 030, and dated June 2002.
(2) PARK.—The term "Park" means the Wind Cave National Park in the State.
(3) SECRETARY.—The term "Secretary" means the Secretary of the Interior.
(4) STATE.—The term "State" means the State of South Dakota.

SEC. 3. LAND ACQUISITION.

(a) AUTHORITY.—
(1) IN GENERAL.—The Secretary may acquire the land or interest in land described in subsection (b)(1) for addition to the Park.
(2) MEANS.—An acquisition of land under paragraph (1) may be made by donation, purchase from a willing seller with donated or appropriated funds, or exchange.

(b) BOUNDARY.—

(1) MAP AND ACREAGE.—The land referred to in subsection (a)(1) shall consist of approximately 5,675 acres, as generally depicted on the map.
(2) AVAILABILITY OF MAP.—The map shall be on file and available for public inspection in the appropriate offices of the National Park Service.
(3) REVISION.—The boundary of the Park shall be adjusted to reflect the acquisition of land under subsection (a)(1).

SEC. 4. ADMINISTRATION.
(a) IN GENERAL.—The Secretary shall administer any land acquired under section 3(a)(1) as part of the Park in accordance with laws (including regulations) applicable to the Park.
(b) TRANSFER OF ADMINISTRATIVE JURISDICTION.—
(1) IN GENERAL.—The Secretary shall transfer from the Director of the Bureau of Land Management to the Director of the National Park Service administrative jurisdiction over the land described in paragraph (2).
(2) MAP AND ACREAGE.—The land referred to in paragraph (1) consists of the approximately 80 acres of land identified on the map as "Bureau of Land Management land.

SEC. 5. GRAZING.
(a) GRAZING PERMITTED.—Subject to any permits or leases in existence as of the date of acquisition, the Secretary may permit the continuation of livestock grazing on land acquired under section 3(a)(1).
(b) LIMITATION.—Grazing under subsection (a) shall be at not more than the level existing on the date on which the land is acquired under section 3(a)(1).
(c) PURCHASE OF PERMIT OR LEASE.—The Secretary may purchase the outstanding portion of a grazing permit or lease on any land acquired under section 3(a)(1).
(d) TERMINATION OF LEASES OR PERMITS.—The Secretary may accept the voluntary termination of a permit or lease for grazing on any acquired land.

APPENDIX B: SERVICEWIDE MANDATES AND ADMINISTRATIVE COMMITMENTS

Special Mandates

Special mandates are legal requirements and administrative commitments that apply to a specific park. These special mandates may be legislative requirements or signed agreements that another dimension to a park unit's purpose and significance (such as designation of an area as wilderness). They may commit managers to specific actions (such as a mandate to allow hunting) or limit their ability to modify land use in the park unit (such as when an easement is in place). Following are some mandates and constraints specific to Wind Cave National Park.

Water Source Purchase, 1931. In 1931, the National Park Service purchased 101 acres of land (from the McAdam Ranch) that included two spring boxes, some of the surrounding watershed, and a 2-inch pipeline. The water source had been developed prior to 1931 by the Bureau of Biological Survey. The deed for the property and associated water system, dated August 28, 1931, and registered in Custer County Book of Deeds Number IS, page 263, also included a 1O-foot right-of-way for the waterline and an access easement "... to the springs and pipeline aforesaid at all times over any existing traveled ways and over the fields of the parties of the first part to the pipeline where the least damage to the property will be done." In conjunction with this, the US Forest Service--through special use permit dated May 16, 1932, and still in effect--granted to the park the use of 40 acres for protection of the watershed in the area.

Another important element of the legislation was to provide "... the State of South Dakota will allow a minimum of ten thousand gallons of water per day to pass from (Custer State Park)..." to Wind Cave National Park.

Highways Relinquished to Wind Cave National Park. Through a state of South Dakota act dated March 8, 1947, the State Highway Commission and the Board of County Commissioners of Custer County relinquished to the United States for use, construction, and maintenance the portions of public highways within the boundaries of Wind Cave National Park. This relinquishment ceded the jurisdiction of the subject highways to the United States. The two main arteries affected are US Highway 385 and State Highway 87.
Pringle Cut-Off Road--Sections 11 and 14, TSS, RSE. On November 7, 1951, through Deed Number 45, the Custer County Commissioners transferred to the National Park Service maintenance responsibility of a county road (Pringle Cut-Off) in the northwest corner of the park with the following stipulations:
The road will remain open and unobstructed as a public thoroughfare.

The road shall not be closed by gates or fences.

Right-of-Way Exchange, Black Hills Electric Cooperative. Upon acquisition of the previously mentioned 232 acres, the National Park Service negotiated an exchange of rights-of-way with the Black Hills Electric Cooperative. On June 14, 1988, the US government granted a right-of-way along the southern boundary of the newly acquired property (Sections 23 and 24, T6S, R5E). This easement consisted of a 20-foot-wide corridor running east-west along the new boundary. A minor variation was made in the vicinity of the Schroeder property (SE 1/4, NW 1/4, Section 23, T6S, R5E). In exchange the Black Hills Electric Cooperative transferred a 20-foot-wide easement running east-west approximately 1/8-mile south of the pre-1978 Wind Cave National Park boundary. This easement was officially transferred upon the cooperative's relocation of the power line in January 1989. This exchange was effected in order to facilitate the relocation of the power line to a less visually impacting corridor. An "administrative" right-of-way document has been established to identify conditions under which the Black Hills Electric Cooperative, or its designee, can access the new right-of-way. This document is administrative in nature because the right-of-way has been previously awarded through a legally recorded right-of-way exchange.

Rights-of-Way, South and West Boundary Access Roads. Two easements and rights-of-way are authorized for use by residents adjacent to the acreage acquired in 1987 (Sections 23 and 24, T6S. R5E). Said easements are recorded in Book 2S of Miscellaneous, page 132 and Book 29 of Miscellaneous, page 235. Wind Cave National Park staff developed a right-of-way document that is strictly for administrative use, for the purpose of delineating specific requirements that the National Park Service needs from the users of said easements to ensure protection of park resources and values. The National Park Service has the obligation, based on the above-stated deeds, to permit ingress and egress but is under no obligation to provide for the maintenance or upgrading of these roads.

Concurrent Jurisdiction, 1980. On February 27, 1980, the state of South Dakota enacted a law that ceded to Wind Cave National Park--as well as Mount Rushmore National Memorial, Badlands National Park, and Jewel Cave National Monument--concurrent jurisdiction. This cession was accepted by the National Park Service through a letter dated June 9, 1980, and confirmed through the governor's signature on August 27, 1980. The state of South Dakota had ceded exclusive jurisdiction through state legislation on March 9, 1917; however, the cession was never accepted and the Act was never rescinded.

Interagency Agreement -Water Gauging Station. A five-year agreement between Wind Cave National Park and the US Geological Survey, activated on January 31, 1991, establishes the access, construction procedures, and conditions of joint management of a water-gauging station on the south side of Beaver Creek, approximately 200 feet downstream from the mouth of Cold Spring Creek.

Cooperative Agreements-USDA Animal and Plant Health Inspection Service (APHIS). On November 12, 1982, the state of South Dakota placed the WICA bison herd under quarantine because of brucellosis infection. A cooperative agreement between the South Dakota Livestock Sanitary Board, the Department of Agriculture's Animal and Plant Health Inspection Service, and Wind Cave National Park established conditions for eradication of brucellosis in the herd. In December of 1986, the quarantine was lifted after a testing and vaccination program reduced the incidents of brucellosis test reactors to zero. This further led to intrastate shipment of live surplus bison to various recipients. The first shipment occurred in October of 1987, with recipients paying roundup expenses on a pro rata cost sharing basis. This program is expected to continue under the conditions of the existing cooperative agreement.

Fees-Entrance and User. Entrance fees are not collected at Wind Cave. The US Code of Federal Regulations, Title 36, 17.13(b), states that entrance fees will not he charged on "... any road or highway established as part of the National Federal-Aid System, which is commonly used by the public as a means of travel between two places...". Recreation (user) fees are charged for cave tours and camping.

Cooperative Agreement, Black Hills Parks and Forest Association. This agreement took effect November 1, 2010, between the National Park Service and the Black Hills Parks and Forests Association. The association agrees to provide interpretive and educational services to the public. The chief interpreter is the agency representative for Wind Cave National Park.

Cooperative Fire Management Agreement. This agreement, signed in 2007, defines management protocols and allows for the exchange of expertise and resources in all aspects of fire management activities. Activities include firefighting, fuels management and cooperation in training personnel devolvement.

Delegation of fire management authority. This agreement allows the Northern Great Plains Fire Office to act on behalf of the park superintendent in the management of most business functions for fire management. It gives the authority represent and advocate for the park in the greater fire community.

Memorandum of Agreement, US Forest Service. This agreement provides for cross-designation of law enforcement authority between Wind Cave National Park, The Black Hills National Forest, and the Nebraska National Forest.

General Agreement between the State of South Dakota and Wind Cave National Park. This agreement establishes standard operating procedures for handling accidental bison exchanges between the park and state lands and reaffirms the commitment to maintain the fence that serves as a common boundary between the two parks.

Cooperative Agreement, Centennial Trail. In 1988, the National Park Service, US Forest Service, Bureau of Land Management, and state of South Dakota entered into a five-year agreement for the development and maintenance of this 111-mile trail system. These cooperative efforts are still underway.

APPENDIX C: PARKWIDE DESIRED CONDITIONS BY RESOURCE TOPIC

INTRODUCTION

Desired future conditions at the Park will be applied in two ways, (1) by individual management zone where prescribed conditions may vary based on specific locations and applicable zone, and (2) by resource type where desired conditions will be prescribed parkwide, regardless of management zone types. For the first scenario, management zones describe differing desired resource and visitor experience conditions for each area of the Park, including appropriate uses and facilities necessary to support these desired conditions within each delineated location. The Management Zone Matrix (see pages 34-47) provides descriptions for desired resource and visitor conditions for each zone in an easily comparable format.

The second scenario prescribes desired resource and visitor experience conditions parkwide. The parkwide (common to all) desired conditions, combined with the area-specific prescribed desired conditions identified within each different management zone, provides the overall, comprehensive land use management direction for the Park. These desired future conditions illustrate the long-range vision for Park resources and visitor experience opportunities and will enable Park managers to make informed future land use management decisions. Parkwide resources covered in this section include:

1. Cave and Karst
2. Paleontology
3. Water
4. Riparian Areas, Wetlands, and Floodplains
5. Vegetation
6. Fire Management
7. Wildlife (General)
8. Wildlife (Bison)
9. Wildlife (Species of Concern)
10. Air Quality
11. Archeology
12. Ethnography
13. Historic Structures / Cultural Landscapes
14. Soundscape / Acoustic Environment
15. Dark Night Skies
16. Scenery Conservation
17. Visitor Use and Experience

Each resource type is organized in the following way:

- Desired Condition/Standards
- Existing Conditions
- Needed and Allowable Changes
- Management Strategies
- Monitoring and Assessment (Implementation level planning)
- Indicators/Measures (Implementation level planning)

Desired Condition (Standards). Desired conditions describe desired resource conditions of Park resources that the Park intends to attain in managing Wind Cave National Park, whereas **management strategies** define practices, management approaches, methods, and procedures that will be applied to achieve the desired conditions.

Desired conditions are statements that express how resources should look and function now and in the future. A desired condition is defined as: "Land or resource conditions that are expected to result if goals and objectives are fully achieved" (USDA 2014). Desired future conditions are both ecological in context, as well as societal in context. As a future-visioning choice, a desired future condition seeks to protect a broad range of choices for future generations, avoid irretrievable losses, and guide current management and conservation strategies and actions. However, given the dynamic nature of ecological and social systems, a desired future condition is also dynamic and thus is always revisited during monitoring, external review, and evaluation of performance.
Desired conditions (standards)

- are measurable and attainable;
- comply with various federal statutes, policies, and directives applicable to park lands; and
- establish goals for resource condition and parameters for management decisions.

The desired conditions (standards) identified in the management zone prescriptions will guide the identification of measurable indicators and standards needed for monitoring and adaptive management. Specific and detailed indicators and standards needed to manage visitor use will likely be addressed as part of a separate visitor use management planning process. Other indicators and standards related to maintaining the health and integrity of the Park's natural and cultural resources and values will be developed through future management documents.

Needed and Allowable Changes — A Way to Evaluate Appropriate Kinds of Changes. Once area-specific desired conditions have been described or defined, they can be compared to the existing conditions to determine the kinds of changes needed to achieve the desired conditions. The needed changes may be minor or major, depending on how different the desired conditions are from the conditions currently existing in each area. A description of these needed changes provides a better understanding of the implications of achieving the desired conditions and will provide direction for subsequent, specific future implementation level planning efforts.

Although management zones will not include details about specific management actions necessary to achieve desired conditions (actions will be deferred to implementation planning), it may be useful to discuss the range of management directions or strategies that the Park manager might consider as possible ways of effecting the needed change. For example, the recovery or simulation of a natural fire regime might be accomplished through mechanical thinning and reseeding, prescribed burns, or some combination of these two methods. For another example, changes needed to achieve the appropriate kinds and levels of development might include construction of self-service or staffed information facilities.

Management Strategies

- Typically identify and prescribe methods of influencing or controlling specific park land uses.
- Are developed and applied consistent with the desired condition and within site capability.
- May be adjusted over time.

Flexibility must be used in applying management strategies because resource components vary from place to place and resource interactions may be different depending on the circumstance. Park standards and management strategies will be implemented through subsequent implementation level planning efforts such as resource management plans (RMPs), research stewardship strategies (RSS), and other documents. Additional management strategies may be identified and implemented through subsequent management plans and activity plans to address local situations not dealt with by this management zoning plan, or general agency policy.

Monitoring and Assessment (Implementation-Level Planning)

Monitoring and assessment is a process that helps improve performance and achieving results. Its goal is to improve current and future resource conditions. Monitoring goals:

- Determine the status and trends, in selected indicators, of the condition of park ecosystems to allow managers to make better-informed decisions and to work more effectively with other agencies and individuals for the benefit of park resources.
- Provide early warning of abnormal conditions of selected resources to help develop defective mitigation measures and reduce costs of management.
- Provide data to better understand the dynamic nature and condition of park ecosystem and to provide reference points for comparison with other, altered environments.
- Provide data to meet certain legal and Congressional mandates related to natural resource protection and visitor enjoyment.
- Provides a means of measuring progress towards performance goals.

Indicators/Measures (Implementation-Level Planning)

Indicator – a specific, measurable resource or social variable that can be measured to track changes in conditions, so that progress towards attaining the desired condition can be assessed.

- Measures – a specific, measurable point identified for an indicator that serves as a trigger point for the identification of unacceptable conditions. A measure is the point at which an indicator changes from an acceptable to an unacceptable condition.

CAVE AND KARST

Desired Conditions

- The Park will protect and perpetuate the natural systems, processes, and conditions that exist in Wind Cave.
- Cave is maintained in natural condition with few human influences on the natural cave physical processes, such as air flow, climate, speleothem growth, hydrological patterns, and biotic communities.
- Existing and future development will not alter or adversely impact karst or cave processes or resources.
- Management activities will have minimal or no adverse impacts on karst and cave resources or processes.

Existing Conditions

The developed corridor in Wind Cave is the most impacted cave and karst resource in the park. This human-caused impact primarily resulted from tour route development. The presence of on-going tours continues to impact cave resources. The developed corridor includes five tour routes, the Natural Entrance, Garden of Eden, Fairgrounds, Blue Grotto Loop, and Candlelight Tour Routes. The most impacted areas occur on and immediately adjacent to these developed trails. Generally, the degree of impact diminishes the farther one travels away from these trails. Impacts include: artificial entrances, concrete paving, asphalt from previous trail surfaces, discarded wood from past construction, wax drippings, artificial roof supports, electrical systems, vandalism, foreign debris and waste from visitors, blasted sections, displaced sediment and rock, rubble blocked side passages and pits, and tracked and displaced dust.

Materials left behind by early explorers include string, candles, wax drippings, signatures, vandalized surfaces, newspaper, and miscellaneous trash items. These early explorers heavily damaged some areas during the pursuit of mineral specimens to sell. They also left behind large amounts of the newspaper that was used to protect these specimens for removal from the cave. These early explorers left signatures on cave surfaces using several methods, including: candle soot, scratching, and finger rubbing.

Caving activities affect cave resources. Permitted activities, such as cave rescues, recreation trips, research, and exploration have all had or do have impacts. Cavers affect compact sediment as well as disturb loose sediment, which may become airborne and settle on cave surfaces. Although this is an especially serious problem along the Wild Cave Tour Route, due to the high number of people, it is also a problem with cavers traveling along all the flagged trails. In some areas cave floor crusts have been broken, causing increased dust production. Any time a caver enters an unexplored area, impact occurs. These impacts become more pronounced as traffic to these areas significantly increases. If a caver drops food crumbs, mold may grow. These crumbs provide unnatural food sources for biota. Cavers also shed lint, hair, and skin cells, which become more noticeable along heavily traveled routes.

Backcountry caves have remained relatively un-impacted. However, the entrance to Elk Antler Cave was modified and a trench was dug into the hillside in an attempt to dig into Salamander Cave in the early 20th century. Other early 20th century impact includes graffiti in Stacked Shack Shelter and a still that was abandoned in Vultures Lair. Cave gates were installed in Coyote Cave during the 1990s and Persistence Cave in 2015 in order to protect cave resources. In addition, park-approved paleontological excavations have been conducted in Beaver Creek Shelter, Salamander, Graveyard, and Persistence Caves.

Needed and Allowable Changes

In order to mitigate impacts or potential impacts on cave and karst resources from surface activities, several actions are needed, including:

- Evaluate existing activities and infrastructure within the Historic Zone over known or potential cave and consider the possibility of moving functions/infrastructure (specifically, noncontributing structures and infrastructure).
- Evaluate potential impact from commercial truck traffic over the cave on Highway 385 and consider rerouting it around the park.
- Reduce the footprint of the Mixing Circle and develop an active waste management program to prevent future accumulations and consider removing the area off of potential cave resources.
- Work with the USFS to create a non-mineral withdrawal area on lands adjacent to the park's southwestern boundary that include known blowholes that are potentially part of the Wind Cave system.

Management Strategies

High Vulnerability Classification Criteria: High vulnerability karst landscapes are those areas where resource damage threats associated with land management activities in the areas are appreciably greater than those posed by similar

activities on low or moderate vulnerability karst lands. These are the areas contributing to or overlying significant caves and areas containing a high density of karst features.

High vulnerability karst landscape areas shall be managed to ensure conservation of karst values through the implementation of a high level of protection. Limited recreational development may be appropriate. Recreational facilities and trails would have to consider karst resource values and objectives discussed here, particularly with respect to reducing disturbance of significant epikarst features and sensitive soils and use of construction methods that avoid erosion and diversion of natural drainage waters into karst features. Roads across such sensitive terrain are generally inappropriate and should be avoided to the greatest extent possible. New roads should not be considered within this zone. Suitable relocation of existing roads within these zones should be sought and located in appropriately suitable locations with regard to karst resources.

It is probable that karst areas with high vulnerability will be found in adjacent lands within and adjacent to areas found to be of moderate vulnerability. Along such boundaries or margins the National Park Service will work collaboratively with adjacent land owners and land managers to establish appropriate land use management guidelines to address the following activities:

- Surface disturbing activities such as road construction and development should not occur within a minimum of 300 feet of the edge of a sinkhole, collapse channel, losing stream, or other collapse karst feature if groundwater dye tracing studies have indicated that such features contribute to class I or class II streams or a domestic water supply. If groundwater dye tracing studies have not been completed and it is suspected that groundwater contributes to a "significant" cave, class I or class II stream, or domestic water supply, ground disturbing activity should not occur within 300 feet of any above mentioned karst features.
- Surface disturbing activities such as road construction development should not occur on lands that overlie a known "significant" cave or contribute waters to any known "significant" cave. Neither should these activities occur on lands that are close enough to the entrance of a significant cave to be capable of altering the microclimate of the cave's entrance and/or cave features within.
- Catchment area management: The catchment areas for karst systems, composed of carbonate or non-carbonate substrate, are an integral portion of those systems. These catchment areas must be effectively managed to protect the resource values of the karst systems into which they flow. The higher the resource values found within a particular karst block, the higher the degree of protection which is needed within a contributing catchment area. As a minimum, such things as potential for increased runoff and increased stream velocities, increased sediment transport capability, and mass wasting potential of the soils within the watershed should be considered when developing management strategies for these catchment areas. The vulnerability of the karst system's catchment areas should be considered equal to the highest down-gradient karst vulnerability values. As part of site-specific analysis, management strategies developed for the catchment areas should ensure protection of the down-gradient karst resource values. Best management practices will be developed to address surface water runoff from impervious surfaces within the catchment area with emphasis on roadways and vehicle parking areas in the greater watershed.
- Mineral Development: It is not the intent of these standards and guidelines to prohibit any adjacent lands from mineral development, though restrictions may be appropriate if a specific project or area outside Park boundaries is located within the karst landscape sensitivity zone. The impacts of any proposed mineral development outside the Park boundaries and within the karst landscape can be analyzed through an environmental analysis provided appropriate notice of proposed action(s) is given. The National Park Service will coordinate with federal, state and local agencies to ensure such activities are regulated and monitored to protect the Park resources from potential adverse effects associated with such activities.
  (As adopted by USFS – Tongass National Forest, Land and Resource Management Plan, 2008)

Indicators and Measures (Implementation Level Planning)

To be developed in the future.

PALEONTOLOGY
Desired Conditions
▪ Paleontological resources within the Park will be identified, documented, and protected from destruction or degradation. ▪ The Park will manage uses and activities to prevent damage to paleontological resources within the Park. ▪ The Park will facilitate appropriate paleontological research to improve understanding of paleontological resources within the Park. ▪ The Park will continue to inventory the Park lands for paleontological resources and evaluate their potential for protection, conservation, research, or interpretation. High use areas within the Park will have high priority for inventory efforts. Beyond high-use areas, inventory and research efforts will be expanded to fill in the information gaps on formations and other information needs.
Existing Conditions
Wind Cave National Park has regionally significant fossil resources that include a range of types of paleontological sites, including: trace fossils, plant, invertebrate, and vertebrate fossil localities that span a significant portion of the geologic timeline. Poaching is a significant threat to Wind Cave fossils, but the biggest threat appears to be weathering of the fossils. Significant erosion can happen yearly, especially during wet years. At the three most fossiliferous sites, numerous fossils are exposed each year. Fossil cyclic surveys were conducted at these three sites yearly over a span of four-years. During this time an average of 37, 42, and 67 identifiable fossils were collected from these sites each year. Once exposed on the surface, these fossils appear to break up and erode away within months to a couple of years, causing them to be lost to science. A secondary but unavoidable threat to these sites is bison and elk trampling. Bison especially like to create wallows on the exposed sediments at these paleontological sites.
Needed and Allowable Changes
In order to mitigate impacts or potential impacts on paleontological resources from surface activities, several actions are needed, including: Install gates on the two significant fossil cave sites.
Management Strategies
▪ Adherence to NPS *Management Policies* 4.8.2.1. ▪ The Park will continue to inventory the Park lands for paleontological resources and evaluate their potential for protection, conservation, research, or interpretation. High use areas within the Park will have high priority for inventory efforts. Beyond high-use areas, inventory and research efforts will be expanded to fill in the information gaps on formations and other information needs.
Monitoring and Assessment (Implementation Level Planning)
A monitoring program will be used to assess management needs of sensitive sites and areas. All proposed projects will be required to include a paleontological site inventory, and appropriate strategies will be used to avoid sensitive sites, restrict access to the sensitive resources (i.e., construct barriers), or if fossil resources are in danger of being poached or destroyed, collect and curate those resources.
Indicators and Measures (Implementation Level Planning)
To be developed in the future.

WATER

Desired Conditions

- Meet and/or exceed water quality parameter standards set by the Environmental Protection Agency and State of South Dakota. In cases where criteria standards differ, the more stringent standard will be applied.
- The natural hydrology of the Park, including surface flow and groundwater levels, and cave lake levels will be protected and degraded functions restored.
- Unique and sensitive groundwater dependent natural resources such as the cave and karst system and aquifer at the Park will be protected and maintained in a naturally functioning condition.
- Groundwater will be maintained at quantities and qualities necessary for the health and preservation of Park resources, especially the Wind Cave system.

Existing Conditions

Surface Waters: the Park includes 94 small springs and three small creeks. The springs depend on precipitation for recharge and generally do not flow during dry periods. Beaver Creek is the major drainage of the Park, which originates outside the Park near the city of Custer, South Dakota, and flow rarely leaves the Park as most of the water is lost to outcrops of the Madison aquifer (known locally as Pahasapa Limestone formation) (Ohms 2009). The Cold Spring Creek enters the Park on the western boundary and is the smallest of the perennial streams in the Park with regard to flow and drainage. Flow in this creek is largely derived through a network of pipes from the Water Supply Springs, a small outlying unit that lies 2 miles west of the Park. Highland Creek is primarily fed by springs originating in Custer State Park, located immediately to the north of the Park. The creek loses a substantial amount of water to the Madison Limestone beginning 0.25 miles from the Park's northern boundary.

Groundwater: the Park lies in the recharge zone for the regionally significant Madison aquifer. A large portion of groundwater recharge is provided by stream flow loss as the water intersects karstic limestone outcrops (Ohms 2009). Beaver and Highland Creeks lose the vast majority of their flow to the bedrock aquifers in the Park. Groundwater levels respond quickly to significant recharge events in the area. The Madison aquifer supplies drinking water to the Park and the local area, including the community of Hot Springs, South Dakota (Ohms 2009).

Overall Condition: The condition of the Park's hydrology has been significantly altered from its natural state, particularly surface streams by dam construction. However, level and flow measurements have not been significantly impacted to date. There is concern that ongoing water development in the Black Hills region could have more serious impacts on groundwater and stream levels in the future.

Water Withdrawals and Diversions: Water withdrawals are a significant threat to the natural hydrology of the Park, potentially altering surface flow, groundwater levels, and cave lakes. Thirty dams have been constructed by private landowners on Beaver Creek upstream of the Park as of 2011, creating small pools which increase evaporation and reduce surface flow in the Park (NPS, Ohms 2009; Ohms, pers. comm., 2011). Reduced surface water availability in streams could negatively impact wildlife. Water temperatures have risen in the creek as a result of the dams, lowering oxygen levels which could threaten fish and other aquatic organisms (Ohms 2009).

Human population growth and associated increases in water use: Population growth in the Black Hills region will place increased demand for water on the region's aquifers as the number of wells increase. Housing developments have been built recently in the Beaver Creek watershed, with continued growth expected in the area. In 2006, the Southern Black Hills Water System filed a Future Use Water Permit application (No. 2580-2) to appropriate 1,474 acre-feet annually of groundwater from four well sites in the Madison aquifer in Custer and Fall River Counties. They also filed Water Permit Application 2585-2 to appropriate 1,600 acre-feet annually of groundwater from one well site in the Madison aquifer in Custer County (Back 2011). This rural water system will be temporarily using the Streeter Well, which is located within one mile of Park boundaries, until a second well, located within 0.25 miles of Park boundaries is drilled in Fuson Canyon and is operational. The project could have a significant impact on the Madison aquifer and could have the potential of eliminating Wind Cave's lakes by lowering the water table. In a worst-case scenario it was estimated by using the groundwater levels in the vicinity of Wind Cave could decline by 45 feet within 10 years if continuous pumping was focused on the Streeter Well (Cuttilo 2006).

Needed and Allowable Changes

Continue existing management.

Management Strategies

The Park will ensure that appropriate quality and quantity of water resources are available for the proper care and management of the Park resources.

Note – United States Geological Survey report (forthcoming) will provide appropriate, additional direction for standards

and guidelines related to groundwater resources in the Black Hills region.

Surface and groundwater quality and groundwater recharge – Protect groundwater quality while promoting groundwater recharge in the connected aquifer.

The Park will apply and comply with water quality standards established by the State of South Dakota water quality rules and the Federal Clean Water; delegated authority to the South Dakota Department of Environment and Natural Resources and Safe Drinking Water Acts. Activities on Park lands will fully support the designated beneficial uses described in the South Dakota Water Quality Standards for surface and groundwater.

Programs and facilities are maintained and operated to avoid pollution of surface and groundwater.

Water Availability: Since much of the water important to the Park falls as precipitation, its continued availability must be ensured by appropriate land management policies. The National Park Service will exercise its existing land management authorities to protect and maintain all available water and natural flows in the Park.

Water Use: The development of water may be provided in limited circumstances, where necessary for visitor safety or resource protection. The provision of water at sites within the Park will be very limited because the only facilities provided aside from the primary visitor center will be modest pullouts, parking areas, trailheads, picnic sites, toilets, and primitive camping areas. These sites do not require water, including most toilets which could use other technologies.

Stormwater Runoff Volume Control: The rate and volume of stormwater runoff will be controlled to the maximum extent possible, soil erosion is minimized, and flooding potential is reduced. The preservation of natural infiltration and the recharge of groundwater will be ensured so that subsurface flows are maintained for groundwater dependent natural resources, including the cave and karst system.

Groundwater Appropriations: Groundwater dependent natural resources such as the cave and karst system and aquifers at the Park will be protected and maintained in a naturally functioning condition with regard to groundwater use and withdrawal. The National Park Service will monitor water right permit applications in the area around Wind Cave and determine if the potential impacts of the proposed withdrawals, in combination with existing permitted withdrawals, will adversely affect the water rights and water-dependent resources of the park. The National Park Service will intervene in the state permitting process when required in order to protect park resources dependent on groundwater levels or surface water flow.
Pursue other options for assuring water availability, if needed: These measures could include:

- Cooperation with other federal agencies that may already have federal reserved water rights and that could indirectly provide adequate protection to Park resources.
- Initiate discussions with state and local water users to identify how nearby communities could secure water rights/supplies for expected future growth without interfering with the water flows needed for Park resources. These discussions will include negotiations toward an agreement between the state and local water users.

Monitoring and Assessment (Implementation Level Planning)
[Suggested language to be expanded during implementation planning]

- Surface and groundwater resources in the Park are well documented and have been studied extensively. Monitoring of water resources should continue into the future in order to document any changes to the Park's hydrology.
- Routine monitoring will continue to be conducted to ensure water flowing into the Park is adequate to support Park resources.
- Surface Water Quality – Continued research on the surface water resources will document their physical and biological characteristics as a means of establishing and implementing water management programs.
- Need additional research to document the extent of alteration to infiltration routes into the cave. Specifically, a study documenting surface drainage modification issues and documenting possible water loss to the cave from vegetative changes above the cave due to landscaping will be conducted.
- The National Park Service will continue to collaborate with others to perform water resource investigations to better understand and conceptualize surface and groundwater systems, and interactions at the regional scale.
- The National Park Service will continue cataloging and classifying hydrologic attributes of the regional system, and will establish appropriate long-term monitoring programs to collect water chemistry and quantity data.
- The National Park Service will quantify hydrologic processes such as surface-water and groundwater exchange, and precipitation, runoff, and sediment transport relationships within the regional hydrologic system.
- The National Park Service will attempt to determine direct and indirect effects of humans on hydrologic

WATER
attributes of the regional system and associated/subsequent effects on Park resources. ▪ Portions of Wind Cave intersect the water table of the Madison aquifer and form a series of groundwater lakes within the cave. Water levels are monitored at three locations: Windy City, Calcite, and What the Hell Lakes. Fluctuations in the water table, which affect cave lake levels, have been natural events to date. Lake level measurements will continue to be taken to document variations over time.
Indicators and Measures (Implementation Level Planning)
To be developed in the future.

RIPARIAN AREAS, WETLANDS AND FLOODPLAINS

Desired Conditions

Riparian Areas and Wetlands are in proper functioning condition as a result of interaction among geology, soil, water, climate, vegetation, and disturbance. Properly functioning riparian-wetland areas will have adequate vegetation, landform, or large woody debris present to

- dissipate stream energy associated with high in-stream and overland water flows, thereby reducing erosion and improving water quality
- develop root masses that stabilize shoreline features against cutting actions
- filter sediment, capture bedload, and aid floodplain development
- improve flood-water retention and groundwater recharge
- develop ponding and characteristics to provide the habitat and the water depth, duration, and temperature necessary to sustain aquatic flora and fauna and other uses
- support greater biodiversity

Riparian areas and wetlands have satisfactory soils containing organic matter sufficient to support a complete nutrient cycle, are able to resist compaction, and support flora/fauna typical of riparian and wetlands sites.

Riparian plants exhibit high vigor and where appropriate, provide an adequate source of coarse and/or large woody debris.

Perennial free-flowing streams and springs function within the natural range of variability consistent with climate, watershed size, and geomorphology and will promote an uninterrupted hydrologic cycle.

Existing Conditions

Riparian areas, although a small fraction of the total lands within the Park, are some of the most productive, ecologically valuable, and utilized areas. Riparian cover is limited in the park and represents valuable habitat for many species of wildlife.

There are three perennial streams in the park: Beaver Creek, Highland Creek, and Cold Spring Creek. Currently, there is very little information available to describe riparian/streamside vegetation, streambank condition, and stream substrate, and no data exist on changes or trends in these attributes over time.

The park was recognized in the Black Hills Community Inventory (BHCI; Marriott et al. 1999a) as an exemplary site – a site with outstanding size, outstanding landscape context (including little landscape fragmentation), a diverse set of community types present, and high-quality occurrences for those types. The park was noted as including 22 community types, including 9 rare community types, one of which was Western Great Plains Streamside Vegetation (NatureServe Explorer 2011). The riparian streambank vegetation recognized as exemplary in 1999 was not comprehensively described, given that the BHCI data set consisted of two plots (Marriott et al. 1999). Since 1999, the park has embraced the concept that riparian/streambank vegetation in the park is rare and exemplary and in good condition but has conducted no further monitoring or analysis.

Plant species data (SDGFP 2014) suggest that the park has been under-studied from a comprehensive floristics perspective and from a specific riparian perspective. However, field observations of relatively low vegetation diversity in the park riparian/streambank areas by the park staff botanist (B. Burkhart) indicate that past conditions may have impacted the persistence of some riparian species.

Most ecological systems have common, abundant species that are often hardier with respect to disturbances than uncommon, sparse species in those systems. These are sometimes referred to as persistent (common, abundant, resilient) species and sensitive (uncommon, sparse, vulnerable) species. Generally, sensitive species may require refugia in the landscape where factors such as natural variability in topography, geomorphology, hydrology, vegetation characteristics, etc. allow them to survive periods of high intensity or high frequency disturbance. Riparian systems in the park may not have provided adequate refugia for disturbance-sensitive riparian species in past periods of low precipitation and high animal use since the park boundary fence was completed in 1953. This could result in bottleneck periods when sensitive species diversity is decreased and not able to recover because seed bank reserves do not exist or have been depleted and/or riparian areas are too far from seed/propagule sources for repopulation.

Needed and Allowable Changes

A vegetation and riparian management plan is needed to make an adequate assessment of riparian and wetland areas.

The capability and potential of riparian/wetland areas will be assessed and proper management practices will be implemented accordingly. Those areas identified as functional – at risk with a downward trend will be prioritized for

resource management because a decline in resource values is apparent. Those areas identified as functional – at risk with an upward trend will be prioritized for monitoring efforts.

Management Strategies

A "no net loss of wetlands" policy is implemented, with an associated goal of net gain of wetlands through the restoration of previously degraded wetlands. The park will adhere to Director's Order #77-1 and Executive Order 11990 and applicable procedural manuals.

Natural floodplain values are preserved or restored. The park will adhere to Director's Order #77-2 and Executive Order 1988 and applicable procedural manuals.

Riparian and Wetland resources within the Park will be managed to provide the widest variety of vegetation and habitat diversity for wildlife and watershed protection.

Protect or restore natural flow regime and functional qualities of riparian-wetland areas to conditions representative of natural conditions.

Minimize human-caused disturbance to the natural processes that deliver water, sediment, and woody debris to streams. Natural fluvial processes will be allowed to proceed unimpeded, and stream processes that create habitat features are protected.

Springs and Seeps will be monitored to allow persistence of sustainable seep/spring native plant species and communities in good condition.

Park will establish riparian buffers within Park and work with outside entities to establish buffers outside Park boundaries. Park will coordinate with local county and municipalities for riparian setbacks.

Riparian areas and resources within the Park will be managed to maintain or restore them to proper functioning conditions and to ensure that stream channel morphology and functions are appropriate to the local soil type, climate, and landform as indicated by:

- Streambank vegetative cover adequate to protect stream banks consisting of species with root masses capable of withstanding high streamflow events, protect against accelerated erosion, capture sediment, and provide for groundwater recharge
- Vegetation reflecting: Desired plant community, maintenance of riparian and wetland soil moisture characteristics, diverse age structure and composition, high vigor, large woody debris when site potential allows, and providing food, cover, and other habitat needs for dependent animal species
- Re-vegetating point bars, lateral stream movement associated with natural sinuosity, channel width, depth, pool frequency, and roughness appropriate to landscape position
- Active floodplain

Upland soils exhibit permeability and infiltration rates that sustain or improve site productivity, considering the soil type, climate, and landform. This is indicated by:

- Sufficient cover and litter to protect the soil surface from excessive water and wind erosion, promote infiltration, detain surface flow, and retard soil moisture loss by evaporation.
- Absence of excessive erosion indicators such as rills, soil pedestals, and actively eroding gullies.
- Presence of (1) the desired plant community (DPC) identified in a land use plan conforming to these standards, or (2) where the DPC is not identified, a community that equally sustains the desired level of productivity and properly functioning ecological processes.

Avoid new construction or alteration of existing structures on wetlands whenever there is an environmentally preferable alternative.

- New facilities will be prohibited in riparian areas, except when needed for resource protection purposes.
- Communication sites and utility rights-of-way will avoid riparian areas whenever possible.
- Trails will be kept out of riparian areas wherever possible. Where this is not possible, trails will be designed to minimize impacts by placing trails away from streams.

Riparian resources will be protected and restored from impacts caused by nonnative vegetation. Nonnative species control program will prioritize treatment of invasive species in order to improve riparian resources.

The timing and duration of grazing will be managed to maintain resilient riparian areas vegetated with native plant

RIPARIAN AREAS, WETLANDS AND FLOODPLAINS
species. This could include the use of riparian and/or wetland area exclosures. Special status species habitat and ecological processes will be evaluated in all future riparian assessments. Designated monitoring areas will be established to determine when actions should be taken to ensure movement towards proper functioning condition on all riparian stream segments within Park.
Monitoring and Assessment (Implementation Level Planning)
The Multiple Indicator Monitoring (MIM) of stream channels and streamside vegetation protocol may be used in order to validate proper functioning condition (PFC) assessments for lotic riparian-wetland areas. The PFC method assesses a much broader reach of stream; however, it is a qualitative method for assessing the condition of riparian-wetland areas and is not designed to be a long-term monitoring tool. The PFC assessment uses hydrology, vegetation, and erosion/deposition (soils) attributes and processes to qualitatively assess the condition of riparian-wetland areas. Many of these same attributes can be quantitatively measured using the MIM protocol. Designated Monitoring Areas (DMA) will be established.
Indicators and Measures (Implementation Level Planning)
To be developed in the future.

VEGETATION

Desired Conditions (ecology associations, community types)

- Native species, native plant communities, and natural ecosystem processes are able to respond and adapt to shifting conditions.
- Plant communities will exhibit or be progressing toward a healthy, productive, diverse population of native plant species, and functioning disturbance processes appropriate to the site characteristics.
- A grazing/browsing regime will be maintained that supports viable habitats related to native vegetation.
- Plant communities will exhibit a combination of successional stages based on differing species composition, age structure, and understory composition appropriate to site characteristics on a watershed by watershed basis, or portions thereof.

Desired species, including native, threatened, endangered, and special status species, are maintained at a level appropriate for the site and species involved. This is indicated by:

- frequency, diversity, density, age classes, and productivity of desired native species necessary to ensure reproductive capability and survival
- habitats connected at a level to enhance species survival
- native species re-occupy habitat niches and voids caused by disturbances
- habitats for threatened, endangered, and special-status species managed to provide for recovery and move species toward delisting
- appropriate amount, type, and distribution of vegetation reflecting the presence of (1) the desired plant community (DPC), where identified in a land use plan conforming to these standards, or (2) where the DPC is not identified, a community that equally sustains the desired level of productivity and properly functioning ecological processes

Existing Conditions

In 1999, TNC Black Hills Community Inventory (BHCI) project (Marriott et al.1999) recognized the park as an exemplary site with respect to native vegetation. The park vegetation includes 22 plant community types based on the US National Vegetation Classification (USNVC), nine of which are considered rare (i.e., NatureServe Global ranks of G1 to G3). The majority of vegetation associations examined in the park by Marriott et al. (1999) received an element occurrence (EO) rank of A (highest possible) or AB and some received a B.

In addition, in 1999, invasive species were noted as being locally common at scattered locations, but the overall condition of the native park vegetation was still considered good (Marriott et al. 1999).This description is still accurate, but the species and locations have changed over the last 10 years (Burkhart, pers. comm., 2010). Marriott et al.'s (1999) categorization of the park's plant communities indicates that native plant communities in the park are in good condition compared with many areas outside the park; however, this does not mean that plant communities at that time should be considered in pristine condition (Burkhart, pers. comm., 2010). Invasive plant species numbers and density have increased in the southern Black Hills since 1999, including in the park. It appears that the invasive species numbers and density in the park are still at a lower level than the surrounding Black Hills landscape (Burkhart, pers. comm., 2010).

While the scope and detail of work accomplished for the Black Hills Community Inventory has not been duplicated since that time, botanical evaluation of the park vegetation in recent years has shown that 21 of the 22 plant community types are persisting in good condition in the park (Burkhart, pers. comm., 2010). Recent data collection will aid in determining the conditions of the last plant community type (Western Great Plains streamside vegetation) in the park. Like many plant communities, these community types are threatened by continued expansion of nonnative invasive plants in and outside of the park; the more than one hundred nonnative or invasive plant species are documented in the park.

Though precise parkwide measurements of ponderosa pine density and extent do not exist, it is estimated that the size of the forested area has increased by more than one third since 1870, mainly as a result of fire suppression (NPS 2005b). Increases in forest size and density cause declines in the amount of herbaceous vegetation in the park. While the increase in ponderosa pine extent is a concern for management, ponderosa pine is a native species that is desirable in many areas of the park. Under natural conditions in the past, an ebb and flow in the amount of forest and prairie cover existed overtime (Burkhart, pers. comm., 2010). However, high pine densities, especially in the seedling and pole-sized classes, may create potential for high severity fires, which could lead to negative effects in terms of native vegetation recovery after fire.

As of 2009, a total of 17 native plant species tracked by the SDNHP are known or suspected to occur in the park (Marriott et al. 1999). The park has information on 48 species of limited occurrence in the park. These species of concern require additional survey, inventory, and monitoring to detect changes in abundance, distribution, and condition and to develop best management practices and mitigations to protect these species.

Needed and Allowable Changes

VEGETATION
A vegetation assessment and management plan is needed to establish specific management goals for vegetation communities and overall resource conditions. Invasive species management will continue to be emphasized and will be incorporated in the vegetation assessment and management plan. Recently completed NPS technical reports on climate change at the Park will be utilized for resource protection; "Vegetation Protections for Wind Cave National Park with Three Future Climate Scenarios" and "Two Approaches for Incorporating Climate Change into Natural Resource Management Planning at Wind Cave National Park."
Management Strategies
The Park will be managed to achieve a natural range of native plant associations and encourage population dynamics and progression of those associations within the natural range of variability for the Southern Black Hills ecosystem. Plant species and plant communities will be maintained to prevent species from becoming listed as threatened, endangered, or sensitive. The Park will work with land-managing partners to better protect species that are threatened, endangered, or of concern in the region. The Park will also collaborate on inventory, monitoring, and development of best management practices to conserve populations. The Park will maintain an updated complete plant list that includes threatened, endangered, species of concern and nonnative species. All management and vegetation restoration strategies will consider site conditions/thresholds and will consider factors such as ecological site, presence of undesirable species, adjacent plant communities, current use or management status, and position in the watershed prior to any treatment application. Where appropriate, re-vegetate sites after disturbance, taking into account factors such as soil moisture, rainfall, elevation, soil type, slope, aspect, previous vegetative community, and adapt management strategies to address specific site conditions. Rest rehabilitated and naturally regenerating areas to allow recovery and establishment of perennial plant species based on specific objectives and ecological site potential. Best management practices will be developed, published, and adhered to for park management activities as they relate to vegetation such as: ▪ Prescribed burns ▪ Vegetation control ▪ Construction projects ▪ Wildlife population management ▪ Human use ▪ Developed areas ▪ Trails ▪ Ceremonial areas A coordinated management plan addressing grazing/browsing, vegetation cover, and fire effects will be developed to ensure vegetation regeneration is in balance. The Park will adhere to NPS *Management Polices 2006*; Director's Order 77: *Natural Resources Protection*, Federal Noxious Weed Control Act, Executive Order 13112, "Invasive Species." Best management practices will be developed, published, and adhered to with regard to nonnative plant species: ▪ Treatment of nonnative and invasive species will be in a prioritized manner that reduces impacts to native plant species/communities and ecological services (e.g., forage for wildlife, habitat for prairie dogs and black-footed ferrets). ▪ Newly discovered occurrences of known, nonnative invasive species will be evaluated for feasibility of eradication, containment, or control. ▪ Park management will employ a number of different tools and resources such as the Northern Great Plains Exotic Plant Management Team (NGP EPMT) to treat infestations of a variety of plant species using integrated pest management techniques. ▪ Herbicide application design protective of the park's cave and karst has been implemented and monitoring of

VEGETATION
cave water for herbicide residue will continue.
Monitoring and Assessment (Implementation Level Planning)
An adequate floristic survey of the Park will be completed to fully document plant species in the Park, including native plant species of concern. Once a floristic survey is completed, inventory can be accomplished to determine overall distribution, abundance, and condition of plant species of concern. A Park monitoring plan for plant species of concern (including protocols appropriate for each species) will be developed and implemented to track native species persistence and quality of occurrences in the Park over time.
Indicators and Measures (Implementation Level Planning)
To be developed in the future.

FIRE MANAGEMENT
Desired Conditions
▪ Firefighter and public safety is the first priority in all fire management activities. ▪ Cooperate with adjacent landowners (BH fire group) in restoring fire-adapted ecosystems in the park and adjacent lands as possible to improve deteriorated conditions due to decades of fire suppression. ▪ Provide opportunities for public understanding of the wildland urban interface problem. ▪ Manage all wildland fire to protect the public, private property, natural, cultural and historic resources and benefit natural resources of the Park. Specific areas identified as fire prevention zones in the Park include the visitor center/housing zone, Elk Mountain campground zone, buffalo corrals zone, Hwy 385 and Hwy 87 Corridor Zone, and the mixing circle zone. ▪ Restore fire as a critical component of the ecosystem. Prescribed burning will attempt to recreate, to the extent possible, a natural fire regime including an appropriate fire-event internal to achieve this desired condition. ▪ Use management-ignited, prescribed fire as a tool to support/perpetuate native plant and animal species and communities, eradicate and reduce nonnative, invasive species when possible, minimize the opportunity for encroachment of alien plant species. ▪ Utilize Minimum Impact Suppression and Tactics (MIST) techniques in all fire operations. ▪ The Park fire management program is designed to meet resource management objectives. The fire management plan will be updated regularly. All wild fires are effectively managed using the appropriate management strategy, including fire use, considering resource values to be protected and firefighter and public safety.
AND
All human-caused and naturally caused wildfires are suppressed. Prescribed fires are the preferred tool to achieve management objectives. Mechanical treatments are used to simulate natural processes, assist with hazard fuel reductions, and prepare for prescribed fire activities.
Needed and Allowable Changes
The Park will use specific strategies listed below to achieve their fire management desired conditions: ▪ Wildfire – The Park will manage all wildfires to meet park management desired conditions. This includes firefighter and public safety, resource benefits, and protection of park and adjacent land management resources at risk. All available park and local firefighting resources will be utilized as necessary to limit damage to values at risk. ▪ Wildland Fire Use – The updated fire management plan will provide direction on automatic wildfire suppression stance to allow for some non-suppression of wildland fires on certain circumstances. ▪ Prescribed Fire – Prescribed fires are intentionally ignited under predetermined weather and fuel moisture conditions that permit managers to exert substantial influence over the spread and intensity levels that the fire can achieve. These fires are ignited for purposes of accomplishing resource management objectives and are the preferred treatment tool. All prescription parameters, ranges, and objectives are clearly stated in an individual project plan for each prescribed fire. ▪ Non-Fire Treatments – Mechanical treatments will be used to reduce fuels such as regeneration, hazard trees, forest pest mitigation, and complete work preparation for prescribed fire.
Management Strategies
The NPS *Management Policies* 2006 directs each park to prepare a wildland fire management plan that is appropriate for that park's purpose and resources. Fire management at the Park is based on this policy and the guidance found in Director's Order 18: *Wildland Fire Management*. The primary NPS policy consideration from the order is: "Wildland fire may contribute to or hinder the achievement of park objectives. Therefore, park fire management programs will be designed to meet resource management objectives prescribed for various areas of the park and ensure that firefighter and public safety are not compromised." The fire management plan outlines a detailed program of actions to be taken by the park to meet their updated fire management goals. Director's Order 18: *Wildland Fire Management* identifies considerations to be addressed by park fire management programs. These are: ▪ Protection of human life, both employee and public,

FIRE MANAGEMENT
▪ Protection of facilities and cultural resources, and ▪ Perpetuation of natural resources and their associated processes. Fire management at the Park will implement activities in accordance with the regulations and directions governing the protection of historic and cultural properties as outlined in the Department of Interior Manual, Part 519 (519 DM), and Code of Federal Regulations (36 CFR 800).
Monitoring and Assessment (Implementation Level Planning)
Monitor and evaluate the effectiveness of the prescribed fire program
Indicators and Measures (Implementation Level Planning)
To be developed in the future.

WILDLIFE (GENERAL)
Desired Conditions
▪ The desired condition for Park wildlife in general is defined as breeding and healthy / disease-free populations. Breeding and healthy populations are described as populations representative of those that would occur across the southern Black Hills within suitable habitat under current and future conditions. ▪ The integrity of wildlife corridors, migration routes and access to key forage, and nesting areas will be preserved within the Park and in collaboration with adjacent lands. ▪ The full range of natural selection pressures will be permitted to operate where possible for native wildlife species within the Park (e.g., predation, competition for mates). ▪ The Park will continue to provide habitat for the expected diversity of wildlife species within this region. ▪ Mixed-grass prairie, ponderosa forest, forest prairie, and transition zones within the greater ecological community, including natural processes and health of the system will be fostered to promote the management of wildlife populations within the Park.
Existing Conditions
As mixed-grass prairie, the Park offers refuge to several habitat specific species. A change in land cover could drastically alter the species composition of the Park. Species diversity of wildlife is dependent on maintaining the diversity of habitat within the park. Species composition appears to be within normal range of variability for reptiles, amphibians, fish, birds and mammals. Less effort has been put into arthropods, but the studies that have been completed on butterflies, dragonflies, and damselflies demonstrate a diverse group of insect species. The state of wildlife in the park appears to be within normal ranges but species diversity and long-term trend data is needed to accurately assess conditions. An overabundance of elk and bison, the two main grazers in the park, requires management actions over time. For an in-depth look at the most recent effort to assess natural resource conditions in the park, including wildlife (Komp 2011).
Needed and Allowable Changes
▪ Park must stay vigilant looking for new and emerging diseases in its wildlife. The park has been dealing with Chronic Wasting Disease (CWD) when it was first detected (elk) in 2002. Currently the park is trying to deal with plague by dusting prairie dog burrows with an insecticide to kill the potentially plague positive fleas. An emerging disease in bats, White-nose Syndrome (WNS), is moving westward from New England and has been found as close as Michigan and Wisconsin. ▪ On a local level the park will be able to create many new wildlife movement corridors by removing the fence between the old part of the park and the new addition of 5,556 acres. ▪ Park can maintain the diversity of habitat with the continuation of restoring processes to the park lands such as prescribed fire and disturbance such as grazing by bison, elk, and prairie dogs. ▪ Wildlife management practices will require closer coordination with riparian and wetland resource management to ensure ecological health of all species and to provide the widest variety of vegetation and habitat diversity for wildlife and riparian/wetland resource protection.
Management Strategies
▪ The Park will manage uses to prevent damage to wildlife and their habitats. ▪ The Park will work in conjunction with state and federal agencies in managing wildlife to achieve and maintain natural populations, population dynamics, and population distributions in a way that protects and enhances Park resources. ▪ The Park will work cooperatively with state and federal agencies to reestablish populations of native species to historic ranges within the boundaries of the Park and in certain cases within adjacent lands, and to take needed actions to protect and enhance the habitat of these native species. The Park will manage habitats for the recovery or reestablishment of native populations through collaborative planning with local, state, and federal agencies, user groups, and interested organizations. ▪ The Park will continue to coordinate with state and federal agencies and other organizations to inventory wildlife species native to this region and specific Park area and to evaluate needs for habitat protection. Inventory and research efforts will be targeted to fill information gaps on habitat needs. Such research will be coordinated as part of adaptive management strategies developed in resource stewardship strategies and management plans. ▪ The Park will facilitate appropriate research to improve understanding and management of wildlife resources within the Park and in certain cases within adjacent lands. ▪ The Park will preserve the integrity of wildlife corridors, migration routes and access to key forage, and nesting areas by limiting adverse impacts from development in the Park. ▪ Establish thresholds that will prompt wildlife population management actions, while considering biological factors, integrate relevant scientific research into management strategies as it becomes available. Coordinate

WILDLIFE (GENERAL)
with other responsible wildlife management agencies to accomplish goals and objectives. ▪ Maintain and allow the full range of natural selection pressures to operate where possible (e.g., predation, competition for mates. ▪ All available data will be used to make an overall assessment of resource health, including ecological processes, watershed functioning condition, water quality conditions, and wildlife habitat conditions for each area within the Park and these data will establish the basis for subsequent implementation level management planning efforts. ▪ Wildlife management practices will maintain sufficient residual vegetation and litter on both upland and riparian sites to protect the soil from wind and water erosion and support ecological functions with the natural range of variability. ▪ Wildlife management practices will promote attainment or maintenance of proper functioning condition riparian/wetland areas, appropriate stream channel morphology, desired soil permeability and infiltration, and appropriate soil conditions and kinds and amounts of plants and animals to support the hydrologic cycle, nutrient cycle, and energy flow. ▪ Any spring and seep developments will be designed and constructed to protect ecological process and functions and improve wildlife distribution. Developed water sources for wildlife use (such as stock tanks, etc.) will be located away from riparian/wetland areas, other permanently located, or other natural water sources. Any development near water resources must be consistent with the overall objectives for wildlife and with riparian area and water development guidelines. ▪ Protocol shall be developed to prevent the outbreak and spread of infectious disease in Park wildlife populations to address individual species accordingly. ▪ Individual threats and species stressors will be identified for Park wildlife species and appropriate management treatments will be prescribed accordingly in implantation level planning efforts.
Monitoring and Assessment (Implementation Level Planning)
To be developed in the future.
Indicators and Measures (Implementation Level Planning)
To be developed in the future.

WILDLIFE (BISON)

Desired Conditions

- To the extent possible, maintain a bison herd and establish a population that enhances the long-term survival of the species genetically, behaviorally, and ecologically and that promotes prairie conservation, and expand the population as additional land and forage become available.
- The bison herd will be permitted to function as naturally as possible, given they are in a restricted environment.
- Manage the herd for health conditions resembling free ranging / disease free bison.

Existing Conditions

The Park bison herd is a unique resource and is in good condition, genetically and physically. The population has been stable in recent history, ranging from 300 to 450 individuals in the fall following the capture. Park Wildlife Biologists have noted that the herd functions as naturally as possible given the constraints of the Park. Bison are the only Park species confined within the Park boundary by the boundary fence. All other species are able to pass in and out of the Park boundary.

Needed and Allowable Changes

The Park's bison herd appears to be healthy and genetically diverse with an ample food supply. Changes should involve expansion of grazing opportunities thereby expanding the size of the bison herd. As the numbers of bison increase so does the opportunity to maintain the high levels of genetic diversity over the next 50–100 years.

If the Park is able to expand its bison herd by allowing them to utilize the new property acquired in 2011, an assessment will be needed to address infrastructure that is available and infrastructure that is needed to facilitate the utilization by bison. Fencing, corrals, water developments, and forage will need to be addressed.

The park does need to consider climate changes and the potential for issues with available, year round water for the bison herd. During recent extended dry periods surface water was very limited with most of the water being available within the three perennial streams that flow into the park. Those streams were beginning to dry up in sections within the park creating issues with over utilization of limited water sources and vegetation in those areas. The park needs to address long-term water availability for its wildlife such as bison and to a lesser extent elk. A water management plan is needed for the park to address water quality and quantity.

Park will continue to look for and test for diseases on an as needed basis. There are always emerging diseases to address but overall the herd appears to be healthy. Brucellosis was found in the herd but since 1984 there have not been any cases of this virus detected in the park bison. The park continues to test for the disease although the state of South Dakota has been determined to be a brucellosis-free state.

Management Strategies

Over the past 30–40 years guidelines and management strategies have been developed for the park bison herd. These guidelines should assure a behaviorally and genetically diverse bison herd.

- A stable population size balanced with the vegetative base.
- A relatively old age herd structure that is representative of all age classes.
- A uniform herd structure with an even sex ratio.
- A culling strategy based on balancing the sexes in the yearling age class.
- Yearlings are generally the age class culled for shipping (this may be adjusted following years with no roundup or if there are requests for calves or older animals). These exceptions would be completed if it was determined that there would not be impacts to the herd structure or viability).
- Bison are ear tagged and implanted with electronic transponder chips.
- Calves are documented during the roundup and herd balancing occurs at the next roundup, when they are yearlings.
- Using the above principles bison are culled in a randomized fashion and not according to unique or unusual physical characteristics.
- Once bison make it through a roundup as a yearling they are left to live the rest of their natural life inside the Park. Bison are not removed because they are not participating in the rut or producing calves or past a certain age.

Long-term strategies are necessary to address genetic diversity in the park bison herd. Technology is rapidly changing in the field of genetics. Currently the bison genome is being mapped and the park is committed to using the best available scientific data to address genetic diversity and determine if there are levels of cattle gene introgression in the herd, and assist with the development of a long-term management strategy for the bison herd.

Monitoring and Assessment (Implementation Level Planning)

To be developed in the future.

Indicators and Measures (Implementation Level Planning)

WILDLIFE (BISON)
To be developed in the future.

WILDLIFE (SPECIES OF CONCERN)

Desired Conditions

- Maintain a self-sustaining, healthy, disease free, and viable population of black-footed ferrets and the associated relationship with Black Tailed Prairie Dog populations.
- Maintain a black-tailed prairie dog population within the Park that achieves a sustained minimum population size and distribution that is sufficient to fulfill the ecological keystone role of the species (support conservation and restoration of a more complete prairie ecosystem).
- Appropriate measures will be taken to enhance the survival of all other state and federally listed species.

Existing Conditions

- The prairie dog population within the Park has shown a steady increase from 1997–2007, with a slight decline over the past 3 years; approximately 2,600 acres in 2010 to an approximately 1,500–1,600 in 2014. There is additional potential habitat for prairie dog and ferret growth within the Park, but disease and white horehound are a present threat.
- Loss of habitat is another serious threat to ferrets within the Park. Ferrets depend on prairie dogs for food and shelter, making threats to prairie dogs, such as sylvatic plague and the invasive, nonnative white horehound, important aspects of managing for ferrets. White horehound is of major concern due to its aggressive growth habits within prairie dog colonies. It takes over bare ground, sometimes forcing prairie dogs to move from the area thereby reducing habitat for ferrets.
- Habitat may also be lost as a result of management decisions to reduce prairie dog acres through poisoning. A management decision that involves the use of rodenticides has to be approved through the NPS Regional and Washington Offices. It may be a very difficult process to get approval knowing the potential impact it could have to Park species such as the prairie dog and an "endangered" species such as the black-footed ferret which relies on the prairie dog for food and shelter. The park does share a prairie dog colony with Custer State Park on its north boundary. That colony can provide habitat for the black-footed ferret but the park does not have any authority to dictate how prairie dogs are managed within the Custer State Park.

Needed and Allowable Changes

Fortunately the park has little need to actively manage prairie dogs either from having too few (<1,000 acres) or too many (> 3,000 acres). The upper end of active prairie dog acres provides more habitat and in turn more food for the endangered ferret. Intervention has included an attempt to dust prairie dog burrows to lower flea loads. Currently, this practice is being carried out in the northern end of the park where the highest concentration of ferrets can be found. The park is uncertain if plague is a contributing factor in the reduction of prairie dog acres in the southern end of the park.

Resources are needed to expand the protection necessary to provide the best chance of prairie dogs to occupy additional acres. At this time dusting with an insecticide to control the flea population is the best tool to protect prairie dogs and ferrets from a plague outbreak. With current staff and funding, only one-fifth of the active prairie dog acres are being treated. An oral plague vaccine has been developed with hopes of it becoming available in the next few years.

Continuing with disturbance on the prairie is a positive contribution towards prairie dog expansion. Grazing and fire are two forms of disturbance that prairie dogs use to their advantage since both of these remove or lessen the height of the vegetation. Without a vegetation barrier, prairie dogs have an opportunity to expand more rapidly into other areas.

Management Strategies

To maintain a healthy population of black-footed ferrets it is critical to maintain a healthy, viable population of prairie dogs. Without the prairie dogs as a food source and the prairie dog burrows providing shelter for the ferrets, the ferrets would parish.

The park continues to be pro-active in its efforts to keep plague from becoming established in the parks' rodent community including the prairie dog colonies. Staff has been "dusting" prairie dog burrows with an insecticide to control flea loads since 2008. Plague kills both prairie dogs and black-footed ferrets.

Since 2007, when the park had approximately 2,800 acres of active prairie dog acres, park staff has had very little need to utilize the approved management tools developed within the 2006 prairie dog management plan. These tools are incorporated into our management strategies and include lethal control tools (rodenticide, shooting by park staff), non-lethal control tools (live trap and relocate), and habitat management tools (management of other species' grazing levels, mowing and mechanical thinning, natural barriers, physical barriers, landowner incentives funded by non-NPS entities, and conservation easements). The implementation of the tools is evaluated on a case-by-case basis to determine what would be best to achieve the objective of control while having the fewest adverse effects on resources.

Monitoring and Assessment (Implementation Level Planning)

To be developed in the future.

Indicators and Measures (Implementation Level Planning)

WILDLIFE (SPECIES OF CONCERN)
To be developed in the future.

AIR QUALITY

Desired Conditions

Air quality is important to the Park because the Park contains air quality-sensitive natural resources that are integral to the Park landscape and visitor experience, and for the protection of visitor and employee health.

The NPS *Management Policies 2006* clarify that the service will seek to "perpetuate the best possible air quality in parks" (section 4.7.1) because air pollution, even at relatively low levels, affects ecological and human health, scenic views, and visitor enjoyment. The Clean Air Act further designates 48 NPS units, including Wind Cave National Park, as class I areas, providing special protection for air quality, sensitive ecosystems and clean, clear views in these areas. The Clean Air Act aims to eliminate all human-caused visibility impairment in class I areas by the year 2064, return visibility to "natural conditions" in class I areas. Natural visibility conditions are those estimated to exist in a given area in the absence of human-caused visibility impairment (EPA 2003).

The NPS Air Resources Division has established benchmark conditions for air quality indicators including visibility, ozone, and deposition (NPS 2013). Desired conditions for Park air quality are to achieve good condition for each air quality indicator according to these established benchmarks.

Existing Conditions

The Park is classified as a class I area under the Clean Air Act. This is the highest air quality classification and is designed to protect the Park from air quality degradation. There are several sources of air pollution that threaten the Park's air quality. These include oil and gas development in northwest Wyoming; smoke from wood and pellet stoves, campfires, wildland fires and prescribed burning; visitor and NPS vehicle emissions; generators, space, and water heating equipment and fuel storage containers within the Park, and nearby operations and development of coal-fired power plants (NPS 2006c, Peterson et al. 1998, EA Engineering, Science and Technology 2003). Air pollutants of particular concern to managers at the Park include wet deposition of sulfur (S), nitrogen (N) and ammonium (NH4+) compounds in particular, as well as concentration of ground-level ozone (O3) and concentration of suspended particulate matter (PM2.5 and PM10)(NPS, Ohms, pers. comm., 2010).

Average visibility warrants moderate concern. This condition is based on NPS Air Resources Division benchmarks and the 2008–2012 estimated average visibility of 5.0 deciviews above estimated natural conditions. For 2003–2012, the trend in visibility improved on both the 20% clearest days and 20% haziest days (IMPROVE Monitor ID: WICA1, SD), resulting in an overall improving visibility trend at the park. The Clean Air Act visibility goal requires visibility improvement on the 20% haziest days, with no degradation on the 20% clearest days (NPS 2013).

Ozone warrants moderate concern for both human and vegetation health. The human health ozone condition is based on NPS Air Resources Division benchmarks and the 2008–2012 estimated ozone concentration (4th highest 8-hour average) of 61.0 parts per billion. Long-term exposures to ozone can also cause injury to ozone-sensitive plants. The W126 metric is a biologically relevant measure that focuses on plant response to ozone exposure and is a better predictor of vegetation response than the metric used for the human health standard. The W126 metric during 2008–2012 was 7.0 ppm-hrs, and falls within the moderate concern category (NPS 2013).

Wet sulfur deposition warrants significant concern. This condition is based on NPS Air Resources Division benchmarks and the 2008–2012 estimated wet sulfur deposition of 1.0 kilograms per hectare per year (kg/ha/yr), a level that normally warrants moderate concern. However, the condition has been elevated to significant concern because Park ecosystems may be very highly sensitive to acidification effects relative to all Inventory & Monitoring parks (NPS 2013, Sullivan et al. 2011a; Sullivan et al. 2011b). Acidification effects can include changes in water and soil chemistry that impact ecosystem health. For 2003–2012, the trend in total wet sulfur concentrations in rain and snow in the Park improved (NADP Monitor ID: SD04, SD).

Wet nitrogen deposition warrants significant concern. This condition is based on NPS Air Resources Division benchmarks and the 2008–2012 estimated wet nitrogen deposition of 2.8 kilograms per hectare per year (kg/ha/yr), a level that normally warrants moderate concern. However, the condition has been elevated to significant concern because Park ecosystems may be very highly sensitive to nitrogen-enrichment effects relative to all Inventory & Monitoring parks (NPS 2013, Sullivan et al. 2011c, Sullivan et al. 2011d). Nitrogen deposition may disrupt soil nutrient cycling and affect biodiversity of some plant communities, including grassland and meadow, wetland. For 2003–2012, the trend in total wet nitrogen concentrations in rain and snow in the Park improved (NADP Monitor ID: SD04, SD).

A study of mercury in precipitation from the Northern Great Plains August 2008 to November 2010 indicates that mean mercury deposition rates at Wind Cave were relatively high as compared to other national parks including Badlands and Theodore Roosevelt National Parks (Stone 2011c). Annual deposition rates were comparable to studies performed at similar latitudes and to estimates from the Mercury Deposition Network (MDN) (Lupo and Stone 2013). A mercury risk assessment based on water chemistry and physical parameters rated the potential for methylmercury production in the park as low, as compared to other NPS units (USGS 2015). Given the relatively high mercury deposition but low potential for methylmercury production, mercury deposition is rated as a moderate concern by the NPS Air Resource

AIR QUALITY
Division.
Needed and Allowable Changes
Continue existing management.
Management Strategies
Along with enhanced protection comes greater management responsibility. Under the CAA, the federal land manager for class I areas has the "affirmative responsibility to protect the AQRVs (including visibility) of any such lands" (42 USC §7475(d)(2)(B)). To achieve this complex task, the Park will continue to cooperate with South Dakota Department of Environment and Natural Resources and the US Environmental Protection Agency on air quality issues, and use the best available science to: ▪ Take actions consistent with the superintendent's affirmative responsibilities under the Clean Air Act to protect air quality-related values within the Park, a class I designated area. ▪ Evaluate the impact new and existing sources of air pollution may have on NPS units. Cooperate with other federal, state, local government agencies and private concerns regarding activities that could impact the Park's air quality. Site specific project proposals affecting the Park and adjacent lands will be reviewed for compliance with existing air quality laws and policies. Mitigation will be incorporated into project proposals to reduce air quality degradation. Projects will be designed to minimize further degradation of existing air quality. ▪ Participate in federal, regional, and local air pollution control plans and drafting of regulations and review permit applications for major new air pollution sources, such as oil and gas development or coal-fired power plants. ▪ Integrated air resources management requirements into NPS operations and planning, and all air pollution sources within the Park—including prescribed fire management and visitor use activities—will comply with all federal, state, and local air quality regulations and permitting requirements. ▪ Monitor air quality indicators and air pollution impacts. ▪ Provide important information about air pollution impacts the Park to NPS management, air regulatory agencies, the public, the scientific community, and other stakeholders. ▪ Notify visitors and employees when air pollution concentrations within an area exceed the national air quality standards established to protect public health. ▪ Develop educational programs to inform visitors and regional residents about the threats of air pollution, climate change, scenic views, visitor experience, and human health. ▪ Use interpretative and educational tools to communicate the connections between air pollution, protecting park resources, scenic views, dark night skies, visitor experience, human health, and climate change. ▪ Be a Climate Friendly Park and environmental leader with continued implementation of the park's Environmental Management System and Sustainability Plan. Actions will minimize air quality pollution emissions associated with Park operations, including the use of prescribed fire and visitor use activities. ▪ Form regional partnerships to develop alternative transportation systems and promote clean fuels. ▪ Participate in and encourage research on air quality and effects of air pollution. ▪ Ensure healthful indoor air quality at NPS facilities.
Monitoring and Assessment (Implementation Level Planning)
▪ The Park will continue to maintain and support the existing visibility and deposition air quality monitoring equipment housed within the Park. ▪ A monitoring program will be used to assess management needs of sensitive sites and areas.
Indicators and Measures (Implementation Level Planning)
The Park uses the NPS Air Resources Division established benchmarks for air quality indicators including visibility, ozone, and deposition.

ARCHEOLOGY
Desired Conditions
▪ Archeological sites are identified and inventoried and their significance is determined and documented. Archeological sites are monitored and protected in an undisturbed condition unless it is determined through formal processes that disturbance or natural deterioration is unavoidable and resulting in resource loss. When disturbance or deterioration to eligible resources is unavoidable, the site is professionally documented and/or excavated and the resulting artifacts, materials, and records are curated and conserved in consultation with the SHPO and the park's affiliated American Indian tribes. Some archeological sites that can be adequately protected are interpreted to the visitor. ▪ All archeological sites are preserved and monitored to document status. ▪ Identify, document, and protect the array of archeological resources in the Park, including inventories within areas that have yet to be formally surveyed. ▪ Manage uses to prevent damage to archeological resources. ▪ Increase public education and appreciation of archeological resources through interpretation. ▪ Facilitate appropriate research on archeological resources such that the Park is recognized as a location for the conservation, study, and appreciation of cultural heritage.
Existing Conditions
▪ 2014: Approximately 14% of the lands within the Park have been intensively inventoried for archeological resources. To date 116 archeological sites have been recorded within the Park boundaries. Of these, 69 are in good condition, 24 are in fair condition, and 6 are considered to be in poor condition. The remaining 30 sites have not recently been revisited to assess their condition and are considered to have an unknown condition. ▪ No resource stewardship strategy exists for park archeological resources and the 1994 resource management plan provides only limited direction for these resources. The 2005 cultural landscape report discusses archeological resources but does not provide a treatment plan for these resources.
Needed and Allowable Changes
Inventory of federal lands is required under section 110 of the National Historic Preservation Act (NHPA). Additional inventory should be undertaken within the Park to increase the percent of inventoried lands. In addition, sites with an unknown condition should be revisited and assessed. Some sites in the Park are currently threated by erosion or other natural causes, some due to climate change. These sites should be evaluated for potential stabilization or mitigation if they cannot be stabilized.
Management Strategies
▪ Evaluate all sites by way of comprehensive surveys for possible inclusion on the national register. ▪ Archeological surveys in high-use areas, such as along trails, open routes or possible future development site, will be prioritized to ensure protection of vulnerable resources. Beyond these areas, inventory and research efforts will be expanded to fill in the information gaps and complete research that will contribute to the protection of sites. The National Park Service will use the information collected to create a better understanding of cultures and will work to showcase and preserve remnants of American Indian and historic Euro-American cultures within the Park. ▪ Inventory and Protection Plans will be developed to address dynamic conditions related to climate change and the associated effects of such changes on in situ resources. In particular, the potential for increased intensity and period density storm events that may adversely impact archeological resources due to accelerated erosion will be addressed. ▪ Public education and interpretation will be emphasized to improve visitor understanding of archeological resources and to prevent damage or theft. ▪ All artifacts collected within the Park will be managed per museum collections guidelines for recovery and maintenance.
Monitoring and Assessment (Implementation Level Planning)
All known archeological sites are routinely monitored to document status and condition per outlined schedule as developed and defined by agency archeologists (Midwest Region Ranger Monitoring Program and Director's Order 28).
Indicators and Measures (Implementation Level Planning)
Sites determined to be undergoing threats through the condition assessment and monitoring program should be evaluated for their eligibility for the national register and should be stabilized or mitigated if determined to be eligible.

ETHNOGRAPHY
Desired Conditions
▪ Ethnographic resources and potential traditional cultural properties (TCP) will be managed and protected from site degradation in accordance with appropriate laws and regulations.
Existing Conditions
▪ Climate Change and Park management activities may be affecting ethno-botanical resources. ▪ *The Home of the Bison: An Ethnographic and Ethnohistorical Study of Traditional Cultural Affiliations to Wind Cave National Park* by Patricia C. Albers.
Needed & Allowable Changes
▪ More evaluation of ethnographic resources is needed to provide appropriate levels of protection through consultation. ▪ The Park must be evaluated and ethnographic resources considered within the entire context of the whole region.
Management Strategies
▪ Traditional cultural properties are those sites recognized by contemporary American Indians as important to their cultural continuity. Ethnographic resources and TCPs will be identified, respected, monitored, and managed for continued recognized traditional uses. Consultation with appropriate American Indian communities will be a priority. Archaeological sites and traditional cultural properties will be managed and protected from site degradation in accordance with appropriate laws and regulations. ▪ The Park will establish continuing collaborative programs with local communities, organizations, local and state agencies, American Indian communities, volunteers, and other interested parties. This will be done in order to identify, inventory, monitor, and develop and implement plans for the restoration, stabilization, protection, and/or interpretation of appropriate sites and resources within the Park. The collaborative programs will include an Oral History Program in cooperation with local communities. The Oral History Program focuses on the collection of histories from local residents and people knowledgeable about the region. The Park will use the information collected to create a better understanding of cultures and communities and will work to showcase the histories of the local communities. ▪ Work with American Indians to ensure accurate representation of the American Indian story regarding the site. As a sacred site, visitors to the cave should be informed of the need to protect and respect this site.
Monitoring and Assessment (Implementation Level Planning)
Support process for formal recognition of Traditional Cultural Properties
Indicators and Measures (Implementation Level Planning)
To be developed in the future.

HISTORIC STRUCTURES / CULTURAL LANDSCAPES
Desired Conditions
▪ Cultural Landscapes and associated historic structures and resources will be protected within the Park (and interpreted to the period(s) of significance and historic contexts present in the park). ▪ Historic structures will be maintained in a condition representative of an appropriately identified time period (as per approved treatment documents). ▪ Maintain and protect all associated resources at NPS standards to retain their historic integrity and interpret the history of Wind Cave's exploration and discovery, including the story of Alvin McDonald, one of the cave's first explorer, and area ranching heritage including the locally significant Sanson Ranch. ▪ Histories and the human stories associated with park cultural resources will be understood and preserved for future generations. ▪ The portion of historic Highway 87 within the Park will be managed as originally conceived, as a continuous scenic driving route between Wind Cave and Mount Rushmore, to the greatest extent possible.
Existing Conditions
▪ The entire Park has been initially surveyed for historic structures as per section 110 of the NHPA, with the exception of those found in the vicinity of the Casey Pole Barn. ▪ Currently, the Park is finalizing the draft parkwide cultural landscape inventory and the Sanson Ranch cultural landscape inventory. As per the Cultural Landscape Inventory Professional Procedures Guide the Park works with the Midwest Regional Office to document cultural landscapes as per section 110 of the NHPA. ▪ A cultural landscape report completed for the park in 2005 identified two landscape districts. ▪ The 2005 cultural landscape report prescribes a rehabilitation treatment strategy only for these two landscapes which are maintained in good condition (no clear evidence of major disturbance and deterioration by natural and/or human forces – no immediate corrective action needed to maintain current conditions). ▪ Identified historic structures and cultural landscape resources that do not have an approved treatment document are maintained in stable condition in that there are no identified impacts that need to be immediately addressed until final treatment is determined for the resources.
Needed and Allowable Changes
▪ Inventory of federal landscapes and properties is required under section 110 of the National Historic Preservation Act (NHPA). ▪ Additional inventory and evaluation should follow national register recommendations for evaluation. In addition, potentially eligible, eligible, and listed cultural resources with both documented and undocumented condition should be revisited and assessed to the most current cultural resource condition standards. ▪ Treatment prescriptions identified in approved treatment documents such as cultural landscape reports and historic structure reports will be followed to meet desired resource conditions under NEPA regulations and section 106 process.
Management Strategies
▪ Cultural landscapes and historic structures will be maintained within the framework of all appropriate NPS, CRM guidelines, approved treatment documents, and compliance procedures. ▪ The NPS will continue to identify, document, maintain, and protect identified historic resources within the Park and will evaluate the potential for preservation, conservation, research, and interpretation of these resources. ▪ The park will continue to assist with updating existing cultural resource inventories and nominating resources as per NHPA section 110 and national register evaluation criteria. ▪ Surveys in high-use areas such as along trails and open routes will be prioritized to ensure protection of vulnerable resources. Beyond these areas, inventory and research efforts will be expanded to fill information gaps and complete research that will contribute to protection of sites. ▪ Treatment plans with crosswalks to facility management will be developed and routinely updated for the protection and maintenance of Park cultural landscapes and historic structures. ▪ The Park will manage uses and activities within the Park to prevent damage to historical resources. All proposed projects will generate a compliance package that will include a site inventory for historic resources, and appropriate strategies and alternatives to protect sensitive and/or vulnerable sites. Alternatives may include avoiding the site altogether, restricting access to the sensitive and/or vulnerable resources (i.e., construct barriers), interpreting the resource, stabilizing the resource, or as a last resort, excavating and/or curating the resource. ▪ The Park will work with adjacent land owners and land managers to appropriately inform and manage cross-boundary historic resources including evaluation needs ▪ The Park will increase public education and appreciation of historic resources through interpretation and visitor

HISTORIC STRUCTURES / CULTURAL LANDSCAPES
involvement/immersion into the resources. ▪ The Park will facilitate appropriate research on historic resources so that the Park is recognized as an outdoor classroom and laboratory for the protection, preservation, conservation, study, and appreciation of cultural heritage. ▪ Existing oral histories will be maintained and migrated to new platforms and systems to facilitate their preservation and use. ▪ New Oral History documentation will be conducted in order to record and preserve the connected cultural histories and the human stories associated with park resources and their historic and developing context.
Monitoring and Assessment (Implementation Level Planning)
▪ A monitoring plan will be developed and routinely updated to protect park cultural landscapes, historic structures, and associated historic resources. ▪ Survey work on former Park boundary corner posts within adjacent USFS. ▪ While many of the cultural resources within the Park are documented, many of the physical characteristics, the oral histories and folklore of the sites and landscapes, are not formally documented. Oral histories associated with Park include ranching, the Civilian Conservation Corps, and Mission 66 are priorities for future research. ▪ An administrative history is also needed to document the management strategies and decisions that have shaped the park and its resources over its 111+ year history. ▪ A national register amendment is needed to update formal documentation of identified resources and evaluate acquired resources/properties.
Indicators and Measures (Implementation Level Planning)
To be developed in the future.

SOUNDSCAPE / ACOUSTIC ENVIRONMENT
Desired Conditions
▪ The desired condition for soundscape in the Park is a natural experience, or a soundscape not influenced by anthropogenic sounds. ▪ Anthropogenic sounds will not cause major changes in wildlife breeding and behavior, or species success. ▪ Intrusive anthropogenic sounds will not detract from Park visitors' natural and cultural resource experiences.
Existing Conditions
Currently, the Park is one of the least impacted acoustic environments in the Midwest because it has relatively low ambient sound levels and little contribution from human-caused sound to the acoustic environment. The National Park Service uses a geospatial sound model to predict the natural and existing sound levels at park units. The mean existing sound level, including natural and human-caused sounds, is modeled to be 32.2 decibels. If the human-caused sounds are excluded, the natural ambient sounds levels are predicted to be 31.9 decibels. One way to describe impact to the acoustic environment is to examine the difference between the natural ambient sounds levels and the existing sound levels. The mean impact is predicted to be 0.3 decibels (ranging from 0 decibels and in the least impacted areas to 3.4 decibels in the most impacted areas.) That is, the average existing sound level (with the influence of man-made sounds) is predicted to be 0.3 decibels above the natural ambient sound level. A 0.3 decibel change is not readily perceived by the human ear and indicates that there is little noise from human activities affecting park resources. These conditions indicate a high-quality acoustic environment that should be preserved from noise degradation.
Needed and Allowable Changes
▪ The Park will restore the soundscape to the natural condition if the Park's soundscape has become degraded by unnatural sounds, and will protect natural soundscapes from unacceptable impacts. ▪ The Park will take action to prevent or minimize all soundscape that through frequency, magnitude, or duration adversely affects the Park's natural soundscape.
Management Strategies
▪ Distribution of non-natural sounds that are not part of the natural soundscape can be heard (e.g., vehicles, airplanes/helicopters, and other human activities) will be minimized. ▪ Noise generated by Park management activities will be minimized to the maximum extent practical. ▪ Encourage visitors to avoid unnecessary noise, such as along trails and maintaining quite hours at the Elk Mountain Campground.
Monitoring and Assessment (Implementation Level Planning)
No quantitative data have been collected by the National Park Service in the Park related to soundscape (above ground or within the cave). Soundscape protocols will be developed by the year 2018 (this will not include the cave). This protocol will include selecting locations for the Park to determine the soundscape status over one to ten years. The protocol will also include various metrics involving natural ambient sound levels, time above ambient levels, natural sound frequencies, and source of sounds.
Indicators and Measures (Implementation Level Planning)
Any increase to the existing ambient soundscape could begin to affect the intrinsic acoustic environment and the acoustic function for wildlife and humans.

DARK NIGHT SKIES
Desired Conditions
▪ The desired condition for the Park is the current level of ambient light or darker. ▪ Pristine night skies exhibit minimal levels of anthropogenic ambient light, which is in accordance with NPS management policies.
Existing Conditions
The park has excellent night skies. Due to the lack of data, a quantitative assessment of dark night skies cannot be completed at this time. However, one way to measure the quality of the photic environment is by measuring total sky brightness averaged across the entire sky and comparing that value to natural nighttime light levels. This measure, called the Anthropogenic Light Ratio (ALR), can be directly measured or modeled when observational data are unavailable. Lower ALR levels reflect higher quality night sky conditions. The ALR level at the Park determined from ground-based data is 0.38 and the ALR level determined by a computer model is 0.35. At night, air pollution scatters the light from human sources, increasing the impact of light pollution. At these light levels, the Milky Way typically stretches from horizon to horizon and has a lot of detail. Most observers would feel they are in a natural environment. There would be negligible impact to dark adaptation of eyesight. However, this ALR is far enough from 0.0 ALR (or no impact) that any additional artificial light would begin to impact the view of celestial objects, the sense of naturalness, and dark adaptation. An assessment may be possible once the results of the NPS night sky team's visits become available to park managers. Because of the park's relative proximity to residential sites, the quality of the park's night skies is influenced by human light sources. Albers and Duriscoe (2001) rated the night skies in the park as 6.81 out of 7.00, which is the only quantitative estimate of dark skies for the park.
Needed and Allowable Changes
Continue existing management.
Management Strategies
▪ Dark Sky Best Management Practices within the Park will adhere to NPS *Management Policies 2006* (section 4.10). ▪ The National Park Service will seek to prevent light pollution and reduce air pollution within the Park. No actions will be proposed within the Park that will contribute to light pollution or air pollution. ▪ Dark Sky Best Management Practices outside Park will be comprehensively coordinated and developed in cooperation with the State of South Dakota and/or its local political subdivisions and local community residents.
Monitoring and Assessment (Implementation Level Planning)
The Park will use *Darkness – V Magnitude and Schaff Scale Scores* to periodically monitor the dark night skies to ensure they are not degrading from the existing condition.
Indicators and Measures (Implementation Level Planning)
Increases in ALR levels, reduced ability to view celestial objects, and any new light sources that create glare or affect ALR levels.

SCENERY CONSERVATION

Desired Conditions

- The desired condition for the viewshed of the Park, as defined in the framework, is an "undeveloped and natural Park experience."
- The Park will be managed in such a manner that will protect the quality of the scenic values of this public resource.
- The natural function of a variety of open (prairie), forested, and riparian habitats will be maintained, allowing little or no air pollution, in order to preserve unobstructed scenic vistas into and out of the Park.
- Preserve and maintain the natural scene adjacent to the south entrance/exit of the Park.
- The Park is managed as a natural environment and has a class I visibility protection as promulgated by the Clean Air Act of 1977.
- Integral vistas to the visitor's Park experience will be preserved and protected.

Existing Conditions

The overall condition and quality of Park scenery is remarkable with regard to the desired condition of a "natural appearing landscape" although in several locations, the background scenery on adjacent lands outside of the Park has deteriorated due to increasing levels of development in less than ideal specific locations. Within the Park, it will be important that all activities and potential future development consider scenery conservation principles in order to maintain the overall scenic qualities. The Park continues to make improvements on Park lands that enhance the overall scenic character, especially with regard to appropriate choice of materials and site locations for human modifications within the Park landscape that help reduce unnecessary and incompatible visual contrasts.

Because observing wildlife within a natural appearing landscape is one of the primary activities visitors enjoy at Wind Cave National Park, continued monitoring of development in the context of scenery conservation will continue to be an important aspect of Park resource management. Overall, the condition of viewsheds from within the Park, looking out is of moderate concern.

Needed and Allowable Changes

Reduce human modification on the Park landscape and focus future development in non-class I scenic areas to avoid further impacts on the Park viewshed.

Develop appropriate agreements to ensure compatible land uses shall continue in a mutually beneficial manner that takes into consideration sensitive resources and scenic views that are part of the Park visitor experience.

Management Strategies

Viewshed analysis is an important tool for recognizing areas that are the most crucial to protect. An in-depth viewshed analysis will help determine areas in and around the Park where development or possible resource extraction could deteriorate Park viewshed quality.

The Park, like most NPS Units, offers spectacular views. To maintain these views within the Park, development will be minimized.

All facilities and parking areas will be designed to be unobtrusive and to meet the scenery conservation objectives appropriate for the designated scenery management class.

Fences may be used in certain circumstances to protect Park resources, to manage visitor use, and to manage wildlife, consistent with Park purposes. Fences will be designed and constructed in accordance with scenery conservation objectives and resource management requirements.
Fencing along ridge tops and other visually obtrusive areas would be realigned for scenery protection.

Scenery Management Class Standards will be developed based on a comprehensive inventory, evaluation, and classification of the scenic values and desired conditions of distinct areas/zones within and viewed from the Park.
Scenery Management Class Standards (see accompanying map):

a. **Class I Standard:** to preserve and enhance the existing character of the landscape to meet Park purpose. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
b. **Class II Standards:** to retain the existing character of the landscape. The level of change to the landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line color, and texture found in the predominant natural features of the characteristic landscape.
c. **Class III Standards:** to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention within the foreground, but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

SCENERY CONSERVATION
A Visual Contrast Rating Process will evaluate all proposed actions/activities for potential effects to Park scenery and to ensure Scenery Management Class Objectives are upheld. All proposed actions must consider the importance of scenic values and must minimize the impacts the project may have on these values. While performing an environmental analysis for projects, the visual resource contrast rating system will be utilized as a guide to analyze potential visual impacts of the proposal to Park scenery. Projects will be designed to mitigate impacts and conform to the assigned Scenery Management Class objective. Adjacent land ownership influences the Park's viewsheds – Private individuals, often with different land management strategies than the National Park Service, own much of the land that neighbors the Park. This has resulted in variable viewsheds when looking out from the Park. The National Park Service will strive to establish partnerships with neighboring landowners to conserve scenic values of the greater landscape that is mutual beneficial to all parties involved. Some types of projects located outside of the Park boundary may impact the scenic setting from within the Park. In these instances, the National Park Service will work collaboratively with adjacent land owners and land managers to accomplish these projects in such a way that visual resource impacts in these instances can be minimized by such measures as screening, painting, project design, relocation, or restoration. The Park superintendent may allow temporary projects, such as research projects, to exceed scenery management class standards, if the project terminates within two years of initiation. Rehabilitation will begin at the end of the two year period. During the temporary project, the superintendent may require phased mitigation to better conform to prescribed scenery management class standards. The scenery management classes acknowledge existing visual contrasts. Existing facilities or visual contrasts will be brought into scenery management class conformance to the extent practicable when the need or opportunity arises (i.e., rights-of-way renewals, new construction, facility relocation and site restoration). Using NPS Visibility Reference Guidelines, visibility degradation will be prevented and/or corrected/improved (Visibility Haze Zones, class 1 airshed limits, etc.).
Monitoring and Assessment (Implementation Level Planning)
A Visual Contrast Rating Process will evaluate all proposed actions/activities for potential effects to Park Scenery and to ensure Scenery Management Class Objectives are upheld
Indicators and Measures (Implementation Level Planning)
To be developed in the future.

VISITOR USE AND EXPERIENCE

Desired Conditions

- Visitors will be provided opportunities for diverse, aboveground experiences.
- Cave tours at Wind Cave, scenic driving, wildlife viewing, photography, picnicking, hiking, developed and backcountry camping are available as activities for Park visitors.
- Every visitor should be provided an opportunity to experience both the cave and the aboveground Park landscape.
- Visitor access to Wind Cave will be provided in a way that protects cave resources.
- Appropriate facilities will be provided to support visitor use while protecting Park resources.
- Self-guided hiking trails will provide interpretation of prairie ecology, cultural histories in the area, early tourism, and current resource management practices such as fire management.
- Visitors will have opportunities to see the Park's native prairie and wildlife ecosystem in a relatively natural setting where human influences are largely inconspicuous.
- Visitors will have opportunities to go crawling in the cave and experience the natural silence and darkness of the interior cave environment.
- Visitors will have accessible opportunities, by personal vehicle or other means, to experience the natural Park setting and to view and photograph native wildlife such as bison, elk, and deer.
- Visitors will be able to go for a long hike within the prairie to view wildlife in a setting that has little to no signs of human disturbance.

Existing Conditions

Currently, about 93% of Park visitation comes between May 1 and September 30 with 87% of visitors never having previously visited the Park. The top five states visitors were from in a 2010 survey conducted during July were, in decreasing order, Minnesota, Nebraska, Illinois, Colorado, and Iowa. Approximately 500,000 people visit the Park annually for recreation visits; including 100,000 to tour Wind Cave. Other popular visitor activities include wildlife viewing, camping, hiking, and otherwise enjoy the area for its natural values.

Needed and Allowable Changes

Develop a social media program that will allow the park to connect with a wide range of visitors from around the globe using a variety of digital platforms. Increase curriculum-based, environmental education opportunities for area students and virtual students via distance learning opportunities.

Management Strategies

The Park will continue to be managed predominantly as a day use area with both moderately developed camping and walk-in backcountry camping available.

Visitors will be encouraged to learn more about the surface resources and the relationship of the surface to the subsurface resources. Park education and interpretive programs and facilities will be designed to encourage visitors to experience the surface resources in addition to Wind Cave proper.

The National Park Service will continue to work towards increasing public awareness of natural systems while providing access to Wind Cave in a way that protects cave resources.

If trails are deemed appropriate, design and construction of said trails will strive to be in accordance with the Architectural Barriers Act Accessibility Guidelines (ABAAS) standards and universal design, where feasible and in consideration of Park resources.

Other interpretive activities focusing on surface resources will include guided walks and talks, self-guided trails, campfire programs at developed Park campgrounds, roving ranger patrols, and wayside exhibits along Park roads, vehicle pull outs (overlooks), and self-guided trails.

Visitor access to the cave will be provided through guided tours that enter at the walk-in entrance or by way of the elevator from the Elevator Building.

The Park will maintain existing trails to a standard that provides for the health and safety of all users.

The Park will maintain existing recreation sites and facilities to provide for the health and safety of all users.

A visitor use management program (user capacity) could be implemented to monitor and direct both the natural and cultural resource conditions at the Park. This Zoning Management Plan provides a basis for beginning to address the Park's user capacity.

User capacity is defined as "the type and level of visitor use that can be accommodated while sustaining the desired resource and social conditions that complement the purposes of the Park and associated management objectives." User

capacity will be integrated into visitor use planning and management through a series of steps implemented over time in response to specific resource and visitor experience needs.

If user capacity is exceeded, the Park will implement actions to restore conditions to acceptable levels, such as restricting visitor use or removing facilities. For the life of this plan, Park visitation is expected to be controlled by the size of existing facilities. Use within developed areas will continue to be regulated by the number of automobile parking spaces, picnic tables, and campsites. Cave tours will be limited to the available number of interpreters, cave trail length, access points, and elevator capacity. Backcountry use will be controlled by camping permits and trailhead parking.

The Park will work towards creating more opportunities to connect with visitors representing a greater range of ethnic, racial, cultural, and economic diversity.

The Park will work to connect with visitors who are looking for more ways to use their digital technology to enhance their visits, such as E-trails or wayfinding.

The Park will work to connect more with youth.

The Park will work to connect with virtual visitors.

The Park will work to connect with distance learning education groups.

The Park will work to connect with visitors who are coming during the off-season and shoulder seasons.

Monitoring and Assessment (Implementation Level Planning)

Inventories, surveys, and studies will establish baseline data for Park resources. These data will be used to establish an ongoing monitoring program and to prioritize areas that require more restrictive management. This will be done as part of an adaptive management strategy. When it is determined that critical indicators have been approached or exceeded, the Park will go through a public process to determine allocations for specific areas. Total numbers of people and group size will be considered.

Management strategies will be devised to achieve the outlined desired objectives and desired conditions for each zone within the Park. Key impact indicators will be identified for each zone, which can measure whether or not management objectives are being met. Existing conditions will be regularly analyzed with respect to desired conditions and the probable causes of discrepancies will be identified. Based on this analysis, management strategies will be refined. A program of continuous monitoring and evaluation will be implemented to ensure that management objectives continue to be achieved.

Indicators and Measures (Implementation Level Planning)

The Park will use the following indicators to determine when and where visitor allocations need to be made:

- Resource damage (e.g., proliferation of campsites, human waste problems, social trailing or vandalism to historical, archaeological, paleontological sites, or human caused soil erosion)
- Conflicts with threatened and endangered plant or animal species
- The number of social encounters become unacceptable based on area (zone based) desired conditions

APPENDIX D: EXPANDED HISTORICAL BACKGROUND

The Black Hills region that includes the Park has had a complex and changing history of human occupation that extends back centuries and many generations to prehistoric times. The Paleoindian period in the Great Plains around 7500 to 10,000 BP is associated with lush grasslands, large herds, and mineral resources that naturally drew people to the region, including the Black Hills. The later archaic period coincided with a warmer, dryer climate that likely caused the extinction of *bison antiquus*, the ancient relative of modern bison, and moved human populations to the cooler, higher locations of the Black Hills' forests and meadows. Adapting to new territorial ranges, the human population continued to hunt bison in a specialized, communal fashion, but also hunted smaller game, such as pronghorn, elk, and deer. Shelters in the lower hills provided habitation for thousands of years during this time.

By the 16th century, the Black Hills were not an exclusive homeland to any one tribe, but rather were habited by different groups with different cultural traditions and practices. Although the Black Hills has traces of habitation of more than ten different tribal nations, the Lakotas and Cheyennes are the tribes with the most well-documented, ongoing historical and cultural relationship to the Black Hills for the past 200 years. The Arapahos arrived to the area sometime in the early 1700s, and many other tribes have historical and cultural relations with the Black Hills as well.

Oral traditions reveal that Wind Cave is one of the most sacred and culturally significant areas in the Black Hills for the Lakotas and Cheyennes. The Lakotas have long identified Wind Cave as a site of genesis where the first humans emerged from the subterranean depths of the cave. The park land above the cave also has long been a place of important cultural connection for the Lakotas, who believe that the site is the home of the buffalo nation and carries cosmological traditions about the relationships between the cave, bison, regeneration, and the wind. The Lakotas and Cheyennes both continue to hold important cultural relationships between humans, animals, and topographical features in the Black Hills, including Wind Cave. In the last half of the late 19th century, large numbers of Lakotas and Cheyennes, and Arapahos moved within the Black Hills and surrounding plains for better grazing lands, more productive bison hunting, and to find sanctuary from increasing encroachment of US military troops, prospectors, and settlers in the Black Hills by the 1870s. Many of the region's attributes that had sustained the tribes for thousands of years – the mild climate, grasses, rich plant communities, mineral waters, timber supply, and abundant game – had also attracted increasing numbers of Euro-American (white), non-Indian settlers to the Black Hills.

Although American Indian tribes of the Black Hills had known about the opening to Wind Cave for thousands of years, two setters, Jesse and Tom Bingham, are credited as the first white discoverers of the cave entrance in 1881 when they observed strong winds blowing out of the cave's natural opening. The first recorded exploration of the cave in modern history occurred later that year in the fall of 1881 by Charlie Crary as interest in the cave's natural resources grew. This and other early documented exploration and interests set in motion events that eventually led to the establishment of Wind Cave National Park (NPS 2011a).

Several mining claims were established at Wind Cave. One of the most noteworthy claims was by the South Dakota Mining Company in 1890 and the hiring of J.D. McDonald as mining claim manager. The mining was unsuccessful, but McDonald and his family realized they could make a profit by giving cave tours and selling formations from the Wind Cave. The McDonald family filed a homestead claim over the natural opening and then began working to open a larger entrance into the cave while widening interior passageways for cave tours (NPS 2015).

Alvin McDonald, one of J.D.'s sons, assumed the role of "permanent guide", exploring and mapping the cave and documenting his findings, but by January 23, 1891, he had "given up finding the end of Wind Cave" (NPS 2015). Alvin helped discover about eight miles of cave and left a lasting legacy to modern explorers. His discoveries also led to increased visitation to the cave and eventually, its national publicity. By the summer of

1891, the cave tourism business was steadily improving, which meant the cave needed additional modifications. In 1892, the McDonalds formed a financial partnership with "Honest John" Stabler and created the Wonderful Wind Cave Improvement Company to help expand and improve tour operations. Between 1892 and 1893, the company widened cave passages, installed wooden staircases, and the Stablers built a hotel near the cave entrance, while a third party established stagecoach service to the hotel from the nearby town of Hot Springs (NPS 2011a).

In 1893, both J.D. and Alvin McDonald attended the Columbian Exposition in Chicago in an effort to promote and advertise the cave. During the trip, Alvin caught typhoid fever and never fully recovered, passing away that year at the age of 20. Shortly after Alvin's death, the partners who had created Wonderful Wind Cave Improvement Company "became embroiled in a dispute over the legal ownership of Wind Cave and the business relationship between the McDonalds and Stabler deteriorated" with the McDonalds accusing the Stablers of keeping profits for themselves and demanding additional money (NPS 2011a). In an attempt to gain control of the title while the McDonald's homestead claim was under review, Peter Folsom gained control of the mining claim on the cave before he and the Stablers joined forces against the McDonalds in court, where both sides attempted to prove that the other party had no claim to the cave.

To settle the ongoing dispute, the US General Land Office sent Special Agent C.W. Greene to examine the surface features and subterranean interests of all involved parties. Agent Greene's report found no legitimate evidence for mining or farming activities by the claimants. Instead, Greene surmised that the claims were filed solely for the purpose of owning the cave entrance for further exploitation of the cave. As a result of Agent Greene's report, the General Land Office denied both the McDonald and Stabler mineral and homestead claims to the property. Greene's report also recommended withdrawing the parcel from private settlement and holding the cave in reserve as a "public resort" (NPS 2011a).

In December 1899, the Department of the Interior made a determination that because neither mining nor proper homesteading had occurred, neither party had any legal claim to the cave. The cave had undergone spoliation, with many specimens having been removed to be sold, with countless others having been damaged or destroyed during these removal efforts, and if the temporary withdrawal of lands around Wind Cave was allowed to lapse, this spoliation might increase and further compromise the cave. Additionally, Commissioner Hermann noted in a letter to Secretary Hitchcock dated 6 June 1902 that Wind Cave's popularity with visitors also necessitated prompt action. "In view of the number of persons that visit Wind Cave at this season," he wrote, "it becomes important that immediate action be taken by Congress to provide for the proper care and management of the cave" (Spence 2011).

Leading up to the Wind Cave National Park bill, South Dakota Representative Eben Martin became more active in the legislative process. Martin was a member of the Public Lands Committee, meaning he would have been aware of the significant challenges to the draft bill, and in February 1902 he wrote Hitchcock offering his support for the Secretary's "very wisely" rendered decision to reserve "this property from public sale for the purposes of a National park." With considerable deference to the Secretary, Martin suggested an immediate short-term management proposal "in order that the property may be better cared for and preserved against possible injury or destruction" (Spence 2011).

Martin was also very forward thinking with regard to what he hoped the incorporation of Wind Cave into the Forest Reserve would accomplish. Not only did he note that it would create increased time and opportunity to establish a more substantial national park, but also that it might "be desirable to recommend that two or three adjacent townships [totaling between 50,920 and 72,960 acres] of the Black Hills Forest Reserve…be set aside as a National park where buffalo, elk and other native animals could be preserved….This particular part of the Forest Reserve is very lightly timbered, but contains excellent grazing and is well watered. It was a natural haunt of buffalo and elk before the settlement of the Black Hills country" (Spence 2011).

The Secretary of the Interior acted by removing the land in and around Wind Cave from settlement and in 1901, the land around the cave was withdrawn from homesteading. This move fueled congressional action and

became the first step toward the cave's eventual park status. In 1902, M.A. Meyendorff and Myron Willsie of the US Department of Mineral Survey conducted the first formal survey of the cave and reported on its immense size and complexity (NPS 2011a).

Commissioner Hermann agreed with the suggestion to attach Wind Cave to the Black Hills Forest Reserve, as well as with the necessity of a larger park, but he argued that additional "underground survey was essential to ascertain definitely the precise lands under which the body of the cave and its numerous ramifications extend" so as to locate any proposed boundaries of a national park only over the extent of the cave. Hermann also recommended to Secretary Hitchcock that lands outside the Forest Reserve should be withdrawn if they could potentially overlay the cave. In a letter dated March 28, 1902, Hermann indicated that these withdrawn lands could be attached to the Forest Reserve in order to provide the Secretary with the largest possible opportunity to protect all of the lands above Wind Cave (Spence 2011).

Hitchcock did not agree with the views of both the Commissioner and Martin. He used a recent report by Rapid City surveyor Myron Willsie, who was working under contract at the General Land Office examining the cave extent, as justification for his views. The rapid manner in which the bill to create Wind Cave National Park was drafted and ultimately passed on 12 December 1903 indicates that "no one thought Wind Cave to be an inferior park. On the contrary; at a time when its primary sponsors were working to develop what would become the Antiquities Act, the establishment of Wind Cave National Park was a matter that required prompt action. As a place of 'natural wonder,' 'curiosities,' and 'scenic beauty' that was also subject to 'spoliation,' Wind Cave perfectly fit the criteria listed in Commissioner Hermann's original 1900 draft of 'a bill to establish and administer national parks, and for other purposes.' In short, Wind Cave was a model national park when it was established" (Spence, Mark David, 2011). The town of Hot Springs and its residents were thrilled with the passing of the bill, with the Hot Springs Star newspaper reporting that "Congressman Martin wired . . . Saturday saying 'Wind Cave National Park bill passed the House today. It has already passed the Senate and will soon be law.' Thus the good things keep coming for Hot Springs" (Spence 2011).

On January 9, 1903, President Theodore Roosevelt signed the bill creating Wind Cave National Park as the eighth national park and the first park created to protect a cave resource. The park boundary at that time included 10,522 acres, or 16.5 square miles, but mostly encompassed the subterranean cave features plus a few above-ground areas required for visitor and administration buildings. The surface land above the cave at that time contained no bison, elk, or pronghorn herds (NPS 2011a). However, Special Agent Greene was quoted by the Hot Springs Star that "in the near future a complete system of electric lights and an elevator will be put in," and once Congress "set aside the tract covering Wind Cave as a national park [it would] make a liberal appropriation for its improvement." (Spence 2011). At first, this new era seemed to be arriving quickly, as in March 1903 "an appropriation of $2500 was granted for initial improvements at the park," but it "would take until the Great Depression and the New Deal before Wind Cave received enough funding and support to fulfill Greene's early pronouncement about electricity and elevators. Congressman Martin's vision of a bison and elk range came sooner, with the creation of the Wind Cave National Game Preserve in 1912", but it was not "until after World War II that the park would be expanded to a size that even approximated Martin's early proposal" (Spence 2011).

The origins of Wind Cave Game Preserve can be traced to the American Bison Society, who in 1912 was searching for lands on which to re-establish a bison herd. The open grasslands of the cave surface attracted the society's attention. They found the prairie habitat on the surface of Wind Cave suitable for the bison and supported the establishment of a preserve by providing funds for the acquisition and fencing of the lands. The Department of Agriculture's US Biological Survey followed by establishing the Wind Cave National Game Preserve on the surface lands within the park boundary for the purposes of reintroducing bison, elk, and pronghorn. The arrival of these animals between 1913 and 1916 had the secondary effect of attracting more visitors to Wind Cave National Park. The increased visitation led to park building and infrastructure improvements in the late 1910s and 1920s (NPS 2011a).

Buildings and infrastructure improvements continued into the 1930s and took advantage of the various public work programs implemented during this time. The Civilian Conservation Corps (CCC) established a camp of 200 young men at Wind Cave National Park on July 16, 1934, to embark on badly needed improvements. Between 1934 and 1942, the CCC planted trees, constructed roads and trails, completed numerous infrastructure projects, and built many of the park administrative structures still extant today, including the area that later became the Wind Cave National Park Administrative and Utility Area Historic District (NPS 2011a).

In July 1935, Wind Cave National Park assumed authority for the Wind Cave National Game Preserve above it, thereafter combining the two entities into Wind Cave National Park. The move ended dual agency authority within the park boundary. The decision to incorporate the preserve changed the park's mission from solely protecting a cave to also protecting surface resources. It also allowed the park to serve as a sanctuary for the reintroduction of elk and pronghorn (NPS 2011a). However, by the end of the 1930s "Hot Springs had faded as both a sanitarium and a recreational destination. Tourism in the Black Hills had grown, but it had also shifted to the central and northern Hills. Wind Cave did not quite become the place that Greene or Martin envisioned, yet the eventual development of the cave and the integration of the wildlife preserve and the national park did create a unique unit in the national park system where ecological restoration was combined with subterranean spectacle" (Spence 2011).

The Park boundary expanded in 1946 with the addition of 16,341 acres. This and other previous additions enlarged the park to 28,059 acres by that point. Park staff began to actively manage the carrying capacity of the bison, pronghorn, and elk herds in the 1950s and 1960s. Although the park's 1961 master plan called for new structures to accommodate increasing visitation, the park later made a pivotal decision to not pursue building projects that could damage the cave. Instead, managers limited tour sizes to protect the cave and continued to focus on caring for the wildlife and rangeland through the 1970s and 1980s (NPS 2011a).

Surveying in Wind Cave started in 1955 and led to the 1964 discovery of the Spillway, which turned out to be the gateway to the western two thirds of the cave. The mapped extent of the cave increased from approximately 3.3 miles in 1964 to over 34.3 miles by 1979. Continued exploration has revealed Wind Cave to be one of the longest and most complex caves in the world and its full extent is still unknown. Ongoing exploration has increased the length of the cave survey to 143 miles as of 2014. Development and application of the Passage Density Model determined that there could be as much as 250 miles of passage within the current footprint of Wind Cave. The current length of the survey is 57% of that projected length. However, the cave could also extend beyond the current boundaries and then it could be much larger than the projected 250 miles (Horrocks 2009).

The Park embarked on new management approaches in the 1970s and 1980s. In 1972, Wind Cave National Park became one of the first parks to incorporate an active fire program, with its first prescribed fire occurring the following year. The park adapted its first cave management program in 1978 to preserve and manage the cave based on science using monitoring and cave inventories.

APPENDIX E: SHPO, USFWS AND TRIBAL CONSULTATION LETTERS

United States Department of the Interior
NATIONAL PARK SERVICE
Wind Cave National Park
26611 US Highway 385
Hot Springs, South Dakota 57747

IN REPLY REFER TO:

December 2, 2014

Mr. Jay Vogt
State Historic Preservation Office
South Dakota Historical Society
900 Governors Drive
Pierre, South Dakota 57501

Subject: Informal consultation concerning the Zoning Management Plan and General Management Plan Amendment

Mr. Vogt,

Wind Cave National Park (Park) is preparing a Zoning Management Plan/General Management Plan Amendment. The purpose of this project is to prepare a Comprehensive Zoning Management Plan and update the management zones as prescribed in the 1994 Park General Management Plan. This new plan will provide the basis for future planning and decision-making related to geographically distinct areas at the Park, and will be incorporated into all existing and future planning documents. Management Zones will be developed to support and uphold the purposes for which Wind Cave was established as a national park.

This plan, based on a comprehensive resource suitability analysis will outline the general allowable types and intensities of uses, activities and development associated with public enjoyment and use of the Park within the proposed management zones. Since publication of the General Management Plan in 1994 the Park has acquired a 5,556 acre parcel, known as the Casey Addition. This recent addition requires comprehensive analysis and integration with Park-wide management guidance regarding resources protection, access, use, and development. At the same time, the park has determined that the original management zones outlined in the 1994 GMP require updating.

Section 106 of the National Historic Preservation Act, as amended, requires that the Park take into account the effect of our undertakings on historic properties, look to avoid or reduce adverse effects on historic properties, and afford the Advisory Council on Historic Preservation an opportunity to comment on our project and its effects on historic properties.

It is not anticipated that establishing new management zones will appreciably change visitor use or resource management in the park in the short term. However, some effects on resource conditions or visitor use in the future could be possible, although at this time are expected to be negligible. No specific actions or undertakings are currently proposed in association with the prescription of parkwide management zones. Specific actions and undertakings will follow prescribed direction outlined in the Park Management Zoning Plan, and will be subject to separate compliance processes.

Attached to this letter are the zoning matrix, alternative maps, and descriptions. Your review and comment of the alternatives and zone types will help ensure that resources important to you are adequately considered in this process. We look forward to receiving your input on our plans and any concerns you have about the project.

If you have questions, please contact me or Tom Farrell, our Section 106 Compliance Coordinator. We can be reached at (605) 745-4600.

Sincerely,

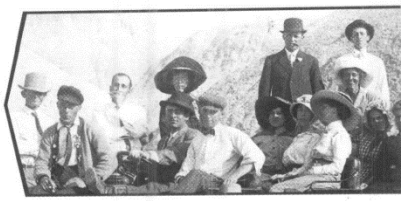
Vidal Davila

Vidal Davila
Superintendent

Enclosure

South Dakota State Historic Preservation Office Consultation Letter Response

SOUTH DAKOTA
STATE HISTORICAL SOCIETY
DEPARTMENT OF TOURISM



January 15, 2015

RECEIVED
JAN 20 2015
Wind Cave National Park

Vidal Davila
Superintendent
Wind Cave National Park
26611 U.S. Highway 385
Hot Springs SD 57747

SECTION 106 PROJECT CONSULTATION – INFORMAL
Project: 141208005F – Information consultation concerning the Zoning Management Plan and General Management Plan Amendment
Location: Custer County
(NPS)

Dear Mr. Davila:

Thank you for the opportunity to provide informal comments on the Zoning Management Plan and General Management Plan Amendment for Wind Cave National Park. We received your correspondence and information on December 8, 2014. Based upon the review of the information submitted, the SHPO has no concerns with the plans as outlined, as they will meet the Secretary of the Interior's Standards for the Treatment of Historic Properties.

Should you require additional information, please contact Kate Nelson at Kate.Nelson@state.sd.us or (605) 773-6005. Your concern for the non-renewable cultural heritage of South Dakota is appreciated.

Sincerely,

Jay D. Vogt
State Historic Preservation Officer

Kate Nelson

Kate Nelson
Restoration Specialist

900 GOVERNORS DR • PIERRE • SD 57501 • P {605 • 773 • 3458} F {605 • 773 • 6041} • HISTORY.SD.GOV
DEPARTMENT OF TOURISM {TOURISM.SD.GOV}

SOUTH DAKOTA
STATE HISTORICAL SOCIETY
DEPARTMENT OF TOURISM

January 29, 2015

Vidal Davila
Superintendent
Wind Cave National Park
26611 U.S. Highway 385
Hot Springs SD 57747

SECTION 106 PROJECT CONSULTATION – INFORMAL
Project: 141208005F – Information consultation concerning the Zoning Management Plan and General Management Plan Amendment
Location: Custer County
(NPS)

Dear Mr. Davila:

Thank you for the opportunity to provide informal comments on the Zoning Management Plan and General Management Plan Amendment for Wind Cave National Park. We received an updated copy of the plan on January 20, 2015, via email from Tom Farrell. Based upon the review of the information submitted, the SHPO would like to provide the following comments:

1. Several sections of the report reference new construction or moving buildings. (For example, see page 25, lines 10-15; page 27, line 6; page 28, lines 12-15; and page 30, line 6.) Projects that involve new construction or moving buildings should be submitted for review pursuant to Section 106.
2. Sanson Ranch Alternative ii: The proposal to zone the core Sanson Ranch and buffalo jump site as "Primary Visitor Service Development Zone" could involve negative impacts to historic properties. SHPO recommends that Sanson Ranch Alternative i, to include the buffalo jump site and Sanson Ranch as "Resource Protection Zone," would be preferable to Alternative ii.
3. Sanson Ranch Alternative iii: Projects that involve historic properties or non-contributing facilities in the "Historic Zone" should be submitted for review pursuant to Section 106. (See page 37, lines 8-22.)

Thank you for the opportunity to review this Zoning Management Plan. Should you require additional information, please contact Kate Nelson at Kate.Nelson@state.sd.us or (605) 773-6005. Your concern for the non-renewable cultural heritage of South Dakota is appreciated.

Sincerely,

Jay D. Vogt
State Historic Preservation Officer

Kate Nelson

Kate Nelson
Restoration Specialist

900 GOVERNORS DR • PIERRE • SD 57501 • P (605 • 773 • 3458) F (605 • 773 • 6041) • HISTORY.SD.GOV
DEPARTMENT OF TOURISM (TOURISM.SD.GOV)

United States Department of the Interior
NATIONAL PARK SERVICE
Wind Cave National Park
26611 US Highway 385
Hot Springs, South Dakota 57747

IN REPLY REFER TO:

December 2, 2014

Memorandum

To: Field Supervisor, U.S. Fish & Wildlife Service, Ecological Services Office,
420 South Garfield Avenue, Suite 400
Pierre, South Dakota 57501-5408

From: Vidal Davila, Superintendent, Wind Cave National Park

Subject: Informal Consultation under the Endangered Species Act

Wind Cave National Park (Park) is preparing a Zoning Management Plan/General Management Plan Amendment. The purpose of this project is to prepare a Comprehensive Zoning Management Plan and update the management zones as prescribed in the 1994 Park General Management Plan. This new plan will provide the basis for future planning and decision-making related to geographically distinct areas at the Park, and will be incorporated into all existing and future planning documents. Management Zones will be developed to support and uphold the purposes for which Wind Cave was established as a national park.

This plan, based on a comprehensive resource suitability analysis will outline the general allowable types and intensities of uses, activities and development associated with public enjoyment and use of the Park within the proposed management zones. Since publication of the General Management Plan in 1994 the Park has acquired a 5,556 acre parcel, known as the Casey Addition. This recent addition requires comprehensive analysis and integration with Park-wide management guidance regarding resources protection, access, use, and development. At the same time, the park has determined that the original management zones outlined in the 1994 GMP require updating.

It is not anticipated that establishing new management zones will appreciably change visitor use or resource management in the park in the short term. However, some effects on resource conditions or visitor use in the future could be possible, although at this time are expected to be negligible. No specific actions are currently proposed in association with the prescription of parkwide management zones. Specific actions will follow prescribed direction outlined in the Park Management Zoning Plan, and will be subject to separate compliance processes.

In accordance with Section 7(a)(2) of the Endangered Species Act of 1973, as amended, and 50 CFR 402, we are asking you to notify us of any threatened or endangered species, and any species of concern that may be found in the Park. Upon reviewing the U.S. Fish and Wildlife Service website, the Park has determined the following federally listed species were identified as potentially occurring in Custer County:

- Red Knot (*Calidris canutus rufa* – Proposed threatened)
- Sprague's Pipit (*Anthus spragueii* – Candidate species)
- Whooping crane (*Grus americana* – Endangered)
- Black-Footed ferret (*Mustela nigripes* – Endangered)
- Northern long-eared Bat (*Myotis septentrionalis* – Proposed endangered)

The National Park Service is actively monitoring the existing Black-footed ferret populations in conjunction and coordination with the U.S. Fish and Wildlife Service as they were reintroduced to the Park in 2007. The presence of the Northern long-eared bat has been documented in the park. The Park is unaware of the existence of any of the other species listed above. Based upon review of the species list and the likely impacts from the long-range zoning management project, the Park believes the Zoning Management Plan, if implemented, would likely result in no adverse effects to listed species.

Attached to this letter are the zoning matrix, alternative maps, and descriptions. Your review and comment of the alternatives and zone types will help ensure that resources important to you are adequately considered in this process. We look forward to receiving your input on our plans and any concerns you have about the project.

If you have questions, please contact me or Greg Schroeder, our Chief of Resources. We can be reached at (605) 745-4600.

Sincerely,

Vidal Davila

Vidal Davila
Superintendent

Enclosure

USFWS Consultation Letter Response

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
420 South Garfield Avenue, Suite 400
Pierre, South Dakota 57501-5408

January 12, 2015

RECEIVED
JAN 20 2015
Wind Cave National Park

Memorandum

To: Vidal Davila, Superintendent, Wind Cave National Park
26611 US Highway 385
Hot Springs, South Dakota 57747

From: Scott Larson, Field Supervisor, U. S. Fish & Wildlife Service, Ecological Services Office
Acting/Natalie Gates

Subject: Zoning Management Plan/General Management Plan Amendment

We received your December 2, 2014 memorandum requesting notification of any listed species in Wind Cave National Park and concurrence with species determinations for species potentially occurring in Custer County.

We believe the species you identified in your memorandum is accurate and we have no additions to your list. You also note that implementation of the Zoning Management Plan is unlike to result in adverse effects to listed species. We agree with that position, but when an alternative is selected, we encourage Wind Cave to make a determination of effects to listed species for that action and if necessary, seek our concurrence. Please contact Charlene Bessken at (605) 224-8693 ext 231 or charlene_bessken@fws.gov if there are any questions.

Thank you for the request of an informal consultation on the Plan Amendment.

Tribal Consultation Letter – Dispensed to Associated Tribes of Wind Cave NP

United States Department of the Interior
NATIONAL PARK SERVICE
Wind Cave National Park
26611 US Highway 385
Hot Springs, South Dakota 57747

IN REPLY REFER TO:

December 2, 2014

«Salutation» «FirstName» «LastName», «JobTitle»
«TribeName»
«Address1»
«City», «State» «ZipCode»

Subject: Consultation – Zoning Management Plan/General Management Plan Amendment and Environment Assessment, Wind Cave National Park

Dear INSERT NAME,

Wind Cave National Park (Park) is preparing a Zoning Management Plan/General Management Plan Amendment. The purpose of this project is to prepare a Comprehensive Zoning Management Plan and update the management zones as prescribed in the 1994 Park General Management Plan. This new plan will provide the basis for future planning and decision-making related to geographically distinct areas at the Park, and will be incorporated into all existing and future planning documents. Management Zones will be developed to support and uphold the purposes for which Wind Cave was established as a national park.

This plan, based on a comprehensive resource suitability analysis will outline the general allowable types and intensities of uses, activities and development associated with public enjoyment and use of the Park within the proposed management zones. Since publication of the General Management Plan in 1994 the Park has acquired a 5,556 acre parcel, known as the Casey Addition. This recent addition requires comprehensive analysis and integration with Park-wide management guidance regarding resources protection, access, use, and development. At the same time, the park has determined that the original management zones outlined in the 1994 GMP require updating.

It is not anticipated that establishing new management zones will appreciably change visitor use or resource management in the park in the short term. However, some effects on resource conditions or visitor use in the future could be possible, although at this time are expected to be negligible. No specific actions or undertakings are currently proposed in association with the prescription of parkwide management zones. Specific actions and undertakings will follow prescribed direction outlined in the Park Management Zoning Plan, and will be subject to separate compliance processes.

The park is aware that you value the Park as a very special place, so we want to be sure that you have input into the development of the management zoning project. Therefore, this letter initiates consultation in accordance with sections 101 and 106 of the National Historic Preservation Act of 1966, as amended; the regulations at 36 CFR 800; the National Park Service *Management Policies 2006*; National Park Service Director's Order 28, Cultural Resources Management; and Executive Orders 13007 and 13175, as well as other authorities. If you could provide us your comments within 30 days of your receipt of this letter that would enable us to make the most use of your information as we begin the next steps of the environmental compliance process.

Attached to this letter are the zoning matrix, alternative maps, and descriptions. Your review and comment of the alternatives and zone types will help ensure that resources important to you are adequately considered in this process. We look forward to receiving your input on our plans and any concerns you have about the project.

If you have questions, please contact me or Tom Farrell, our Section 106 Compliance Coordinator. We can be reached at (605) 745-4600.

Sincerely,

Vidal Davila
Superintendent

Enclosure

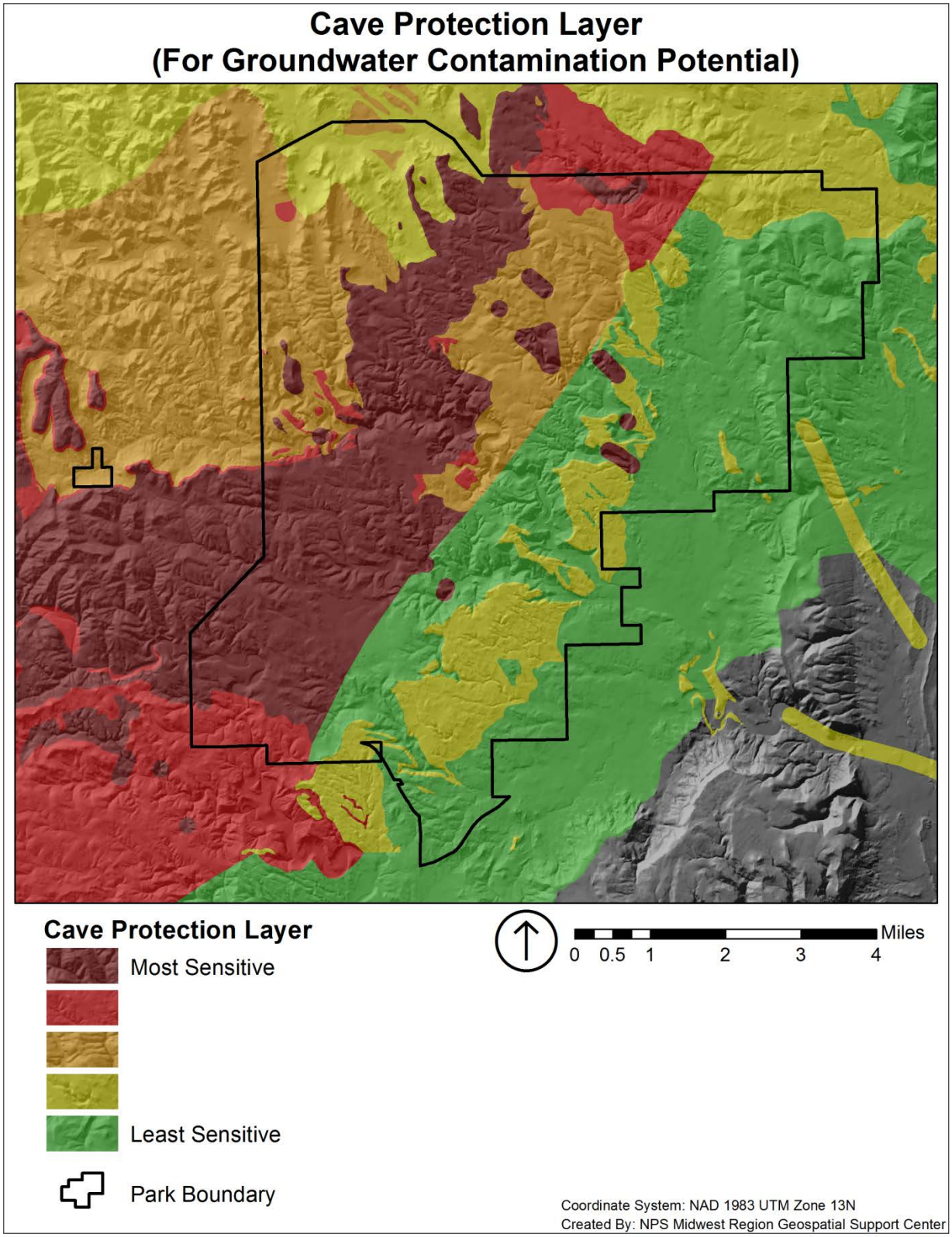
TRIBAL CONSULTATION LETTERS WERE SENT TO THE FOLLOWING TRIBES:

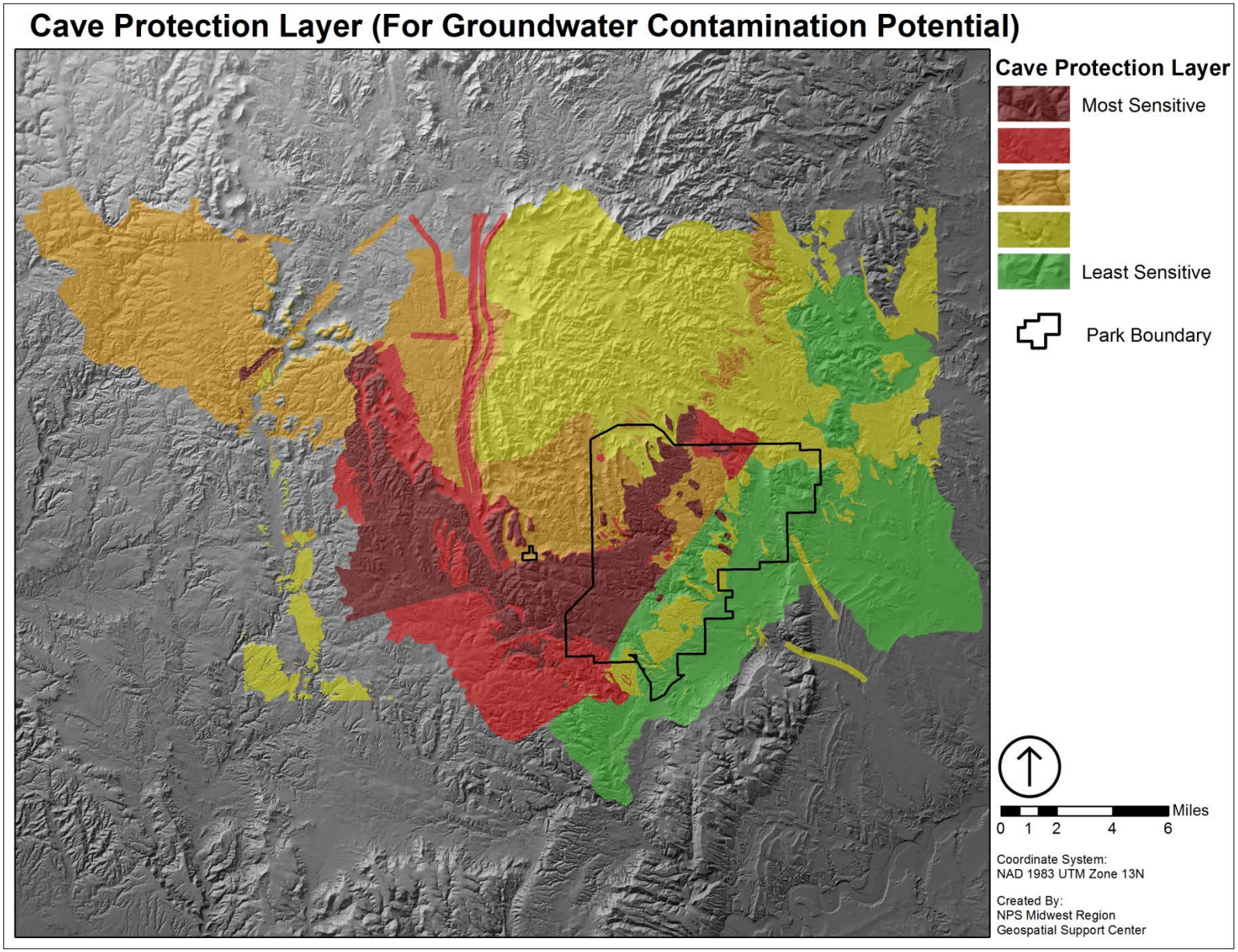
- Mr. Kevin Keckler, Chairman, Cheyenne River Sioux Tribe
- Mr. Eddie Hamilton, Governor, Cheyenne-Arapaho Tribes of Oklahoma
- Ms. Roxanne Sazue, Chairman, Crow Creek Sioux Tribal Council
- Mr. Anthony Reider, President, Flandreau Santee Sioux Tribe
- Ms. Tracey King, President, Fort Belknap Community Council
- Mr. Floyd Azure, Chairman, Fort Peck Tribal Executive Board
- Ms. Amber Toppah, Chairman, Kiowa Tribe of Oklahoma
- Mr. Michael B. Jandreau, Chairman, Lower Brule Sioux Tribal Council
- Mr. Denny Prescott, President, Lower Sioux Indian Community
- Mr. Harvey Spoonhunter, Chairman, Northern Arapaho Tribe
- Mr. Leroy Spang, President, Northern Cheyenne Tribal Council
- Mr. Bryan V. Brewer, President, Oglala Sioux Tribal Council
- Ms. Becky White, Chairman, Ponca Tribe of Nebraska
- Mr. Earl Howe, Chairman, Ponca Tribe of Oklahoma
- Mr. Cyril Scott, President, Rosebud Sioux Tribal Council
- Mr. Roger Trudell, Chairman, Santee Sioux Tribal Council
- Mr. Robert Shepherd, Chairman, Sisseton-Wahpeton Sioux Tribal Council
- Mr. Dave Archambault II, Chairman, Standing Rock Sioux Tribal Council
- Mr. Marcus Levings, Chairman, Three Affiliated Tribes Business Council
- Mr. Robert Flying Horse, Chairman, Yankton Sioux Tribal Business & Claims Committee
- Mr. Dana Dupris, Cultural Preservation Specialist, Cheyenne River Sioux Tribe
- Mr. Max Bean, Coordinator of Cultural and Heritage Program, Cheyenne-Arapaho Tribes of Oklahoma
- Mr. Darrell Zephier, Historic Preservation Officer, Crow Creek Sioux Tribal Council
- Mr. Sam Allen, Historic Preservation Officer, Flandreau Santee Sioux Tribe
- Mr. Michael B. Black Wolf, Historic Preservation Officer, Fort Belknap Community Council
- Mr. Curley Youpee, Cultural Resource Dept. Director, Fort Peck Tribal Executive Board
- Ms. Claire Green, Cultural Resource Officer, Lower Brule Sioux Tribal Council
- Ms. Grace Goldtooth, Historic Preservation Officer, Lower Sioux Indian Community
- Ms. Darlene Conrad, Historic Preservation Officer, Northern Arapaho Tribe
- Mr. James Walks Along, Historic Preservation Officer, Northern Cheyenne Tribe
- Mr. Randy Teboe, Historic Preservation Officer, Ponca Tribe of Nebraska
- Ms. Mona Poor Thunder, Historic Preservation Officer, Oglala Sioux Tribal Council
- Mr. Rick Thomas, Historic Preservation Officer, Santee Sioux Tribal Council
- Mr. Russell Eagle Bear, Historic Preservation Officer, Rosebud Sioux Tribe
- Ms. Dianne Desrosiers, Historic Preservation Officer, Sisseton-Wahpeton Sioux Tribal Council
- Ms. Waste' Win Young, Historic Preservation Officer, Standing Rock Sioux Tribe
- Mr. Elgin Crowsbreast, Historic Preservation Officer, Three Affiliated Tribes Business Council
- Mr. Pete Coffey Jr., Chief Compliance Officer, Three Affiliated Tribes Business Council
- Ms. Lana Gravatt, Historic Preservation Officer, Yankton Sioux Business & Claims Committee

No written or oral response indicating acceptance or opposition to the plan had been received by the Park per requests in the letter dated December 2, 2014.

APPENDIX F: SUITABILITY ANALYSIS MAPS AND DESCRIPTIONS

The delineation of distinct management zones is based on a suitability analysis that combines resource suitability with Park purpose, significance and associated fundamental resources and values. The suitability analysis was conducted to identify appropriate locations for various types and general intensities of development and use within different areas of the Park based on resource protection requirements and to outline measures for the preservation of associated Park resources. Individual resource map layers were developed as an informative tool to guide the development of the management zones and are included in the appendices. This plan considers and addresses geology, soils, cave and karst resources, water resources, riparian areas, wetlands and floodplains, vegetation and fire, wildlife, air quality, soundscape and night skies, scenery, cultural resources, visitor use and experience and other physical resource conditions affecting potential future development.


Cave Protection Layer
(For Groundwater Contamination Potential)
Cave Protection Layer
Most Sensitive
Least Sensitive
Park Boundary
Miles
0 0.5 1 2 3 4
Coordinate System: NAD 1983 UTM Zone 13N
Created By: NPS Midwest Region Geospatial Support Center


Cave Protection Layer (For Groundwater Contamination Potential)
Cave Protection Layer
Most Sensitive
Least Sensitive
Park Boundary
Miles
0 1 2 4 6
Coordinate System:
NAD 1983 UTM Zone 13N
Created By:
NPS Midwest Region
Geospatial Support Center

CAVE PROTECTION LAYER (FOR GROUNDWATER CONTAMINATION POTENTIAL) SUITABILITY ANALYSIS METHODOLOGY:

1. Delineate "known" cave location(s), as well as "likely" and "potential" cave extents using image provided by Park's Physical Science Specialist.

2. Use Park provided watershed data to delineate Total Park Watershed.

3. Rank individual watersheds in order of sensitivity based on "known, likely and potential" cave extents into four categories, most sensitive to least sensitive, for upstream areas above each locational area. Areas downstream of known, likely and potential cave extents become least sensitive.

4. Buffer all Park provided point "cave and karst" features by a distance of 600 feet.

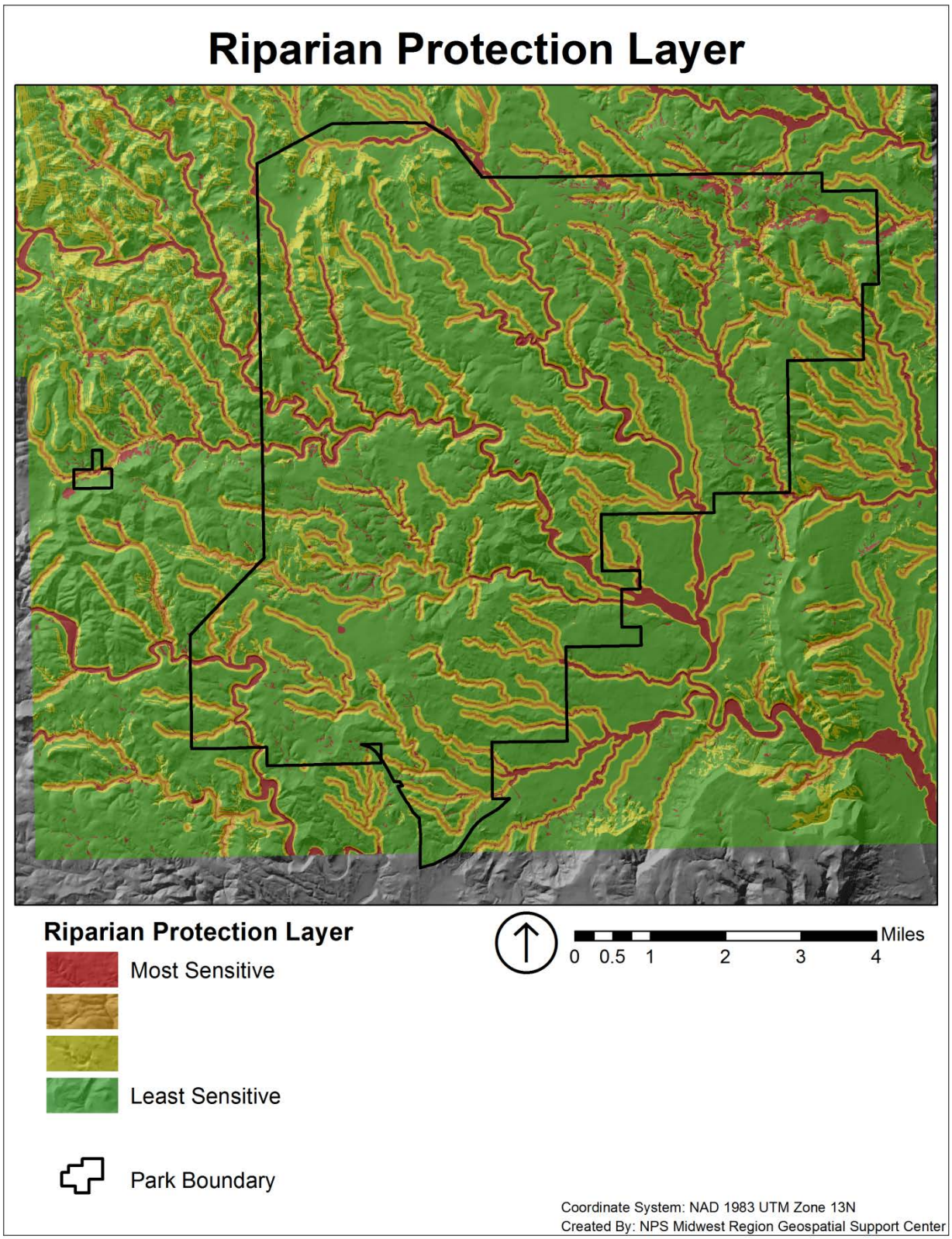
5. Combine (through Union geoprocessing function) the buffered point cave and karst features (now given a value of [1], most sensitive) with the previously created (in steps 1-3) cave sensitivity layer (1-4 sensitivity level ranks) for a compiled new layer.

6. Add surface Karst Geology Layer (includes Minnekahta L.S., Pahasapa L.S., Englewood L.S. and White River Group).

7. Reclassify existing cave sensitivity layer (created in step 5) with the Karst Geology layer (through Union geoprocessing function) and include one additional sensitivity ranking level (previously 1-4, now 1-5).
    a. Downstream areas without surface karst geology previously ranked (4) are now ranked [5] – least sensitive.
    b. Downstream areas with surface karst geology and areas outside primary watersheds are now ranked [4].
    c. Watershed areas previously ranked [3] shift to [4] and watershed areas previously ranked [2] shift to [3], where karst geology occurs within watershed areas under new classification rank, each decrease in number ranking by one, thus increasing the sensitivity ranking: [4] becomes [3] and [3] becomes [2].
    d. All portions of the Cold Brook Canyon Creek watershed south and downstream of the overlapping karst geology layer also become [2].
    e. Areas previously classified as Most Sensitive [1] remain [1].

8. Using the Geologic Fault Layer, create a 600 foot buffer on either side of each mapped fault line.

9. Combine (through Union geoprocessing function) buffered fault line layer with existing cave sensitivity layer (created in step 7) and reclassify. Fault line buffered areas are given a value that ranks one level more sensitive than the overlapping level except where fault lines intersect sensitivity levels [1] and [2], where they remain the same rank as the level they overlap. Otherwise, faults on [5] become [4], faults on [4] become [3], and faults on [3] become [2].


Riparian Protection Layer
Riparian Protection Layer
Most Sensitive
Least Sensitive
Park Boundary
Miles
0 0.5 1 2 3 4
Coordinate System: NAD 1983 UTM Zone 13N
Created By: NPS Midwest Region Geospatial Support Center

RIPARIAN PROTECTION LAYER SUITABILITY ANALYSIS METHODOLOGY:

1. Stream networks identified and mapped (based on National Hydrologic Dataset); includes perennial, intermittent, and ephemeral stream channels (though no ephemeral streams were found in the Park).

2. Springs, seeps, wetlands, lakes and ponds identified (based on Park data and National Hydrologic Dataset).

3. FEMA Flood Hazard Areas map and categorized as Most Sensitive [1].

4. Utilize Park resource specialist to identify any additional sensitive stream, seep and wetland resources not identified immediately by GIS data for both previously surveyed Park lands and preliminary survey work on recently acquired lands.

5. Create 100 and 300 feet buffers on all streams (perennial, intermittent and ephemeral), wetlands and other water bodies. Areas within 100 feet are classified as next most sensitive [2], areas between 100 and 300 feet are classified as [3] and areas beyond 300 feet are classified as [4].

6. Reclassify soils GIS layer based on Soil Survey data in NRCS "Custer and Pennington Counties, Prairie Parts, South Dakota (Table 15: Physical and chemical properties of the soils)" and "Custer and Pennington Counties, Black Hills Parts, South Dakota (Table 17: Physical and chemical properties of the soils)".

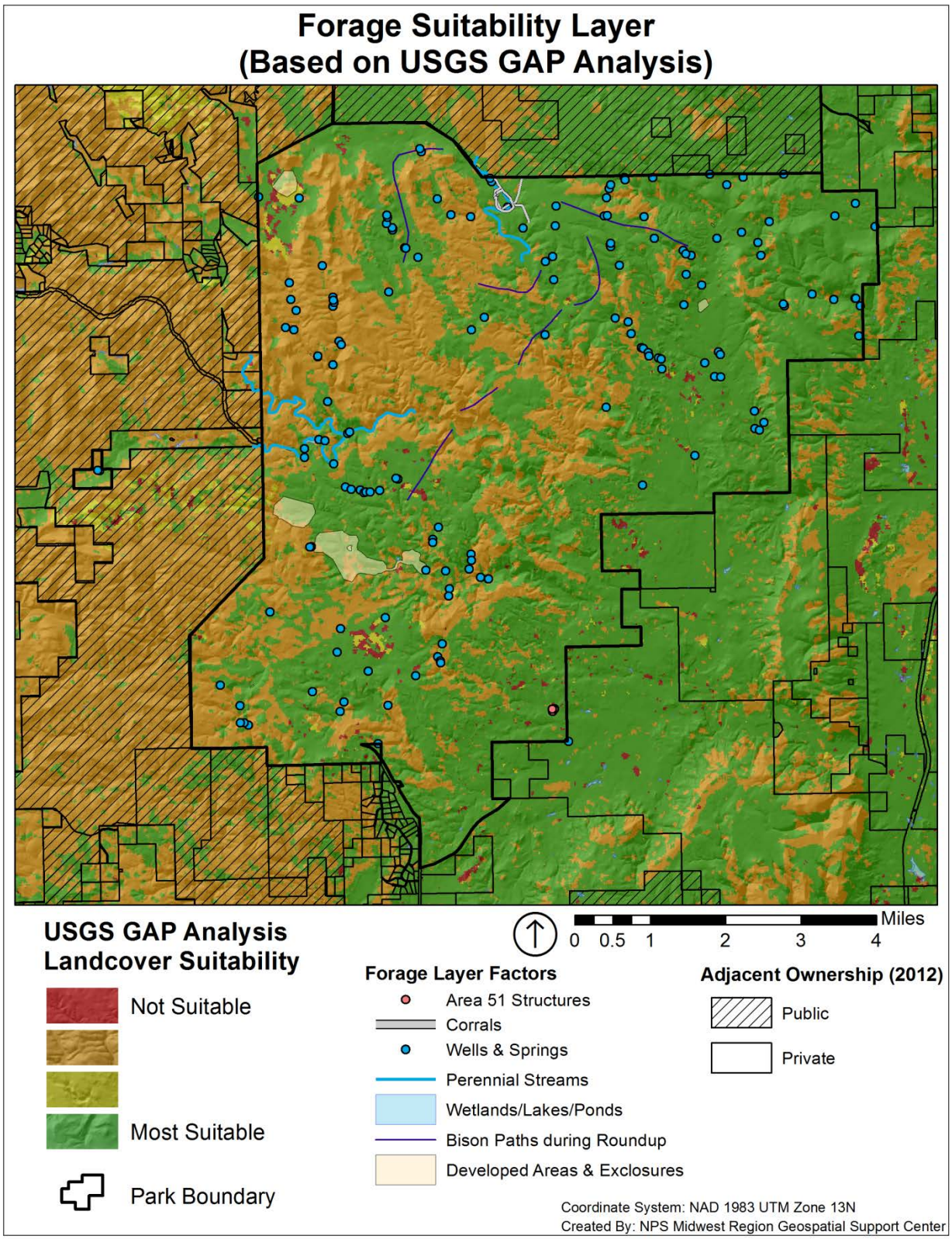
7. Combine (through Union geoprocessing function) slope analysis and reclassified soils layer with stream buffer layer (created in step 4). Areas between 100 and 300 feet where slopes exceed ten (10) percent and soil erodibility K values exceed 0.24 (from step 6) are reclassified as [2] from preliminary classification of [3].

8. 1999 vegetation GIS layer (from Park) grouped into six categories: coniferous forest [1], deciduous forest [2], shrubland [3], grassland [4], emergent wetland [5] and impervious surfaces [6]. These six categories were then reclassified based on general capacity to withstand erosion from rainfall events: coniferous forest, deciduous forest and impervious surface = most susceptible, shrubland = moderately susceptible, grassland and emergent wetland = least susceptible.

9. Areas beyond 300 feet where slopes exceed ten (10) percent and soil erodibility K values exceed 0.24 (from step 6) and the vegetative cover erosion susceptibility rating (from step 8) are reclassified as slightly sensitive [3] from preliminary classification of least sensitive [4].

10. Combine (through Union geoprocessing function) current riparian protection layer (from step 9) with vegetation GIS data (from 1999 Park GIS layer) identified as riparian (Western Snowberry Shrubland, Plains Cottonwood/Western Snowberry Forest and Emergent Wetland Herbaceous Complex). All areas identified as riparian vegetation are reclassified as most sensitive [1].

11. Create a 100 foot buffer on all spring points. Identify any stream segments that intersect this spring buffer. Buffer the affected stream segments an additional 100 feet and classify these new buffers as Most Sensitive [1].


Forage Suitability Layer
(Based on USGS GAP Analysis)
USGS GAP Analysis
Landcover Suitability
Not Suitable
Most Suitable
Park Boundary
Miles
0 0.5 1 2 3 4
Forage Layer Factors
Area 51 Structures
Corrals
Wells & Springs
Perennial Streams
Wetlands/Lakes/Ponds
Bison Paths during Roundup
Developed Areas & Exclosures
Adjacent Ownership (2012)
Public
Private
Coordinate System: NAD 1983 UTM Zone 13N
Created By: NPS Midwest Region Geospatial Support Center

FORAGE SUITABILITY LAYER (BASED ON USGS GAP ANALYSIS) SUITABILITY ANALYSIS METHODOLOGY:

1. USGS GAP Analysis GIS data provided by the Park was classified into four suitability ranks. The classifications were determined using the expertise of a Park resource specialist, with [1] being Not Suitable and [4] being Most Suitable. The landcover classes were categorized as follows:

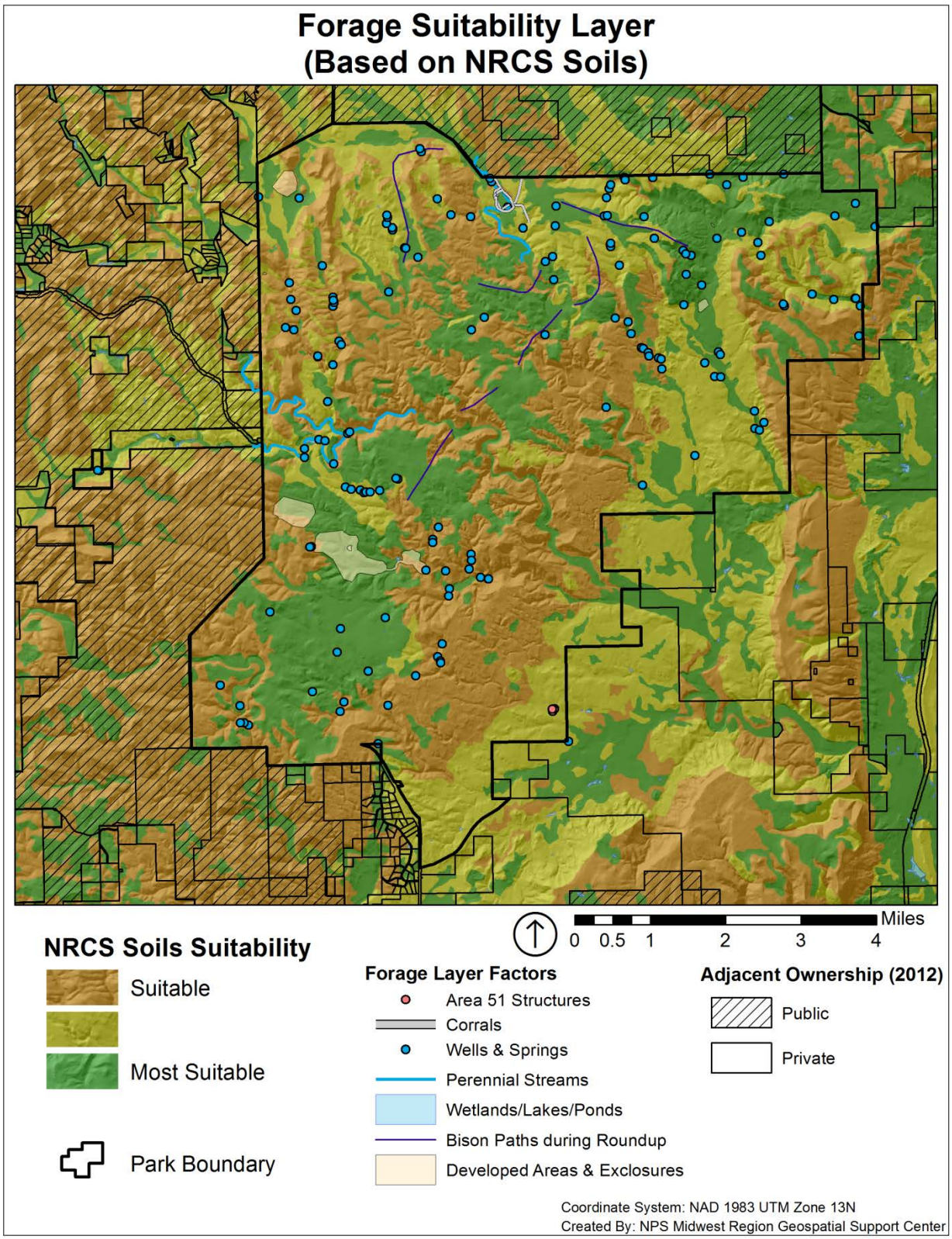
   NOT SUITABLE:
   - Barren, Towns, Mines & Quarries = 1
   - Low & High Density Development = 1
   - Sand Hills Sparse Vegetation = 1
   - Shale Barren Slope Sparse Vegetation = 1
   - Unvegetated Badlands = 1
   - Water = 1

   LOW SUITABILITY:
   - Bur Oak Forest = 2
   - Cottonwood Forest = 2
   - Other Deciduous Forests = 2
   - Ponderosa Pine Forest = 2
   - White Spruce Forest = 2

   MODERATE SUITABILITY:
   - Burned Pine = 3
   - Creeping Juniper Dwarf-shrubland = 3
   - Eastern Red Cedar Shrubland = 3
   - Mesic Shrubland = 3
   - Xeric Shrubland = 3
   - Other Deciduous Shrubland = 3
   - Temporary, Seasonal, Semi-permanent, Permanent Wetlands = 3
   - Riverine Wetland = 3

   MOST SUITABLE:
   - Agriculture = 4
   - Hayland = 4
   - Low, Medium & High Cover Grassland = 4
   - Idle Grassland = 4
   - Pastureland = 4
   - Sand Hills High Cover Grassland = 4
   - Vegetated Badlands = 4

2. Add all water source GIS data, including perennial streams, wells, springs, wetlands, lakes and ponds.
3. Add wildlife (Bison) infrastructure GIS data, including pens, corrals, drive lines and wing wall fences.
4. Overlay Adjacent Land Boundaries GIS data, and symbolize it to indicate what lands are public and what lands are private.
5. Overlay existing fenced exclosures GIS data (locations where Bison and Elk are not permitted.


Forage Suitability Layer
(Based on NRCS Soils)
Miles
0 0.5 1 2 3 4
NRCS Soils Suitability
Suitable
Most Suitable
Park Boundary
Forage Layer Factors
Area 51 Structures
Corrals
Wells & Springs
Perennial Streams
Wetlands/Lakes/Ponds
Bison Paths during Roundup
Developed Areas & Exclosures
Adjacent Ownership (2012)
Public
Private
Coordinate System: NAD 1983 UTM Zone 13N
Created By: NPS Midwest Region Geospatial Support Center

FORAGE SUITABILITY LAYER (BASED ON NRSC SOILS DATA) SUITABILITY ANALYSIS METHODOLOGY:

1. Reclassify soils GIS layer based on Soil Survey data in Natural Resources Conservation Service (NRCS) "Custer and Pennington Counties, Prairie Parts, South Dakota (Table 9: Wildlife Habitat)" and "Custer and Pennington Counties, Black Hills Parts, South Dakota (Table 11: Wildlife Habitat)". The first three categories were used primarily: 1 – Grain & Seed Crops, 2 – Grasses & Legumes, and 3 – Native Herbaceous Plants. The third category (Native Herbaceous Plants) carried the most weight; "Good" = best soils for forage suitability, "Fair" = moderately suitable, and "Poor" & "Very Poor" = least suitable.

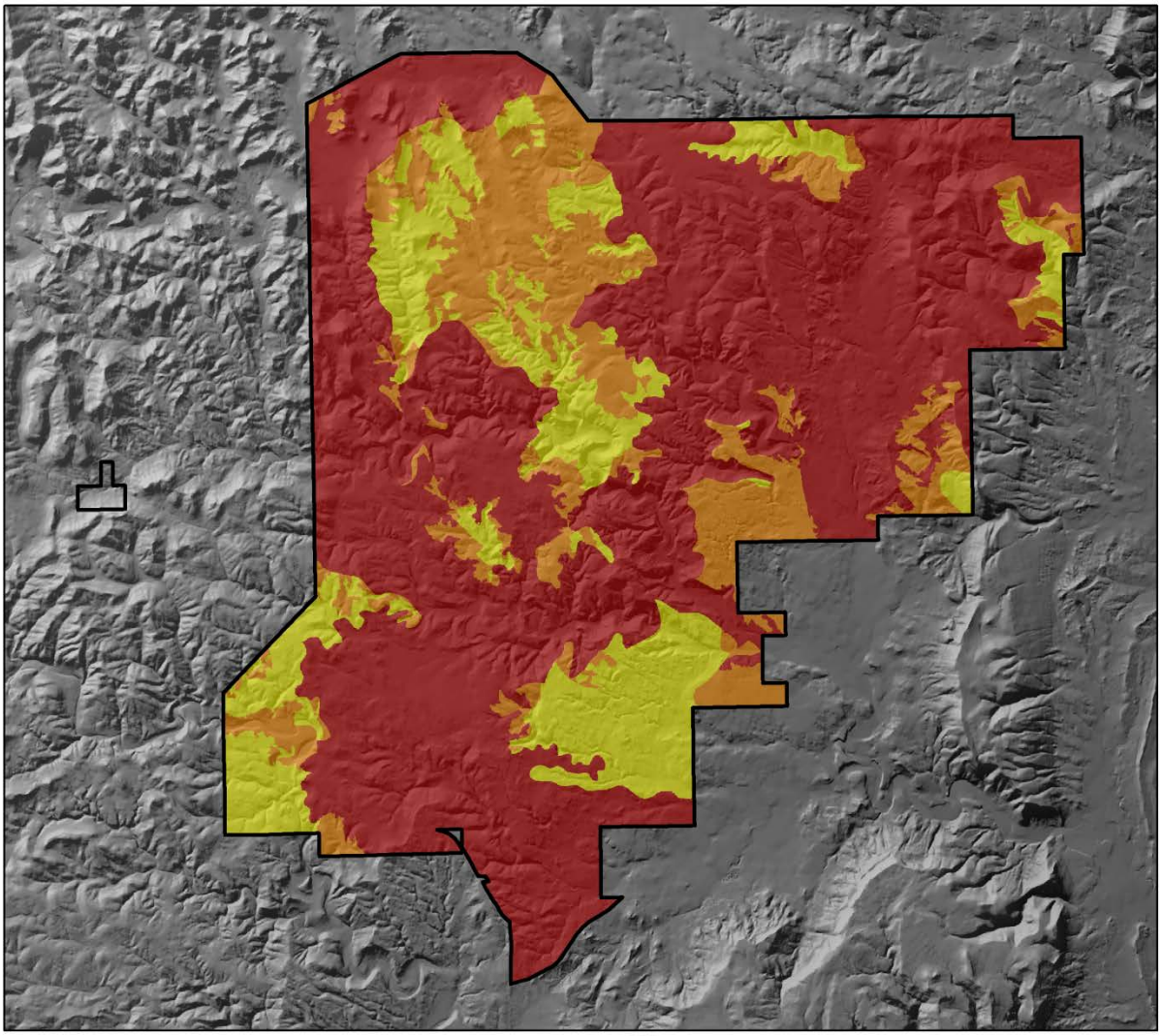
2. Add all water source GIS data, including perennial streams, wells, springs, wetlands, lakes and ponds.

3. Add wildlife (Bison) infrastructure GIS data, including pens, corrals, drive lines and wing wall fences.

4. Overlay Adjacent Land Boundaries GIS data, and symbolize it to indicate what lands are public and what lands are private.

5. Overlay existing fenced exclosures GIS data (locations where Bison and Elk are not permitted).

Scenic Inventory Classes



Scenic Inventory Classes

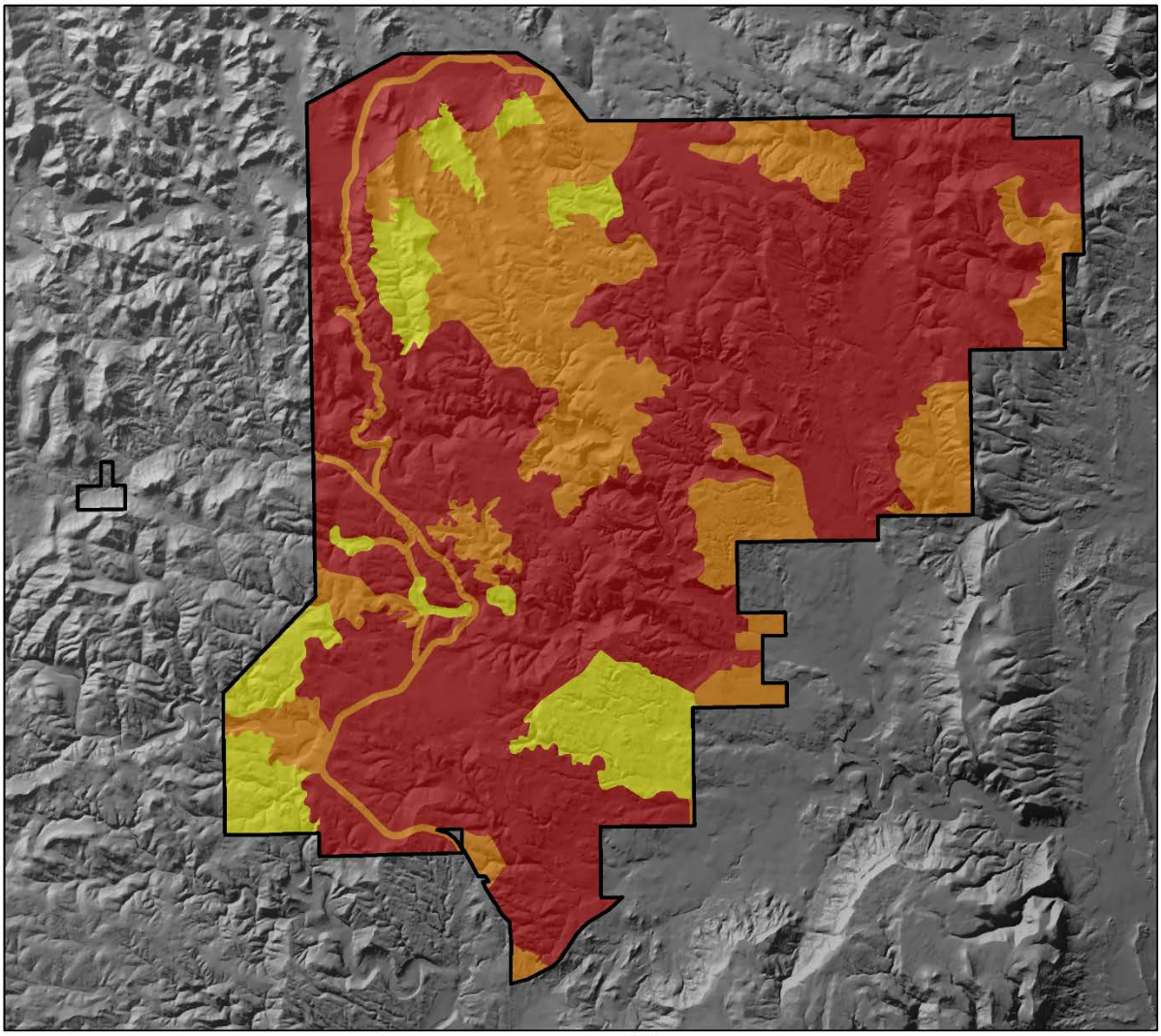
Miles
0 0.5 1 2 3 4

Class 1 (Highest Scenic Value)
Class 2 (Moderate Scenic Value)
Class 3 (Lowest Scenic Value)

Park Boundary

Coordinate System: NAD 1983 UTM Zone 13N
Created By: NPS Midwest Region Geospatial Support Center

Scenery Management Classes



Scenery Management Classes

Class 1 (Highest Scenic Value)

Class 2 (Moderate Scenic Value)

Class 3 (Lowest Scenic Value)

Park Boundary

0 0.5 1 2 3 4 Miles

Coordinate System: NAD 1983 UTM Zone 13N
Created By: NPS Midwest Region Geospatial Support Center

SCENIC INVENTORY AND MANAGEMENT CLASSES ANALYSIS METHODOLOGY (SEE APPENDIX E FOR SPECIFIC APPLIED METHODOLOGY):

1. Scenic Quality – Inventory and Evaluation Form based on United States Forest Service (USFS) and Bureau of Land Management (BLM), modified for NPS use, applied to scenic quality rating units to measure the visual appeal of different tracts of land.

2. Sensitivity Viewshed Spread Analysis – based on GIS analysis of United States Geological Survey (USGS) Digital Elevation Models (DEM) or other available digital elevation data applied to sensitivity level rating units to measure public concern for scenic quality and landscape visibility.

3. Distance Zone Analysis – based on the principles of Foreground (FG), Middle Ground (MG), and Background (BG) – would also use a GIS Viewshed spread function examining such factors as visibility from roads (while moving at different speeds), trails and key observation points around the Park.

4. Scenery/Visual Resource *Inventory* Classes are assigned through the inventory process based on a combination of the three previous steps to characterize scenic quality, sensitivity level and distance zones. Each of these three analyses is mapped as an individual spatial layer and the combined overlay, based on the categorization of each, establishes the inventory class.

Inventory classes do not establish management direction and should not be used as a basis for constraining or limiting management actions or activities related to Park purpose. Scenery *Management* Class Objectives will be developed based on a comprehensive inventory, evaluation and classification of the scenic values and desired conditions of distinct areas/zones within and viewed from each specific Park unit in tandem with other resource values.

HISTORIC CULTURAL SENSITIVITY LAYER ANALYSIS METHODOLOGY:

NOTE: Analysis was performed and results were utilized during this project, but maps are not presented here due to the sensitivity of the resources.

1. Georectify historic General Land Office (GLO) survey maps.

2. Reduce opacity of georectified GLO maps and overlay them on top of aerial imagery. Create two new features (point and line, respectively) and use them to create a new layer identifying any mapped historic cultural features (home sites, fence lines, roads, etc.) and locations where existing visible roads and foundation remnants appear to match GLO mapped features.

3. Using GLO overlay, tract ownership data (provided by NPS Lands Division) and Historic Property Plat Boundaries (based on Homestead Patent Claim Chronology in 1990s Lands Study, 2005 Cultural Landscape Report and 2011 Historic Resource Study), identify historic property areas based on ownership patterns.

4. Based on these historic ownership patterns and mapped historic cultural features, differentiate areas based on topography where historic use was likely higher or lower (i.e. steep hillsides = lower likely usage, flat ground by home site/streams where till occurred = higher likely usage).

5. Add Park mapped data for all known historic cultural resources (Homestead sites, Historic Districts, notable Highway 89 features, etc.).

6. Create Viewshed spreads at important cultural areas (Headquarters Historic District, Highway 89 Bridge over Beaver Creek, Highway 89 Pigtail Bridge, Sanson Ranch).

7. Create 150 foot buffer on either side of all Historic Cultural lines, and create 200 foot buffer around Historic Cultural points.

8. Combine layers (through Union geoprocessing function) and rank composite overlay:
   a. Most Sensitive = National Register listed and eligible sites and districts, and known historic features
   b. Next Most/Moderately Sensitive = Historic roads, likely more actively used historic areas inside historic homesteads, and areas within specific cultural area viewsheds
   c. Likely Less Sensitive = Areas within historic areas that were likely less actively used, but for which detailed surveys have yet to be completed and potential resources may exist
   d. All other areas designated as Unknown/Unsurveyed

ARCHEOLOGICAL SENSITIVITY LAYER ANALYSIS METHODOLOGY:

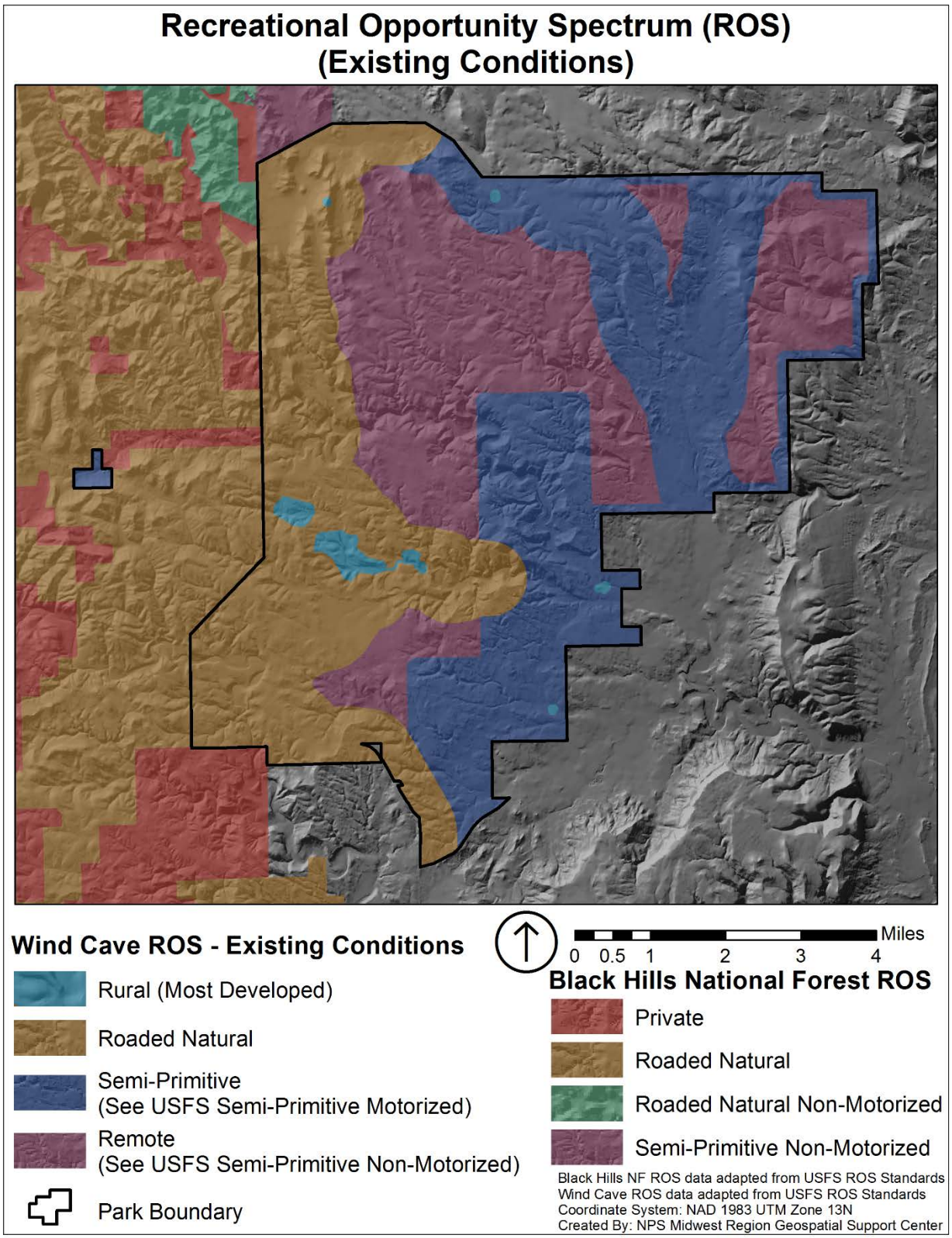
NOTE: Analysis was performed and results were utilized during this project, but maps are not presented here due to the sensitivity of the resources.

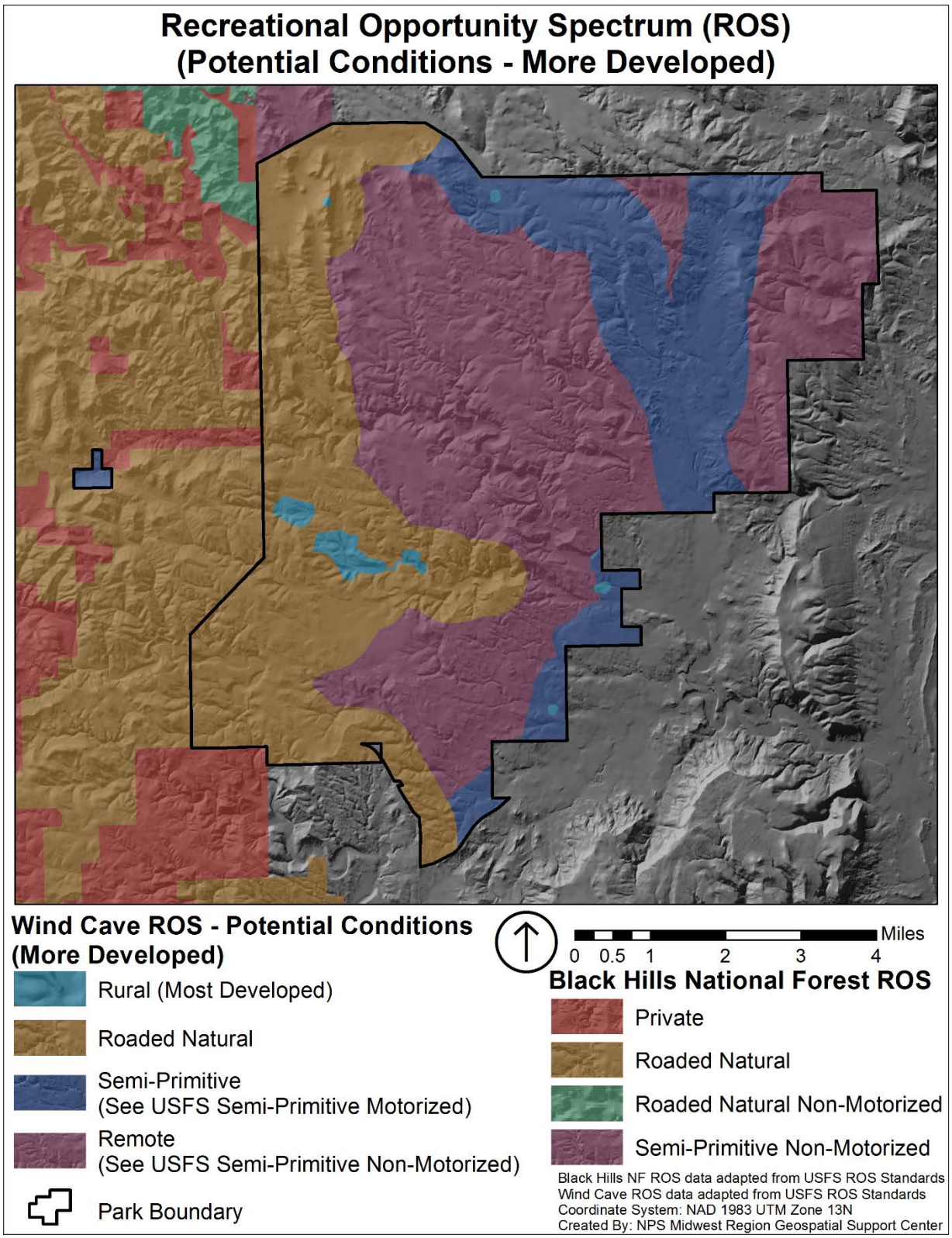
1. This analysis is based purely on NPS Midwest Archeological Center (MWAC) Survey data, and is ranked from lowest to highest sensitivity:

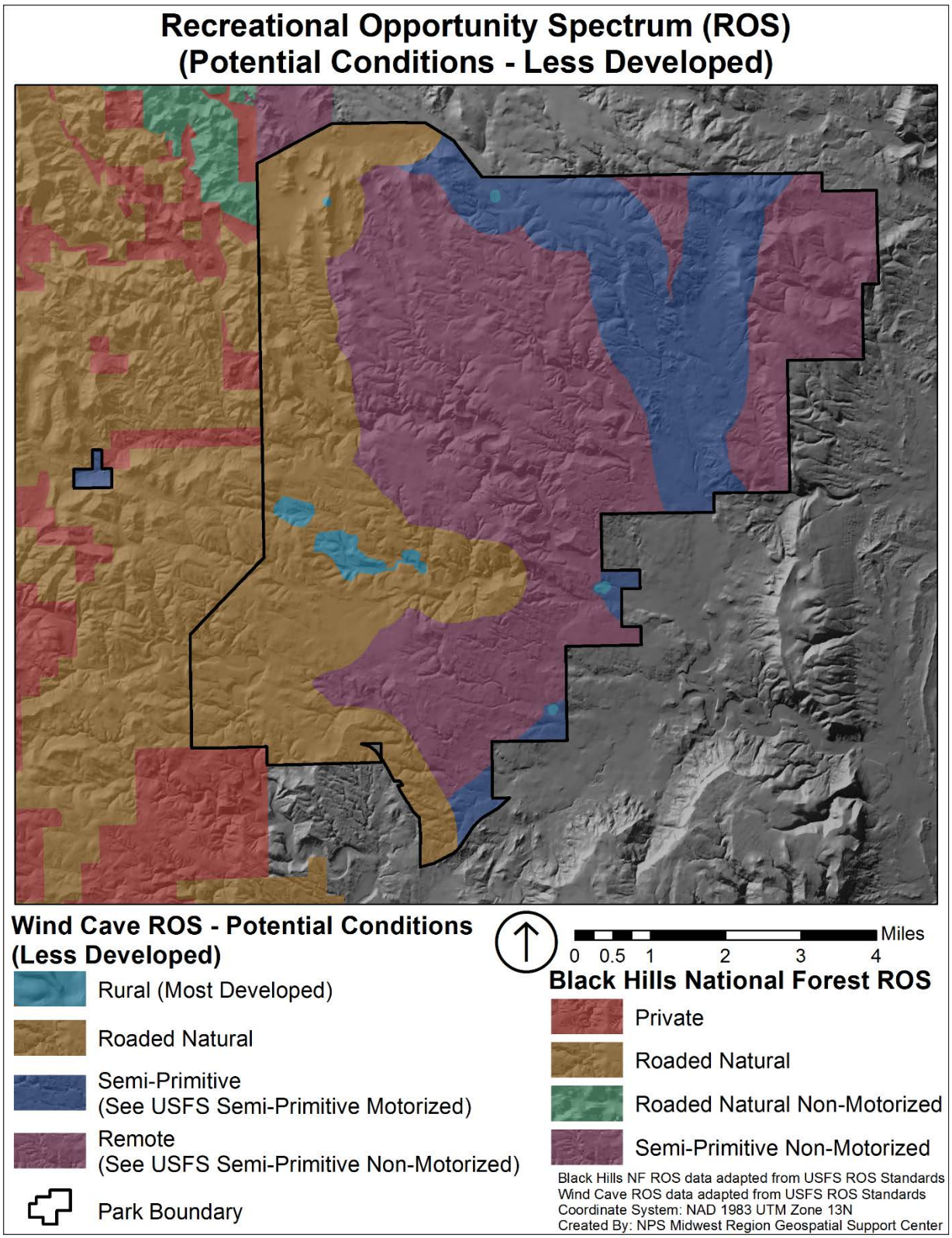
    a. Low Sensitivity (Surveyed, No Resources Found)

    b. Unknown (Unsurveyed)

    c. High Sensitivity (Surveyed, Resources Present)


Recreational Opportunity Spectrum (ROS)
(Existing Conditions)
Wind Cave ROS - Existing Conditions
Rural (Most Developed)
Roaded Natural
Semi-Primitive
(See USFS Semi-Primitive Motorized)
Remote
(See USFS Semi-Primitive Non-Motorized)
Park Boundary
Miles
0 0.5 1 2 3 4
Black Hills National Forest ROS
Private
Roaded Natural
Roaded Natural Non-Motorized
Semi-Primitive Non-Motorized
Black Hills NF ROS data adapted from USFS ROS Standards
Wind Cave ROS data adapted from USFS ROS Standards
Coordinate System: NAD 1983 UTM Zone 13N
Created By: NPS Midwest Region Geospatial Support Center


Recreational Opportunity Spectrum (ROS)
(Potential Conditions - More Developed)
Wind Cave ROS - Potential Conditions
(More Developed)
Rural (Most Developed)
Roaded Natural
Semi-Primitive
(See USFS Semi-Primitive Motorized)
Remote
(See USFS Semi-Primitive Non-Motorized)
Park Boundary
Miles
0 0.5 1 2 3 4
Black Hills National Forest ROS
Private
Roaded Natural
Roaded Natural Non-Motorized
Semi-Primitive Non-Motorized
Black Hills NF ROS data adapted from USFS ROS Standards
Wind Cave ROS data adapted from USFS ROS Standards
Coordinate System: NAD 1983 UTM Zone 13N
Created By: NPS Midwest Region Geospatial Support Center


Recreational Opportunity Spectrum (ROS)
(Potential Conditions - Less Developed)
Wind Cave ROS - Potential Conditions
(Less Developed)
Rural (Most Developed)
Roaded Natural
Semi-Primitive
(See USFS Semi-Primitive Motorized)
Remote
(See USFS Semi-Primitive Non-Motorized)
Park Boundary
Miles
0 0.5 1 2 3 4
Black Hills National Forest ROS
Private
Roaded Natural
Roaded Natural Non-Motorized
Semi-Primitive Non-Motorized
Black Hills NF ROS data adapted from USFS ROS Standards
Wind Cave ROS data adapted from USFS ROS Standards
Coordinate System: NAD 1983 UTM Zone 13N
Created By: NPS Midwest Region Geospatial Support Center

RECREATIONAL OPPORTUNITY SPECTRUM ANALYSIS METHODOLOGY:

1. Create a 3 mile buffer from the Park boundary.

2. Create a 3 mile and ½ mile buffer from all roads within the previously buffered area (see step 1).

3. Areas further than 3 miles from any road are assigned preliminary "Primitive" classification and areas between ½ mile and 3 miles from any road are assigned preliminary "Semi-Primitive, Non-Motorized" classification.

4. Areas within ½ mile of a paved road are assigned preliminary "Roaded Natural" classification, while areas within ½ mile of a gravel road are assigned preliminary "Semi-Primitive, Motorized" classification.

5. Verify all areas with preliminary "Semi-Primitive, Non-Motorized" classifications are at least 2500 acres or more.

6. For Existing Conditions, distinguish between "Roaded Natural", "Rural" and "Urban" based on ROS definitions. Visitor Center/Headquarters, maintenance areas, housing areas and other developed areas within the Park are assigned preliminary "Rural" classification (for Wind Cave National Park, this is the "most developed" condition).

7. Resolve inconsistencies such as:

    a. *"Evidence of Humans"*: create a 1/8 mile buffer from existing fence lines, power lines, trails, two-track roads, other human modifications and infrastructure; within these buffers consider "Semi-Primitive, Motorized" classification.

    b. *"Social Setting"*: consider "Semi-Primitive, Non-Motorized" for backcountry camping areas, "Roaded Natural" at waysides and parking overlook areas, and "Rural" for administrative areas, picnic areas, main campground and cave entrance.

    c. Identify all administrative areas that are closed to the public (such as waste water treatment facilities, bison corrals, fire cache, etc.).

8. Because lands in newly acquired Casey Property are not currently zoned and only open for public use by ranger-led tour, the two scenarios labeled "Potential – More Developed" and "Potential – Less Developed" represent two possible future scenarios with regard to the two ROS categories (Semi-Primitive Motorized and Semi-Primitive Non-Motorized) rather than existing conditions.

ROS Setting Characterization (Defined by USFS and adapted for Wind Cave)

Remote (called 'Semi-Primitive Non-Motorized' in USFS ROS)
Area is characterized by a predominantly natural of natural-appearing environment of moderate-to-large size. Interaction between users is low, although evidence of other users may be apparent. The area is managed in such a way that minimum on-site controls and restrictions may be present, but are subtle. Motorized use is generally not permitted, except in limited cases for administrative purposes when authorized by the Park superintendent.

Semi-Primitive (called 'Semi-Primitive Motorized' in USFS ROS)
Area is characterized by a predominantly natural of natural-appearing environment of moderate-to-large size. Concentration of users is low but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but are subtle. Motorized use is permitted on designated roads, and in limited cases for administrative purposes when authorized by the Park superintendent.

Roaded Natural
Area is characterized by predominantly natural appearing environments with moderate evidences of the sights and sounds of humans. Such evidences usually harmonize with the natural environment. Interaction between users may be low to moderate, and evidence of other users may be prevalent. Resource modification practices are evident, but harmonize with the natural environment. Conventional motorized use is provided for in construction standards and design of facilities within developed areas and established roads.

Rural
Area is characterized by a substantially modified natural environment. Resource modification and utilization practices are to enhance specific recreation activities and to maintain vegetative cover and soil. Sights and sounds of humans are readily evident, and the interaction between users is often moderate to high. A considerable number of facilities are designed for use by a large number of people. Facilities are often provided for special activities. Moderate densities are provided far away from developed sites. Facilities for intensified motorized use and parking are available.

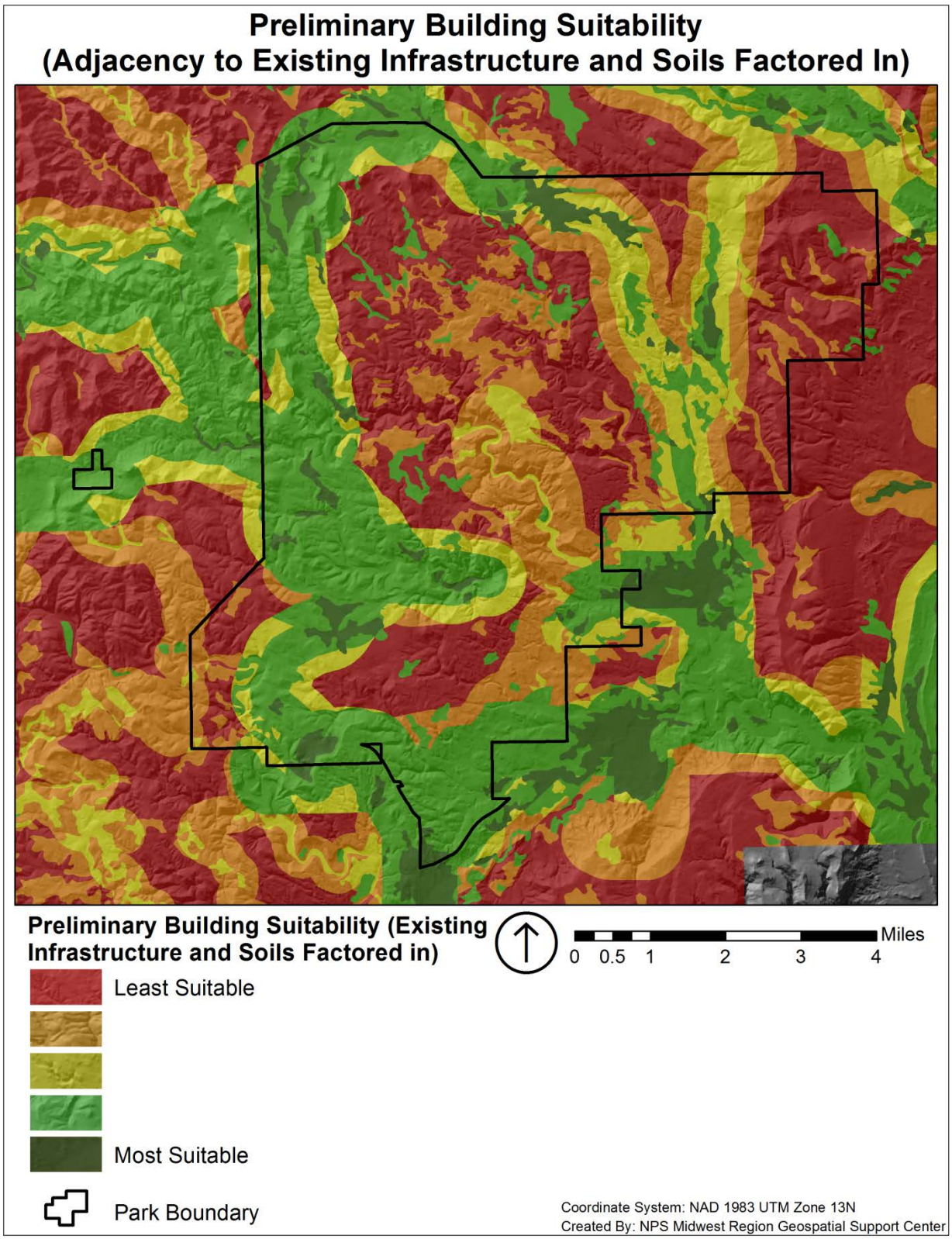
ROS Experience Characterization (Defined by USFS and adapted for Wind Cave)

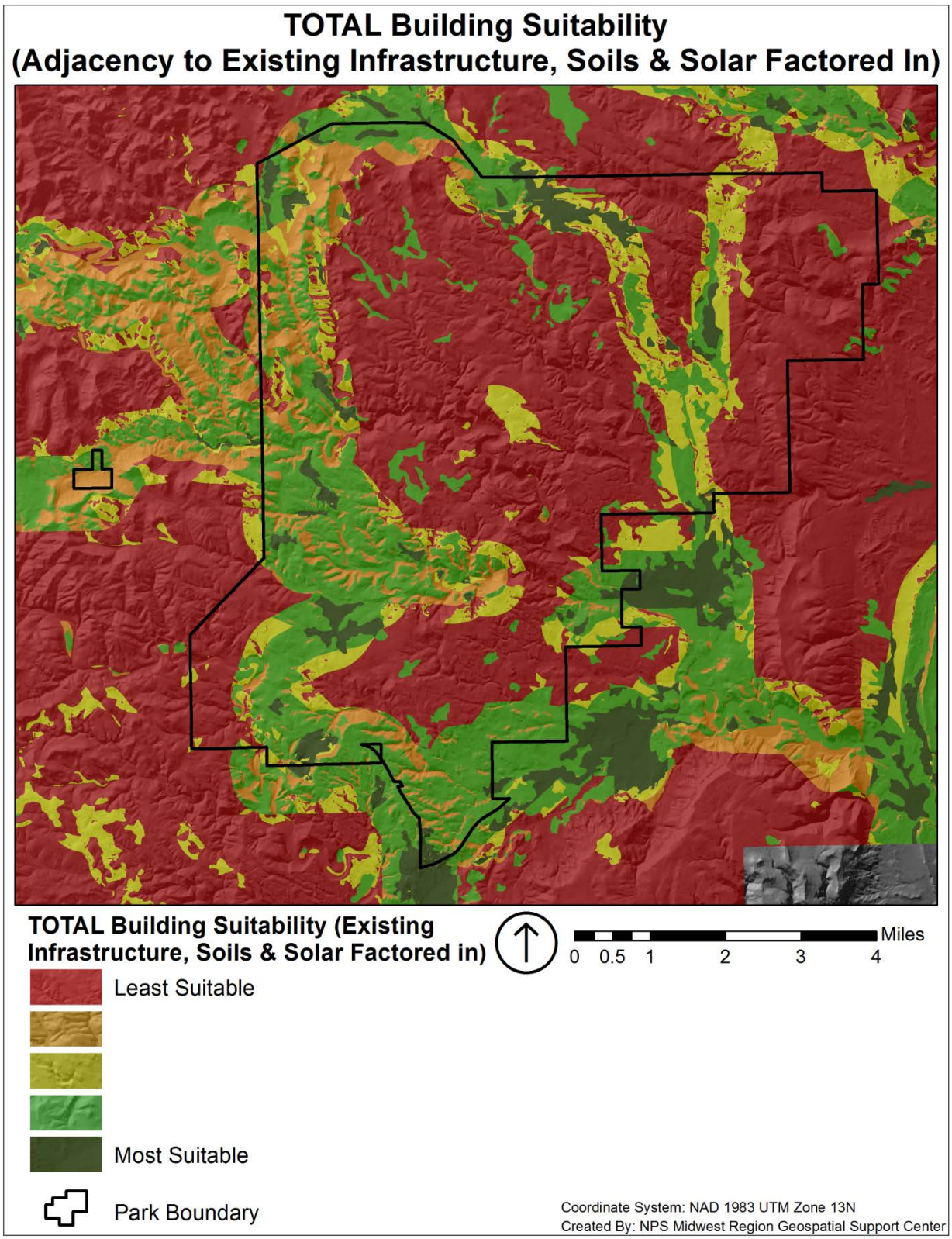
Remote (called 'Semi-Primitive Non-Motorized' in USFS ROS)
High, but not extremely high, probability of experiencing isolation from the sights and sounds of humans. Independence, closeness to nature, tranquility, and self-reliance through the application of woodsman and outdoor skills in an environment that offers challenge and risk.

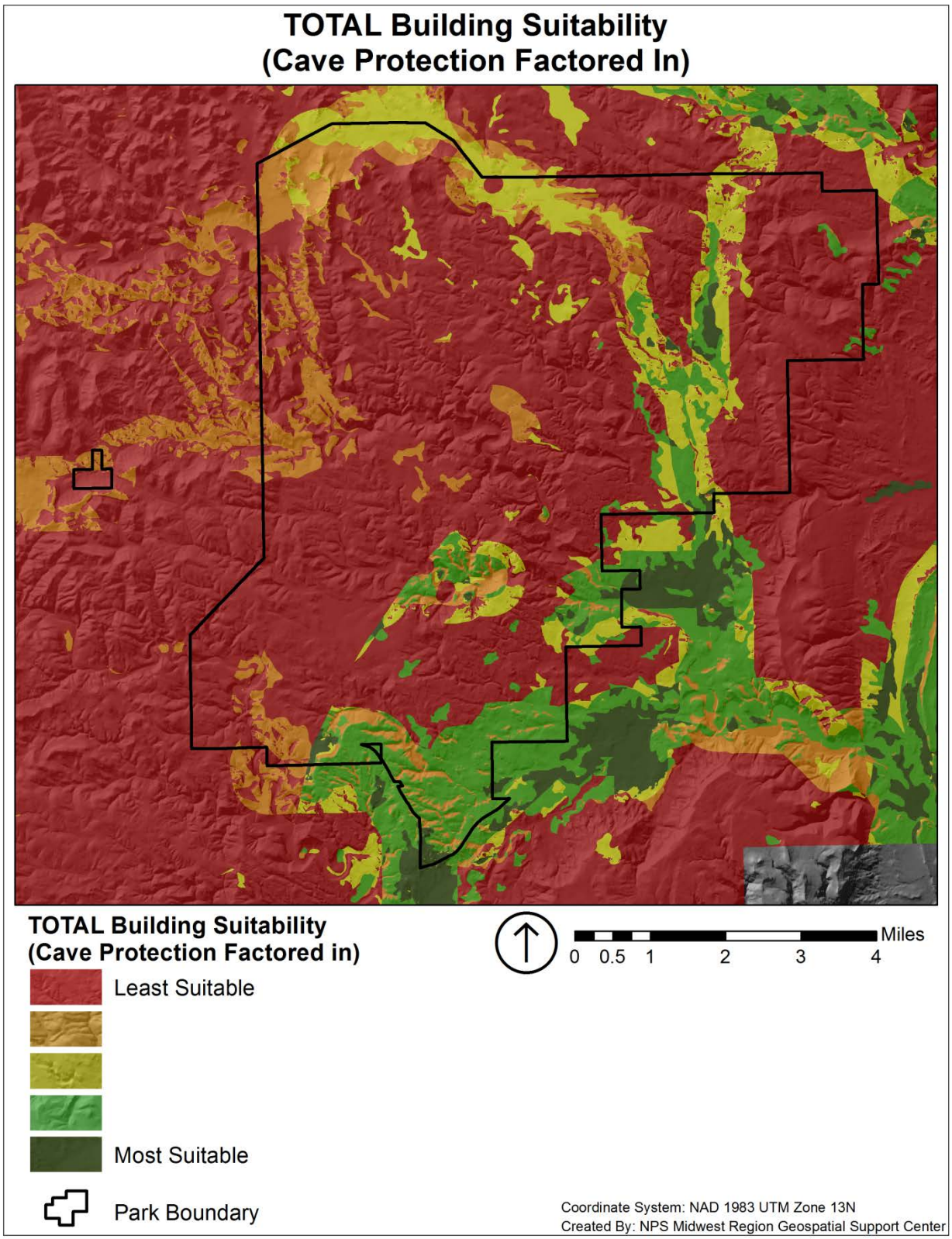
Semi-Primitive (called 'Semi-Primitive Motorized' in USFS ROS)
Moderate probability of experiencing isolation from the sights and sounds of humans. Independence, closeness to nature, tranquility and self-reliance through the application of woodsman and outdoor skills in an environment that offers challenge and risk. Opportunity to have a high degree of interaction with the natural environment.

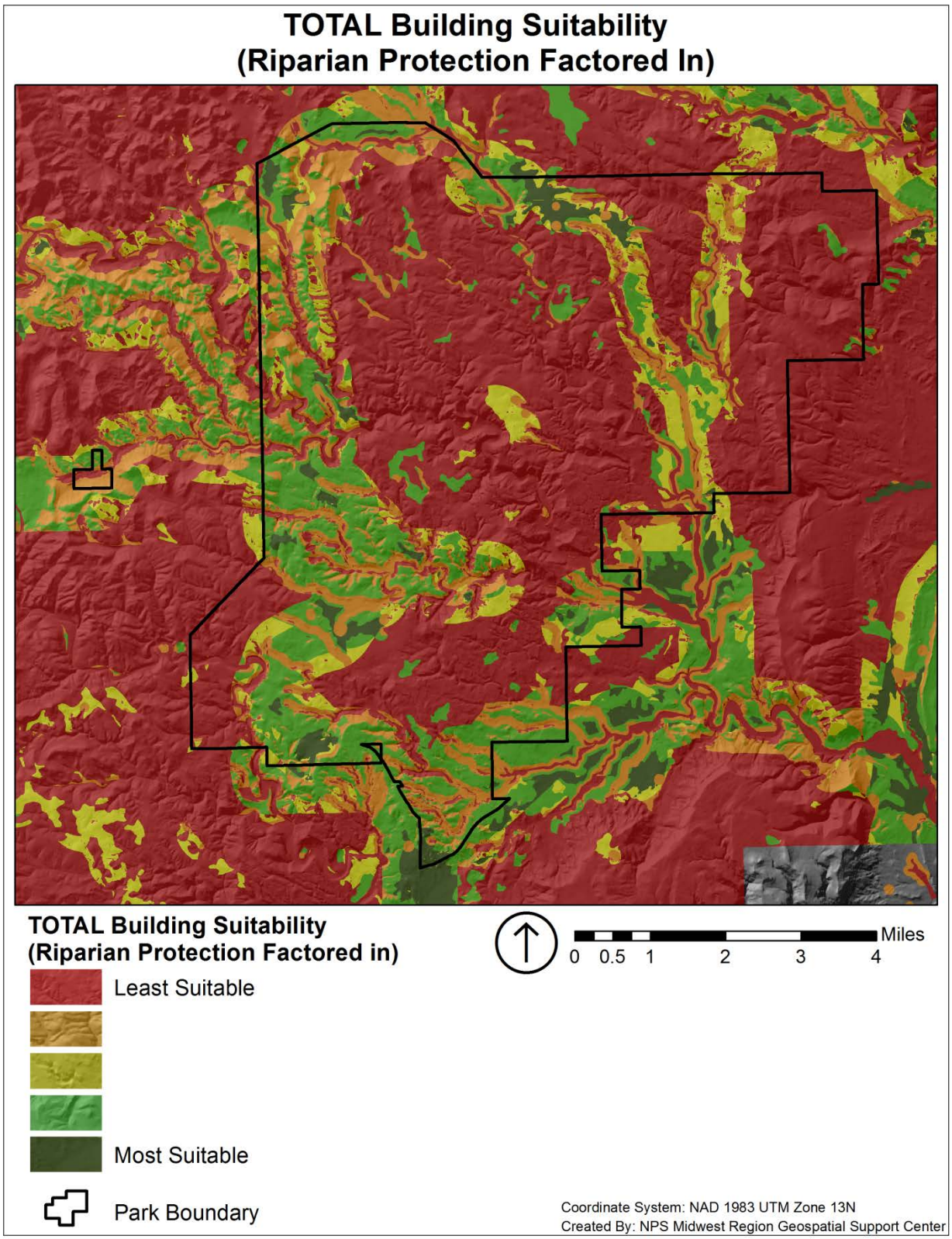
Roaded Natural
About equal probability to experience affiliation with other user groups and for isolation from sights and sound of humans. Opportunity to have a high degree of interaction with the natural environment. Challenge and risk opportunities associated with more primitive type of recreation are not very important. Practice and testing of outdoor skills might be important. Visitor opportunities for motorized forms of recreation and non-motorized forms of recreation away from developed roads are possible along Park roads.

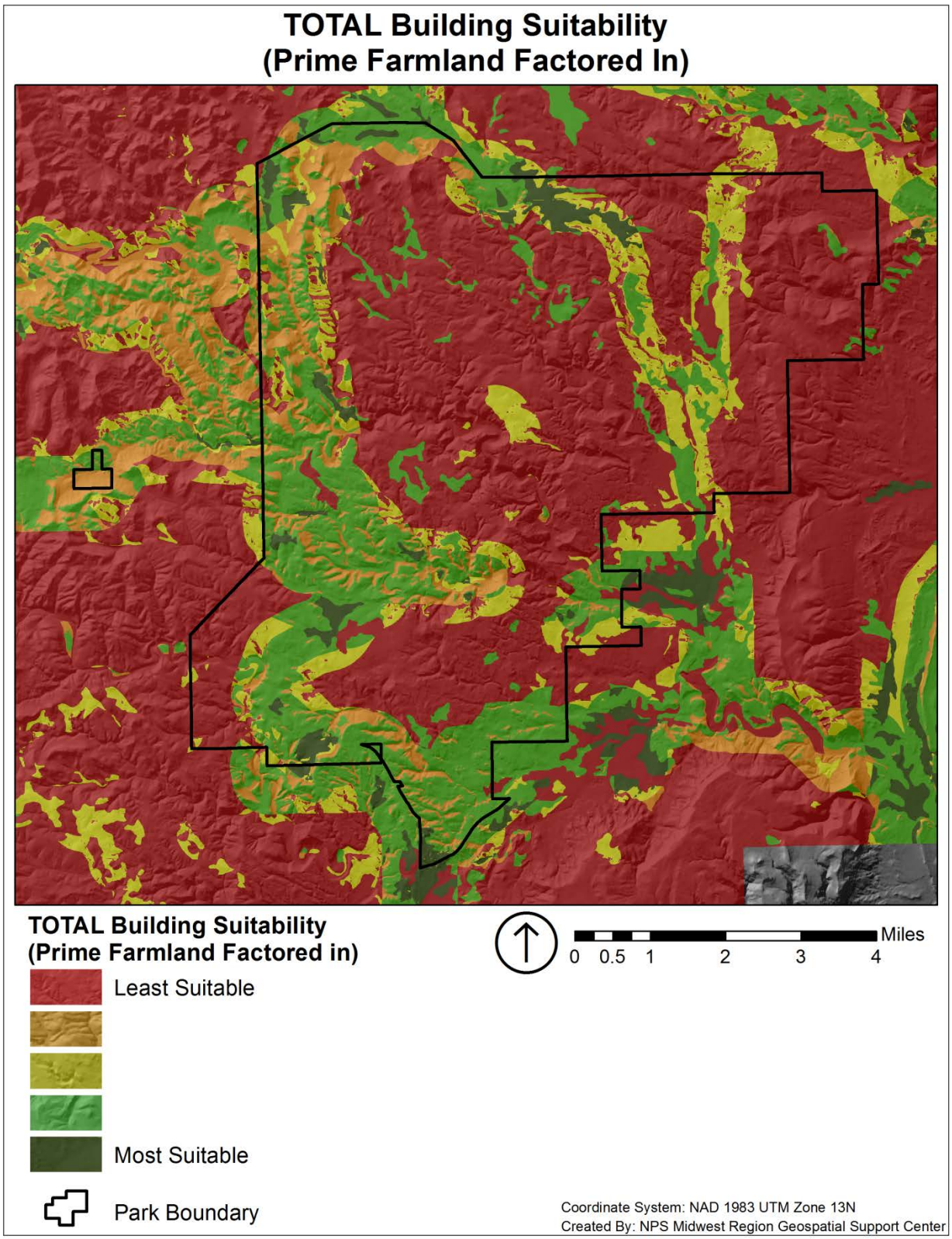
Rural
Probability for experiencing affiliation with individuals and groups is prevalent, as is the convenience of sites and opportunities. These factors are generally more important than the setting of the physical environment. Opportunities for wildland challenges, risk-taking, and testing of outdoor skills are generally unimportant.

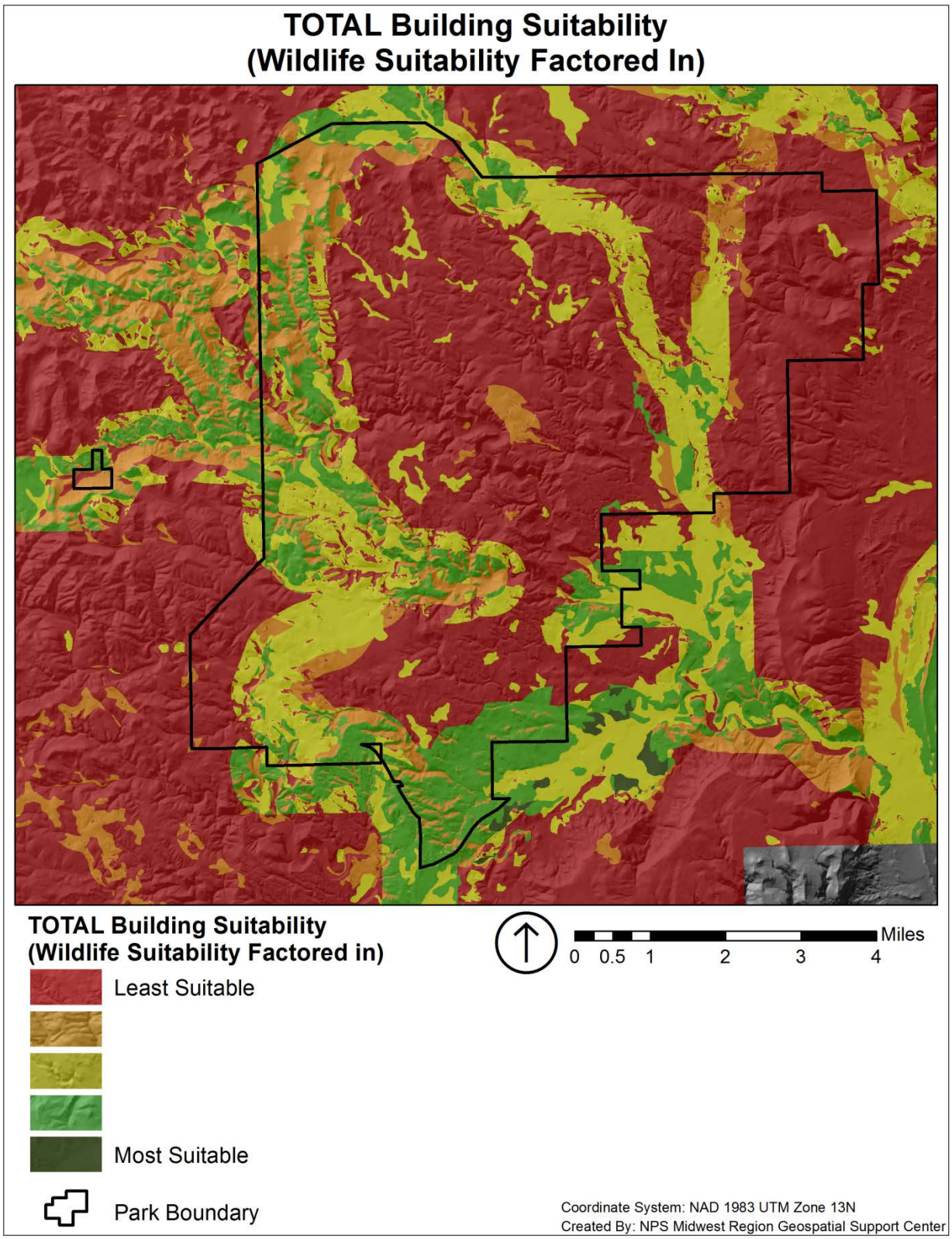

Preliminary Building Suitability
(Adjacency to Existing Infrastructure and Soils Factored In)
Preliminary Building Suitability (Existing Infrastructure and Soils Factored in)
Miles
0 0.5 1 2 3 4
Least Suitable
Most Suitable
Park Boundary
Coordinate System: NAD 1983 UTM Zone 13N
Created By: NPS Midwest Region Geospatial Support Center

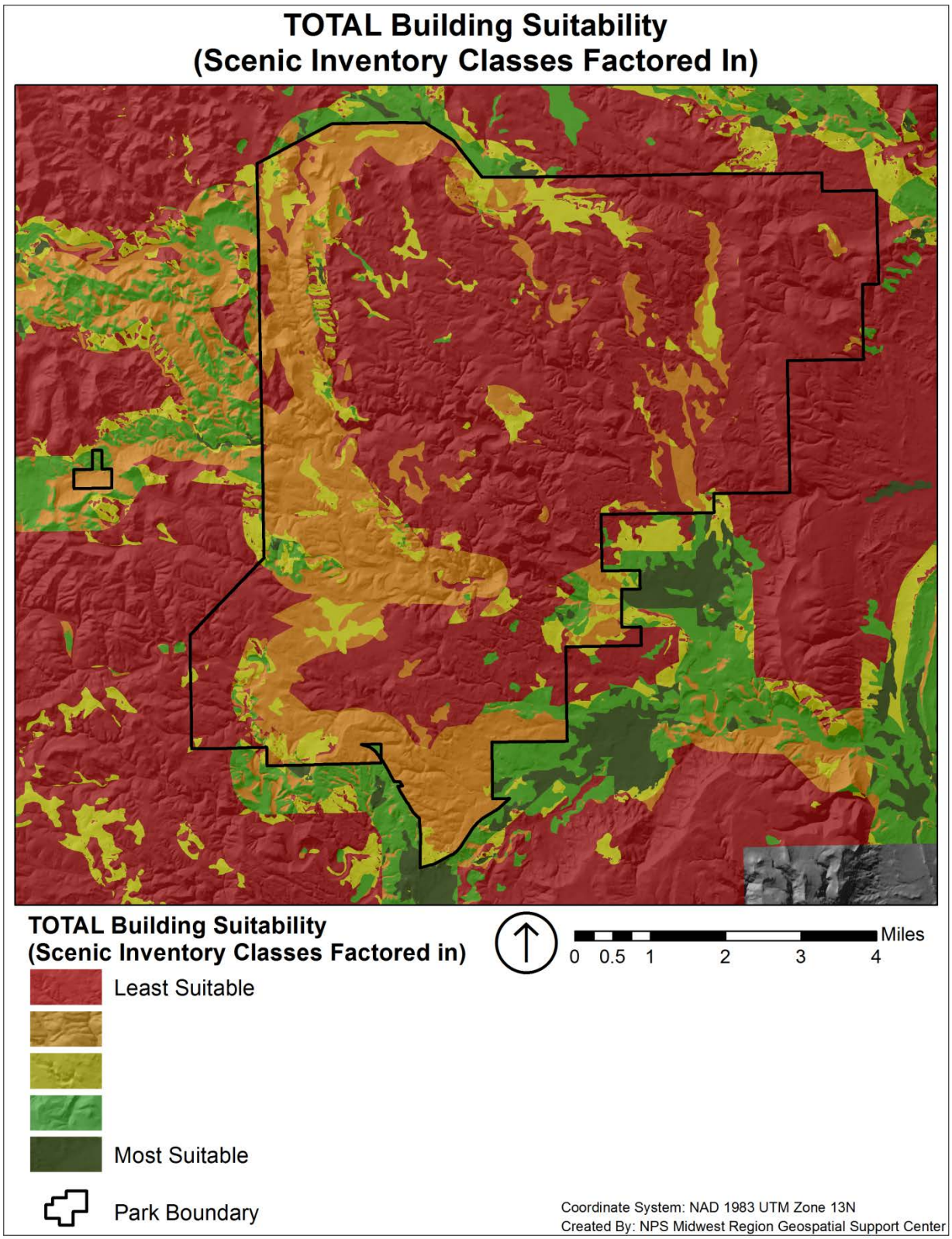

TOTAL Building Suitability
(Adjacency to Existing Infrastructure, Soils & Solar Factored In)
TOTAL Building Suitability (Existing Infrastructure, Soils & Solar Factored in)
Miles
0 0.5 1 2 3 4
Least Suitable
Most Suitable
Park Boundary
Coordinate System: NAD 1983 UTM Zone 13N
Created By: NPS Midwest Region Geospatial Support Center


TOTAL Building Suitability
(Cave Protection Factored In)
TOTAL Building Suitability
(Cave Protection Factored in)
Least Suitable
Most Suitable
Park Boundary
Miles
0 0.5 1 2 3 4
Coordinate System: NAD 1983 UTM Zone 13N
Created By: NPS Midwest Region Geospatial Support Center


TOTAL Building Suitability
(Riparian Protection Factored In)
TOTAL Building Suitability
(Riparian Protection Factored in)
Least Suitable
Most Suitable
Park Boundary
Miles
0 0.5 1 2 3 4
Coordinate System: NAD 1983 UTM Zone 13N
Created By: NPS Midwest Region Geospatial Support Center


TOTAL Building Suitability
(Prime Farmland Factored In)
TOTAL Building Suitability
(Prime Farmland Factored in)
Least Suitable
Most Suitable
Park Boundary
Miles
0 0.5 1 2 3 4
Coordinate System: NAD 1983 UTM Zone 13N
Created By: NPS Midwest Region Geospatial Support Center


TOTAL Building Suitability
(Wildlife Suitability Factored In)
TOTAL Building Suitability
(Wildlife Suitability Factored in)
Least Suitable
Most Suitable
Park Boundary
Miles
0 0.5 1 2 3 4
Coordinate System: NAD 1983 UTM Zone 13N
Created By: NPS Midwest Region Geospatial Support Center


TOTAL Building Suitability
(Scenic Inventory Classes Factored In)
TOTAL Building Suitability
(Scenic Inventory Classes Factored in)
Least Suitable
Most Suitable
Park Boundary
Miles
0 0.5 1 2 3 4
Coordinate System: NAD 1983 UTM Zone 13N
Created By: NPS Midwest Region Geospatial Support Center

BUILDING AND USE SUITABILITY ANALYSIS METHODOLOGY:

A. Preliminary Building Suitability (Adjacency to Existing Infrastructure & Soils Factored)

1. Reclassify soils GIS layer based on Soil Survey data in NRCS "Custer and Pennington Counties, Prairie Parts, South Dakota (Table 10: Building Site Development)" and "Custer and Pennington Counties, Black Hills Parts, South Dakota (Table 12: Building Site Development)".

2. Prepare ¼ and ½ mile buffers from:
   a. Roads
   b. Water Supplies and Wells
   c. Electricity and Power Lines

3. Combine and reclassify previous steps to create a range of preliminary building suitability where areas that have suitable soils for building site development and are near existing infrastructure are ranked most suitable and areas with poor soils for building site development and far from existing infrastructure are ranked least suitable.

B. TOTAL Building Suitability (Adjacency to Existing Infrastructure, Soils, and Solar Duration Factored)

1. Classify Solar Duration at winter solstice GIS layer (created using ArcGIS Area Solar Radiation Spatial Analyst Tool) into the following categories: [1] greater than 8 hours of direct incoming solar radiation, [2] 7-8 hours of direct incoming solar radiation, and [3] less than 7 hours of direct incoming solar radiation.

2. Combine and reclassify previous steps (A & B) to create a range of TOTAL building suitability where areas that have suitable soils for building site development, are near existing infrastructure and have highest potential for solar gain are ranked most suitable and areas with poor soils for building site development, are far from existing infrastructure and have lowest potential for solar gain are ranked least suitable.

C. Ensure base resource suitability layers (the various suitability layers created and described previously) are consistent and accurate prior to combining TOTAL Building Suitability with individual resource layers.

D. Compare Resource Sensitivities to TOTAL Building Suitability

1. On a resource by resource basis, combine (through Union geoprocessing function) TOTAL Building Suitability layer values ([1] to [5], Least to Most Suitable) with each resource sensitivity layer (Most to Least Sensitive).
   a. Most Suitable with Least Sensitive = Most Suitable with regard to each resource layer.
   b. Least Suitable with Most Sensitive = Least Suitable with regard to each resource layer.
   c. Most Suitable with Most Sensitive = decreased suitability, never higher than [3] on Building Suitability, depending on the resource type, with most having

combined Building and Resource suitability value no higher than [2] and decreasing to [1].

2. Each Building Suitability model combined with each individual Resource Sensitivity layer is informative for Park Management to determine best locations to permit future activities, allowable development types and intensities of use in the classical zoning model. Certain resource layers such as cave protection, riparian protection and scenery conservation will be prescriptive overlays, while TOTAL Building Suitability layers in combination with other Resource Sensitivity layers will all be informative as to the traditional management zones.

APPENDIX G: PROCESS FOR ADDRESSING SCENERY CONSERVATION AT WIND CAVE NATIONAL PARK

September 2013

This write up outlines the process used in identifying Scenery Conservation Inventory Classes and ultimately Scenery Conservation Management Classes as part of the Management Zoning Plan currently underway at **Wind Cave National Park.**

Primary Authorities:

August 25, 1916 National Park Service Organic Act:

> **Section 1.** *"…The service thus established shall promote and regulate the use of the Federal areas known as national parks, monuments, and reservations hereinafter specified by such means and measures as conform to the fundamental purpose of the said parks, monuments, and reservations,* ***which purpose is to conserve the scenery*** *and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."*

Legislation Establishing the Individual Park Unit and Subsequent Boundary Revisions (Amending Purpose)**:**

Act of January 9, 1903: *Established Wind Cave as a National Park (seventh oldest National Park), further being identified in the 1916 Organic Act establishing a National Park System. As such, scenic values are among those mandated for preservation at Wind Cave National Park.*

Act of March 4, 1931, (46 Stat. 1518)*: extended the boundary and included lands described therein and made these lands also subject to all laws and regulations applicable to the park* [1916 Organic Act]…

January 10, 1931 Memorandum *to Secretary of the Interior from Director regarding S. 5248: The bill as drawn would extend the boundaries of Wind Cave National Park…****This additional land will not only help to round out the boundaries but will also add areas that possess scenery highly typical of the lower Black Hills…***

June 15, 1935*, TITLE VI-TRANSFER OF WIND CAVE NATIONAL GAME PRESERVE TO THE DEPARTMENT OF THE INTERIOR; SECTION 601: That, effective July 1, 1935, the Wind Cave National Game Preserve in the State of South Dakota, be, and the same is hereby, abolished, and all the property, real or personal, comprising the same is hereby transferred to and made a part of the Wind Cave National Park and the same* ***shall hereafter ·be administered by the Secretary of the Interior as a part of said park, subject to all laws and regulations applicable thereto*** [1916 Organic Act], *for the purposes expressed in the Act of August 10, 1912 (37 Stat. 268-293), establishing said game preserve. (16 USC sec. 141b.)*

Act of November 10, 1978 *(92 Stat. 3467) SEC. 301: The boundaries of the following units of the National Park System are revised as follows, and there are authorized to be appropriated such sums as may be necessary, but not exceed the amounts specified in the following paragraphs for acquisitions of lands and interests in lands within areas added by reason of such revisions: (21) Wind Cave National Park, South Dakota: To add approximately two hundred and twenty-eight acres as generally depicted on the map entitled "Boundary Map, Wind Cave National Park, South Dakota", numbered 108-80,008, and dated July 1977: $227,000.*

December 12, 1977 Memorandum *to Regional Director from Chief of Legislative Affairs . . .Revise boundary by purchasing 240 acres of private land immediately adjacent to the park* ***to protect the southern entrance to the park from possible unsightly commercial development****. Legislative support data was supplied October 31, 1977.*

October 31, 1977 Memorandum *to Chief of Legislative Affairs from Regional Director . . .Although presently used for cattle grazing,* ***the owner is presently arranging the subdivision of his property into 20-acre parcels for public sale. This would lead to residential and commercial development. Since the area is immediately adjacent to the park, unsightly and undesirable development would upset the aesthetic character of the park.*** *Custer County, South Dakota does not have local zoning ordinances. It would seem, therefore, that no alternative to outright acquisition exists.*

October 31, 1977 *Legislative Support Data [regarding the addition of tracts adjacent to the park's southern entrance]:. . .****to provide a buffer area at the southern entrance to the park. This would in turn prevent the possibility of unsightly commercial development and provide scenic protection to maintain the natural character of the area****.*

Act of September 21, 2005 *(PL 109-71), S. 276 would authorize the expansion of Wind Cave National Park . . . These additions will protect archaeological sites such as a thousand-year-old Buffalo Jump, expand the backcountry,* ***preserve a viewshed****, and increase natural habitat for bison, elk, deer and pronghorn antelope.* ***The lands are a natural extension of the rolling hills and prairie that dominate the current park landscape and will help preserve the magnificent mixed-grass prairie and ponderosa pine forest of this natural treasure. . . .While the cave is the focal point of the park, the land above the cave is equally impressive with 28,295 acres of rolling prairie, majestic forests, and pristine creeks. . . .***

National Environmental Policy Act of 1969, 43 USC 4321 et. seq.;

> **1. Section 101 (b).** Requires measures be taken to "**...assure for all American...esthetically pleasing surroundings....**"
> **2. Section 102.** Requires agencies to "**Utilize a systematic, interdisciplinary approach which will ensure the integrated use of...Environmental Design Arts in the planning and decision making....**"

Please see Draft "Federal and State Scenery Protection Related Authorities" currently under development by the Renewable Energy Visual Resource Management Program in the Air Resource Division of the National Resource Stewardship and Science Directorate for a more comprehensive list of related authorities. Wind Cave is a Class I area subject to requirements in the Clean Air Act.

This write up is not complete, but begins to outline and illustrate the process used, **as adapted** from the established Visual Resource Management (VRM) Program in the Bureau of Land Management (BLM) (Department of the Interior) and the Scenery Management System (SMS) Program in the US Forest Service (USFS) (Department of Agriculture), **and adjusted** for use within National Park System managed and/or administered lands, addressing laws, policies and mission specific to this agency. This process also follows the process outlined in the "Draft Scenery Guidance Master A 08 26 2010" document developed to address proposed Energy Developments outside of NPS Unit Boundaries.

The VRM system as outlined in BLM Manuals H-8400-1 and H-8410-1 provides the primary methodology for this process as do portions of the SMS program for other aspects of the process, as outlined in Agricultural Handbook Number 701. This outline/write up does not attempt to reproduce all components within each of these other programs/systems, but rather is intended to address specific steps taken during this process that 1) either differ from VRM or SMS processes, or 2) help to elaborate and/or provide details on any additional or specific steps that have been adapted as part of an NPS Scenery Conservation System and Process.

Components and Steps for Establishing a Scenery Conservation System

A. Inventory and Establishment of Desired Conditions

- **I. Scenic Quality - Inventory and Evaluation Form** based on USFS and BLM evaluation charts, modified for NPS use (see attached form/process)
- **II. Sensitivity Viewshed Spread Analysis** –based on GIS analysis of USGS DEMs or other digital elevation data
  Public Input may be included –based on photo examples (modified Steinitz method) -ability to capture audiences both locally and globally to reach a representative cross section of diverse populations
- **III. Distance Zone Analysis** –based on the principals of Foreground (FG), Middle ground (MG) and Background (BG) established for each physiographic province and sub province combined with the mid-scale Ecoregion (between Level II & Level IV –Likely Level III, but may need specific tailoring); Use: *Ecoregions of the Continental United States, (as revised); National Health and Environmental Effects Research Laboratory, US Environmental Protection Agency* [1] – would also use a GIS viewshed spread function. FG, MG & BG distances will vary based on location.
- **IV. Scenic Integrity** –The measure/degree by which the landscape is visually perceived to be "complete". Combines Scenic Quality Assessments with a process *similar to* a National Register type integrity evaluation and portions of USFS Scenic Integrity Component. Scenic Integrity differs from *both* Landscape (Ecological) Integrity and Historic Integrity, but the concept is nearly the same
- **V. Land Use Types** –Based on broadscale mapping –i.e., Industrial, Urban, Suburban, Rural, Agricultural, Natural…
- **VI. Vulnerability** –Based on an Index of Vulnerability Concept that predicts potential impacts due to development activities, natural events or other non-compatible visual intrusions.
- **VII. Ideal Condition/Desired Future Condition** –<u>This is integral to the management zoning process and establishes future goals to be achieved</u>. –Mapped and described. As part of the Management Zoning process, Scenic *Inventory* Classes will be factored in with other resource values, needs and requirements to establish and delineate Scenery Conservation *Management* Classes and will include scenery conservation objectives based on associated individual classifications. <u>*Park Purpose will be the fundamental basis for establishing desired future conditions for overall Park Management goals and objectives</u> and these will differ based on unit and unit type (i.e., Parks established primarily for natural *or* cultural resources, Parks established for natural *and* cultural resources, Battlefields, Trails, Wild and Scenic Rivers, Wilderness Areas, etc.)

B. Mitigation for Proposed Actions that may adversely affect Desired Conditions

The BLM Visual Contrast Rating System has been adopted as it provides a solid and robust methodology for addressing existing or potential impacts to scenery/visual resources and includes design solutions to avoid, minimize and mitigate proposed actions that may threaten (in this case – NPS) managed and administered scenic resources

C. Achieving the Future Ideal/Desired Future Conditions

- **I. Management Zoning and Scenery Conservation Management Classes**
- **II. Land Protection Plan (LPP)** (Provides guidance for future actions to protect resources, consistent with the purposes for which the unit was established with specific emphasis on scenic vista conservation for the use and enjoyment of the public. Options range from acquisition of land, to interest in land, to agreements with landowners) The LPP will: 1) Determine the appropriate means of protection to achieve legislated Park purpose, either by boundary adjustments (acquisition or otherwise), 2) Inform landowners about NPS intentions, 3) Set priorities for accomplishing land protection, 4) Identify opportunities for the National Park Service to cooperate with other individuals and agencies
- **III. Steps/Strategies** (Implementation Treatments)
- **IV. Partnership Agreements** (Implementation Actions and Agreements)

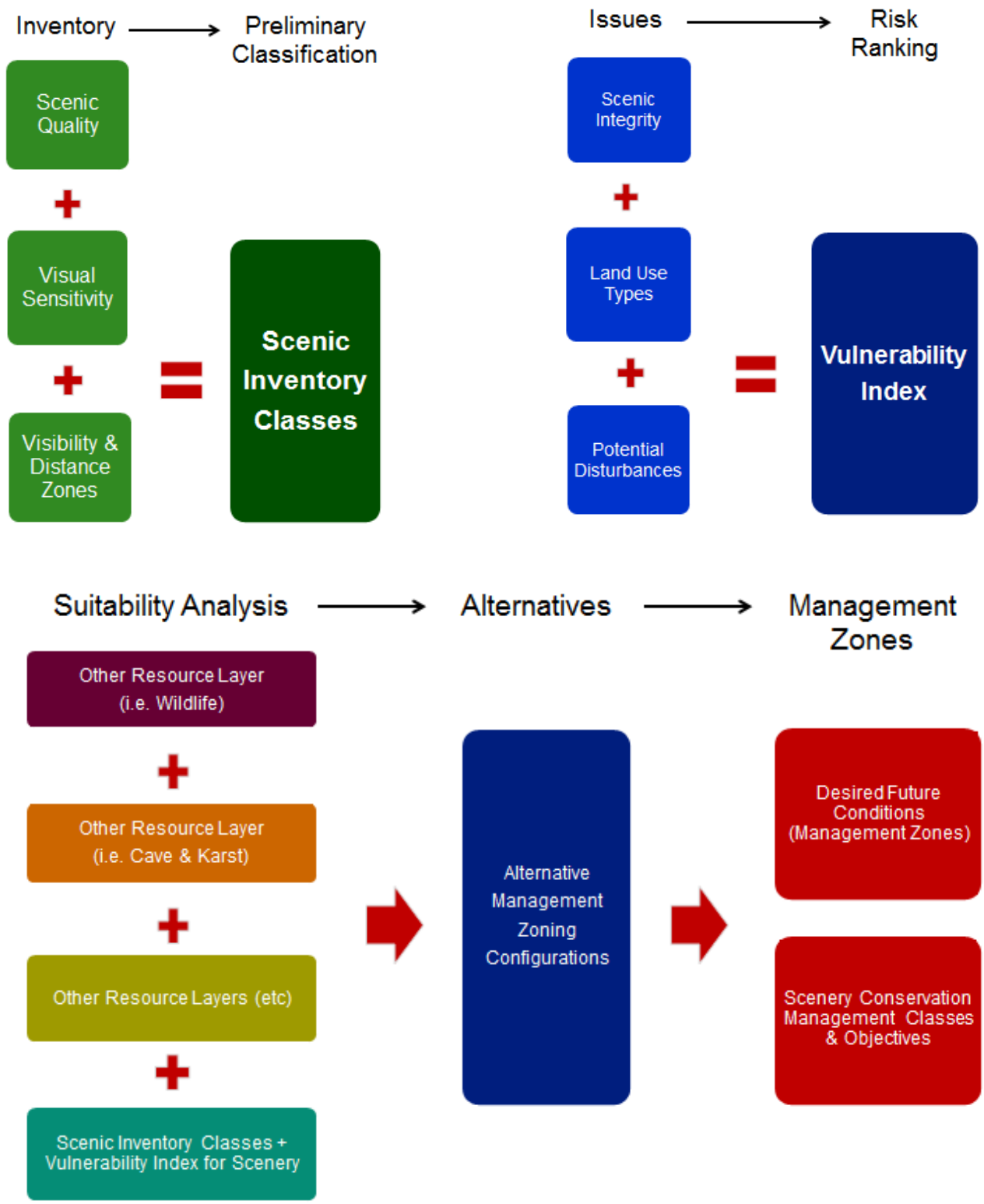
Steps:

1. Scenic Quality +
2. Viewshed Sensitivity +
3. Distance Zone =
   Inventory Class
4. Scenic Integrity+
5. Land Use Types+
6. Potential Human or Natural Disturbances =
   Index of Vulnerability
7. Visual/Scenic Inventory Class + Index of Vulnerability + Other Resource Considerations = **Management Zones, Desired Future Conditions & delineated Scenery Conservation Management Classes with associated Objectives**
8. Management Zone + Vulnerability/Proposed Actions = **Mitigation** (See BLM Manual 8431 for details)
9. **Land Protection Plan** provides detailed steps for achieving management zoned desired future conditions, goals and objectives on lands *within and outside* of the Park unit boundary (While a LPP is not *required* for lands outside the Park boundary, the LPP is the best vehicle to address impacts to Park scenery on adjacent lands)

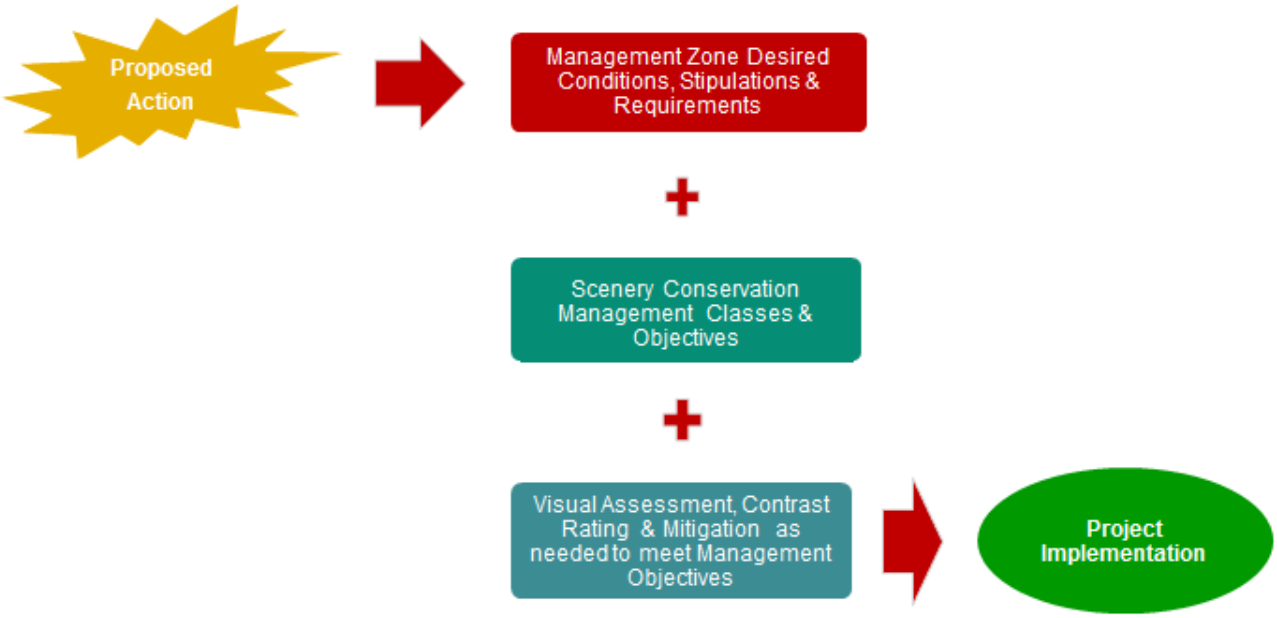
Notes:

[1]:From "Ecoregions of the Continental United States" Ecoregions have been derived from Omernik (1987) and from refinements of Omernik's framework that have been made for other projects. These ongoing or recently completed projects, conducted in collaboration with the US EPA regional offices, state resource management agencies, and with other federal agencies, involve refining ecoregions, defining subregions, and locating sets of reference sites. Designed to serve as a spatial framework for environmental resource management, ecoregions denote areas within which ecosystems (and the type, quality, and quantity of environmental resources) are generally similar. The most immediate needs are to develop regional biological criteria and water quality standards and to set management goals for nonpoint source pollution.
The approach used to compile this map is based on the premise that ecological regions can be identified through the analysis of the patterns and the composition of biotic and abiotic phenomena that affect or reflect differences in ecosystem quality and integrity (Wiken 1986; Omernik 1987, 1995). These phenomena include geology, physiography, vegetation, climate, soils, land use, wildlife, and hydrology. The relative importance of each characteristic varies from one ecological region to another regardless of the hierarchical level. Because of possible confusion with other meanings of terms for different levels of ecological regions, a Roman numeral classification scheme has been adopted for this effort. Level I is the coarsest level, dividing North America into 15 ecological regions, whereas at Level II the continent is subdivided into 50 classes (CEC 1997). Level III is the hierarchical level shown on this map. For portions of the United States (see map inset) the ecoregions have been further subdivided to Level IV. The applications of the ecoregions are explained in reports and publications from the state and regional projects (e.g., Bryce et al., 1998, 2003; Chapman et al., 2001, 2006; Daigle et al., 2006; Gallant et al., 1989, 1995; Griffith et al., 1998, 2002, 2004; McGrath et al., 2002; Omernik et al., 2000, 2004; Thorson et al., 2003; and Woods et al., 1996, 2002, 2004). For additional information, contact James M. Omernik, US EPA National Health and Environmental Effects Laboratory (NHEERL), 200 SW 35th Street, Corvallis, OR 97333

PROCESS FLOW CHART



ADDRESSING POTENTIAL EFFECTS OR IMPACTS TO SCENERY OF PROJECT PROPOSALS USING PARK MANAGEMENT ZONES AND SCENERY CONSERVATION MANAGEMENT CLASSES



I. Scenic Quality Evaluation.

Scenic quality is a measure of the visual appeal of a tract of land. In the visual resource inventory process, the landscape within the planning area is subdivided into scenic quality rating units and each unit is given an A, B, or C rating based on the apparent scenic quality. Scenic quality is determined using seven key factors: landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications. During the rating process, each factor is ranked on a comparative basis with similar features within the physiographic region and ecoregion.

Because *of the differences in conceptual approaches and mapping methodologies applied to develop the most common* physiographic and *ecoregion-type frameworks,* it will be important to reference and consider several different frameworks when identifying and determining the contextual region. Physiographic regions are broad-scale subdivisions based on terrain texture, rock type, and geologic structure and history and *Ecoregions denote areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources.*

Begin by first identifying the physiographic division, province and section(s) where the study area is located, as delineated in the "Physiographic Regions of the United States" by Nevin Fenneman. The boundaries of these provinces may be refined to fit local situations after reviewing and comparing the associated ecoregional contexts. "Ecoregions of the United States" *(USFS;* R. C. *Bailey and others, 1994),* "Ecoregions of the Continental United States" *(USEPA; Omernik, 1987, 1995), and* "Major Land Resource Areas of the United States" *(NRCS; US Department of Agriculture–Soil Conservation Service, 1981)* are three primary resources that will be helpful in making these refinements.

An important premise of the Scenic Quality Evaluation is that all public lands have scenic value, but areas with the most variety and most harmonious composition have the greatest scenic value. Another important concept is that the evaluation of scenic quality is done in relationship to the natural landscape. This does not mean that man-made features within a landscape necessarily detract from the scenic value. Man-made features that complement the natural landscape may enhance the scenic value. Evaluations should avoid any bias against man-made modification to natural landscape.

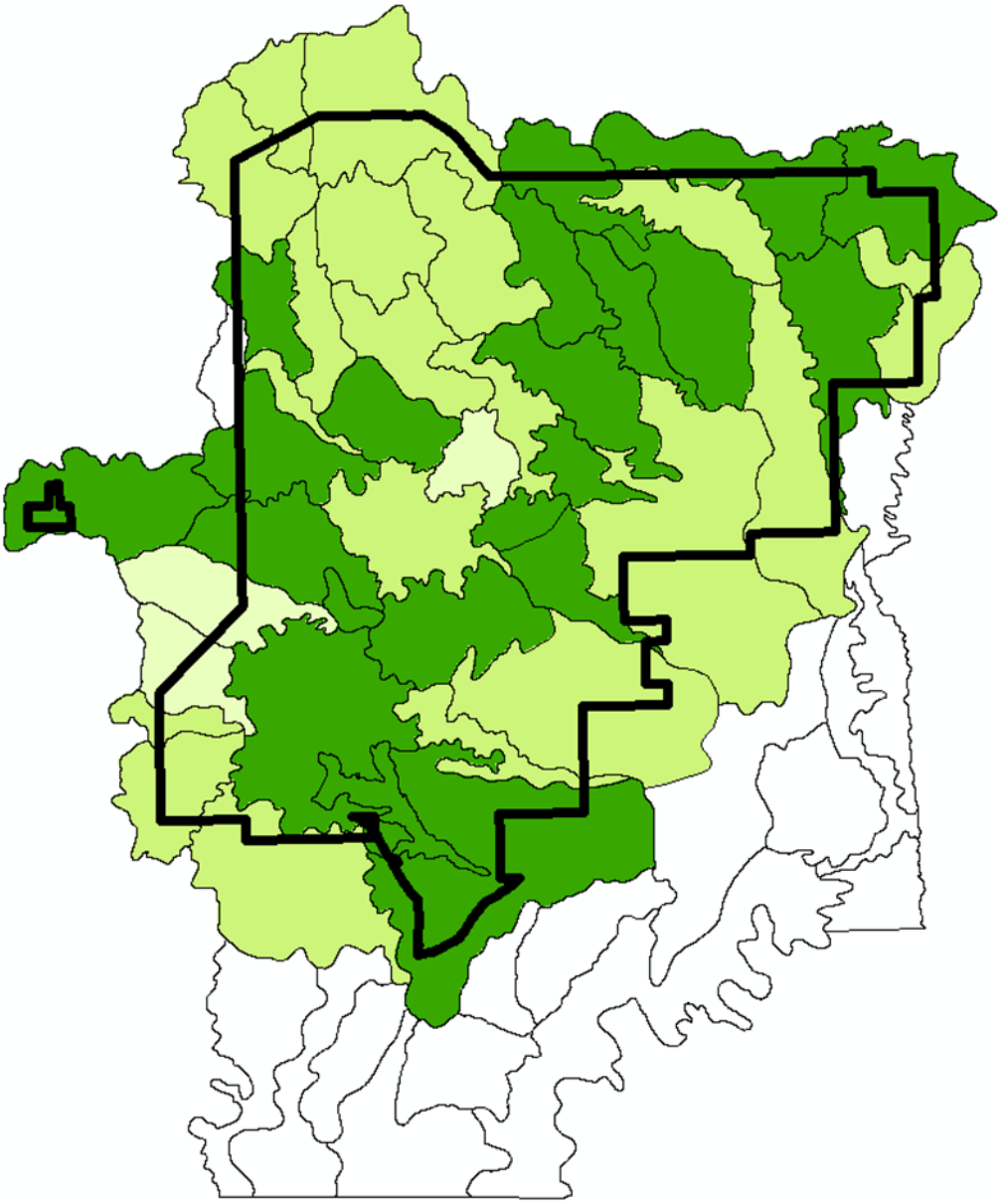
A. Delineating Scenic Quality Rating Units (SQRU's). The planning area is subdivided into scenic quality rating units for rating purposes. Rating areas are delineated on a basis of: like biophysical characteristics; similar visual patterns, texture, color, variety, etc.; and areas which have similar impacts from man-made modifications. The size of SQRU's may vary from several thousand acres to 100 or less acres, depending on the homogeneity of the landscape features and the detail desired in the inventory. Normally, more detailed attention will be given to highly scenic areas or areas of known high sensitivity. Map and number each SQRU as a distinct map layer.

B. Evaluating Scenic Quality. It is recommended that an interdisciplinary team do the evaluations. Ideally, one team member should have an environmental design arts background. All participants should have an understanding of the visual resource inventory system and be familiar with the areas to be evaluated. Evaluate each SQRU by observing the area from several important viewpoints. Scores should reflect the evaluator's overall impression of the area. After evaluating all the SQRU's, show the scenic ratings on the scenic quality map layer. Record the rating on the Scenic Quality Rating Summary Form. Individual forms/worksheets should be used for completing each scenic quality evaluation. A photographic record should be maintained for the area. Photographs and completed evaluation forms should be filed for future reference.

Scenic Quality Inventory and Evaluation Form (as adapted from BLM rating form, Manual H-8410-1)

Key Factors	Rating Criteria and Score		
Landform	Detail features are dominant and exceptionally striking and intriguing *relative to the physiographic sub-region* **5**	Interesting patterns or variety in size and shape of landforms are present, or detail features which are interesting though not dominant or exceptional *relative to the physiographic sub-region* **3**	Few or no interesting features *relative to the physiographic sub-region* **1**
Vegetation	A variety of vegetative (types/associations?) as expressed in interesting forms, textures, patterns **5**	Some variety in vegetation, but only one or two major (types/associations?) **3**	Little or no variety or contrast in vegetation **1**
Water	Water is a dominant factor in the landscape **5**	Water is present, but not dominant in the landscape **3**	Water is absent, or present, but not noticeable **0-1**
Color	Rich color combinations, variety or vivid color; or pleasing contrasts in the soil, rock, vegetation, water or snow fields **5**	Some intensity or variety in colors and contrasts of the soil, rock, vegetation, water or snow fields **3**	Subtle color variations, contrast or interest in soil, rock, vegetation, water or snow fields; generally mute tones **1**
Influence of Adjacent Scenery	Adjacent scenery greatly enhances the overall visual quality **5**	Adjacent scenery moderately enhances the overall visual quality **3**	Adjacent scenery has little or no influence on the overall visual quality **0–1**
Scarcity	One of a kind; or unusually memorable, or very rare within region **5**	Distinctive, though somewhat similar to others within the region **3**	Interesting within its setting, but fairly common with in the region **1**
Cultural Modifications	Modifications add favorably to visual variety while promoting visual harmony and may be commemorative or unobtrusive and currently provide recreational and interpretation opportunities related to the enabling legislation purposes **5**	Modifications add little or no visual variety, introduce no discordant elements, may be noticeable but not commemorative and have potential to provide future recreational/ interpretation development **0**	Modifications may add variety, but are strongly discordant, promote disharmony, are obtrusive and/or have no potential to provide future recreational opportunities **-5**

I. Scenic Quality Evaluation Units and Scores



Scenic Quality Classification

A	A = 19 or More
B	B = 12 – 18
C	C = 11 or Less

II. Sensitivity Level Analysis.

Sensitivity levels are a measure of public concern for scenic quality and landscape visibility. Public lands are assigned high, medium, or low sensitivity levels by analyzing the various indicators of public concern and visibility.

A. Delineation of Sensitivity Level Rating Units (SLRU's).

There is no standard procedure for delineating SLRU's. The boundaries will depend on the factor that is driving the sensitivity consideration. Consequently, a thorough review of the individual factors should be completed before any attempt is made to delineate SLRU's. Distance zone may also play an important role in identifying the SLRU boundaries.

B. Documentation Requirements.

1. Narrative. Prepare a summary statement with the essential facts and rationale to support the conclusions reached on sensitivity levels. The format for presenting this information is optional. As a minimum, the summary data must be entered in a comparable spreadsheet format. Backup information used to evaluate each of the factors should be maintained with the inventory record.

2. Map Overlay. Prepare an individual map layer showing the sensitivity rating units and ratings.

C. Completion of Sensitivity Rating.

Determine the overall sensitivity level for each rating unit. This process requires careful analysis of the individual factors for each delineated sensitivity rating unit. Review the ratings given to each factor and then analyze the relationship between factors for each rating unit. A high rating in any one factor does not necessarily mean that the overall sensitivity level rating should be high. For example, the rating for "type of users" might be high, but the "amount of use" might be low. Depending on all of the other factors and considerations, the overall rating could range from low to moderate or high. The sensitivity analysis provides for a relative comparison of different areas both within the specific Park unit and generally within the overall landscape context and setting. The range of factors and possible outcomes are designed to be analyzed as a collaborative, consensus based process as there is no one single outcome for each unit. Ideally, the rating should be done as a team effort involving the Park or Regional Scenery Conservation System (SCS) Coordinator, appropriate Park Manager(s), and at least one other staff person. If timing or funding will to allow this approach, the rating may be done by the SCS coordinator and reviewed by the Park management team and superintendent. Park management should be in agreement on the summary rating for each SLRU.

D. Factors to Consider.

1. Type of Users/Context of Viewers. Visual sensitivity will vary with the type of users and the context for which scenery is being viewed. Recreational sightseers may be highly sensitive to any changes in visual quality, whereas workers or commuters who pass through the area on a regular basis for purposes unrelated to Park designation may not be as sensitive to change. Inherent conflicts often exist between locals and those who live far from the area and for this reason, Viewer Expectations, Perspectives, professional backgrounds, Reason for Visit, and Individual Values related to the significance or importance of scenic and other aesthetic qualities of the landscape must be considered. Determining feelings, values, desires, preferences and expectations in terms of landscape character and scenery management is neither simple nor uniform as every individual brings a different perspective to the Park setting. As with all sensitivity factors, Park purpose and legal mandate to "conserve the scenery" provides the ultimate baseline for evaluating this factor. *Consider:*

Visitor feelings – sensory responses to visible scenes and settings
Visitor values – importance or worth of aesthetics
Visitor expectations – anticipated encounters and experiences
Visitor desires – what is desired by visitors provided there are no constraints

Visitor preferences – what choices would be made among a range of available options
Acceptable levels of quality – what are the lowest standards permissible

Existing sources of information are likely available to help assess this factor. Visitor use studies, reports and surveys often contain salient information to help analyze this factor. Direct staff observations of visitor use patterns and trends as well as comments expressed by visitors related to the significance or importance of scenic and other aesthetic qualities of the landscape are also extremely valuable and quite pertinent.

Consider visitor actions, activities or behaviors that may directly relate to the scenic quality of a landscape:

- Are visitors observed viewing wildlife and birds with binoculars, are visitors engaged in landscape photography, or are visitors observed simply gazing into the field?
- Are there areas where visitors are repeatedly or frequently observed enjoying, experiencing or otherwise viewing the landscape, possibly indicating a common inherent scenic value or attribute of a particular location?
- Are there visitor use patterns, social behaviors, management activities or landscape modifications that may directly or indirectly affect opportunities for visitors to experience otherwise intrinsically valuable scenic landscapes?

Maintenance of visual quality is:

High – a major concern for most users
Moderate – a moderate concern for most users
Low – a low concern for most users

2. Amount of Use/Number of Viewers. Areas seen and used by large numbers of people are potentially more sensitive. Protection of visual values usually becomes more important as the number of viewers increase. However, this is just one factor considered in sensitivity analysis because there are cases where few viewers may have high sensitivity (e.g., wilderness or pristine, undeveloped areas). When evaluating this factor, consider Factor #1, the type of users, and potential differences between large and small numbers of viewers with high concern for scenery compared with large and small numbers of viewers with low concern for scenery.

High – high level of use
Moderate – moderate level of use
Low – low level of use

Table for classifying amount of use			
Type Area	**High**	**Moderate**	**Low**
Roads and Highways	45,000+ visitors/year	5,000-45,000 visitors/year	Less than 5,000 visitors/year
Rivers and Trails	20,000+ visitors/year	2,000-20,000 visitors/year	Less than 2,000 visitors/year
Recreation Sites	10,000+ visitors/year	2,000-10,000 visitors/year	Less than 2,000 visitors/year

3. Duration of View. The amount of time an area is "within view" is directly related to use and activity type. Duration of View also factors in the relative dynamic or fixed characteristics of the associated use and activity. For dynamic activities and uses, the associated rate (or speed) further affects this factor. Consider the differences in the dynamic and fixed qualities of differing uses and activity types such as, campgrounds, picnic areas, public viewing points or overlooks, visitor centers, other public use areas, trails, scenic drives, parkways and Park roads, general public use roads and highways with varying speed limits, paved and gravel roads, etc. In general, areas where the duration of view is longer tend to be more sensitive because the viewer is afforded more time to "view" the scene. Peripheral areas viewed while in motion are often less visually sensitive as the viewer is only provided fleeting glimpses, and as the speed or rate of travel increases, the peripheral "cone of vision" or "vertical and horizontal view angles" decrease to a more narrow view.

High	– long duration of view
Moderate	– moderate duration of view
Low	– short duration of view

4. Degree of Visibility. The degree of visibility directly correlates with topography, aspect and the physiographic profile of specific landscape features within a viewshed. High profile or elevated landscape features such as hills, mountainsides, cliff faces and other pronounced features that are seen or can be seen from many locations within the overall landscape have a high degree of visibility and can therefore be more sensitive to landscape disturbances. Landscape features such as valleys, canyons or other landscape depressions are generally less visible from most viewpoints within a landscape and therefore tend to have a low degree of visibility as these type features are generally not seen or seldom seen.

High	– high degree of visibility
Moderate	– moderate degree of visibility
Low	– low degree of visibility

5. Public Interest. The visual quality of an area may be of concern to local, State, or National groups. Indicators of this concern are usually expressed in public meetings, letters, newspaper or magazine articles, newsletters, land-use plans, etc. Public controversy created in response to proposed activities that would change the landscape character should also be considered. The Context of Viewers may also influence the characterization of Public Interest. Park Purpose and the related legal mandate to "Conserve the Scenery" is the ultimate threshold when considering potential differences of opinion in the Public Interest factor. *Maintenance of visual quality is:*

High	– a major public issue
Moderate	– a moderate public issue
Low	– a minor public issue

6. Adjacent Land Uses. The interrelationship with land uses in adjacent lands can affect the visual sensitivity of an area. Areas within the collective view shed of designated Park lands and adjacent dedicated open spaces, cultural & historic landscapes, or other landscapes for which the visual context is important may be very sensitive. Adjacent areas where scenic values may not be a primary concern for the associated land use may not be as visually sensitive to landscape disturbance such as in the case of industrial, commercial or agricultural land use developments or "improvements". This criterion relates specifically to the potential compatibility of Park uses, actions and activities with adjacent land uses. *Vulnerability* of Park scenic values *within* Park Boundaries to adjacent land uses, actions and activities is addressed separately. *Maintenance of visual quality within Park boundaries to sustain adjacent land use objectives is:*

High	– very important
Moderate	– moderately important
Low	– slightly important

7. Special Areas. Management objectives for special areas such as Natural Areas, Wilderness Areas or Wilderness Study Areas, Wild and Scenic Rivers, Scenic Areas, Scenic Roads or Trails, Areas of Critical Environmental Concern (ACEC), Significant Features or Locations (TCP or other) and designated or eligible Historic Areas frequently require special consideration for the protection of the visual values. This does not necessarily mean that these areas are scenic, but rather that one of the management objectives may be to preserve the natural landscape setting. The management objectives for these areas may be used as a basis for assigning sensitivity levels. *Maintenance of visual quality to sustain special area management objectives is:*

High	– very important
Moderate	– moderately important
Low	– slightly important

8. Visual Absorption Capability. The capacity of an individual landscape unit to withstand or "absorb" various types and intensities of existing, planned or potential future uses, activities or disturbances is an additional factor related to visual sensitivity. Landform, topography, aspect, vegetation, degree of visibility, distance, scale and other environmental factors all affect the visual absorption capability of each individual rating unit. These landscape characteristics and environmental factors accommodate varying degrees and intensities of use, activities, development or disturbance based on the individual, distinct composition of each within each unit. Environmental factors such as seasonal variations (deciduous forests vs. coniferous forests) or climatic conditions (clear skies in dry landscapes vs. foggy or hazy skies in humid landscapes) may be significant factors within a specific landscape and should be considered. Dynamic elements such as vegetation, light conditions, weather and other atmospheric conditions must be carefully assessed with regard to duration of potential effect and recovery time.

High	– low capacity to absorb use or disturbance
Moderate	– moderate capacity to absorb use or disturbance
Low	– high capacity to absorb use or disturbance

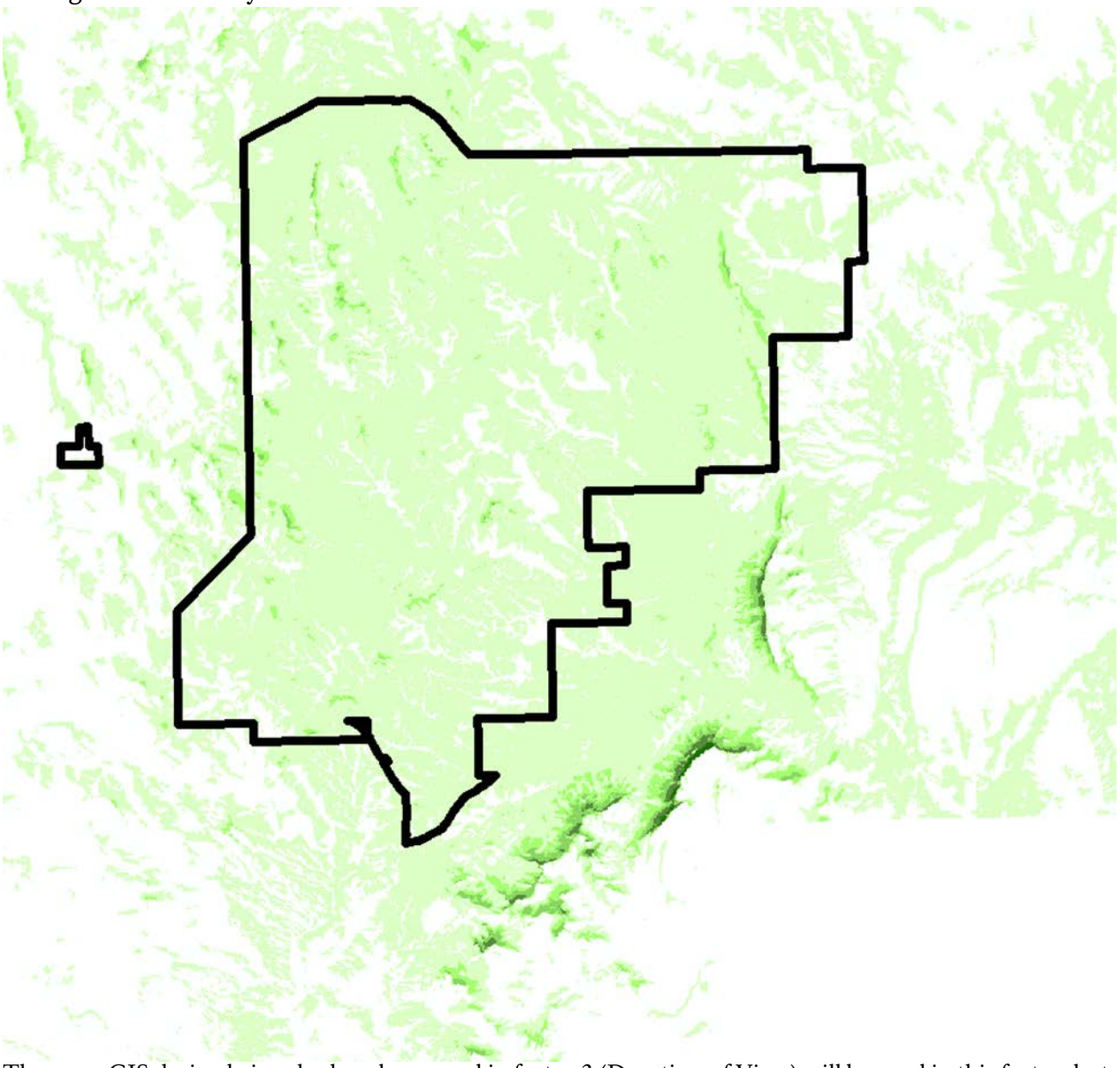
9. Other Factors. Consider any other information such as research or studies that includes indicators of visual sensitivity. One example is visibility within mandatory designated Class I federal areas (International Parks, National Wilderness Areas, National Memorial Parks exceeding 5,000 acres and National Parks exceeding 6,000 acres)under the Clean Air Act. Class I areas factors into the viewshed sensitivity analysis and visibility conditions factor into the separate vulnerability analysis. Other factors may also apply.

Sensitivity Level Analysis Factors to Consider for GIS Mapping

1. **Type of Users/Context of Viewers.**
   Region to delineate in preliminary terms, Park to identify and confirm
   This step will attempt to separate areas of use by user groups if possible. For instance, one road may be used by both Park visitors and through traffic or commuters, while another road may be used almost solely by recreational sightseers and not through traffic or commuters. Various considerations will apply to this factor.
2. **Amount of Use/Number of Viewers.**
   Region to delineate in preliminary terms, Park to confirm
   This step will outline use areas by general use types and categories and will identify associated user numbers.
3. **Duration of View.**
   GIS derived viewshed analyses based on identified viewpoints will be factored in separate categories based on the nature of the key observation point(s) (KOPs) with regard to potential time spent by visitors observing visible scenery. Primary KOPs identified by Park staff based on public preferences (observed or reported), iconic views (as illustrated in postcards, books or other images), locations where visitors are sitting or otherwise using an area in a more stationary nature (such as in campgrounds, picnic areas, or congregation areas by visitor use facilities) and locations that are simply based on personal knowledge of the landscape will receive the highest weight. Primary KOPs may include wayside exhibit locations and overlooks where stationary scenic viewing opportunities are available. The next category is based on trail views. Because walking and hiking is a dynamic activity done on foot, the duration of views generally will be less than stationary views (unless a KOP is identified along a trail), but more than dynamic activities such as vehicular travel, and will therefore receive an intermediate weight. Viewsheds within vehicular travel corridors may be extensive, but due to the nature of speed, will receive the lowest weight for duration of view. Using the viewshed spread map layers for the three distinct layers, a binary value system will be established identifying all locations as either seen or unseen.
   Proposed individual layer multipliers (values):
   3X weight: Viewpoints, overlooks and other KOPs (3 = seen, 0 = unseen)
   2X weight: Trail viewpoints (2 = seen, 0 = unseen)
   1X weight: Roads and other vehicular travel corridor viewpoints (1 = seen, 0 = unseen)
   As soon as the values have been reclassified, these three layers will then be combined in an additive manner to create a new layer (the duration of view value layer) with total values ranging from zero to six.

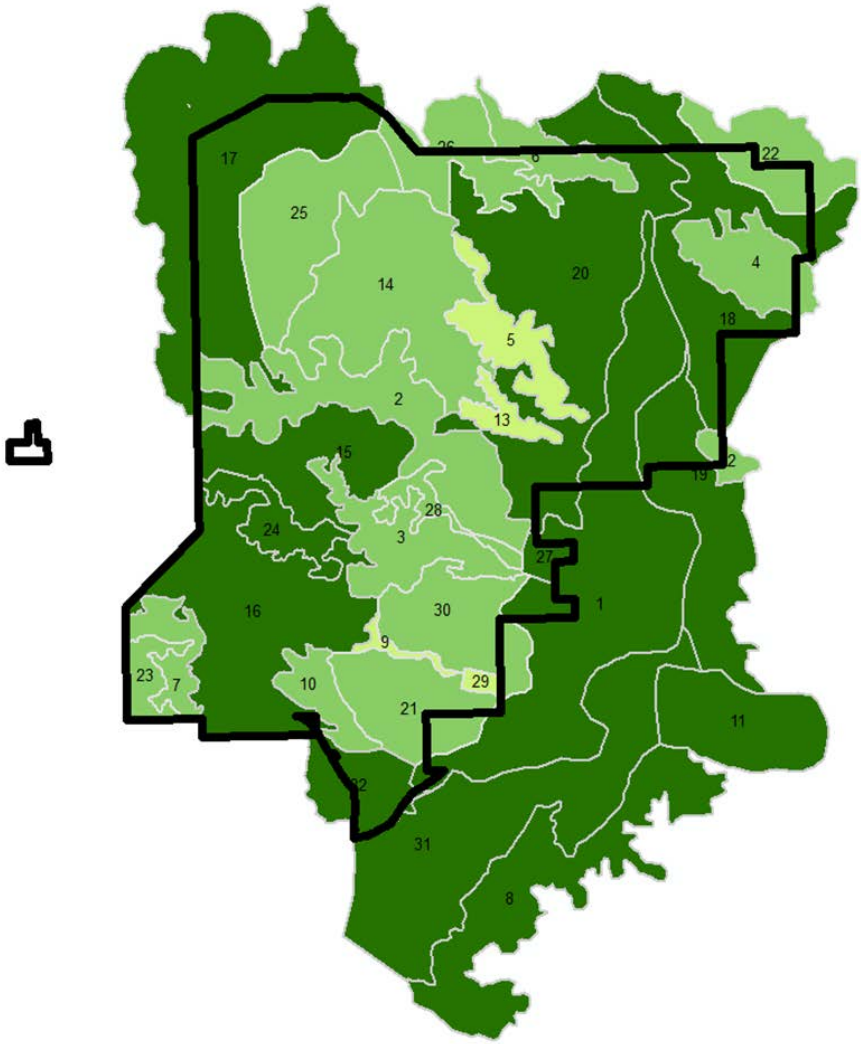
4. **Degree of Visibility.**
   The same GIS derived viewshed analyses used in factor 3 will be used in this factor, but will be computed in a different manner. For the degree of visibility, all viewpoints, regardless of from where will be compiled equally and then will be divided into 6 categories; not seen from any viewpoint, and then divided into 20% increments related to percentage of viewpoints a particular location is within view. This is purely a GIS based visibility analysis.
5. **Public Interest.**
   Park to identify
6. **Adjacent Land Uses.**
   Adjacent Park, Forest or Wildlife refuge lands and potential associated scenery management classifications should be considered. Local municipal or county ordinances, stipulations or regulations regarding scenery conservation should also be considered if any exist. Otherwise, any other adjacent land use for which scenery is a concern will be identified. All other adjacent land uses will be rated accordingly or not rated at all related to "sensitivity".
7. **Special Areas.**
   Previously identified "Integral Vistas", locations of ethnographic significance (including potential TCPs), historic areas/districts (eligible or listed), Wilderness areas or Wild and Scenic Rivers (eligible or listed), and other special area for which scenery may be an important factor should be identified on this map layer as accurately as possible.
8. **Visual Absorption Capability.**
   This factor will take into account generalized vegetative cover in three basic categories; forested, shrubland and grass or open rock face. The existing vegetation cover will consider historic vegetation cover (from georectified GLO survey plats and other sources), elevation, and aspect, and soil type to derive a "Kuchleresque" vegetation potential map for the Park. Forested areas generally have the highest visual absorption capacity, shrublands intermediate and grasslands & open rock face the lowest.
9. **Other Factors.**
   Air Quality and Class I visibility information may be factored into this category as information is available.

II. Degree of Visibility –Factor 4



The same GIS derived viewshed analyses used in factor 3 (Duration of View) will be used in this factor, but will be computed in a different manner. For the degree of visibility, all viewpoints, regardless of from where will be compiled equally and then will be divided into 6 categories; not seen from any viewpoint, and then divided into 20% increments related to percentage of viewpoints a particular location is within view. This is purely a GIS based visibility analysis. The value of this type of analysis is that features that are highly visible from many locations are highlighted, providing Park managers and members of the public a clear depiction of the most visible features. The features in most cases require greater consideration with regard to any potential disturbance (land use or development) and therefore are considered "sensitive". This map view illustrates that the ridge tops in the Northwest (such as Rankin Ridge), the intermediate highpoint formed by the Minnekahta Limestone outcrop running Southwest to Northeast, and the Fall River (Dakota Sandstone) Hogback to the East and Southeast. Buffalo Gap, immediately outside of the Park Boundary is by far the most prominently visible physical feature in this vicinity. This hogback ridge and Buffalo Gap have been identified as sacred by some affiliated Tribes. The ridge also has been identified as moderate potential for wind generation development.

II A. Visual Sensitivity Rating Units and Scores



H
M
L

Sensitivity Level Analysis Factors considered for each rating unit:
1. Type of Users/Context of Viewers.
2. Amount of Use/Number of Viewers.
3. Duration of View.
4. Degree of Visibility.
5. Public Interest.
6. Adjacent Land Uses.
7. Special Areas.
8. Visual Absorption Capability.
9. Other Factors.

III. Distance Zone Analysis and Process

Foreground (FG), Middle ground (MG), Background (BG) and Seldom Seen (SS) zones will be established based on the same locations identified as Key Observation Points (KOPs), visitor use areas and travel corridors and will also use a GIS viewshed spread function combined with buffer spreads of varying distances and widths. The delineated distance between Middleground and Background is determined by and established for the relevant physiographic province and sub-province(s) for which the viewshed context is situated. The delineated boundary between middleground and background will vary based on location *(Consult Ecoregion Map)* increasing up to 5 miles from stationary KOPs in the arid Western regions and may be shortened to as little as 3 miles in the more humid, heavily vegetated Eastern regions. The delineated boundary between Foreground and Middleground is always one half mile from both stationary and dynamic KOPs regardless of region or province. A composite viewshed spread from all stationary KOPs and other viewpoints of significance will be created by combining each individual viewshed spread and placing a value of 3 for all foreground points, 2 for all midground points, 1 for all background points and 0 for all "unseen" areas. These four layers will be combined with 3 as the top layer and zero as the bottom layer to provide a weighted distance zone delineated map layer for this category.

The same process will then be used for Trails to create an individual distance layer and then the same for roads. For Roads, the 45 mph zone will be combined with the 35 mph and 30 mph and less zones to create a total Roads composite layer. (*This note relates specifically to the WICA analysis –rephrase for greater system wide application*) When these three distinct distance zone layers are established (stationary KOPs, Trails & Roads), the next step will be to create a fourth layer that combines the two separate layers for Trails and KOPs into one layer using the same process.

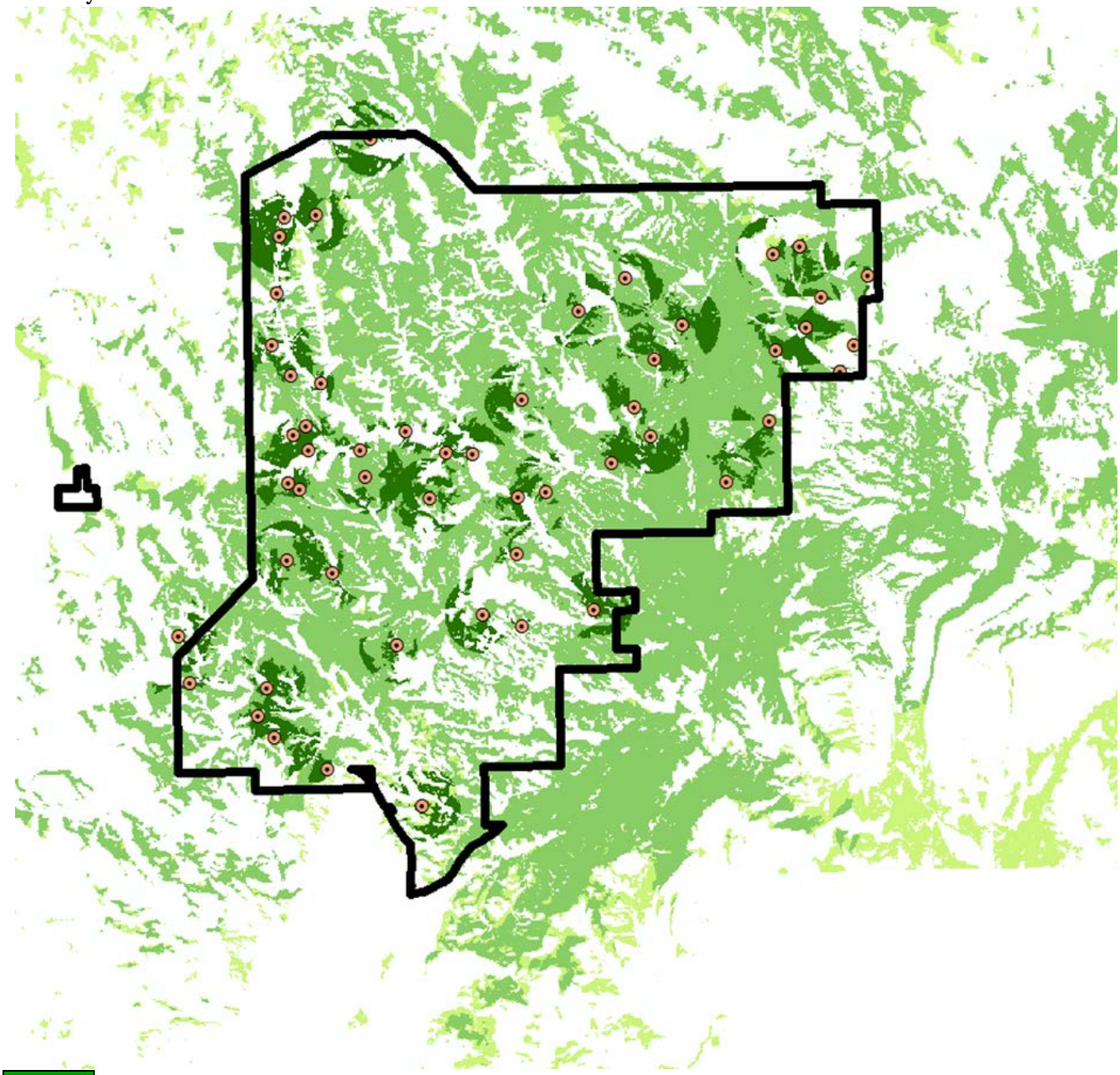
For the combined KOPs and Trails layer, values will be given in the following order: Foreground = 30, Midground = 20, Background = 10 and Seldom Seen (not visible) = 0. For the Roads layer, values will be given in the following order: Foreground = 3, Midground = 2, Background = 1 and Seldom Seen (not visible) = 0. These two distinct layers with reclassified values will then be combined in an additive manner and the following chart indicates the ultimate distance classification for the Park:

33	23	13	03
32	22	12	02
31	21	11	01
30	20	10	00

Foreground
Middleground
Background
Seldom Seen

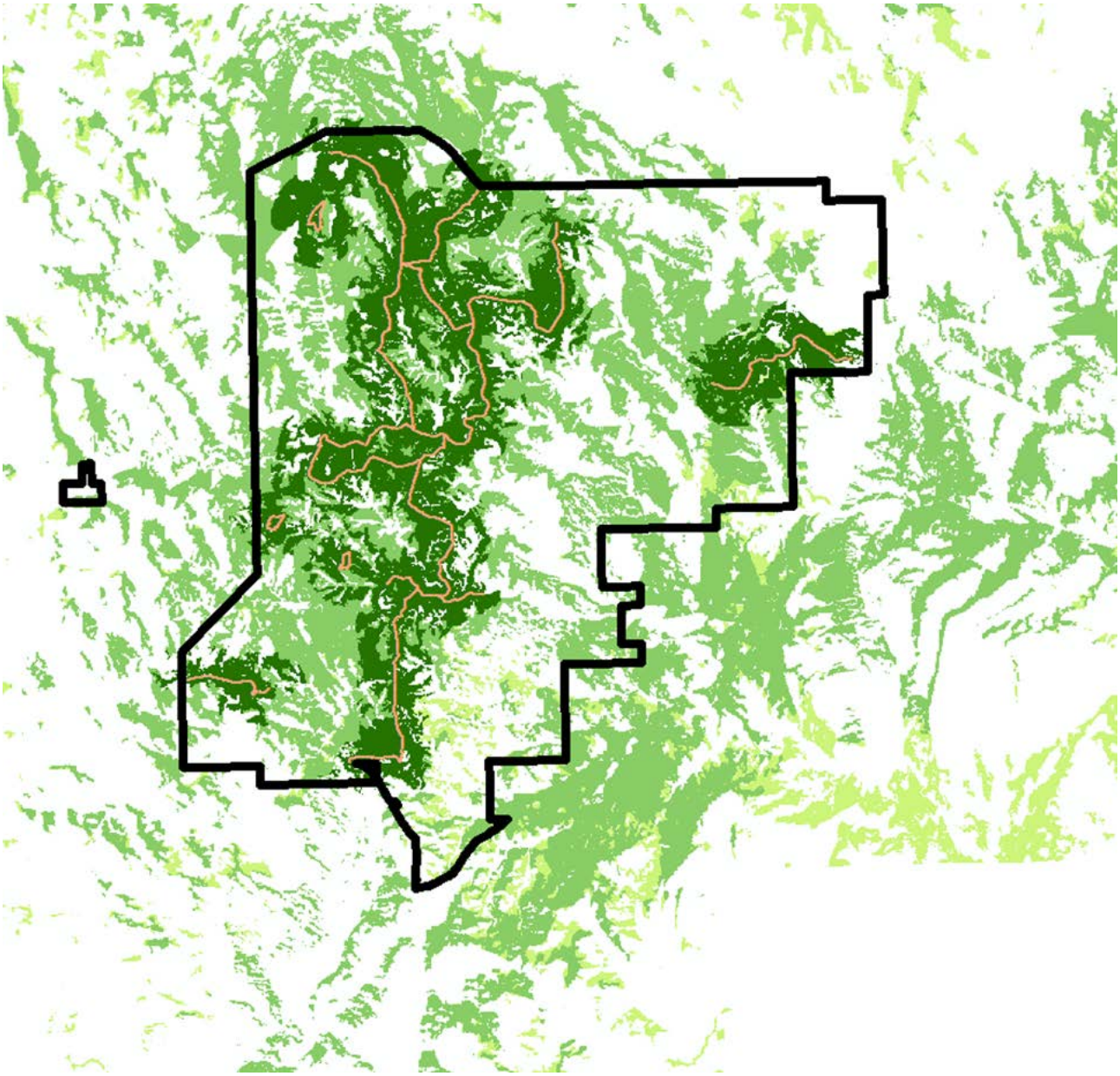
Color use is optional for distance zones; however, it is standard to use the "no fill" option on the Map Layer color palette for areas identified as Seldom Seen.

III. Key Observation Points Viewshed



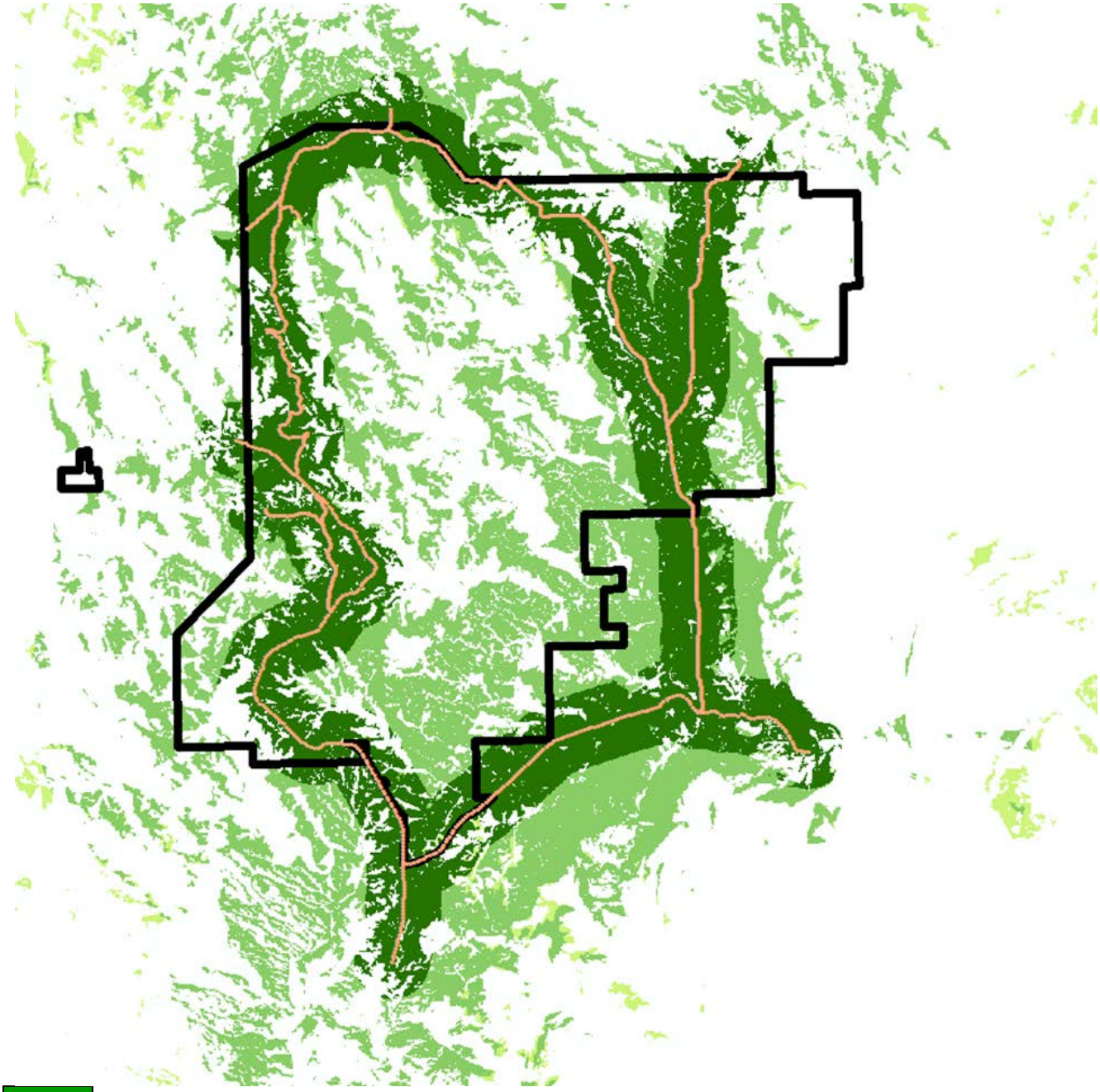
FG
MG
BG
SS

III. Park Trails Viewshed



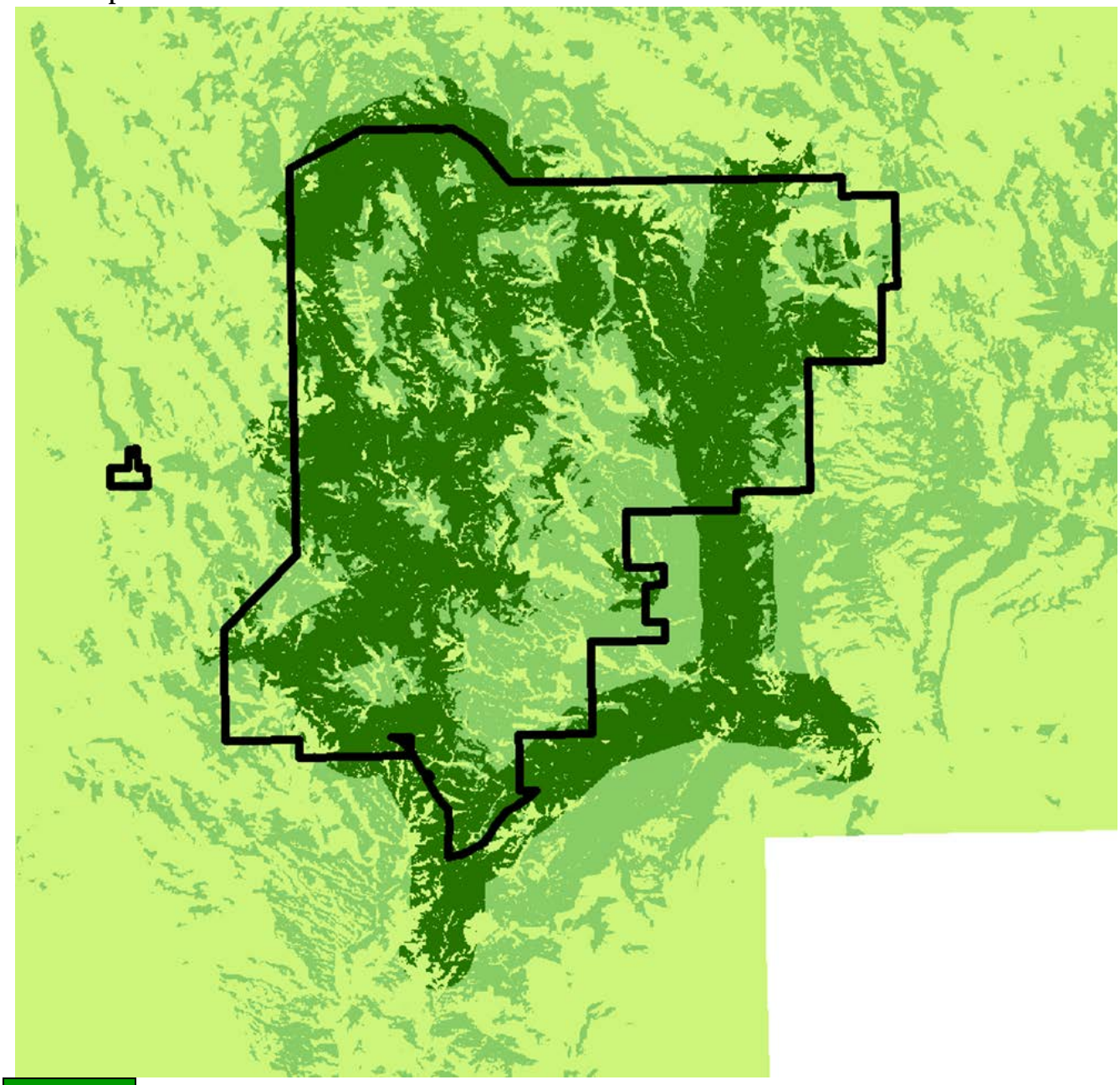
FG
MG
BG
SS

III. Roads Viewshed



FG
MG
BG
SS

III. Composite Distance Zone Viewshed



FG
MG
BG/SS

Scenery/Visual Resource Inventory Classes –As adapted from BLM

		VISUAL SENSITIVITY LEVELS						
		HIGH =50			MEDIUM = 30			LOW = 10
SCENIC QUALITY	A = 500	I	I	I	I	I	I	I
	B = 300	I	II	II	II	III	III	III
	C = 100	II	III	III	III	III	III	III
		FG = 3	MG = 2	BG/SS = 1	FG = 3	MG = 2	BG/SS = 1	BG/SS = 1
		DISTANCE ZONES						

Scenery/Visual Resource Inventory Classes are assigned through the inventory process based on a combination of scenic quality, sensitivity level and distance zones. Each of these three analyses is mapped as an individual spatial layer and the combined overlay, based on the categorization of each establishes the inventory class as illustrated in the table above.

Inventory Classes are informational in nature and provide the basis for considering visual values in the Park zoning management process. Inventory classes do not establish management direction and should not be used as a basis for constraining or limiting management actions or activities related to Park purpose.

Scenery Conservation Management Classes are assigned through the Park Management Zoning process and/or General Management Planning (GMP) process. The assignment of visual management classes is ultimately based on the management decisions made in the Management Zoning Process (part of or separate from a comprehensive GMP process). Scenery and visual values must be considered throughout the Management Zoning process. All actions proposed during the Management Zoning or GMP process that would result in surface disturbances must consider the importance of the scenic values and the impacts the project may have on these values. Management decisions in the Management Zoning or GMP process must reflect the value of Park Scenery. In some cases, Scenery may be the driving force for some management decisions, especially if Scenery is specifically called out in Establishing Legislation or is identified as a Fundamental Resource and Value.

Objectives for Scenery Conservation Management Classes (Draft -*as adapted* from BLM) The following Scenery Conservation Objectives are the base objectives for all Park units to be managed in such a manner that will protect the quality of the scenic values on these public lands and resources. Scenery Management Class Objectives will be developed based on a comprehensive inventory, evaluation and classification of the scenic values and desired conditions of distinct areas/zones within and viewed from each specific Park unit *and may provide additional objectives*. Some Park units may require specific objectives *in addition to* the base objectives, and in these cases, such specific objectives will be just that, *additions to rather than substitutions for* base objectives. Clean Air Act Class 1 visibility objectives and integral vista identification processes will also be considered.

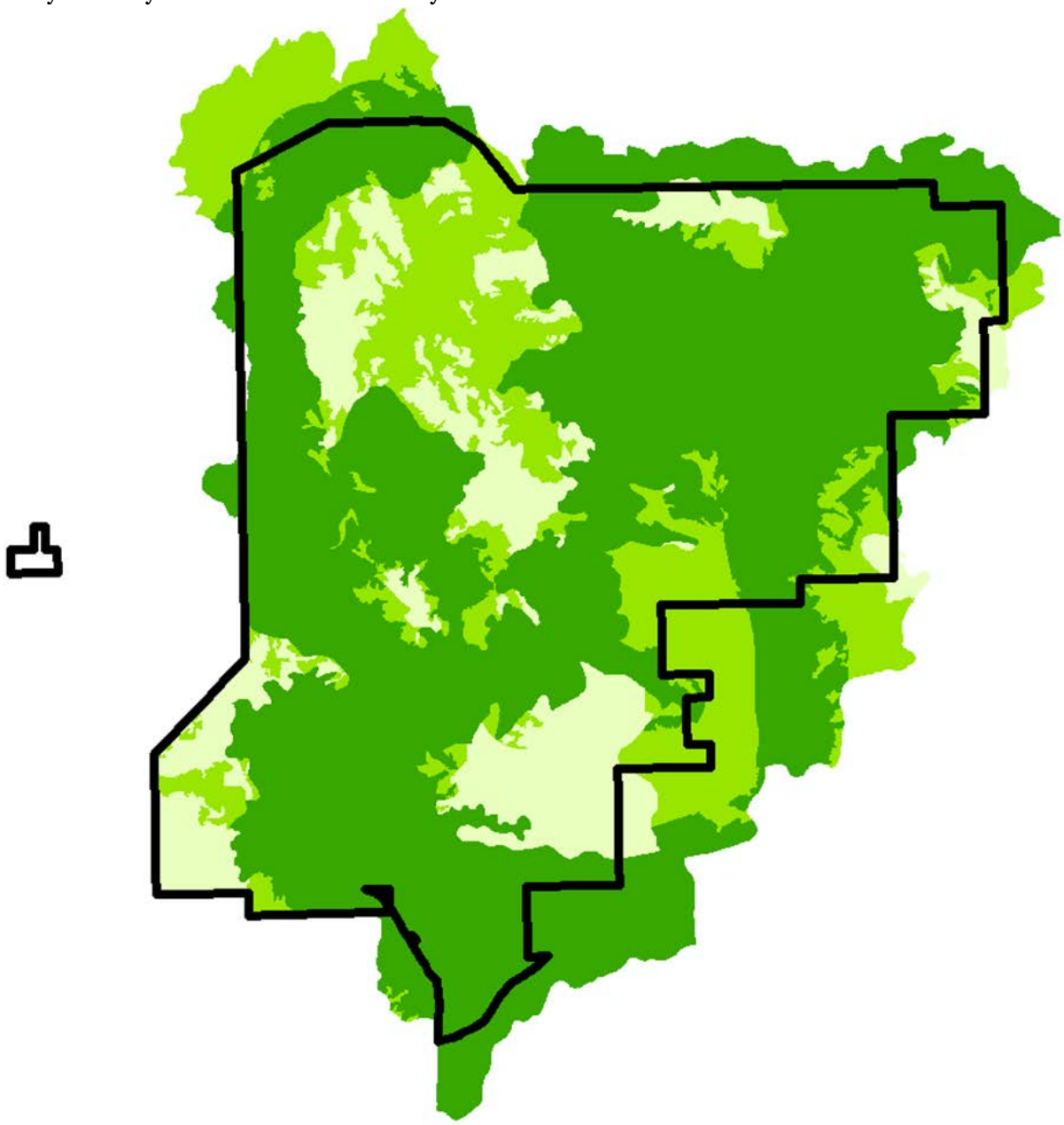
Class I Objective: The Objective of this Class is to preserve and enhance the existing character of the landscape to meet Park Purpose. This Class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

Class II Objective: The objective of this class is to retain the existing character of the landscape. The level of change to the landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line color and texture found in the predominant natural features of the characteristic landscape.

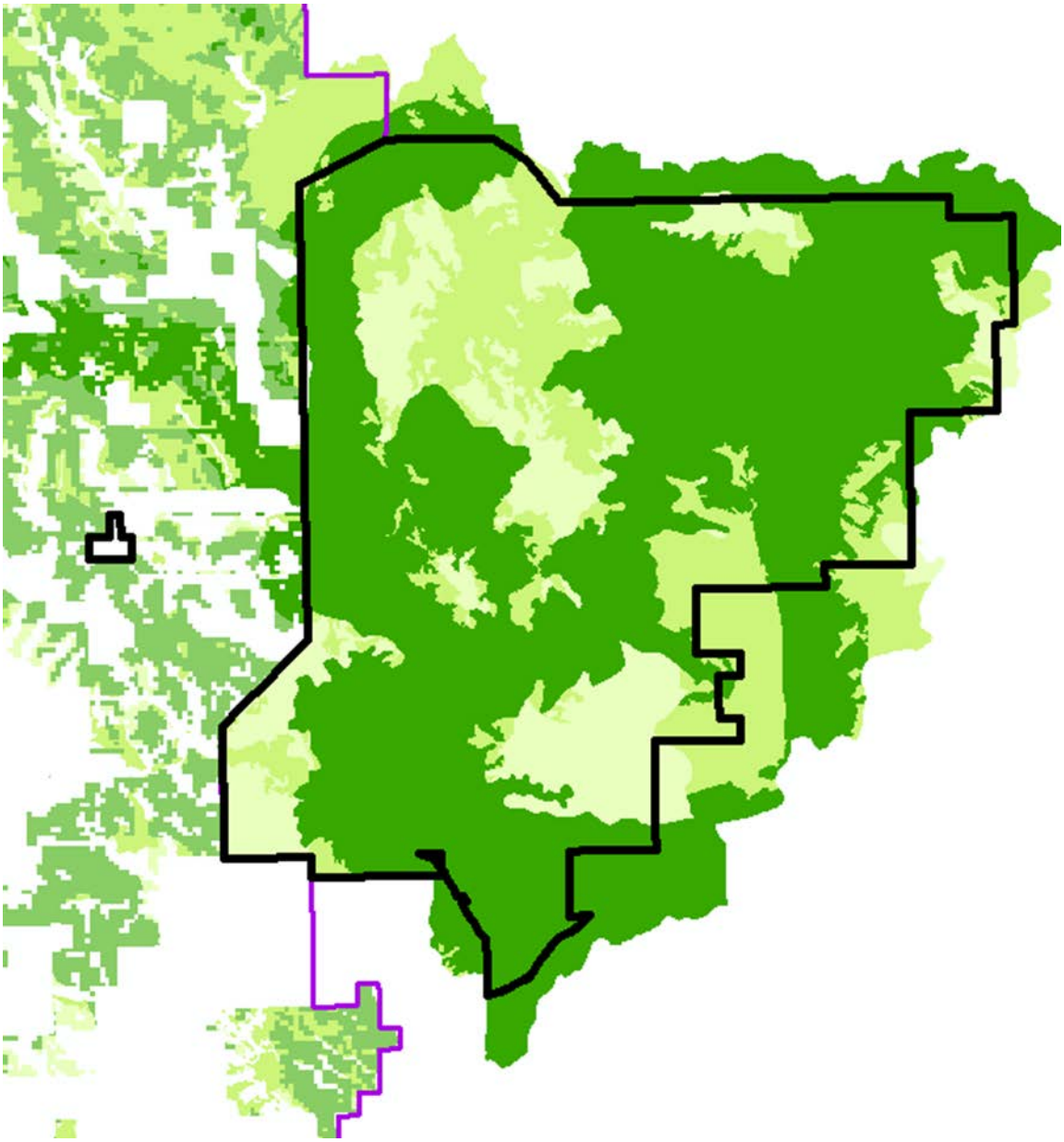
Class III Objective: The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention within the foreground, but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

A Visual Contrast Rating Process will evaluate all proposed actions/activities for potential effects to Park Scenery and to ensure Scenery Management Class Objectives are upheld

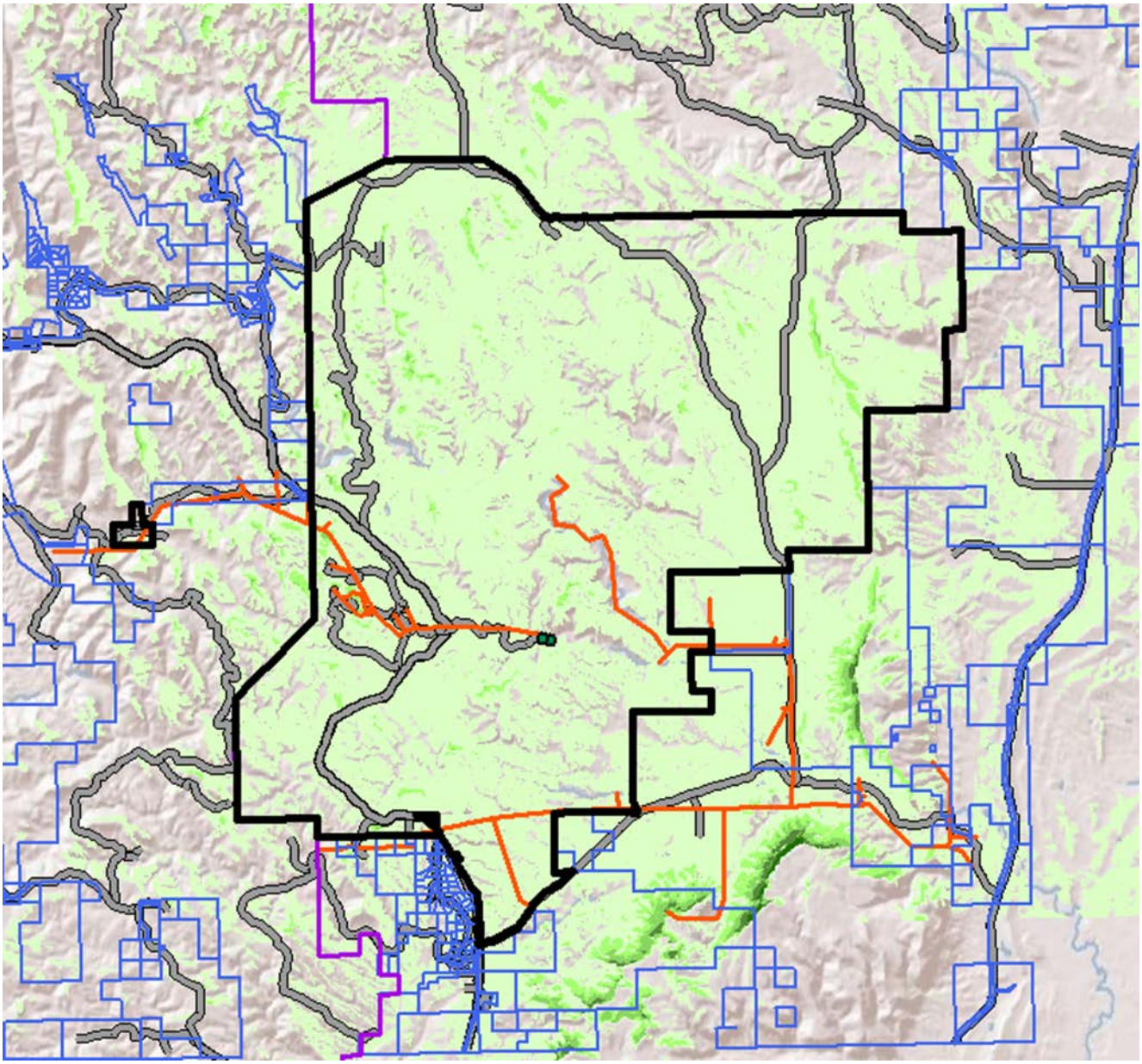
Preliminary Scenery Conservation Inventory Classes



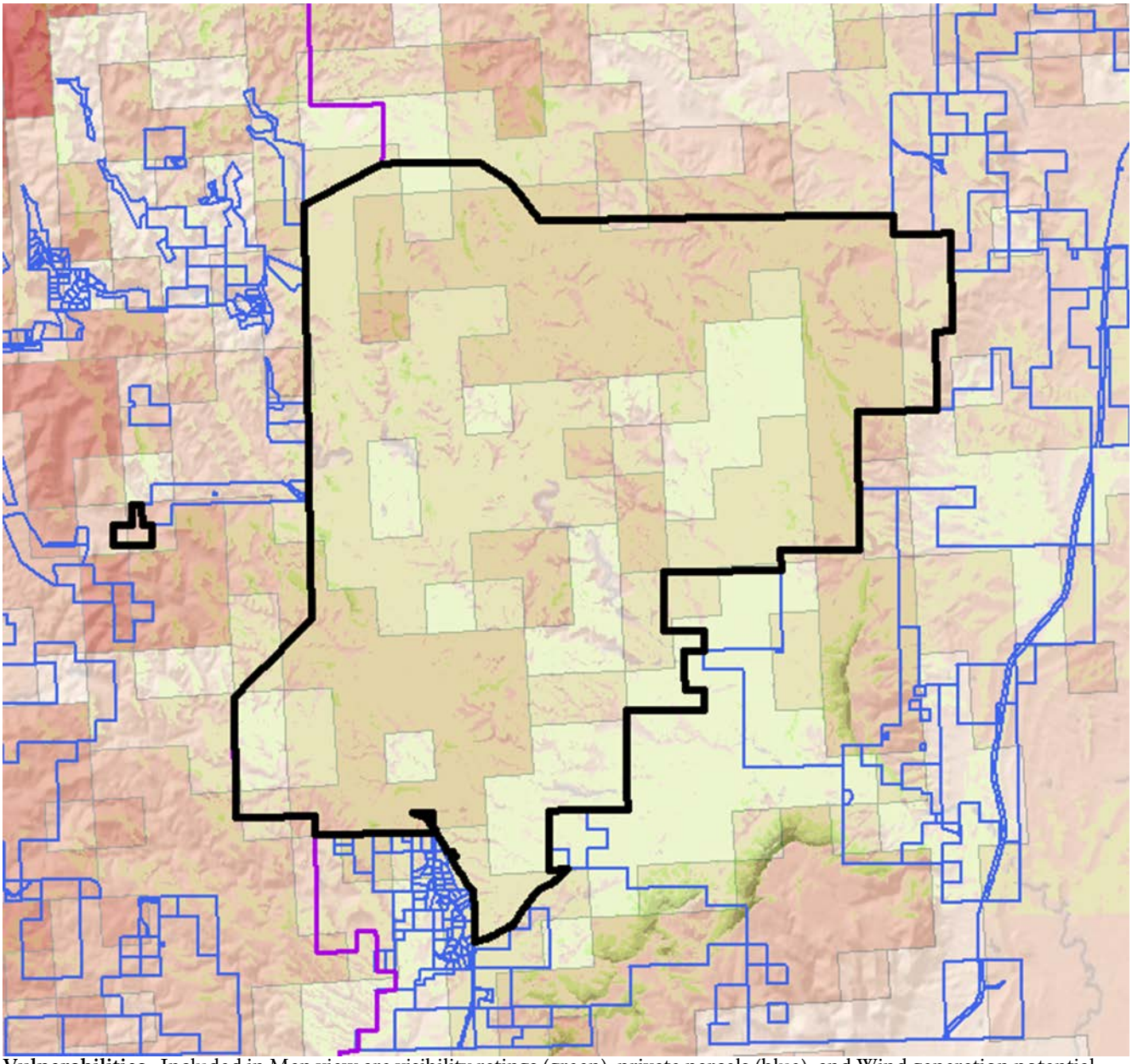
I	**Class I Objective:** The Objective of this Class is to preserve and enhance the existing character of the landscape to meet Park Purpose. This Class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
II	**Class II Objective:** The objective of this class is to retain the existing character of the landscape. The level of change to the landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line color and texture found in the predominant natural features of the characteristic landscape.
III	**Class III Objective:** The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention within the foreground, but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.



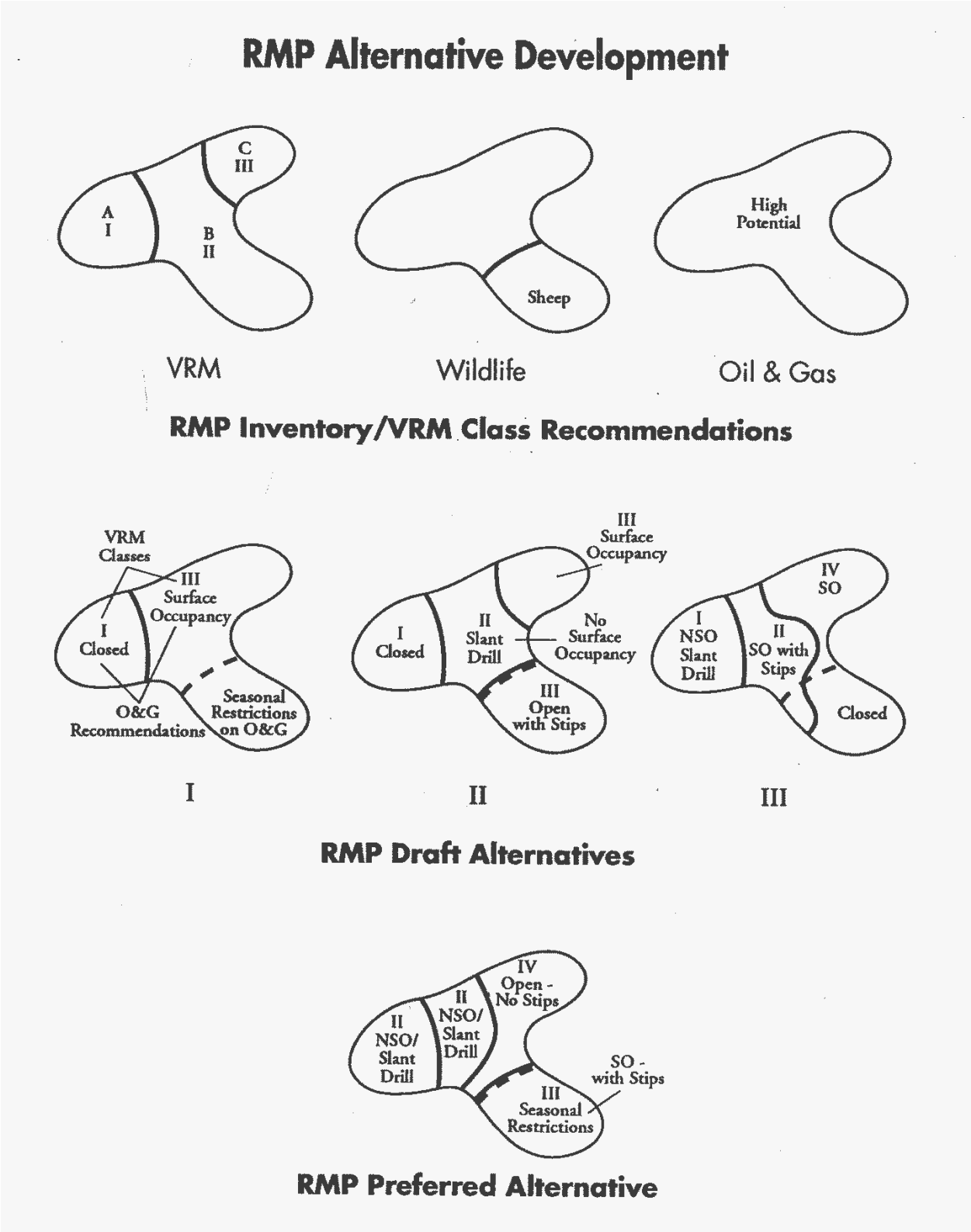
Scenic Inventory Classes and Adjacent Black Hills National Forest Scenery Management Classes



Vulnerabilities –Included in Map view are visibility ratings (green), private parcels (blue), roads (grey) and utilities (orange). Note that not all utilities have been mapped outside of Park boundary.



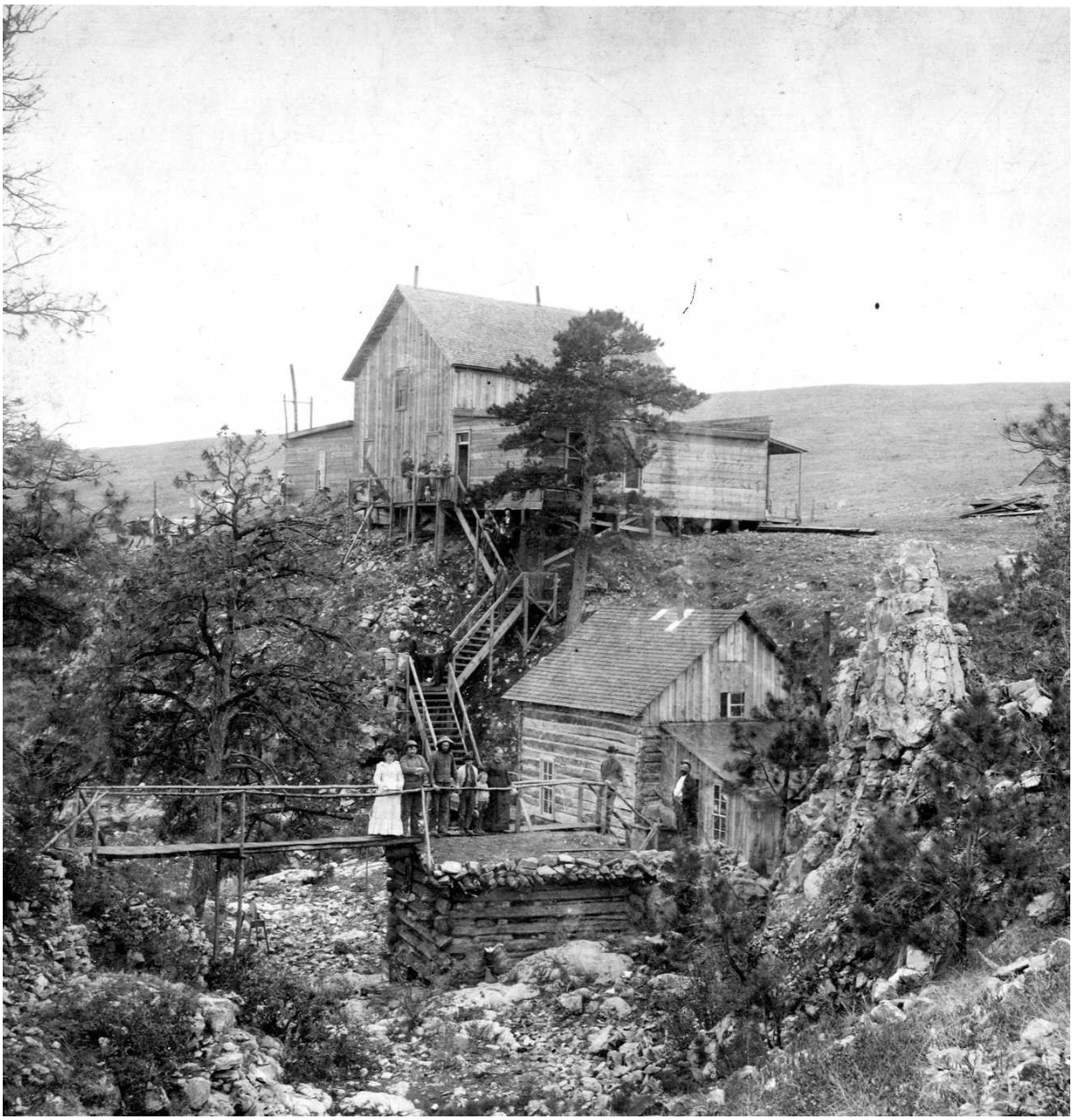
Vulnerabilities –Included in Map view are visibility ratings (green), private parcels (blue), and Wind generation potential map (large grid tiles ranging from beige through pink to red)



Example of how Scenery/Visual Resource Inventory Classes are factored into the Land Use Management Zoning Process (and NEPA Alternatives), and the ultimate Scenery/Visual Resource Management Class (from BLM)

APPENDIX H: SUPPLEMENTARY HISTORIC AND CONTEMPORARY PARK IMAGES

The following images are intended to be historic and contemporary views of the same locations to provide the reader with an idea of how the Park looked in the past in comparison to how it looks now.



Early Development at Wind Cave ca. 1890s

Wind Cave Old Walk-In Entrance, 2010

Wind Cave New Walk-In Entrance, 2014

Stage Coach Arriving at Wind Cave Hotel, ca. early 1890s

Wind Cave ca. 1920s

Wind Cave Visitor Center, 1938

2010 Wind Cave Visitor Center

Wind Cave, ca. 1920s

Wind Cave 2012

Visitor Center and Park Housing, 1938

Wind Cave Bison Herd, ca. 1930s

Wind Cave Bison Herd, 2014

As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historic places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

WICA 108/129286A
August 2015