

Rehabilitate Failing Park Sewage System Environmental Assessment

National Park Service
U.S. Department of the Interior
Bryce Canyon National Park
Bryce Canyon, Utah



October 2010

This page intentionally left blank.

Table of Contents

SUMMARY	V
PURPOSE AND NEED	1
Introduction	1
Background	3
Purpose and Need.....	3
Relationship to Other Plans and Policies.....	3
Appropriate Use	4
Scoping.....	5
Impact Topics Retained for Further Analysis.....	5
Threatened, Endangered, Rare, and Protected Species (Utah Prairie Dog Only)	6
Wildlife	6
Vegetation.....	6
Visitor Use and Experience	6
Impact Topics Dismissed From Further Analysis	7
Threatened, Endangered, Rare, and Protected Species (UPD Excluded)	7
State Listed or Other Sensitive Species	8
Topography, Geology, and Soils	9
Paleontological Resources	9
Archeological Resources	10
Ethnographic Resources.....	10
Cultural Landscapes.....	11
Historic Structures and Districts	11
Museum Collections	12
Water Resources	12
Wetlands	13
Floodplains.....	14
Air Quality	14
Natural Soundscapes.....	15
Lightscapes	15
Socioeconomics	15
Prime and Unique Farmlands.....	15
Indian Trust Resources	16
Environmental Justice.....	16
Climate Change.....	16
Park Operations.....	16
ALTERNATIVES CONSIDERED	17
Alternatives Carried Forward	17
Alternative A – No-Action.....	17
Alternative B – Open-Cut Trench Method	17
Alternative C – Pipe Bursting Methodology through Utah Prairie Dog Occupied Areas (Preferred Alternative).....	18
Mitigation Measures.....	20

Alternatives Considered and Dismissed.....	25
Alternative Summaries	25
Identification of the Environmentally Preferred Alternative.....	29
AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES	30
Cumulative Effects	30
Threatened, Endangered, Rare, and Protected Species (UPD Only).....	32
Intensity Level Definitions	34
Impacts of Alternative A (No-Action Alternative).....	34
Impacts of Alternative B (Open-Cut Trench Method).....	35
Impacts of Alternative C (Preferred Alternative)	36
Wildlife.....	37
Affected Environment.....	37
Intensity Level Definitions	38
Impacts of Alternative A (No-Action Alternative)	38
Impacts of Alternative B (Open-Cut Trench Method).....	39
Impacts of Alternative C (Preferred Alternative)	39
Vegetation	40
Affected Environment.....	40
Intensity Level Definitions	41
Impacts of Alternative A (No-Action Alternative)	41
Impacts of Alternative B (Open-Cut Trench Method).....	42
Impacts of Alternative C (Preferred Alternative)	43
Visitor Use and Experience	43
Intensity Level Definitions	44
Impacts of Alternative A (No-Action Alternative)	44
Impacts of Alternative B (Open-Cut Trench Method).....	45
Impacts of Alternative C (Preferred Alternative)	46
CONSULTATION AND COORDINATION	47
Internal Scoping	47
External Scoping	47
Federal Agencies.....	48
State Agencies.....	48
Environmental Assessment Review and List of Recipients	48
List of Preparers	49
National Park Participants.....	49
Consultant Participants	49
List of Environmental Assessment Recipients	49
Federal Agencies.....	49
State and Local Agencies and Governments.....	50
Indian Tribes	50
Organizations	50
Local Businesses	51

REFERENCES..... 52

LIST OF TABLES

Table 1-1: Federally Threatened, Endangered, Proposed, and Candidate Species and Their Potential to Occur in the Project Area (UPD Excluded) 7
Table 2-1: Alternatives Summary and Project Objectives..... 26
Table 2-2: Environmental Impact Summary by Alternative..... 27
Table 3-1: 2009 UPD Survey Results within the 750-foot Buffer..... 33
Table 3-2: 2009 UPD Survey Results within the 50-foot Disturbance Area 33

LIST OF FIGURES

Figure 1: Location Map 2
Figure 2: Utah Prairie Dog Habitat Map..... 19

LIST OF APPENDICES

Appendix A Agency Consultation
Appendix B Impairment

This page intentionally left blank.

Rehabilitate Failing Park Sewage System

Environmental Assessment

Summary

The National Park Service (NPS) proposes to rehabilitate the failing sewage system within Bryce Canyon National Park, Utah. The rehabilitation would provide a safe, healthy, and functional environment, and maintain public health and future service for park visitors and staff. Portions of the sanitary sewage collection system were originally constructed in 1958 of clay pipe and currently service the lodge, staff housing, and visitor center before feeding into sewage treatment lagoons. Sections of the sewage system have deteriorated significantly with age. These sections of the system and appurtenant manholes are deteriorating into pieces that regularly clog the system and cause raw sewage to back up, leak out of the system, and spill onto the ground from backed-up manholes. The sewer system has not been replaced since 1958 with the exception of maintenance repairs to small sections of the sewer line and manholes.

Three alternatives, including the no-action alternative, were identified based on program goals and objectives, internal and external scoping, guidance from existing park plans, and policy guidance from the NPS. An external scoping letter dated July 20, 2009 was mailed to over 225 addresses in the Bryce Canyon area. Additionally, the scoping letter was mailed to various federal and state agencies, affiliated Native American tribes, local governments, and local news organizations. No new information came forward from public scoping or consultation with other agencies to necessitate the development of any alternatives other than those described and evaluated in this document.

Alternative A (No-Action): Under this alternative, the sewer system would not be rehabilitated. Sections of the collection system and associated manholes would continue to deteriorate into pieces that clog the system and cause raw sewage to back up and spill onto the ground.

Alternative B (Open-Cut Trench Method): Sewer line rehabilitation would include replacement of the broken and deteriorating portions of the park's sewage collection system, which includes repairing or replacing some manholes and replacement of approximately 20,390 linear feet of sewer pipeline with high density polyethylene (HDPE) type piped connections to the park's main sewage collection system. Under this alternative, open-cut trenching techniques would be utilized for all sewer line replacement. Additionally, there would be improvements to the lagoon treatment system which would include replacement, rehabilitation, and/or repair of the existing sanitary sewage lagoon treatment system.

Alternative C (Pipe Bursting Methodology through Utah Prairie Dog Occupied Areas/NPS Preferred Alternative): The preferred alternative was designed to lessen the effects to Utah prairie dog (UPD) (*Cynomys parvidens*) colonies located within the Project area and would have the same elements as alternative B except a trenchless technology referred to as pipe bursting would be used in place of open-cut trenching as the sewer pipeline replacement methodology through active UPD towns.

Impact topics retained for analysis in this document include: threatened, endangered, rare, and protected species (UPD); wildlife; and vegetation. In addition to the resources listed, visitor use and experience was also retained for further analysis. Impacts associated with action alternatives B and C were similar, except that impacts to UPD were lessened with the implementation of alternative C.

NOTE TO REVIEWERS AND RESPONDENTS

If you wish to comment on the Environmental Assessment, you may post comments online at <http://parkplanning.nps.gov/> or mail comments to: Superintendent, Bryce Canyon National Park, P.O. Box 640201, Bryce Canyon, Utah, 84764.

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 publicly available at any time. Although you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

PURPOSE AND NEED

Introduction

The core area of Bryce Canyon National Park (BRCA) was set aside as a national monument in 1923 to protect the geologic structures known as hoodoos and other natural and cultural resources. The following year it was designated Utah National Park. In 1928, Congress doubled the amount of protected land to 35,835 acres and renamed the park Bryce Canyon National Park.

BRCA is located on the western edge of the Colorado Plateau (Figure 1). The park lies in portions of two counties in Utah: Garfield and Kane Counties. The entrance to the park is approximately 210 miles southeast of Salt Lake City, Utah. Most of the land surrounding BRCA is federally owned and managed by the U.S. Forest Service as part of the Powell Ranger District of Dixie National Forest. The Bureau of Land Management manages land along the northern and northeastern park boundaries. Remaining land in the area is owned by the State of Utah and private landowners.

The park's sewage system collects wastewater flow from campgrounds, dorms, housing, and other park facilities. Major trunklines of the system flow toward treatment lagoons. Park yearly visitation is about 1.5 million people, with most of this number focused on the central (or Main Amphitheater) section of the park. The aged sewer system is currently overtaxed, and the failing collection system has deficiencies in both condition and capacity.

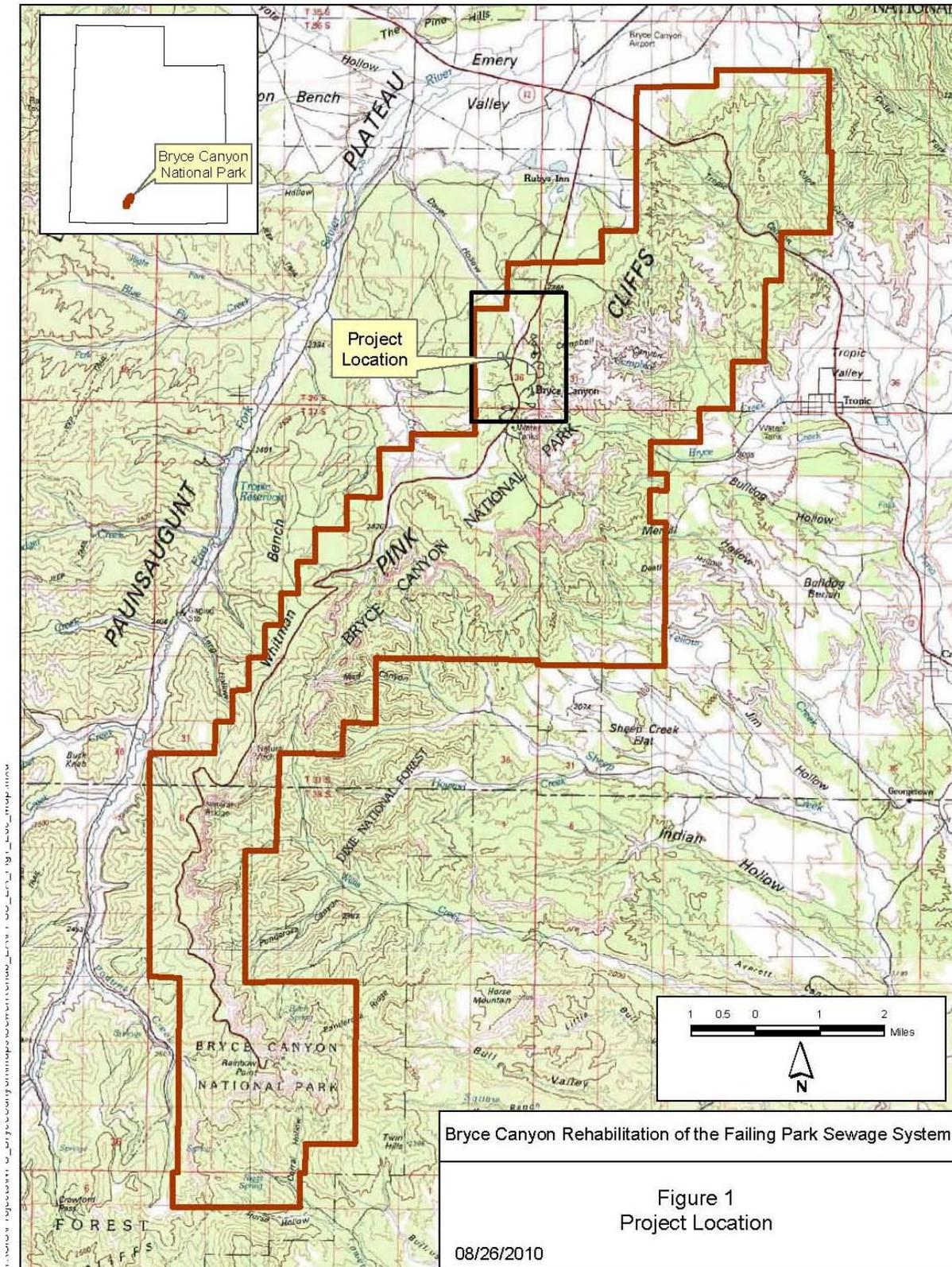
The purpose of this environmental assessment (EA) is to examine the environmental impacts associated with the proposed rehabilitation of the park's failing park sewage system. This EA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, regulations of the Council on Environmental Quality (CEQ) (40 *Code of Federal Regulations* [CFR] §1508.9), and the National Park Service (NPS) Director's Order (DO)-12 (*Conservation Planning, Environmental Impact Analysis, and Decision-Making*).

NPS *Management Policies 2006* (NPS 2006) requires analysis of potential effects to determine whether or not actions would impair park resources. NPS managers must always seek ways to avoid, or to minimize to the greatest degree practicable, adversely impacting park resources and values.

However, the laws do give the NPS management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the NPS management discretion to allow certain impacts within parks, that discretion is limited by the statutory requirement that the NPS must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of these resources or values. An impact to any park resource or value may, but does not necessarily, constitute an impairment. An impact would more likely constitute an impairment when there is a major or severe adverse effect upon a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park,
- Key to the natural or cultural integrity of the park, or
- Identified as a goal in the park's general management plan or other relevant NPS planning documents.

Figure 1: Location Map



An impact would less likely constitute an impairment if it is an unavoidable result of an action necessary to pursue or restore the integrity of park resources or values and it cannot be further mitigated. An impairment analysis for the preferred alternative can be found in Appendix B.

Background

The park sanitary sewage collection system is spread over an area approximately 1.9 miles long (south to north) and 0.7 mile wide (east to west). The system collects wastewater flow from campgrounds, dorms and housing facilities, and other park facilities. Major trunklines of the system flow to the northwest and north toward a lagoon treatment system.

Portions of the sanitary sewage collection system were originally constructed in 1958 of clay pipe and currently service the lodge, staff housing, and the visitor center before feeding into sewage treatment lagoons. Sections of the sewage system have deteriorated significantly with age. These sections of the system and appurtenant manholes are deteriorating into pieces that regularly clog the system and cause raw sewage to back up, leak out of the system, and spill onto the ground from backed-up manholes. The sewer system has not been replaced since 1958 with the exception of maintenance repairs to small sections of the sewer line and manholes. In addition, the Maintenance facility was added to the sewer system in 2008.

Even when leaks in the system are repaired, the collection system (collection sewers and treatment lagoons) would still be inadequate to handle an anticipated increased volume from both the addition of the maintenance facility to the system and from additional flow within the pipes since the sewage would no longer be seeping out from deteriorating pipes.

Purpose and Need

The purpose of the BRCA Rehabilitate Failing Park Sewage System Project (Project) is to rehabilitate the condition of the existing BRCA sewage system in order to provide a safe, healthy, functional environment, and maintain public health and future service for park visitors and staff in compliance with the goals and objectives of current plans and policy. Currently, the existing system does not function in accordance with accepted sewage handling practices. The Project is needed to accomplish the following objectives:

1. Repair broken and deteriorating portions of the park's sewage collection system.
2. Replace failed septic tank and leach field systems.
3. Recondition the sewage treatment lagoon cells in order to support fully functioning sewer lines.

Relationship to Other Plans and Policies

This Project has been developed in a manner consistent with NPS legal mandates and *Management Policies 2006* (NPS 2006). The Bryce Canyon National Park General Management Plan (NPS 1987) provides broad direction for management of the park and identifies actions to improve the quality of both visitor and employee experience, as well as improve management and protection of historic values and natural resources. The proposed Project analyzed in this document was reviewed for conformance with the General Management Plan.

Appropriate Use

Section 1.5 of NPS *Management Policies 2006*, “Appropriate Use of the Parks,” directs that the NPS must ensure that park uses that are allowed would not cause impairment of, or unacceptable impacts on, park resources and values. An Impairment determination is included in Appendix B. A new form of park use may be allowed within a park only after a determination has been made in the professional judgment of the park superintendant that it will not result in unacceptable impacts.

Section 8.1.2 of NPS *Management Policies 2006*, Process for Determining Appropriate Uses, provides evaluation factors for determining appropriate uses. All proposals for park uses are evaluated for:

- Consistency with applicable laws, executive orders, regulations, and policies
- Consistency with existing plans for public use and resource management
- Actual and potential effects on park resources and values
- Total costs to the NPS
- Whether the public interest will be served.

Park managers must continually monitor all park uses to prevent unanticipated and unacceptable impacts. If unanticipated and unacceptable impacts emerge, the park manager must engage in a thoughtful, deliberate process to further manage or constrain the use, or discontinue it.

From Section 8.2 of NPS *Management Policies 2006*: “To provide for enjoyment of the parks, the National Park Service will encourage visitor use activities that

- Are appropriate to the purpose for which the park was established
- Are inspirational, educational, or healthful, and otherwise appropriate to the park environment
- Will foster an understanding of and appreciation for park resources and values, or will promote enjoyment through a direct association with, interaction with, or relation to park resources
- Can be sustained without causing unacceptable impacts to park resources and values.”

A properly functioning sanitary sewage collection system is a vital structure in most park units. Proper construction materials and methods should ensure that unacceptable impacts to park resources and values would not occur. The proposed construction related to the rehabilitation of the park sewage system is consistent with the park’s general management plan and other related park plans. With this in mind, the NPS finds that the rehabilitation of the park failing sewage system is an acceptable use at BRCA.

The next question is whether such use, and the associated necessary and appropriate impacts, can be sustained without causing unacceptable impacts to park resources and values. That analysis is found in the *Environmental Consequences* chapter.

Scoping

Scoping is a process to identify the resources that may be affected by a project proposal and to explore possible alternative ways of achieving the proposal while minimizing adverse impacts. BRCA conducted internal scoping with appropriate NPS staff, as described in more detail in the *Consultation and Coordination* chapter. The park also conducted external scoping with the public and interested and affected groups and agencies.

External scoping was initiated with the distribution of a scoping letter to inform the public of the proposal to rehabilitate the park failing sewage system, and to generate input on the preparation of this EA. The scoping letter dated July 20, 2009 was mailed to over 225 addresses in the Bryce Canyon area. In addition, the scoping letter was mailed to various federal and state agencies, affiliated Native American tribes, local governments, and local news organizations. Scoping information was also posted on the park's website.

During the 30-day scoping period, four public responses were received:

- A representative from the Five County Association of Governments, a voluntary association of local governments consisting of Beaver, Garfield, Iron, Kane, and Washington Counties, requested that the feasibility of connecting the sewer system to a regional waste water treatment facility that would accommodate the park, Bryce Canyon City and other land users atop the plateau be addressed in the EA. This alternative was not analyzed within this EA because a connection to a regional waste water treatment facility was beyond the scope of the objective of the EA to repair the existing sewer system within the park.
- A representative from the Utah Department of Transportation requested notification if there would be a direct effect to State Route 63. No direct effects would be anticipated with any of the proposed alternatives.
- The Hopi Tribe responded with requests for results of cultural resource surveys and treatment plans for review and comment if prehistoric cultural resources are identified that will be adversely affected by Project activities.
- In addition, the U.S. Army Corps of Engineers (USACE) requested wetland delineations and avoidance of impacts to wetlands or other waters of the United States within the range of alternatives. Wetland delineations were conducted June 9, 2010 and a wetland delineation report for USACE review and verification was submitted by BRCA to USACE on August 3, 2010. More information regarding scoping can be found in Comments and Coordination.

Impact Topics Retained For Further Analysis

Impact topics for this Project have been identified on the basis of federal laws, regulations, and orders; NPS *Management Policies 2006*; and NPS knowledge of resources at BRCA. Impact topics that are carried forward for further analysis in this EA are listed below along with the reasons why each impact topic is further analyzed. For each of these topics, the following text also describes the existing setting or baseline conditions (i.e., affected environment) within the Project area. This information will be used to analyze impacts relative to the current conditions of the Project area in the *Environmental Consequences* chapter.

Impact topics retained for further analysis are: threatened, endangered, rare, and protected species (Utah prairie dog [UPD] only); wildlife; and vegetation. In addition to the resources listed, visitor use and experience is also retained for further analysis.

Threatened, Endangered, Rare, and Protected Species (Utah Prairie Dog Only)

The Endangered Species Act of 1973 requires examination of impacts on all federally-listed threatened, endangered, and candidate species. Section 7 of the Endangered Species Act requires all federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) to ensure that any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of listed species or critical habitats. In addition, the NPS *Management Policies 2006* and *DO-77 Natural Resources Management Guidelines* require the NPS to examine the impacts on federal candidate species, as well as state-listed threatened, endangered, candidate, rare, declining, and sensitive species. The UPD (*Cynomys parvidens*) is the only federally listed or sensitive species that is known to nest and breed within the proposed construction areas, therefore, only this species will be further evaluated for environmental consequences within this EA. This determination was confirmed in consultation with the USFWS as provided in the Biological Opinion (Appendix A).



Wildlife



According to the NPS *Management Policies 2006*, the NPS strives to maintain all components and processes of naturally evolving park unit ecosystems, including the natural abundance, diversity, and ecological integrity of animals.

The Project may affect wildlife within and adjacent to the construction corridor.

Vegetation

Construction activities would directly impact vegetation. In addition, the activities may influence the spread of invasive non-native plant species.

Visitor Use and Experience

According to the NPS *Management Policies 2006*, the enjoyment of park resources and values by people is part of the fundamental purpose of all park units. The NPS is committed to providing appropriate, high quality opportunities for visitors to enjoy the parks, and will maintain within the parks an atmosphere that is open, inviting, and accessible to every segment of society. Further, the NPS will provide opportunities for forms of enjoyment that are uniquely suited and appropriate to the superlative natural and cultural resources found in the parks. The NPS *Management Policies 2006* also state that scenic views and visual resources are considered highly valued associated characteristics that the NPS should strive to protect.

Because the proposed Project will affect park infrastructure and scenic views and the impacts to these resources would temporarily affect visitor experience, the topic of visitor use and experience is carried forward for further analysis.

Impact Topics Dismissed From Further Analysis

In this section of the EA, the NPS provides a limited evaluation and explanation as to why some impact topics are not evaluated in more detail. Impact topics are dismissed from further evaluation in this EA if:

- They do not exist in the analysis area;
- They would not be affected by the proposal, or the likelihood of impacts are not reasonably expected; or
- Through the application of mitigation measures, there would be minor or less effects (i.e., no measurable effects) from the proposal, and there is little controversy on the subject or reasons to otherwise include the topic.

Threatened, Endangered, Rare, and Protected Species (UPD Excluded)

The Endangered Species Act of 1973 requires examination of impacts on all federally-listed threatened, endangered, and candidate species. Section 7 of the Endangered Species Act requires all federal agencies to consult with the USFWS to ensure that any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of listed species or critical habitats. In addition, the NPS *Management Policies 2006* and *DO-77 Natural Resources Management Guidelines* require the NPS to examine the impacts on federal candidate species, as well as state-listed threatened, endangered, candidate, rare, declining, and sensitive species.

Table 1-1 lists federally threatened, endangered, proposed, and candidate species that may occur in the park, along with an assessment of their potential to occur in the areas associated with the construction and operation of the Project. There are no Federally listed, proposed, or candidate plant species that occur in the park.

Table 1-1: Federally Threatened, Endangered, Proposed, and Candidate Species and Their Potential to Occur in the Project Area (UPD Excluded)

Name	Status ¹	Habitat	Potential for Occurrence in Study Area and Preliminary Determination
Birds			
California condor	E	Foraging habitat consists of open foothill grassland areas and oak savannah foothills that support deer and cattle. Roosting sites consist of large trees, dead snags, and cliffs. Breeding habitat consists of mountainous areas with cliffs and pine forest or chaparral vegetation types.	California condors are an intermittent visitor to BRCA. The current population in Utah is experimental. This species is not known to use the park consistently, nor is it known to use the park as a breeding area. No effect.
Southwestern willow flycatcher	E	The southwestern willow flycatcher (SWF) winters in Mexico, Central America, and northern South America. The SWF breeds in the United States (i.e., Arizona; New Mexico; southern California; and portions of Nevada, Utah, and Colorado), and nesting habitat consists of mid-to-low elevation multilayered, dense riparian habitat along rivers, streams, or other wetlands.	Nesting habitat is rare in BRCA. Surveys for the SWF have been conducted within BRCA since 1995, with a few sightings recorded near Yellow Creek and Sheep Creek/Swamp Canyon drainages. No nesting signs or behavior have been observed in the park. Yellow Creek is approximately 2.0 miles from the study area, and the Sheep Creek/Swamp Canyon drainages are approximately 5.0 miles from the study area. No effect.

Table 1-1: Federally Threatened, Endangered, Proposed, and Candidate Species and Their Potential to Occur in the Project Area (UPD Excluded)

Name	Status ¹	Habitat	Potential for Occurrence in Study Area and Preliminary Determination
Western yellow-billed cuckoo	FC	Breeding habitat consists of dense riparian woodlands of willow and cottonwood. Non-breeding habitat consists of various types of woodlands and scrub in the United States and mangroves in Puerto Rico.	This cuckoo species may be rare to BRCA, with only one unconfirmed sighting taking place along Sheep Creek in 2002, which is approximately 5.0 miles from the study area. No effect.

Source and Notes:

BRCA 1996-2002; BRCA 2002; NatureServe 2009; USFWS 2004; USFWS 2006; BRCA 2007

¹Status: E = Federally Endangered, FC = Candidate for Federal Listing

State Listed or Other Sensitive Species

Several species on the Utah Sensitive Species List (UDWR 2007) and listed in the Utah Comprehensive Wildlife Conservation Strategy (UDWR 2005) as a species of concern have been documented or are suspected of occurring within the park seasonally or throughout the year including:

- Bald eagle – an occasional winter visitor to the park,
- Ferruginous hawk – occasional winter visitor to the park,
- Greater sage-grouse – a rare year-round inhabitant,
- Lewis’s woodpecker – a rare winter visitor,
- Three-toed woodpecker – a rare winter visitor,
- Long-billed curlew – a migrant visitor,
- American white pelican – a migrant visitor,
- Spotted bat, and
- Fringed myotis.

Peregrine falcon and northern goshawk are two sensitive bird species known to breed in Bryce Canyon which are associated with special management/monitoring actions. The peregrine falcon was removed from the federal list of endangered and threatened species in 1999 and is state-listed as a Tier III species. BRCA staff continues to conduct protocol monitoring on this species semi-annually and keeps data on nesting sites within the park. There are several known eyries within the park, all located along the breaks or cliffs; however, birds have been observed hunting in surrounding open woodlands and grasslands.

Northern goshawk is a state-listed Tier I and Conservation Agreement species in the state of Utah, and is known to nest in the park and hunt over open grasslands. Northern goshawks are monitored within the park and protocol surveys are conducted prior to prescribed fires. Northern goshawk are known to nest near the Project area. As described in Mitigation Measures, if construction activities are scheduled within the nesting season for northern goshawk (or any birds protected under the Migratory Bird Treaty Act [MBTA]), generally April 1 through July 15, pre-construction surveys would be conducted for nests. No construction activities would be conducted in identified nesting areas until the young have fledged.

No populations of rare plant species are known to occur within the Project area. Most of the known populations of rare plants at Bryce Canyon inhabit barren areas along breaks and in open pine woodland habitats on bare, gravelly soils that are not located within the Project area.

Because mitigation measures would be implemented to lessen effects to migratory birds, no sensitive species (excluding UPD) are known to nest and breed within the proposed construction areas. Effects to migratory birds during construction activities would be localized and negligible. A determination of no effect to federally threatened, endangered, proposed, and candidate species (excluding UPD) was submitted from BRCA to USFWS on September 23, 2009. A final Biological Opinion with concurrence of no effect to these species was submitted by USFWS to BRCA on May 11, 2010. The Biological Opinion is included in Appendix A.

Given that there would be no effects to federally threatened, endangered, proposed, and candidate species (excluding UPD) and that mitigation measures would lessen the effects to migratory birds to short-term and negligible; such negligible impacts would not result in any unacceptable impacts. The proposed actions are consistent with §1.4.7.1 of *NPS Management Policies 2006*. Because these effects are minor or less in degree and would not result in any unacceptable impacts, this topic is dismissed from further analysis in this document.

Topography, Geology, and Soils

According to *NPS Management Policies 2006*, the NPS will preserve and protect geologic resources and features from adverse effects of human activity, while allowing natural processes to continue. These policies also state that the NPS will strive to understand and preserve the soil resources of park units and prevent, to the extent possible, the unnatural erosion, physical removal, or contamination of the soil, or its contamination of other resources.

The proposed construction would be in an area that does not contain significant topographic or geologic features. Further, the general locations for the sewer lines were previously disturbed by past construction of utilities. Repair of lagoon cells would require excavation, which would displace and disturb soils, primarily in the footprint of the lagoon. Given that there are no significant topographic or geologic features in the Project area, and that the area has been previously disturbed, the proposed actions would result in negligible to minor, temporary and permanent adverse effects to topography, geology, and soils. Further, such minor or negligible impacts would not result in any unacceptable impacts; the proposed actions are consistent with §1.4.7.1 of *NPS Management Policies 2006*. Because these effects are minor or less in degree and would not result in any unacceptable impacts, this topic is dismissed from further analysis in this document.

Paleontological Resources

According to *NPS Management Policies 2006*, paleontological resources (fossils), including both organic and mineralized remains in body or trace form, will be protected, preserved, and managed for public education, interpretation, and scientific research.

The proposed location for the sewer rehabilitation is in an area previously surveyed, and no paleontological sites were identified in the immediate Project area. Therefore, the proposed Project area is not expected to contain paleontological resources; however, appropriate steps would be taken to protect any paleontological resources that are inadvertently discovered during construction. Should currently unidentified paleontological resources be discovered during Project implementation, work in that location would stop until the resources are properly evaluated and avoided if necessary. Because the Project will not disturb any known paleontological sites, the affect of the Project on these resources is expected to be negligible. Further, such negligible impacts would not result in any unacceptable impacts; the proposed actions are consistent with §1.4.7.1 of *NPS Management Policies 2006*. Because these effects are minor or less in degree and would not result in any unacceptable impacts, this topic is dismissed from further analysis in this document.

Archeological Resources

In addition to the National Historic Preservation Act and the NPS *Management Policies 2006*, the NPS DO-28A *Archeology* affirms a long-term commitment to the appropriate investigation, documentation, preservation, interpretation, and protection of archeological resources inside units of the National Park System. As one of the principal stewards of America's heritage, the NPS is charged with the preservation of the commemorative, educational, scientific, and traditional cultural values of archeological resources for the benefit and enjoyment of present and future generations. Archeological resources are nonrenewable and irreplaceable, so it is important that all management decisions and activities throughout the National Park System reflect a commitment to the conservation of archeological resources as elements of our national heritage.

The Bryce Canyon 2000-2002 Archeological Inventory Survey was the first large-scale, intensive archeological survey conducted in the park. This resulted in a comprehensive and detailed view of the archeological resources on nearly 11,000 acres on the Paunsaugunt Plateau.

There are known archeological features near and in the Project Area of Potential Effect that meet eligibility criteria for listing in the National Register of Historic Places (NRHP). Five sites are either in or very close to the area of potential effect for the Project. Because it is a NPS goal to avoid impacts to archeological resources, alternative installation techniques such as pipe bursting or directional drilling would be used in areas where known archeological resources are present. Ground disturbing activities in archeologically sensitive areas would be monitored by an archeologist and would meet the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation. Within known archeological site areas, surface disturbances would be limited to previously disturbed areas and kept to a minimum. Construction access corridors would also be kept to a minimum. Manhole construction areas would be limited to 10 to 12 feet in diameter. In addition, the construction access corridor would be protected with construction matting or plywood. Prior to placing construction matting or plywood, a surface collection would be conducted to retrieve artifacts that could be crushed.

Mitigation would limit surface disturbance to previously disturbed areas, even if trenching technology were utilized. Therefore, the Project is not expected to impact intact archeological areas that retained significance for inclusion in the NRHP. Appropriate steps would be taken to protect any archeological resources that are inadvertently discovered during construction. Because the Project will not disturb any known archeological sites, the affect of the Project on archeological resources is expected to be negligible. Further, such negligible impacts would not result in any unacceptable impacts; the proposed actions are consistent with §1.4.7.1 of *NPS Management Policies 2006*. Because these effects are minor or less in degree and would not result in any unacceptable impacts, this topic is dismissed from further analysis in this document.

Ethnographic Resources

NPS DO-28 *Cultural Resource Management Guideline* defines ethnographic resources as any site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it. According to DO-28 and Executive Order 13007 on sacred sites, the NPS should try to preserve and protect ethnographic resources.

Human related studies are poorly represented at BRCA. Although Native Americans acknowledge their former usage of the BRCA area for hunting and gathering activities, there is very little ethnographic information documenting the extent of this usage. During the late Prehistoric period, Numic-speaking peoples like the Southern Paiute occupied BRCA and the surrounding area. Ethnohistorical accounts and the oral history of contemporary Southern Paiute include the BRCA area. Contemporary descendents of the Southern Paiutes and the Kaibab Tribe are considered Native American tribes who have traditional affiliation with BRCA. No specific ethnographic resources have been identified within the park, and no ethnographic

resource issues were raised during public scoping. Therefore no impacts to significant ethnographic resources are expected. Because the proposed construction would not result in any unacceptable impacts, this topic is dismissed from further analysis in this document.

Cultural Landscapes

According to the NPS DO-28 *Cultural Resource Management Guideline*, a cultural landscape is a reflection of human adaptation and use of natural resources, and is often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures that are built.

Five cultural landscapes have been identified within BRCA, including Bryce Canyon Lodge and Deluxe Cabins area, Bryce Inn (Sunrise Camper Store), NPS Historic Housing area, Rim Road, and Bryce Canyon National Park Scenic Trails Historic District. The only landscape for which a cultural landscape inventory (CLI) has been completed is for Rim Road. Cultural landscape reports have been completed for the Bryce Canyon Lodge and Deluxe Cabins area and NPS Historic Housing area. (Note: CLIs were completed for the Bryce Canyon Lodge and Deluxe Cabins area and NPS Historic Housing area on August 26, 2010. However, SHPO concurrence is pending.)

Although there would be temporary disruption of the historic scene within the historic districts during construction, following construction the landscapes within the historic districts would be restored. Sewer line replacement within the park's identified and potential cultural landscapes would not represent a change to the existing land use or structure types within the historic districts such that the overall integrity of the cultural landscapes at the park would be degraded. The eligibility of the cultural landscapes at the park for listing in the NRHP would not be in jeopardy.

The Project construction areas would be restored and the effect of the Project on identified and potential historic scenes are expected to be temporary and negligible. Further, since such negligible impacts would not result in any unacceptable impacts; the proposed actions are consistent with §1.4.7.1 of NPS *Management Policies 2006*. Because these effects are minor or less in degree and would not result in any unacceptable impacts, this topic is dismissed from further analysis in this document.

Historic Structures and Districts

NPS DO-28 *Cultural Resource Management Guideline* defines "historic properties" as any site, district, building, structure, or object eligible or listed in the NRHP, which is the nation's inventory of historic places and the national repository of documentation on property types and their significance. The term "historic structures" refers to constructed works that are architecturally designed or engineered to serve a human activity. These may include buildings, roads, trails, bridges, irrigation ditches, or earthen berms, to name a few. Historic districts are groups of buildings, properties or sites that have been designated as historically or architecturally significant.

There are three Historic Districts in BRCA that are listed on the NRHP. These historic districts are the Bryce Canyon Lodge Historic District, Old NPS Housing Historic District, and Bryce Canyon National Park Scenic Trails Historic District. Both the Bryce Canyon Lodge Historic District and Old NPS Housing Historic District were added to the register in 1994, and both are located in the heart of the existing developed area of the park. The Bryce Canyon National Park Scenic Trails Historic District was also listed on the NRHP in 1994.

The Bryce Canyon Lodge and Deluxe Cabins are in the best condition of what remains of the entire Bryce Lodge Complex, and are a National Historic Landmark. The complex, built 1924-1927, is an excellent example of the type of architecture encouraged by the NPS and built by the Union Pacific Railroad. The

period of significance for Bryce Canyon Lodge Complex is 1924 through 1944, an era characterized by the development of visitor facilities by the concessioner and the NPS.

Sewer line replacement would occur within Bryce Canyon Lodge Historic District and the Old NPS Housing Historic District. Although there would be temporary disruption of the historic scene within the historic districts during construction, following construction the landscapes within the historic districts would be restored. Any temporary impacts due to construction related activities are expected to be temporary and negligible. Construction activities would not directly affect historic structures. Sewer line replacement within the park's historic districts would not represent a change to the existing land use or structure types such that the overall integrity of the historic districts at the park would be degraded. The eligibility of the historic structures and districts at the park for listing in the NRHP would not be in jeopardy.

In accordance with Section 106 of the National Historic Preservation Act (36 CFR 800.3), a request for concurrence of a determination of no adverse effect to historic properties was submitted by BRCA to the State Historic Preservation Office on August 3, 2010. Concurrence from State Historic Preservation Office to BRCA was received on August 19, 2010.

Since any anticipated impacts would be temporary and negligible impacts and would not result in any unacceptable impacts; the proposed actions are consistent with §1.4.7.1 of NPS *Management Policies 2006*. Because these effects are minor or less in degree and would not result in any unacceptable impacts, this topic is dismissed from further analysis in this document.

Museum Collections

According to DO-24 *Museum Collections Management*, the NPS requires the consideration of impacts on museum collections (historic artifacts, natural specimens, and archival and manuscript material), and provides further policy guidance, standards, and requirements for preserving, protecting, documenting, and providing access to, and use of, NPS museum collections.

Museum collections would not be affected by the Project. Neither the disruption of existing collections, nor the addition of new collections is anticipated. Therefore, the proposed actions are consistent with §1.4.7.1 of NPS *Management Policies 2006*. Because these effects are minor or less in degree and would not result in any unacceptable impacts, this topic is dismissed from further analysis in this document.

Water Resources

NPS policies require protection of water quality consistent with the Clean Water Act (CWA) of 1977. The purpose of the CWA is to “restore and maintain the chemical, physical, and biological integrity of the Nation's waters.” To enact this goal, the USACE has been charged with evaluating federal actions that result in potential degradation of waters of the United States and issuing permits for actions consistent with the CWA. The U.S. Environmental Protection Agency also has responsibility for oversight and review of permits and actions that affect waters of the United States.

With the exception of the sewer lagoon cells, the proposed Project construction area does not contain surface waters, and would not affect groundwater. Leaking sewer lines have not affected the water quality within groundwater, which is 30 to 40 feet below the surface. To minimize erosion and protect water quality, disturbed areas would be revegetated and recontoured following construction. The proposed action would result in negligible effects to water resources. Further, such negligible impacts would not result in any unacceptable impacts; the proposed actions are consistent with §1.4.7.1 of NPS *Management Policies 2006*. Because these effects are minor or less in degree and would not result in any unacceptable impacts, this topic is dismissed from further analysis in this document.

Wetlands

For regulatory purposes under § 404 of the CWA, the term wetlands means “those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.”

Executive Order 11990 *Protection of Wetlands* requires federal agencies to avoid adversely impacting wetlands, where possible. Further, §404 of the CWA authorizes the USACE to prohibit or regulate, through a permitting process, the discharge of dredged or fill material within waters of the United States. NPS policies for wetlands as stated in *NPS Management Policies 2006* and *DO-77-1 Wetlands Protection* strive to prevent the loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. In accordance with *DO-77-1*, proposed actions that have the potential to adversely impact wetlands must be addressed in a Statement of Findings for wetlands.

The proposed Project would transverse wet meadow habitat consisting of wetland vegetation, but lacking hydric soils, distinct evidence of hydrology, and connectivity to waters of the United States, criteria required for wetlands by the USACE (Environmental Laboratory 1987). Per *DO-77-1*, (Section 4.2.1g), the proposed actions would be an “Excepted Action” as maintenance, repair, or renovation of currently serviceable facilities or structures that were under construction or were completed prior to May 28, 1980 (date the original “NPS Floodplain Management and Wetland Protection Guidelines” were published) but whose retention has been reviewed and justified according to Section 5.6 of *DO-77-1*. Therefore, a Statement of Findings for wetlands will not be prepared. As described in the *Wetland Report – Rehabilitation of the Failing Park Sewage System, Construction of Wildlife Pullout at the Mixing Circle Intersection* (NPS 2010), the Project would result in a total of less than 0.01 acre of wetland disturbance. Therefore, potential impacts from replacing the sewer lines in these wetland areas would be minor or less. Because these effects are minor or less in degree and would not result in any unacceptable impacts, this topic is dismissed from further analysis in this document.



Floodplains

Executive Order 11988 *Floodplain Management* requires all federal agencies to avoid construction within the 100-year floodplain unless no other practicable alternative exists. The NPS under *NPS Management Policies 2006* and *DO-77-2 Floodplain Management* will strive to preserve floodplain values and minimize hazardous floodplain conditions. According to *DO-77-2 Floodplain Management*, certain construction within a 100-year floodplain requires preparation of a Statement of Findings for floodplains.

Flood maps do not exist for the Project area. Therefore, the following discussion is based on the conservative assumption that the Project could be within a potential floodplain area.

If the Project area is within a 100-year floodplain, there would be no threats to public health and safety or the potential for property damage due to implementation of the proposed Project. The sewer line replacement would be below ground level and natural surface contours would be restored to pre-construction condition after construction. The Project would not involve filling or modification of the ground surface such that people or structures would be exposed to flooding. In addition, there would be no permanent occupancy or direct or indirect modification of floodplains. The proposed Project would not adversely affect the functions of a floodplain or increase flood risk. The activities associated with rehabilitating the park's sewage system would not violate National Flood Insurance Program requirements or result in changes that would increase an existing floodway or the flood elevation level associated with the 100-year flood event.

Under the proposed Project, construction equipment may be staged in a potential floodplain area. However, the effects from any temporary occupancy of staging equipment within floodplains during construction would be negligible. There would be no permanent effects on floodplains. Therefore, temporary impacts from replacing the sewer lines in potential floodplain areas would be minor or less. A Statement of Findings for floodplains is not necessary because there would be no unacceptable impacts to floodplains. The proposed actions are consistent with §1.4.7.1 of *NPS Management Policies 2006*. Because potential effects are minor or less in degree and would not result in any unacceptable impacts, this topic is dismissed from further analysis in this document.

Air Quality

The Clean Air Act of 1963 (42 *United States Code* [USC] 7401 *et seq.*) was established to promote the public health and welfare by protecting and enhancing the nation's air quality. The act establishes specific programs that provide special protection for air resources and air quality related values associated with NPS units. Section 118 of the Clean Air Act requires a park unit to meet all federal, state, and local air pollution standards. Further, the Clean Air Act provides that the federal land manager has an affirmative responsibility to protect air quality related values (including visibility, plants, animals, soils, water quality, cultural resources, and visitor health) from adverse pollution impacts.

BRCA is designated a Class 1 area under the Clean Air Act. The park's air quality is among the best in the nation with occasional periods of regional haze, forest fire smoke, or widely dispersed industrial pollution. Construction activities such as hauling materials and operating heavy equipment could result in temporary increases of vehicle exhaust, emissions, and fugitive dust in the general Project area. Any exhaust, emissions, and fugitive dust generated from construction activities would be temporary and localized and would likely dissipate rapidly. Overall, any of the alternatives could result in a negligible degradation of local air quality near construction areas, but such effects would be temporary, lasting only as long as Project work on that given day. The Class 1 air quality designation for BRCA would not be affected by the proposal. Because effects to air quality would be negligible and would not result in any unacceptable impacts, this topic is dismissed from further analysis in this document.

Natural Soundscapes

In accordance with NPS *Management Policies 2006* and DO-47 *Sound Preservation and Noise Management*, an important component of the NPS mission is the preservation of natural soundscapes associated with national park units. Natural soundscapes exist in the absence of human-caused sound. The natural ambient soundscape is the aggregate of all the natural sounds that occur in park units, together with the physical capacity for transmitting natural sounds. Natural sounds occur within and beyond the range of sounds that humans can perceive and can be transmitted through air, water, or solid materials. The frequencies, magnitudes, and durations of human-caused sound considered acceptable vary among NPS units as well as potentially throughout each park unit, being generally greater in developed areas and less in undeveloped areas.

The proposed location for construction activities would occur in what can be considered a developed area of BRCA. Existing sounds in this area are most often generated from vehicular traffic (visitors and employees entering/leaving the park), people, climate controls on the buildings, some wildlife such as birds, and wind.

During construction, human-caused sounds would likely increase due to construction activities, equipment, vehicular traffic, and construction crews. Any sounds generated from construction would be temporary, lasting only as long as the construction activity is generating the sounds, and would have a negligible to minor adverse impact on visitors and employees. Further, such negligible or minor impacts would not result in any unacceptable impacts; the proposed actions are consistent with §1.4.7.1 of NPS *Management Policies 2006*. Because these effects are minor or less in degree and would not result in any unacceptable impacts, this topic is dismissed from further analysis in this document.

Lightscaapes

In accordance with NPS *Management Policies 2006*, the NPS strives to preserve natural ambient lightscaapes, which are natural resources and values that exist in the absence of human caused light.

The proposed action could potentially include minimal temporary lighting for construction related activities; however, no new permanent lighting would be included in the Project.

Such negligible impacts would not result in any unacceptable impacts; the proposed actions are consistent with §1.4.7.1 of NPS *Management Policies 2006*. Because these effects are minor or less in degree and would not result in any unacceptable impacts, this topic is dismissed from further analysis in this document.

Socioeconomics

The proposed action would neither change local and regional land use nor appreciably impact local businesses or other agencies. Implementation of the proposed action could provide a negligible beneficial impact to the economies near BRCA due to minimal increases in employment opportunities for the construction workforce and revenues for local businesses and governments generated from these additional construction activities and workers. Any increase in workforce and revenue, however, would be temporary and negligible, lasting only as long as construction. Because the impacts to the socioeconomic environment would be negligible, this topic is dismissed.

Prime and Unique Farmlands

The Farmland Protection Policy Act of 1981, as amended, requires federal agencies to consider adverse effects to prime and unique farmlands that would result in the conversion of these lands to non-agricultural uses. Prime or unique farmland is classified by the U.S. Department of Agriculture's Natural Resources Conservation Service, and is defined as soil that particularly produces general crops such as common foods,

forage, fiber, and oil seed; unique farmland produces specialty crops such as fruits, vegetables, and nuts. Because no prime or unique farmlands occur either in the park or in the nearby vicinity, this topic is dismissed from further analysis in this document.

Indian Trust Resources

Secretarial Order 3175 requires that any anticipated impacts to Indian trust resources from a proposed project or action by the Department of Interior agencies be explicitly addressed in environmental documents. The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes.

There are no Indian trust resources at BRCA. The lands comprising the park are not held in trust by the Secretary of the Interior for the benefit of Indians due to their status as Indians. Because there are no Indian trust resources, this topic is dismissed from further analysis in this document.

Environmental Justice

Executive Order 12898 *General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. Because the sewer system would be available for use by all park staff and visitors regardless of race or income, and the construction workforces would not be hired based on their race or income, the proposed action would not have disproportionate health or environmental effects on minorities or low-income populations or communities. Because there would be no disproportionate effects, this topic is dismissed from further analysis in this document.

Climate Change

Although climatologists are unsure about the long-term results of global climate change, it is clear that the planet is experiencing a warming trend that affects ocean currents, sea levels, polar sea ice, and global weather patterns. Although these changes will likely affect winter precipitation patterns and amounts in the parks, it would be speculative to predict localized changes in temperature, precipitation, or other weather changes, in part because there are many variables that are not fully understood and there may be variables not currently defined. Impacts from construction equipment emissions would be temporary and would not measurably contribute to global climate change. Because effects to climate change would be negligible and would not result in any unacceptable impacts, this topic is dismissed from further analysis in this document.

Park Operations

Rehabilitating the park's failing sewer system would correct the deficiencies associated with the overall poor condition of the existing sewer system and flow volumes would be brought to the industry standard of a minimum two feet per second. There would be no additional workload requirements for park employees beyond short-term contracting requirements associated with implementation of any of the alternatives. The improved system would decrease annual maintenance activities and costs associated with the deterioration of the existing sewer line and would therefore have a minor or less beneficial impact on park operations.

Because these effects would result in minor or negligible beneficial impacts, this topic is dismissed from further analysis in this document.

ALTERNATIVES CONSIDERED

During June of 2009, an interdisciplinary team of NPS employees met for the purpose of developing Project alternatives. This meeting resulted in the definition of Project objectives as described in the *Purpose and Need*, and a list of alternatives that could potentially meet these objectives. A total of three action alternatives and the no-action alternative were originally identified for this Project. Of these, one of the action alternatives was dismissed from further consideration for various reasons, as described later in this chapter. Two action alternatives and the no-action alternative are carried forward for further evaluation in this EA. A summary table comparing alternative components is presented at the end of this chapter.

Alternatives Carried Forward

Alternative A – No-Action

Under this alternative, the sewer system would not be rehabilitated. Sections of the collection system and associated manholes would continue to deteriorate into pieces that clog the system and cause raw sewage to back up and spill onto the ground. The High Plateau Institute building would not be added to the sewer system, and the existing sanitary sewage lagoon treatment system would not be improved. Should the no-action alternative be selected, the NPS would respond to failures of the existing sewer system as problems arise.

Alternative B – Open-Cut Trench Method

Sewer rehabilitation under alternative B consists of two replacement, rehabilitation, and/or restoration pieces: the sanitary sewage collection system and sanitary sewage lagoon treatment system. Construction would occur in three phases based on funding availability. Phase I would address portions of the Project with the most immediate need of replacement and include improvement of the sewage lagoon treatment system and replacement of approximately 6,600 linear feet of sewer pipeline. Phases II and III would include replacement, as funds become available, of approximately 5,500 and 3,800 linear feet of sewer pipeline, respectively.

Sanitary Sewage Collection System

The existing collection system has deficiencies with both the condition and capacity of the system; therefore, BRCA is proposing to improve the existing sewage collection system with the following improvements:

- Replacement of the broken and deteriorating portions of the park's sewage collection system, which includes repairing or replacing most manholes.
- Removal of one failed small independent septic tank and abandonment in place of one leach field located near the High Plateau Institute.
- Replacement of approximately 15,900 linear feet of sewer pipeline with high density polyethylene (HDPE)-type piped connections to the park's main sewage collection system.

Open-cut trenching techniques would be utilized. There would be a maximum 50-foot temporary right-of-way (ROW) and 2- to 6-foot deep trench associated with the open-cut method. The average trench depth would be approximately 4.5 feet. Existing sewer lines would be removed and new pipe would be replaced within the same trench. The replacement pipe diameter within the open-cut trench locations would vary from 6 to 10 inches.

In order to avoid impacts to known archeological resources, alternative installation techniques such as pipe bursting or directional drilling would be used in areas where archeological resources are present.

Sanitary Sewage Lagoon Treatment System

The replacement, rehabilitation, and/or repair of the existing sanitary sewage lagoon treatment system would include the following improvements.

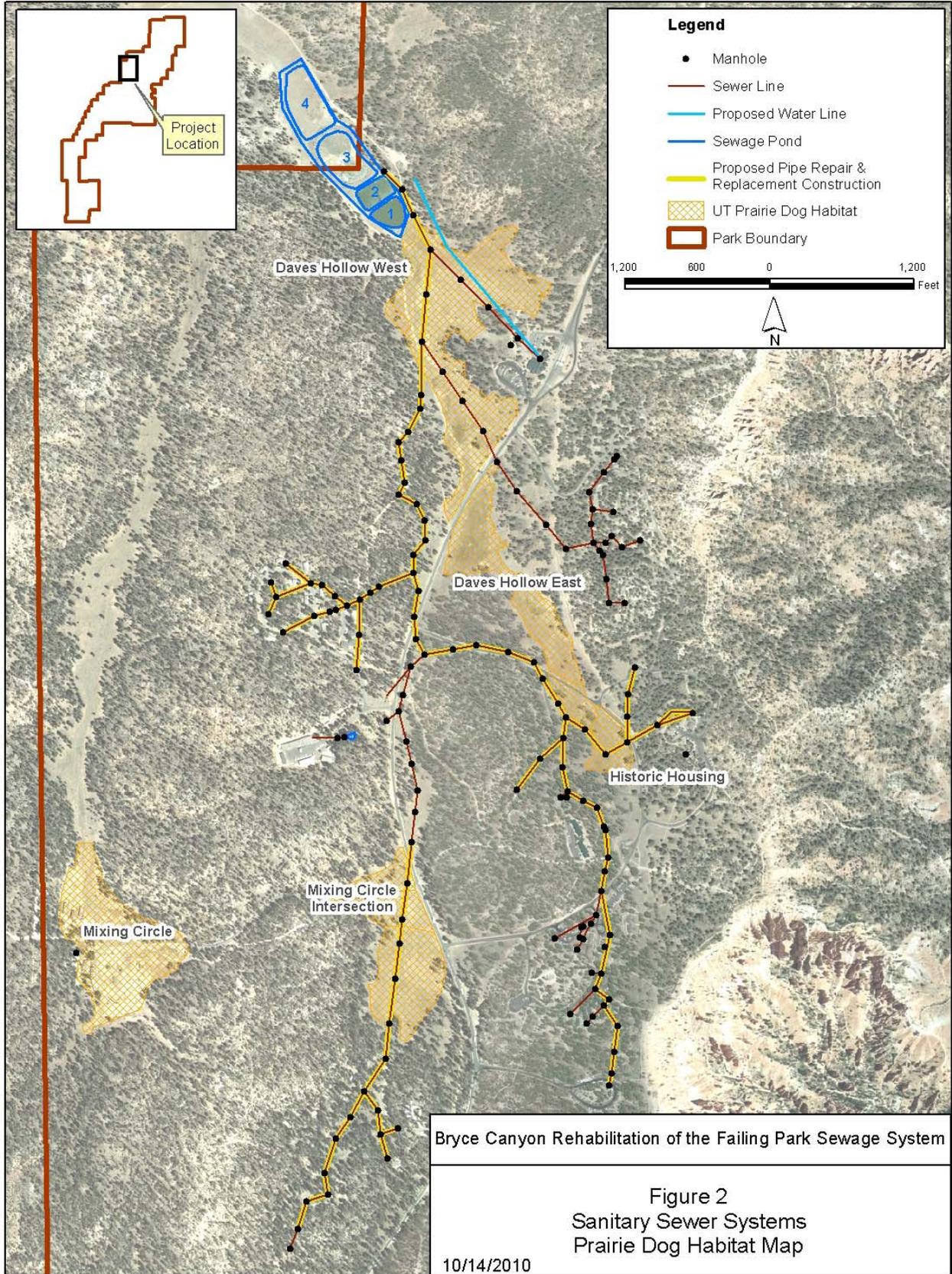
- Rehabilitation of all four lagoon cells. Cell 2 would be used for primary treatment and would be lined with a HDPE liner for emergency overflow. Cells 3 and 4 would be used for evaporation and would be lined with bentonite clay. Cell 1 would remain in its current state and would be used as an overflow cell.
- Reconditioning of Cell 3, which would include adding a head gate and flume for weed control and adding water for cell integrity during dry years.
- Installation of a small wash station, inline grinder pump on the main sewer pipe feeding the treatment lagoons, and flow meter at the lagoon site.
- Repairing the entire fence surrounding the lagoons (cells 1-4), including the existing 4-foot deep UPD enclosure fence near Cell 1. The fence surrounding the lagoons is partially located on United States Forest Service (USFS) land and would be repaired within both NPS and USFS jurisdictions.
- Installation of a 2,500 linear foot, 1.5-inch polyethylene water supply pipeline from the visitor center to the existing lagoon dump station, to be used primarily by maintenance staff. The water supply pipeline would be installed using horizontal directional drill (HDD) technology at a depth of approximately 4.5 feet. A maximum 30-foot temporary ROW would be utilized for vehicle and equipment access. In the event that the water supply pipeline cannot be installed using HDD technology because of geologic conditions, the open-cut trenching method would be the secondary construction method utilized at a depth of 4.5 feet with a maximum temporary 50-foot disturbance area. A depth of 4.5 feet is suitable to prevent the water pipeline from freezing during the winter months.

Alternative C – Pipe Bursting Methodology through Utah Prairie Dog Occupied Areas (Preferred Alternative)

Alternative C would have the same elements as alternative B except a trenchless technology referred to as pipe bursting would be used in place of open-cut trenching as the sewer pipeline replacement methodology through active UPD towns shown on Figure 2. In addition, after rehabilitation of the sewer system, routine removal and maintenance activities in the lagoon area (such as filling abandoned burrows with gravel) would discourage prairie dogs from this area. In order to avoid impacts to known archeological resources, pipe bursting would be used in areas where archeological resources are present.

Pipe bursting is a technique that installs a new pipe by pulling or pushing a device referred to as a “bursting head” through the existing pipe. The new replacement pipe is pulled along behind the bursting head as the existing pipe is demolished in place. The bursting head expands the existing pipe to the point that it bursts into shards which are then pressed into the surrounding soil. Bursting forces can be developed pneumatically, hydraulically, or as radial expansion resulting from the pulling forces exerted on a bursting head of a fixed diameter. The insertion (entry or launch) pit is typically a long and narrow pit that is used to insert the pipe bursting head into the host pipe. Since the new pipe is attached to the rear of the pipe bursting head, this pit must be longer and have a gently sloping bottom to accommodate the radius of curvature allowed by the type of new pipe being installed.

Figure 2: Utah Prairie Dog Habitat Map



Pipe bursting would allow up to 1,000-foot segments to be installed within straight pipe areas, at an anticipated rate of 50 feet per hour. However, pipe would only be installed in up to 50-foot segments in areas with pipe bends. The pipe in UPD towns would be installed approximately 4 feet deep, with the diameter varying between 6 and 8 inches.

Mitigation Measures

The following mitigation measures were developed to minimize the degree and/or severity of adverse effects and would be implemented during implementation of the action alternatives, as needed:

- To minimize the amount of ground disturbance, staging and stockpiling areas would be in previously disturbed sites, away from visitor use areas to the extent possible. All staging and stockpiling areas would be returned to pre-construction conditions following construction.
- To minimize the potential for impacts to park visitors, variations on construction timing may be considered. One option includes implementing daily construction activity curfews such as not operating construction equipment between the hours of 6 p.m. to 7 a.m. in summer (May to September), and 6 p.m. to 8 a.m. in winter (October to April). The NPS would determine this in consultation with the contractor.
- Construction ROW within occupied UPD habitat would be flagged. Staging of construction materials and/or equipment would be placed in designated locations away from the UPD habitat areas, in order to minimize impacts.
- Revegetation and recontouring of disturbed areas would take place following construction and would be designed to minimize the visual intrusion of the structure. Revegetation efforts would follow the park's Vegetation Management Plan (BRCA 2010), use native species and would strive to reconstruct the natural spacing, abundance, and diversity of native plant species. All disturbed areas would be restored as nearly as possible to pre-construction conditions shortly after construction activities are completed.
- Weed control methods would be implemented to minimize the introduction of noxious weeds. Construction equipment would be washed prior to entering the work site for the first time. Since the lagoon areas contain noxious weed, dirt from the lagoon areas would not be stockpiled or transported to other areas of the park.
- Because disturbed soils are susceptible to erosion until revegetation takes place, standard erosion control measures such as silt fences and/or sand bags would be used to minimize any potential soil erosion.
- To minimize soil compaction, use of low-pressure vehicles could be utilized in the meadow area, if necessary.
- Fugitive dust generated by construction would be controlled by spraying water on the construction site, if necessary.
- To reduce noise and emissions, construction equipment would not be permitted to idle for long (> 5 minutes) periods of time.

- To minimize possible petrochemical leaks from construction equipment, the contractor would regularly monitor and check construction equipment to identify and repair any leaks. In addition, spill containment supplies would be kept on site.
- Construction workers and supervisors would be informed about the UPD and other special status species.
- In order to keep prairie dogs out of the lagoon area, any fencing surrounding the treatment lagoons removed for construction activities would be replaced as soon as Project access to the lagoons is no longer required.
- If construction activities are scheduled within the nesting season for birds protected under the MBTA, generally April 1 through July 15, pre-construction surveys would be conducted for nests. No construction activities would be conducted in identified nesting areas until the young have fledged.
- To avoid impacts to known archeological resources, identified archeological resource areas would be flagged as sensitive areas and delineated as 'no construction zones.' In areas where existing pipe traverses archeological resources, alternative installation techniques such as pipe bursting or directional drilling would be used.
- Within known archeological site areas, surface disturbances would be kept to a minimum as practicable. Manhole construction areas would be limited to 10 to 12 feet in diameter.
- Within known archeological site areas, the construction access corridor would be kept to a minimum. The corridor would be protected with construction matting or plywood. Prior to placing construction matting or plywood, a surface collection would be conducted to retrieve artifacts that could be crushed.
- A qualified archeological monitor would be on site during ground disturbing activities within known archeological site areas to identify and record anything that might be uncovered.
- Should construction unearth previously undiscovered cultural resources, work would be stopped in the area of any discovery, and the park would consult with the state historic preservation officer and the Advisory Council on Historic Preservation, as necessary, according to §36 CFR 800.13, *Post Review Discoveries*. In the unlikely event that human remains are discovered during construction, provisions outlined in the Native American Graves Protection and Repatriation Act (1990) would be followed.
- The NPS would ensure that all contractors and subcontractors are informed of the penalties for illegally collecting artifacts or intentionally damaging paleontological materials, archeological sites, or historic properties. Contractors and subcontractors would also be instructed on procedures to follow in case previously unknown paleontological or archeological resources are uncovered during construction.

Following are Applicant-Committed Conservation Measures identified in the USFWS Biological Opinion that would be implemented by BRCA for all construction and maintenance activities.

- For all acres of direct disturbance within UPD habitat that would involve underground impacts (i.e., pipe bursting for sewer pipeline replacement and horizontal directional drilling for waterline installation), BRCA would mitigate at a 2:1 acreage ratio.

- For all acres of direct disturbance within UPD habitat that would involve surface disturbance (i.e., if underground methods fail or if manholes require replacement), BRCA would mitigate at a 5:1 acreage ratio.

Measures to Minimize UPD Mortality

- Construction in UPD habitat would not occur until after June 15, after the UPD pups have emerged from the burrows. Construction in UPD habitat would continue and be completed by August 31 when the pre-hibernation period begins. Pipeline replacement activities in UPD habitat would occur in different phases, however all work within each affected colony would be completed within one season.
- BRCA would ensure a biological monitor from the Bryce Canyon Resources Management Division would be onsite during all excavation activities. This individual would monitor the numbers and locations of UPD individuals in or immediately adjacent to the Project footprint prior to and during construction.
- All Project employees would be informed of the occurrence of UPD in the Project area, and to the threatened status of the species. All Project employees would be advised as the definition of “take” and the potential penalties for taking a species listed under the Endangered Species Act. Take is defined as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct; may include significant habitat modification or degradation if it kills or injures wildlife by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering.”
- Staging of construction material and/or equipment would be placed in designated locations away from the UPD habitat areas, in order to minimize impacts.
- Within 1,000 feet of occupied UPD habitat, all stored or placed pipes within suitable habitat would be immediately capped to prevent prairie dogs from entering.
- Construction and maintenance vehicles would be operated in a manner as to minimize impacts to UPD habitat. Vehicles used to access the Project site or equipment used on the Project would not be parked within any UPD habitat. All Project employees would be instructed to operate vehicles within the area of UPD only when necessary for construction and to remove the vehicles from the area as quickly as possible. Speed would not exceed 10 miles per hour within or adjacent to UPD colonies. Within occupied UPD habitat, all vehicles would be confined to flagged areas and established road corridors.
- To the maximum extent possible, all vehicle maintenance activities would be conducted in maintenance facilities outside of occupied or potential UPD habitat. Precautions would be taken to ensure that contamination of maintenance sites by fuels, motor oils, grease, etc. does not occur and such materials are contained and properly disposed of off-site. Inadvertent spills of petroleum based or other toxic materials would be cleaned up and removed immediately.



- A trash abatement program would be initiated for each phase of the Project, and would continue through the duration of the Project. All construction refuse (including, but not limited to, fencing materials, twine, buckets, metal or plastic containers, and boxes) will be disposed of properly and not left uncontained on site overnight.
- No Project-related personnel would be permitted to discharge firearms or have pets in their possession while on the Project site.
- If the open-cut trenching method is necessary during a pipeline break and/or manhole replacement procedure, appropriate dust abatement practices (using water trucks) would be performed to minimize the amount of dust settling on the surrounding vegetation (i.e., UPD food sources).
- To avoid the spread of non-native invasive plant species, construction equipment would be washed prior to entering the work site for the first time.
- Upon completion of the construction within occupied UPD habitat, the disturbance area would be raked and seeded with an approved seed mix.
- BRCA would continue to perform management activities that sustain a healthy population of UPD, such as the utilization of delta dust treatments to control the outbreak of sylvatic plague and the completion of a BRCA UPD management and conservation strategy.

Measures to Minimize Impacts to UPD and Their Habitat During Construction within the Lagoon Area

- All ground disturbance work would stay within the sewer lagoon fence until the emergence of UPD pups (~June 15). Once pups are above ground, work adjacent to the fence (including installation of a wash station and associated plumbing) as well as pipe bursting of the existing sewer line outside of the lagoon area and construction of the water line using horizontal directional drilling can commence. Work outside of the sewer lagoon fence would be completed by August 31 to reduce impacts to UPD prior to hibernation. Work inside the sewer lagoon fence may continue past August 31 if necessary (weather dependent).
- All contracted workers would be required to attend a UPD briefing prior to Project initiation and would receive information on the status of the species, Project conservation measures, contacts for UPD incident reporting and acceptable actions while working near colonies. All workers in the Project area would be required to sign a sheet indicating their attendance at this training.
- Vehicle speed limit is 10 miles per hour along the lagoon access road. Violation of this restriction would result in a warning to the driver (1st violation) and removal from the Project (2nd violation). A staff member from Bryce Canyon Resources Management Division would periodically inspect the construction area and access road to monitor compliance to required conservation measures.
- Vehicles would not be allowed to leave the lagoon access road corridor unless a biological monitor is on site. A monitor would be on site during Project work within UPD habitat outside of the sewer lagoon fence.
- Designated vehicle parking areas would be delineated by park staff and would be outside of active UPD colonies.
- Vehicles/equipment would not be maintained/repared within the sewer lagoons or the access road in Dave's Hollow. A separate staging area (outside of the meadow) would be established for any necessary vehicle maintenance.

Habitat Improvements within the Park

- In addition to implementing conservation measures following Project completion in UPD habitat, BRCA would conduct habitat improvements within two meadow complexes inside the park: Dave's Hollow Meadow and East Creek Meadow. Habitat improvements would be conducted on approximately 8 to 20 acres (depending on final direct disturbance impacts) in these two meadow complexes and would improve forage quality and quantity as well as provide more attractive habitat that could potentially connect a small, isolated UPD colony in East Creek Meadow with larger established colonies to the west.
- All Project participants would be informed about the special status of the UPD and what actions are authorized within active UPD colonies, including distance restrictions, burrow avoidance and approved tool use.
- Vegetation treatments (mechanical/herbicide treatments) within 500 feet of active UPD colonies would not occur until pups have emerged from burrows (~June 15) and would be completed by August 31 to reduce interference with pre-hibernation foraging. This would reduce impacts to UPD during especially critical life history periods for the species.
- The use of motorized equipment within 500 feet of active UPD colonies for vegetation treatments (that do not involve ground disturbance) would be conducted during the dormant season when possible. If motorized equipment is necessary during the active season, treatments would occur after the pups emerge and be completed in time to reduce interference with pre-hibernation foraging (June 15 to August 31) and would be limited to two hours per day during the less active period of the day (approximately 10 a.m. to 2 p.m.). Motorized equipment used for vegetation treatments includes such items as string trimmers and chainsaws.
- No motorized vehicles (including ATVs, cars/trucks, tractors, heavy equipment, etc.) would be used overland (off existing roads and trails) within 0.5 mile of occupied UPD habitat.
- Only hand-pulling of weeds is authorized within 50 feet of an active UPD burrow.
- Only Plateau, RoundUp, Milestone, Fusilade, and Habitat (or generic equivalents) would be used between 50 feet and 500 feet of active UPD colonies. These herbicides are rated 'practically nontoxic' according to the U.S. Environmental Protection Agency's toxicity scale. Outside of 500 feet from active UPD colonies, BRCA may use Garlon (or generic equivalent) to treat non-native invasive species. Only one application using Garlon would be conducted within the same year, per treated site. If additional herbicides are developed or discovered to be more effective at treating exotic plants, BRCA would contact the USFWS for authorization for those products.
- All application instructions in the herbicide applicator manual would be followed. To prevent drift, herbicide would not be applied during windy conditions or when rainfall is threatening.
- No more than 20% of habitat within 500 feet of active UPD colonies would be treated within one season; follow-up treatments can occur for up to two years after the initial treatment in the same 20% area with reseeding efforts to occur following the last year of treatment. New treatment areas within the same colony would not be selected until rehabilitation is completed on previously treated sites (i.e., previously treated areas were reseeded and no further vegetation removal is expected for at least a 5-year period). This method ensures that no greater than a 20% loss in vegetation would occur in the area surrounding active colonies. A maximum of 40% of habitat would be treated between 500 feet and 0.5 mile from an active UPD colony within one season. First year/initial treatments would not be performed on two colonies in the same season if those colonies have functional connectivity.

- Rehabilitation efforts of UPD habitat would strive to produce vegetation characteristics that optimize colony establishment and success, including the following parameters:
 - 1-20% ground cover of warm season grasses
 - 12-14% ground cover of cool season grasses
 - 1-10% ground cover of forbs
 - 0-8% ground cover of shrubs (<10% canopy cover).
- Reseeding of treated areas within 500 feet of active UPD colonies would use a native seed mix (seed collected from plants from within BRCA or a local genetic strain).

Alternatives Considered and Dismissed

The alternative to utilize the pipe bursting methodology for all sewer line replacement was considered for Project implementation. This alternative was considered to minimize ground disturbances within the Project area. This alternative did not eliminate ground disturbance at insertion areas and manholes and was also a much higher cost. Therefore, this alternative was deemed unfeasible because impacts to resources would be similar to those presented under alternatives already considered, but this alternative would be at a much higher cost.

Another alternative considered was sliplining, a method where a smaller pipe is inserted into the existing sewer pipe. This alternative would minimize ground disturbance and associated impacts to UPD. However, sliplining would reduce sewer line capacity; therefore, it was deemed infeasible because the resulting capacity would be inadequate for current park visitor and staff levels.

Alternative Summaries

Table 2-1 summarizes the major components of alternatives A, B, and C, and compares the ability of these alternatives to meet the Project objectives (the objectives for this Project are identified in the *Purpose and Need* chapter). As shown in the following table, alternatives B and C meet each of the objectives identified for this Project, while the No-Action alternative does not address the objectives.

Table 2-2 summarizes the anticipated environmental impacts for alternatives A, B, and C. Only those impact topics that have been carried forward for further analysis are included in this table. The *Environmental Consequences* chapter provides a more detailed explanation of these impacts.

Table 2-1: Alternatives Summary and Project Objectives

Alternative A – No-Action	Alternative B – Open-Cut Trench	Alternative C – Pipe Bursting
<p>Under this alternative, the sewer system would not be rehabilitated. Sections of the collection system and associated manholes would continue to deteriorate into pieces that clog the system and cause raw sewage to back up and spill onto the ground.</p>	<p>Under alternative B, the sewer would be rehabilitated. This rehabilitation would consist of the sanitary sewage collection system and sanitary sewage lagoon treatment system. Under this alternative, approximately 20,350 linear feet of sewer pipeline would be replaced utilizing an open-cut trenching technique. In order to avoid impacts to NRHP eligible archeological sites, alternative installation techniques such as pipe bursting or directional drilling would be used in areas where archeological resources are present.</p>	<p>Alternative C would have the same elements as alternative B except in order to avoid impacts to UPD, a trenchless technology referred to as pipe bursting would be used as the sewer pipeline replacement methodology through all active UPD towns. Adverse impacts to NRHP eligible archeological sites would be avoided with pipe bursting in areas where archeological resources are present.</p>
Meets Project Objectives?	Meets Project Objectives?	Meets Project Objectives?
<p>No. Continuing the existing conditions would not change the status of the broken and deteriorating portions of the park’s sewage system or septic tank and leach field systems.</p>	<p>Yes. The sewer rehabilitation would repair broken and deteriorating portions of the park’s sewage system, replace failed septic tank and leach field systems, and recondition the sewage treatment lagoons.</p>	<p>Yes. The sewer rehabilitation would repair broken and deteriorating portions of the park’s sewage system, replace failed septic tank and leach field systems, and recondition the sewage treatment lagoons.</p>

Table 2-2: Environmental Impact Summary by Alternative

Impact Topic	Alternative A – No-Action	Alternative B	Alternative C –Preferred Alternative
Special Status Species (only UPD analyzed in detail)	No impacts to UPD populations or habitat because comprehensive sewer rehabilitation construction activities would not be conducted. This alternative would not contribute to overall localized, adverse and beneficial, negligible to minor, cumulative impacts on populations, or habitat, of UPD within the park when considered with other past, present, and reasonably foreseeable future actions.	Adverse, site-specific, short-term, and minor to moderate impacts during construction due to disturbances to UPD individuals and UPD habitat. Cumulatively, these actions would have an overall minor site-specific, and adverse effect on UPD when considered with other past, present, and reasonably foreseeable future actions.	Adverse, site-specific, short-term, and minor impacts during construction due to disturbances to UPD burrows, but to a lesser degree than under the implementation of alternative B. Cumulatively, these actions would have an overall minor site-specific, and adverse effect on UPD when considered with other past, present, and reasonably foreseeable future actions.
Wildlife	No impacts to wildlife because sewer rehabilitation construction activities would be conducted. This alternative would not contribute incrementally to the minor, adverse, cumulative disturbances of wildlife when considered with other past, present, and reasonably foreseeable future actions.	Adverse, site-specific, short-term, negligible to minor impacts during construction due to disturbances to area wildlife and their habitat. There would be no long-term effect to wildlife under the implementation of alternative B. Cumulatively, these actions would have short-term, incremental, site-specific, adverse impacts with an overall moderate effect when considered with other past, present, and reasonably foreseeable future actions.	The implementation of the preferred alternative would be similar to alternative B and would result in adverse, site-specific, short-term, and negligible to minor impacts during construction due to disturbances to area wildlife and their habitat. There would be no long-term effect to wildlife under the implementation of the preferred alternative. Cumulatively, the implementation of the preferred alternative would have an incremental, site-specific, adverse impacts with an overall moderate effect when considered with other past, present, and reasonably foreseeable future actions.
Vegetation	No impacts to vegetation because sewer rehabilitation construction activities would not be conducted. As such, this alternative would not contribute incrementally to the minor, adverse, cumulative disturbances of vegetation when considered with other past, present, and reasonably foreseeable future actions.	Adverse, site-specific, short and long-term, negligible to minor impacts during construction due to ground disturbances. Cumulatively, these actions would have incremental, site-specific, adverse impacts with an overall minor to moderate effect when considered with other past, present, and reasonably foreseeable future actions.	The implementation of the preferred alternative would be similar to alternative B and would result in adverse, site-specific, short and long-term, and negligible to minor impacts during construction due to disturbances to vegetation. Cumulatively, the implementation of the preferred alternative would have incremental, site-specific, adverse impacts with an overall minor to moderate effect when considered with other past, present, and reasonably foreseeable future actions.

Table 2-2: Environmental Impact Summary by Alternative

Impact Topic	Alternative A – No-Action	Alternative B	Alternative C –Preferred Alternative
Visitor Use and Experience	Primarily minor effects to visitor use and experience because of impacts from odors and viewer perception and would be localized, short-term, adverse and minor. Cumulatively, because visitor experience would not appreciable change, the effects of not rehabilitating the parks sewage system would only have a slight, incremental, negligible, adverse effect to the overall minor to moderate beneficial cumulative effect to visitor use and experience at the park when considering past, present, and reasonably foreseeable future actions.	Long-term, minor to moderate beneficial effect on visitor use and experience. Construction related disturbances (noise, dust, limited areas) would have localized, minor, temporary adverse impacts to park visitors. Cumulatively, this alternative would have an incremental minor beneficial effect to the overall minor to moderate beneficial visitor use and experience effects because ultimately this Project combined with other past, present, and reasonably foreseeable future actions would benefit visitor use and experience.	Impacts under the preferred alternative would be the same as described under alternative B, the rehabilitation of the parks sewer system would have a long-term, minor to moderate beneficial effect on visitor use and experience. Construction related disturbances (noise, dust, limited areas) would have localized, minor, temporary adverse impacts to park visitors. Cumulatively, the preferred alternative would have an incremental minor beneficial effect to the overall minor to moderate visitor use and experience effects.

Identification of the Environmentally Preferred Alternative

The environmentally preferred alternative is determined by applying the criteria suggested in the NEPA, which guides the CEQ. The CEQ provides direction that “The environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in NEPA’s Section 101”. “In order to carry out the policy set forth in this Act, it is the continuing responsibility of the Federal Government to use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate Federal plans, functions, programs, and resources to the end that the Nation may:

1. Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
2. Assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings;
3. Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
4. Preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment that supports diversity, and variety of individual choice;
5. Achieve a balance between population and resource use which would permit high standards of living and a wide sharing of life’s amenities; and
6. Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.”

Alternative A, *No-Action*, only minimally meets the above six evaluation factors because it retains infrastructure that does not function in accordance with accepted sewage handling practices. Although it minimizes potential impacts to significant park resources such as the UPD, it does not achieve a balance between these resources and the health and safety of visitors and staff. This alternative also does not meet the criteria for assuring for all generations, healthful, and esthetically pleasing surroundings nor does this alternative meet the criteria to achieve a balance between population and resource use that would permit high standards of living as the failing sewer system is not healthful, esthetically pleasing, or promoting a high standard of living.

Alternative B, *Open-Cut Trench Method*, would provide for healthful and esthetically pleasing surroundings and also promote a higher standard of living. As a rehabilitated sewage system would repair the current condition of raw sewage backing up and leaking out of the system. However, the open-cut trenching through existing UPD areas would not fulfill the responsibilities as trustees of the environment by disturbing UPD habitat more than necessary.

Alternative C is the environmentally preferred alternative because it best addresses these six NEPA evaluation factors. Alternative C, *Pipe Bursting Methodology through Utah Prairie Dog Occupied Areas*, would provide for healthful and esthetically pleasing surroundings and also promote a higher standard of living, while minimizing impacts to the UPD to the extent possible.

No new information came forward from public scoping or consultation with other agencies to necessitate the development of any new alternatives, other than those described and evaluated in this document. Because it meets the purpose and need for the Project, the Project objectives, and is the environmentally preferred alternative, alternative C is also recommended as the NPS preferred alternative. For the remainder of the document, alternative C would be referred to as the preferred alternative.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter analyzes the potential environmental consequences, or impacts, that would occur as a result of implementing the proposed Project. Resources analyzed in this chapter include: special status species (UPD only), wildlife, and vegetation. Visitor use and experience is analyzed in addition to the resources listed. Direct, indirect, and cumulative effects, as well as impairment are analyzed for each resource topic carried forward. Impairment analysis is included in Appendix B. Potential impacts are described in terms of type, context, duration, and intensity. General definitions of terms are provided below, while more specific impact thresholds are given for each resource at the beginning of each resource section.

- **Type** describes the classification of the impact as either beneficial or adverse, direct or indirect:
 - *Beneficial*: A positive change in the condition or appearance of the resource or a change that moves the resource toward a desired condition.
 - *Adverse*: A change that moves the resource away from a desired condition or detracts from its appearance or condition.
 - *Direct*: An effect that is caused by an action and occurs in the same time and place.
 - *Indirect*: An effect that is caused by an action but is later in time or farther removed in distance, but is still reasonably foreseeable.
- **Context** describes the area or location in which the impact would occur. Are the effects site-specific, local, regional, or even broader?
- **Duration** describes the length of time an effect would occur, either short-term or long-term:
 - *Short-term impacts* generally last only during construction, and the resources resume their pre-construction conditions following construction.
 - *Long-term impacts* last beyond the construction period, and the resources may not resume their pre-construction conditions for a longer period of time following construction.
- **Intensity** describes the degree, level, or strength of an impact. For this analysis, intensity has been categorized into negligible, minor, moderate, and major. Because definitions of intensity vary by resource topic, intensity definitions are provided separately for each impact topic analyzed in this EA.

Cumulative Effects

The CEQ regulations, which implement the National Environmental Policy Act of 1969 (42 USC 4321 et seq.), require 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 non-federal) 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 alternative with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other ongoing or reasonably foreseeable future projects at BRCA and, if applicable, the surrounding region. The geographic scope for this analysis includes elements mostly within the park's boundaries, while the temporal scope includes projects within a range of approximately ten years. Given this, the following projects were identified for the purpose of conducting the cumulative effects analysis:

Urbanization: The communities surrounding BRCA continue to grow. The park is near the town of Bryce Canyon City (to the north) and Tropic (to the east). Residential and commercial development near park boundaries would result in increased visitation.

Visitor Transportation System: In 2000, the park initiated a shuttle system that primarily services the northern portion of the park within the main BRCA amphitheater. Recent changes to the transportation system have included shuttle service twice daily to the southern portion of the park.

Rim Road Reconstruction: In 2004, the main park road was rerouted and improved in several sections, including the East Creek meadow area. Reconstruction widened and stabilized the road in several sections and installed erosion control features in areas of high grade.

Development of Fire Management Plan (FMP): In 2005, the park developed a FMP in cooperation with the neighboring Dixie National Forest to implement wildland and prescribed fire to reduce fuel loads; restore native vegetative communities; and safeguard human structures (residential areas, historic buildings and maintenance areas) from fire hazards. The plan also allows for prescribed fire in meadow habitat throughout the park as a means to improve vegetative diversity via the reduction of shrub encroachment.

Visitor Use: In 2008, over one million people visited Bryce Canyon. Visitor use is anticipated to increase within the next ten years.

Horse Concession Fence Construction near Mixing Circle Junction: In 2008, and in cooperation with the horse rides concessioner, the park approved the construction of a single rail fence near the Mixing Circle junction to direct horse/mule traffic more efficiently over the hill between the evening and day corrals. Construction of the fence did not occur within prairie dog habitat or require the closure of any public areas.

Paria View Rehabilitation: In 2008, the Paria Viewpoint was reconstructed to improve the walkway, fencing and parking area.

Chip Sealing: In 2009, the main park road was chip-sealed during the summer from the park entrance to the Farview Viewpoint turnoff. The project area included chip-sealing the road through the entire East Creek meadow area.

Vegetation Management Plan: The park-wide vegetation management plan, completed in July 2010, directs efforts to protect and restore native plant communities while controlling the spread of invasive vegetation within the park.

Exotic Vegetation Management: Ongoing annual exotic species management occurs throughout the park but is strongly concentrated on the northern portion (surrounding the visitor center) and adjacent to the main park road. Vegetation removal focuses on non-native species along the roadside, including infestations of smooth brome adjacent to the road which resulted from the Rim Road Reconstruction project in 2004. Herbicide and manual pulling of non-natives occurs in portions of East Creek meadow and is anticipated to continue in future years.

Future Wildlife Viewing Pullouts: The project proposes to install five wildlife viewing pullouts to facilitate appropriate visitor use and enhance visitor enjoyment of park resources and protect the limited and important meadow resources of the park.

Future Bike Path Project: The park is in the planning stage of a bike path project that may lead to the construction of several miles of paved biking trails within the park. The trails are proposed mainly near Highway 12. However, the addition of bike trails would likely lead to increased visitor use of bikes throughout the park, including the southern portion and through East Creek Meadow.

Rehabilitate Bryce Point and Sunset Point: BRCA plans to rehabilitate both Bryce Point and Sunset Point in the next 3 years.

Emergency Response Center: BRCA is considering a multi-agency emergency response center on the parks northern border along State Route 63.

Threatened, Endangered, Rare, and Protected Species (UPD Only)

This impacts analysis section focuses solely on the UPD, a federally listed threatened species that occurs within the proposed Project area. The UPD is the only federally listed or sensitive species that is known to nest and breed within the proposed construction areas; therefore, only this species will be further evaluated for environmental consequences within this EA. This determination was confirmed in consultation with the USFWS as provided in the Biological Opinion (Appendix A).

The UPD, a federally threatened and state-listed sensitive species, is a burrowing rodent that is part of the squirrel family (*Sciuridae*) and is one of three members of the white-tailed prairie dog group. The UPD occurs only in southwestern Utah and is the most geographically restricted of the three members of this group.

Within BRCA, the UPD was eradicated in the 1950s (Stebbins 1971). Reintroduction of the UPD, mostly as juveniles, into BRCA started in 1974 and continued through 1988 (Bryant 1995). Since this reestablishment period, UPDs have colonized new areas within the open, grassy meadows of the central and northern portions of BRCA. The UPD numbers fluctuate within the park because of natural predators; fire suppression; road fatalities; sylvatic plague; habituation; and longer and more extreme winters that decrease the time available for the feeding season. Currently, BRCA biologists perform management activities such as utilization of delta dust treatments to control the outbreak of sylvatic plague and the current development of a UPD management and conservation strategy in order to sustain healthy populations of UPD. In addition, the NPS conducts annual population counts of adult UPDs each spring to monitor active colonies and population trends. Between 2004 to 2006, BRCA park staff counted on average 209 animals from six to ten colonies (BRCA 2007). At the present time there are eight active UPD colonies (in approximately 400 acres) within the park.

In 2009, UPD field surveys were conducted within the proposed Project area. The survey results gathered by BRCA Natural Resource Specialists Laura Schrage and Sarah Haas are presented in Tables 3-1 and 3-2.

Table 3-1 represents the surveys conducted within a 750-foot buffer between May 26, 2009 and July 9, 2009. The 750-foot buffered area was determined by buffering the proposed pipelines by 25-feet on each side of the centerline and adding an additional 350-foot on each side of the 25-foot construction zones.

Table 3-1: 2009 UPD Survey Results within the 750-foot Buffer

UPD Colony Name	Survey Details				Total Habitat (acres)	Habitat within 750 foot buffer ¹ (acres)	Actual Number of UPD Observed in 750 foot Buffer ¹		Estimated Number of UPD in 750 foot Buffer ²	
	Sewer Line		Water Line				Adult	Juvenile	Adult	Juvenile
	Date	Start Time	Date	Start Time						
Dave's Hollow West #215A	7-9-09	14:15	7-8-09	11:15	29.5	21.0	5	3	10	6
Historic Housing #215B	7-9-09	15:15	NA ³	NA ³	4.7	4.3	2	0	4	0
Mixing Circle Intersection #215C	5-26-09	12:00	NA ³	NA ³	14.3	14.0	5	0 ⁴	10	0 ⁴
Total					48.5	39.3	12	3	24	6

Source: Schrage 2009, Haas 2009

Notes:

¹750 foot buffer was determined by adding a 25-foot disturbance area plus a 350-foot buffer on each side of the proposed pipeline centerline(s).

²Due to the potential for prairie dogs to be in their burrows during the field surveys, an estimated number of prairie dogs were determined by multiplying the actual number of UPD observed by two.

³NA = Area will not be impacted by water line installation.

⁴Surveys were conducted when juveniles were too young to be seen above ground.

Table 3-2 represents the survey results for the UPD surveys conducted on July 7, 2009 within the 50-foot disturbance area (i.e., construction zone). The disturbance area was determined by buffering the proposed pipelines by 25-feet on each side of the centerline.

Table 3-2: 2009 UPD Survey Results within the 50-foot Disturbance Area

UPD Colony Name	Survey Details				Habitat within Disturbance Area ¹ (acres)	Actual Number of UPD Observed in Disturbance Area		Census Number of UPD in Disturbance Area ²	
	Sewer Line		Water Line			Adult	Juvenile	Adult	Juvenile
	Date	Start Time	Date	Start Time					
Dave's Hollow West #215A	7-7-09	14:50	7-8-09	11:15	1.5	1	1	2	2
Historic Housing #215B	7-7-09	14:10	NA ³	NA ³	0.5	2	0	4	0
Mixing Circle Intersection #215C	7-7-09	13:45	NA ³	NA ³	1.4	1	0	2	0
Total					3.4	4	1	8	2

Source: Schrage 2009, Haas 2009

Notes:

¹50 foot disturbance area was determined by adding a 25-foot buffer on each side of the proposed pipeline centerline(s).

²Due to the potential for prairie dogs to be in their burrows during the field surveys, an estimated number of prairie dogs were determined by multiplying the actual number of UPD observed by two.

³NA = Area will not be impacted by water line installation.

The methodologies used for assessing impacts to rare and protected species are based on the knowledge and best professional judgment of planners and biologists, data from park records, and studies of similar actions and effects where applicable. Analyses of the potential intensity impacts were based on information compiled on known federal- and state-listed species.

Intensity Level Definitions

The intensity thresholds of an impact to UPD are defined as follows:

- Negligible:** Impacts would result in no measurable or perceptible changes to a population or individuals of a species or resource regarding size, integrity, or continuity.
- Minor:** Impacts would be measurable or perceptible but would be localized within a relatively small area. The overall viability of the species would not be affected and, if left alone, would recover.
- Moderate:** Impacts would cause a change to a population or individuals of a species or resource (e.g., abundance, distribution, quantity, or quality). The change would be measurable and of consequence to the species or resource; however, the impact would remain localized.
- Major:** Impacts to a population or large number of individuals of a species or resource would be substantial, highly noticeable, and permanent. The change would be measurable, and impacts would occur over a widespread geographic area.

Impacts of Alternative A (No-Action Alternative)

Under the no-action alternative, there would be no change to the existing conditions and comprehensive sewer rehabilitation construction activities would not take place. Failing sewer lines which currently lie under UPD habitat would not be repaired. There would be no ground disturbance or construction activities with associated impacts on UPD individuals, populations, or habitat under the no-action alternative.

Cumulative Effects: The UPD numbers fluctuate within the park because of natural predators; fire suppression; road fatalities; sylvatic plague; habituation; and longer and more extreme winters that decrease the time available for the feeding season. Adverse impacts could occur to the UPD from wildland fires, the presence of plague, and vehicle collisions where colonies are adjacent to roads. Impacts to biotic communities in and around BRCA are occurring on lands managed by the federal government, the state of Utah, and private landowners. Examples of past, present, and reasonably foreseeable future actions with potential to affect UPD include road construction or improvement (such as Rim Road reconstruction, chip sealing, and the proposed construction of wildlife viewing pullouts); vegetation management; exotic vegetation management; fire management, and urbanization development near park boundaries. Construction and maintenance activities can temporarily disrupt or fragment habitat, displace individuals, or otherwise cause stress to animals. In the long-term, development reduces potential UPD habitat. Vegetation management and fire management have adverse effects in the short-term, but beneficial effects in the long-term as meadow habitat is improved. When combined with other past, present, and foreseeable future actions, the no-action alternative would provide no noticeable incremental impact to the overall localized, adverse and beneficial, negligible to minor cumulative impacts on UPD within the park.

Conclusion: The no-action alternative would result in no impacts to UPD populations or habitat because comprehensive sewer rehabilitation construction activities would not be conducted. As such, this alternative would not contribute to overall localized, adverse and beneficial, negligible to minor, cumulative impacts on populations or habitat of UPD within the park when considered with other past, present, and reasonably foreseeable future actions.

Impacts of Alternative B (Open-Cut Trench Method)

Of the 20,390 feet of pipeline to be replaced, 1,340 feet would cross Dave's Hollow West, 405-feet would cross Historic Housing, and 1,250 feet would cross the Mixing Circle Intersection. Within all three UPD colonies, a total of approximately 3.4 acres would be temporarily affected by pipeline replacement activities. Mitigation measures designed to protect UPD and their habitat would be implemented as specified within the USFWS Biological Opinion.

UPD colonies would be temporarily affected by construction crews and their equipment traveling within the 50-foot disturbance corridor. Construction equipment traveling within the corridor could cause direct mortality to individual UPDs. However, a qualified biologist would be onsite during excavation activities in order to lessen impacts to UPD from construction equipment. During construction, UPD would also be adversely impacted by noise and vibration disturbances associated with heavy equipment and vehicles driving within this travel corridor. However, all Project employees would be instructed to operate vehicles within the area of UPD only when necessary for construction and to remove the vehicles from the area as quickly as possible. Speed would not exceed 10 miles per hour within or adjacent to UPD colonies. The noise and vibration may result in the temporary movement of UPD away from the pipeline area. This movement would be perceptible, but in a relatively small area. Therefore, temporary impacts associated with the 50-foot corridor would be adverse, localized, and minor. However, the Historic Housing and Mixing Circle Intersection colonies would be less affected by the noise and vibration associated with construction equipment, due to the close proximity of these two colonies to park roads and acclimation to vehicular traffic noise.

Open-cut trench pipe replacement methodology and manhole replacement activities would adversely affect foraging from temporary loss of vegetation available for the UPD. The replacement of each manhole would include a 30-foot radius disturbance for the construction footprint and a 50-foot disturbance area needed to access each manhole with construction equipment. These adverse impacts would be temporary as these areas would be revegetated after construction activities following the BRCA Vegetation Management Plan with a seed mixture approved by the NPS Resources Management Division (BRCA 2010). Impacts to the foraging habitat of the UPD would be minor and measurable.

UPD burrows and passages could be present within the ROW (50-foot maximum width) and trench (4.5-foot average depth). On average, prairie dog burrows reach an approximate depth of 6 to 9 feet (Hoogland 1995). Open-cut trenches could potentially collapse these burrows and passages and cause UPD mortality. To lessen effect to UPD, BRCA would ensure a qualified biologist would be onsite during all excavation activities. The direct destruction of burrows within the trench would cause a greater impact to young pups that would also be more vulnerable and unable to leave the burrow. In order to minimize impacts to the pups, construction in the UPD habitat would not occur until after June 15, after the UPD pups have emerged from the burrows. Construction in the UPD habitat would continue and be completed by August 31, when the UPD pre-hibernation period begins. UPD that could excavate or relocate to a new burrow would be less alert for predators and thus vulnerable to mortality. Subsurface impacts to UPD from destruction of burrows would be localized, adverse, short-term and moderate.

Within the Dave's Hollow West colony, a 900 foot, 1.5-inch water pipe would be installed using HDD technology at a depth of approximately 4.5 feet. However, should the HDD method fail, the open-cut method would be implemented for pipe installation. The UPDs within this colony would be adversely impacted by direct subsurface impacts, in addition to noise and vibration caused by the installation of the pipe. These impacts would be localized, adverse, short-term and moderate.

The prairie dog proof barrier (4-foot deep enclosure fence) between the Dave's Hollow West colony and the lagoon treatment system would be maintained in good condition in order to dissuade UPDs from extending their territory into this portion of the park's sewage system. Any UPD that enter the lagoon area would be

relocated prior to any construction activities. As a result, there should be no impacts to UPD associated with the replacement, rehabilitation, and/or repair of the existing sanitary sewage lagoon treatment system.

Cumulative Effects: Past, present, and reasonably foreseeable future actions would be the same as described under alternative A – no-action alternative. The implementation of alternative B could cause individual UPD mortality and disturbance to UPD foraging habitat as described above. Cumulatively, the implementation of alternative B would add incremental adverse, localized impacts that would have an overall minor effect when considered with other past, present, and reasonably foreseeable future actions.

Conclusion: The implementation of alternative B would result in adverse, site-specific, short-term, and minor to moderate impacts during construction due to disturbances to UPD habitat and UPD individuals discussed above. Cumulatively, these actions would have an overall minor site-specific, and adverse effect on UPD when considered with other past, present, and reasonably foreseeable future actions.

Impacts of Alternative C (Preferred Alternative)

The preferred alternative would be the same as alternative B except that pipe bursting methodology would be used in UPD colony areas in place of open-cut trench methodology, thus decreasing impacts to UPD habitat. Mitigation measures, listed in this EA and detailed in the USFWS Biological Opinion (Appendix A), would be implemented to minimize impacts to UPD. In order to minimize impacts to the pups, construction in the UPD habitat would not occur until after June 15, after the UPD pups have emerged from the burrows. Construction in the UPD habitat would continue and be completed by August 31, when the UPD pre-hibernation period begins.

Pipe bursting activities would occur at a depth of approximately 4 feet (the depth of the existing line), which would result in subsurface impacts to colonies in Dave's Hollow West, the historic housing area, and the Mixing Circle Intersection. On average, prairie dog burrows reach an approximate depth of 6 to 9 feet (Hoogland 1995); noise and vibration impacts associated with the pipe bursting process may result in the temporary displacement of UPD away from the Project area. Additionally, vibration may permanently damage existing UPD burrows within close proximity to the pipe bursting activities, which could result in the need for UPD to excavate new burrows or relocate to abandoned burrows in other portions of the Project area or park. When UPD are excavating or relocating to a new burrow, mortality has the potential to occur as UPDs would be less alert for predators. Because pipe bursting would only affect limited areas around the existing sewer pipe, there would be fewer potential impacts to burrows under alternative C than under alternative B. These impacts would be short-term, localized, adverse and minor.

Under the preferred alternative, surface disturbance and habitat impacts to UPD would be less than under alternative B because the 50-foot construction ROW associated with pipeline replacement would be used only as a travel corridor for construction equipment traveling along the ROW. Impacts associated with the travel corridor would be the same as under alternative B; adverse, localized, and minor. However, in instances where manholes would need to be replaced as a result of pipe bursting activities or where an emergency pipe replacement issue arises (e.g., pipe clog), the UPD colonies would be temporarily impacted the same as they would be with open-cut trench methodology under alternative B. To lessen effect to UPD, BRCA would ensure a qualified biologist would be onsite during all excavation activities. This individual would monitor the numbers and locations of UPD individuals in or immediately adjacent to the Project footprint prior to and during construction.

Under the preferred alternative, impacts associated with the installation of the 1.5-inch water pipe would be the same as under alternative B. These impacts would be localized, adverse, short-term and moderate. As in alternative B, there would be no impacts associated with the rehabilitation of the lagoon treatment system.

Cumulative Effects: Past, present, and reasonably foreseeable future actions would be the same as described under alternative A – no-action alternative. The implementation of the preferred alternative could cause individual UPD mortality as a result of disturbance to burrows, but to a lesser degree than would occur under the implementation of alternative B. Cumulatively, the implementation of the preferred alternative would add incremental localized, adverse impacts that would have an overall minor effect when considered with other past, present, and reasonably foreseeable future actions.

Conclusion: The implementation of the preferred alternative would result in adverse, site-specific, short-term, and minor impacts during construction from disturbances to UPD habitat and individuals associated with disturbances to UPD burrows, but to a lesser degree than under the implementation of alternative B. Cumulatively, these actions would have an overall minor site-specific, and adverse effect on UPD when considered with other past, present, and reasonably foreseeable future actions.

Wildlife

Affected Environment

The diverse habitats within Bryce Canyon support a variety of wildlife species. The park is home to four species of amphibians, 11 reptile species, 59 mammal species, and 175 bird species. BRCA does not support a large number of fish or amphibians due to the limited aquatic resources in the park. No rigorous studies of fish populations or aquatic habitats have been conducted. Surveys for amphibians have shown that their abundance may be correlated with summer rainfall and drought conditions (Kershaw et al. 1998). Also, many species of birds and some mammal species, such as bats, are migratory. Consequently, the number of species and the size of populations vary considerably from season to season.

Common mammals of BRCA include mule deer, striped skunk, badger, gray fox, mountain cottontail, red squirrel, golden-mantled ground squirrel, and various small rodents. Elk, pronghorn, mountain lion, and black bear use the park, as well as neighboring lands. Common birds include Steller's jay, pinyon jay, common raven, mountain chickadee, pygmy nuthatch, northern flicker, mountain bluebird, western bluebird, white-throated swift, violet-green swallow, and dusky grouse. Raptors known to nest in the park include golden eagle, red-tailed hawk, American kestrel, prairie falcon, northern goshawk, Cooper's hawk, peregrine falcon, and great-horned owl (NPS 1996; Hirshmann 1991; Bezy 2004). Little is known about the insects of Bryce Canyon. Butterflies and moths have been collected and are in the museum collections.

Pinyon nuts, juniper berries, manzanita fruits, grasses, and forbs form the base of the food chain for BRCA wildlife. These are eaten by ground squirrels, deer mice, chipmunks, wood rats, and other small herbivores and a variety of birds, which are in turn prey for the park raptors, coyotes, foxes, bobcats, and other predators. Insects that inhabit park meadows and forests support a wide variety of birds, as well as reptiles and the limited amphibians present. Pine nuts and berries also supply food for large herbivores such as mule deer and black bear (Bezy 2004).

Effects on wildlife include both direct and indirect effects and can be considered in terms of whether they are temporary or permanent. Direct impacts on wildlife include the accidental or intentional mortality of an individual or population, injury, or stress from species flight. Direct contact with certain species may induce injury, leading to death of the animal. Within this analysis, impacts on wildlife in the park were assessed based on the type of action proposed and were compared to the available scientific literature, known animal behaviors, and general ecology.

Intensity Level Definitions

The intensity thresholds of an impact on wildlife are defined as follows:

- Negligible:** The action might result in a change in wildlife, but the change would not be measurable or would be at the lowest level of detection.
- Minor:** The action might result in a detectable change, but the change would be slight and have a local effect on a population. This could include changes in the abundance or distribution of individuals in a local area but not changes that would affect the viability of local populations. Changes to local ecological processes would be minimal.
- Moderate:** The action would result in a clearly detectable change in a population and could have an appreciable effect. This could include changes in the abundance or distribution of local populations but not changes that would affect the viability of regional populations. Changes to local ecological processes would be of limited extent.
- Major:** The action would be severely adverse or exceptionally beneficial to a population. The effects would be substantial and highly noticeable, and they could result in widespread change and be permanent. This could include changes in the abundance or distribution of a local or regional population to the extent that the population would not be likely to recover (adverse) or would return to a sustainable level (beneficial). Important ecological processes would be altered, and “landscape-level” (regional) changes would be expected.

Impacts of Alternative A (No-Action Alternative)

Under the no-action alternative, there would be no change to existing conditions and comprehensive sewer rehabilitation construction activities would not take place. There would be no ground disturbance or construction activities with associated effects on wildlife populations or habitat.

Cumulative Effects: Road construction or improvement; livestock grazing; mineral extraction; construction of homes, businesses, and associated utility lines; fences; and development associated with public recreational use are past, present, and foreseeable future actions with potential to affect wildlife. Wildlife could be adversely impacted by visitors travelling off-trail, vehicle collisions on park roads, and wildland fires. Park visitors feeding wildlife in high use areas has led to increases in habituation and concentrations of ravens and ground squirrels. There is concern that wildlife can be exposed to pathogens at a higher rate when they are concentrated in these areas. In addition, wildlife that has habituated to park visitors are more prone to be killed by collisions with vehicles. Impacts to biotic communities in and around BRCA are occurring on lands managed by the federal government, the State of Utah, and private landowners. These actions can disrupt or fragment habitat, displace individuals, or otherwise cause stress to animals. When combined with other past, present, and foreseeable future actions, the no-action alternative would provide no noticeable incremental impact to overall localized, adverse and minor cumulative impacts on wildlife within the park.

Conclusion: The no-action alternative would result in no impacts to wildlife because sewer rehabilitation construction activities would not be conducted. As such, this alternative would not contribute incrementally to the minor, adverse, cumulative disturbances of wildlife when considered with other past, present, and reasonably foreseeable future actions.

Impacts of Alternative B (Open-Cut Trench Method)

Wildlife would be temporarily affected by construction crews and their equipment. Vehicles passing along the road would cause short-term, site-specific disturbance or displacement of wildlife directly in the road corridor, and this would represent a negligible, adverse effect. During construction, wildlife would experience slight effects from noise and disturbances associated with the heavy equipment and vehicles driving within the park. The noise may result in the temporary movement of wildlife away from the construction areas and potential mortality of wildlife being hit by moving vehicles. Wildlife populations (with the exception of UPD and other ground-dwelling, burrowing wildlife) generally could use other areas of the local habitats without having much of an adverse effect on them. Therefore, temporary impacts would be adverse, site-specific, and negligible to minor.

Open-cut trench pipe replacement methodology, manhole replacement activities, water line construction and lagoon rehabilitation activities would adversely affect wildlife foraging due to temporary loss of vegetation available for the wildlife. These adverse impacts would be temporary as these areas would be revegetated following construction. Tree removal within the construction ROW would be required where the existing sewer line traverses areas with trees. Limited tree and shrub removal may result in minor wildlife habitat loss. Based on the relatively small areas that would be affected and the short-term nature of the effects, construction associated with the sewer rehabilitation would have short-term, negligible to minor, site-specific, adverse impacts on wildlife and their habitats because of habitat disturbance at the Project sites.

Following sewer rehabilitation construction activities, there would no long-term effects on wildlife.

Cumulative Effects: Past, present, and reasonably foreseeable future actions would be the same as described under alternative A – no-action alternative. The implementation of alternative B could cause short-term disturbance to wildlife related to construction activities. Cumulatively, the implementation of alternative B would have short-term, incremental, site-specific, adverse impacts with an overall moderate effect when considered with other past, present, and reasonably foreseeable future actions.

Conclusion: Alternative B would result in adverse, site-specific, short-term, negligible to minor impacts during construction due to disturbances to area wildlife and their habitats. There would be no long-term effect to wildlife under the implementation of alternative B. Cumulatively, these actions would have short-term, incremental, site-specific, adverse impacts with an overall moderate effect when considered with other past, present, and reasonably foreseeable future actions.

Impacts of Alternative C (Preferred Alternative)

The preferred alternative would be the same as alternative B except that pipe bursting methodology would be used in UPD colony areas in place of open-cut trench methodology. Impacts from construction equipment would be similar to alternative B, except that pipe bursting activities would generate different noise and vibrations than the open-cut methodology. Under the preferred alternative, the sewer pipe would be directly buried in UPD areas and there would be fewer associated surface impacts and vegetation removal in these relatively small areas.

Therefore, impacts would be the same or less than alternative B. Adverse, site-specific, short-term, and negligible to minor impacts during construction due to disturbances to area wildlife and their habitat. There would be no long term effects to wildlife.

Cumulative Effects: Past, present, and reasonably foreseeable future actions would be the same as described under alternative A – no-action alternative. The implementation of the preferred alternative could cause short-term disturbance to wildlife related to construction activities. Cumulatively, the implementation of the

preferred alternative would have short-term, incremental, site-specific, adverse impacts with an overall moderate effect when considered with other past, present, and reasonably foreseeable future actions.

Conclusion: The implementation of the preferred alternative would be similar to alternative B and would result in adverse, site-specific, short-term, and negligible to minor impacts during construction due to disturbances to area wildlife and their habitats. There would be no long-term effect to wildlife under the implementation of the preferred alternative. Cumulatively, the implementation of the preferred alternative would have short-term, incremental, site-specific, adverse impacts with an overall moderate effect when considered with other past, present, and reasonably foreseeable future actions.

Vegetation

Affected Environment

Bryce Canyon has an elevation range of 6,850 feet above sea level on the eastern side of the park, climbing to 9,115 feet at its southern end. The vegetation of BRCA reflects the change in elevation and topography, as well as the geology, soils, and water availability within the park. Five major vegetation communities occur at BRCA: pinyon-juniper woodlands, breaks communities, ponderosa pine forests, mountain grasslands, and fir-spruce-aspen forests. Ponderosa pine forest, and mountain grassland communities are located within the proposed Project area.

Ponderosa pine forests cover approximately 15,093 acres within the park. Ponderosa pine is the most fire-resistant conifer in the park and is a climax community at favorable sites on the high plateau of the park. Common understory species include greenleaf manzanita, serviceberry, mountain mahogany, and snowberry.



Bryce Canyon contains approximately 2,309 acres of grassland. The mountain grasslands exist mainly along drainages in the north end of the park. The primary species found in the grasslands include black sagebrush, needle and thread, cinquefoil, buckwheat, and sedges.

Non-native plants exist throughout the park but are concentrated along the road corridor and areas heavily impacted by park operations, visitor use, and livestock facilities. Common invasive species include whitetop, yellow salsify, yellow sweet-clover, black medic, smooth brome, cheatgrass, and several species of knapweed and thistle. The park has successfully controlled the two known non-native tree species in the region: Russian olive and tamarisk. The park's intermittent and perennial streams are essentially devoid of these species with very few individual trees identified during annual vegetation surveys. However, cattle grazing adjacent to the park, and frequent livestock trespass into riparian areas within the park require monitoring of these species to prevent future establishment of non-native plants. Management of vegetation within BRCA is directed by the 2010 Vegetation Management Plan (BRCA 2010).

The impact analysis of vegetation was also based on the knowledge and best professional judgment of planners and biologists; data from park records; and studies of similar actions and effects, when applicable.

Intensity Level Definitions

The intensity thresholds of an impact on vegetation communities are defined as follows:

- Negligible:** The action might result in a change in vegetation, but the change would not be measurable or would be at the lowest level of detection.
- Minor:** The action might result in a detectable change, but the change would be slight and have a local effect on a population. This could include changes in the abundance or distribution of individuals in a local area but not changes that would affect the viability of local populations. Changes to local ecological processes would be minimal.
- Moderate:** The action would result in a clearly detectable change in a population and could have an appreciable effect. This could include changes in the abundance or distribution of local populations but not changes that would affect the viability of regional populations. Changes to local ecological processes would be of limited extent.
- Major:** The action would be severely adverse or exceptionally beneficial to a population. The effects would be substantial and highly noticeable, and they could result in widespread change and be permanent. This could include changes in the abundance or distribution of a local or regional population to the extent that the population would not be likely to recover (adverse) or would return to a sustainable level (beneficial). Important ecological processes would be altered, and "landscape-level" (regional) changes would be expected.

Impacts of Alternative A (No-Action Alternative)

Under the no-action alternative, there would be no change to existing conditions; comprehensive sewer rehabilitation construction activities would not take place. There would be no ground disturbance or construction activities with associated effects on vegetation.

Cumulative Effects: Road construction or improvement; livestock grazing; mineral extraction; construction of homes, businesses, and associated utility lines; fences; and development associated with public recreational use are past, present, and foreseeable future actions with potential to affect vegetation.

Impacts to biotic communities in and around BRCA are occurring on lands managed by the federal government, the state of Utah, and private landowners. These actions reduce, disrupt or fragment vegetation habitat. Aggressive non-native plants (invasive species) displace native vegetation. Non-native plants are spread from activities such as park visitors traveling off-trail, horseback riding, and from construction activities that can spread invasive species in soil stock piles and on equipment.

Development of the FMP and exotic vegetation management has been implemented by BRCA staff to help restore native vegetation within the park.

When combined with other past, present, and foreseeable future actions, the no-action alternative would provide no noticeable incremental impact to overall long-term, localized, adverse and minor cumulative impacts on vegetation.

Conclusion: The no-action alternative would result in no impacts to vegetation because sewer rehabilitation construction activities would not be conducted. As such, this alternative would not contribute incrementally to the minor, adverse, cumulative disturbances of vegetation when considered with other past, present, and reasonably foreseeable future actions.

Impacts of Alternative B (Open-Cut Trench Method)

During construction, there would be a potential introduction of invasive species from contaminated soils, construction equipment, and vehicles driving into the park. Weed control methods would be implemented to minimize the introduction of noxious weeds. Since the lagoon areas contain noxious weeds, dirt from the lagoon areas would not be stockpiled or transported to other areas of the park. These mitigative measures would reduce the potential for impacts from noxious weeds displacing native species. Any impacts would be short-term, site-specific, adverse and negligible.

Trenches would be cut through mountain grassland communities and some ponderosa pine forest. Revegetation efforts after construction activities would strive to reconstruct the natural spacing, abundance, and diversity of native plant species using seeds native to BRCA. The park would use only an approved seed mix consisting of plant seeds collected within the park or from plant seeds from plants propagated from within the park. All disturbed areas would be restored as nearly as possible to pre-construction conditions shortly after construction activities are completed. Impacts from construction disturbance resulting in loss of vegetation would be short-term, site-specific, adverse and minor until revegetation is complete. Following sewer rehabilitation construction activities, there would no long-term effects on most vegetation.

Tree removal within the construction ROW would be required in areas where the existing sewer line traverses forested areas. There are approximately 360 trees 8 inches or larger in diameter within 25 feet of either side of the sewer line that may need to be removed in Phase I of construction. It is conservatively estimated that up to approximately 500 additional trees would be removed as part of Phases II and III, resulting in an approximate 860 total trees affected by the Project. Trees would take several growing seasons to regenerate, and as a result, impacts to trees would be long-term, site-specific, adverse and minor until the trees could grow back.

Cumulative Effects: Past, present, and reasonably foreseeable future actions would be the same as described under alternative A – no-action alternative. The implementation of alternative B could cause short-term and long-term disturbance to vegetation related to construction activities. Cumulatively, the implementation of alternative B would have incremental, site-specific, adverse impacts with an overall minor to moderate effect when considered with other past, present, and reasonably foreseeable future actions.

Conclusion: Alternative B would result in adverse, site-specific, short- and long-term, negligible to minor impacts during construction due to ground disturbances. Cumulatively, these actions would have incremental, site-specific, adverse impacts with an overall minor to moderate effect when considered with other past, present, and reasonably foreseeable future actions.

Impacts of Alternative C (Preferred Alternative)

The preferred alternative would be the same as under alternative B except that pipe bursting methodology would be used in UPD colony areas in place of open-cut trench methodology. Impacts from construction equipment would be the same as under alternative B, with implementation of mitigative measures impacts would be short-term, site-specific, adverse and negligible.

Under the preferred alternative, the sewer pipe would be directly buried in UPD areas and there would be fewer associated surface impacts and vegetation removal than under alternative B. Impacts in areas outside of the UPD pipe bursting areas would be similar to alternative B with open-cut trenches in mountain grassland and ponderosa pine forest. Impacts would be short-term, site-specific, adverse and minor until revegetation is complete.

Impacts from tree removal within the construction ROW would be the same as under alternative B, long-term, site-specific, adverse and minor until the trees could regenerate.

Cumulative Effects: Past, present, and reasonably foreseeable future actions would be the same as described under alternative A – no-action alternative. The implementation of the preferred alternative could cause short and long-term disturbance to vegetation resources related to construction activities, although there would be less surface disturbance than under the implementation of alternative B, these impacts would be an incremental adverse effect towards the overall cumulative effects. Cumulatively, the implementation of the preferred alternative would have incremental, site-specific, adverse impacts with an overall minor to moderate effect when considered with other past, present, and reasonably foreseeable future actions.

Conclusion: The implementation of the preferred alternative would be similar to alternative B and would result in adverse, site-specific, short and long-term, and negligible to minor impacts during construction due to disturbances to vegetation. Cumulatively, the implementation of the preferred alternative would have incremental, site-specific, adverse impacts with an overall minor to moderate effect when considered with other past, present, and reasonably foreseeable future actions.

Visitor Use and Experience

BRCA was established to preserve and protect the fascinating geologic structures known as hoodoos and other natural and cultural resources for the benefit and enjoyment of the public. BRCA is open year-round, averaging over 1.5 million visitors per year over the last five years. The BRCA sewer system serves the high use visitor areas and is a critical park resource in managing the over 1.5 million visitors per year. Although the majority of visitation occurs in the northern portion of the park at the overviews to the main BRCA Amphitheater, thousands of visitors also drive to the southern part of the park to Rainbow Point, passing through the park's high meadow habitat. These meadows are excellent viewing areas for some of the park's wildlife, as the habitat affords unobstructed views along with attractive forage for many different species.

Visitors participate in a wide range of activities, including lodging and camping (both within the park and in the gateway towns), hiking, attending ranger guided programs, scenic driving, photography, picnicking, horseback riding, cross-country skiing and snowshoeing, and nature observation. Trails range from short, easy walks along sections of the rim trail to long, strenuous hikes such as Riggs Spring Loop and Fairyland Loop. Hoodoos, the intricately carved rock spires for which BRCA is known, are best experienced on day-hiking trails. The Under the Rim Trail is a 23-mile long trail that extends from Bryce Point to Rainbow Point and has eight backcountry campsites. Overall, backcountry visitors seek varying degrees of solitude, and visitors enjoy natural sounds during most of their experiences. Once a visitor ventures from traveled roadways, unnatural sound diminishes markedly.

Bryce Canyon's natural quiet is also an important park element, especially for those visitors seeking opportunities for solitude. Ambient noise levels at the park range from an average of 23.7 dBA in the winter months to an average of 28.0 dBA in the spring, summer, and fall months (Ambrose 2004). Threats to natural quiet come from overhead aircraft, vehicle traffic, construction activities, and the potential for external development.

The impact analysis was based on the knowledge and best professional judgment of planners and biologists, data from park records, and studies of similar actions and effects, when applicable. The methodology used for assessing impacts to visitor use and experience is based on how sewer rehabilitation would affect the visitor, particularly with regards to the visitors' enjoyment of BRCA resources.

Intensity Level Definitions

- Negligible:** Visitors would not be affected or changes in visitor use and/or experience would be below or at the level of detection. Any effects would be short-term. The visitor would not likely be aware of the effects associated with the alternative.
- Minor:** Changes in visitor use and/or experience would be detectable, although the changes would be slight and likely short-term. The visitor would be aware of the effects associated with the alternative, but the effects would be slight.
- Moderate:** Changes in visitor use and/or experience would be readily apparent and likely long-term. The visitor would be aware of the effects associated with the alternative and would likely be able to express an opinion about the changes.
- Major:** Changes in visitor use and/or experience would be readily apparent and have substantial long-term consequences. The visitor would be aware of the effects associated with the alternative and would likely express a strong opinion about the changes.

Impacts of Alternative A (No-Action Alternative)

The no-action alternative would have adverse effects on visitor use and experience because areas utilized by visitors such as the lodge area, Bryce Inn ("Sunrise Camper Store"), and near the North Campground could experience sewage backups and leaking from manholes. The impacts would be associated with odors and visitor perception from seeing leaking sewage would be short-term, but noticeable. Repairs would be required for blocked sewage pipes, visitors would notice restroom facility closures while crews make emergency repairs. Impacts would be adverse, short-term, localized, and minor.

Cumulative Effects: Any construction activities have the potential to affect visitor use and experience. The Rim Road reconstruction likely had an adverse effect on the visitor experience as a result of noise, dust, and unavailability to view some of the primary attractions in the park. Projects such as wildlife pullouts and vegetation management have had or could have an adverse short-term effect on visitor use and experience because of the inconvenience of construction noise, dust, and possible off-limit areas. Ultimately, however, these actions would have or had a long-term beneficial effect on visitor use and experience because of improvements to the human health and safety aspects of the park, the visual and natural environment, interpretive opportunities, and functionality of the park. Under this alternative, although visitors may experience some unpleasant odors and see sewage leaking from manholes, visitor functions in the Project area are not expected to change, and past actions have had beneficial impacts on visitor use and experience. Because visitor experience would not appreciably change, the effects of not rehabilitating the park's sewage system would only add a slight, incremental, negligible, adverse effect to the overall minor to moderate beneficial cumulative effect to visitor use and experience at the park when considering past, present, and reasonably foreseeable future actions.

Conclusion: The no-action alternative would result in primarily minor impacts to visitor use and experience because of impacts from odors and viewer perception and would be localized, short-term, adverse, and minor. Cumulatively, because visitor experience would not appreciably change, the effects of not rehabilitating the park's sewage system would only have a slight, incremental, negligible, adverse effect to the overall minor to moderate beneficial cumulative effect to visitor use and experience at the park when considering past, present, and reasonably foreseeable future actions.

Impacts of Alternative B (Open-Cut Trench Method)

Implementation of alternative B would rehabilitate the park failing sewer system. Visitor use and experience would be improved with upgrades to the sewer system and repair of the clogged pipes that are leaking sewage from manholes. Returning park guests who previously noticed foul odors or leaking sewage would perceive improvements to the overall quality of the visitor experience. The sewer system improvements to facilities and areas utilized by park visitors would result in long-term, minor to moderate, localized, and beneficial effects on visitor use and experience, depending on the visitor's level of perception.

Minor, temporary, adverse impacts to visitor use and experience would result from construction activities and the temporary presence of construction equipment, materials, and crews. Portions of Project areas currently used by visitors, such as the lodge area and Bryce Inn area, would be temporarily limited to visitor use during construction. Some restroom facilities utilized by both visitors and park staff would be temporarily closed. Noise and dust from construction activities would also adversely affect visitor use and experience; however all construction-related impacts would be temporary and cease following construction activities. During construction, the existing parking lots at either the Mixing Circle or maintenance yard would be used by construction crews, thereby reducing the capacity for visitors and employees.

Visually, the changes to the Project areas would have short-term, minor effect on visitor experience. The open-cut trench and construction laydown areas would be revegetated with native seed mix after construction, but construction scars would be noticeable until the revegetation is complete.

The lagoon area is not typically visible to park guests. Impacts associated with activities at the lagoon treatment system would be similar to impacts from the pipeline replacement and would result from construction related noise, dust and the presence of construction equipment entering the park.

Cumulative Effects: As described under alternative A, any construction activities have the potential to affect visitor use and experience. Projects such as road maintenance, bike path construction, vegetation management, and wildlife pullouts, have had or could have an adverse effect on visitor use and experience because of the inconvenience of construction noise, dust, and possible off-limit areas. Ultimately, however, these actions would have or have had a beneficial effect on visitor use and experience because of long-term improvements to the human health and safety aspects of the park, the visual and natural environment, and functionality of the park. Potential rehabilitation of the sewage system would also have a beneficial effect on visitor use and experience. Considering these past, present, and reasonably foreseeable future actions, the beneficial effects of rehabilitating the park's sewage system would add an incremental minor cumulative benefit to the overall minor to moderate beneficial visitor use and experience effects at the park.

Conclusion: Under alternative B, the rehabilitation of the park's sewer system would have a long-term, minor to moderate, localized and beneficial effect on visitor use and experience. Construction-related disturbances (noise, dust, restricted access) would have localized, minor, temporary adverse impacts to park visitors. Cumulatively, this alternative would have an incremental minor beneficial effect to the overall minor to moderate beneficial visitor use and experience effects because ultimately this Project combined with other past, present, and reasonably foreseeable future actions would benefit visitor use and experience.

Impacts of Alternative C (Preferred Alternative)

Implementation of the preferred alternative would be the same as described under alternative B except that pipe bursting methodology would be utilized in UPD areas. The sewer system improvements to facilities and areas utilized by park visitors would result in long-term, minor to moderate, localized, and beneficial effects on visitor use and experience, depending on the visitor's level of perception.

Construction impacts would be similar to those described under alternative B, except that equipment and noise from pipe busting might be noticed along with the other construction related noise described under alternative B. Under the preferred alternative, more manholes may be replaced and visitors might notice more construction related activities associated with manhole replacement than they would with the implementation of alternative B. As in alternative B, construction related disturbances (noise, dust, restricted access) would have localized, minor, temporary adverse impacts to park visitors.

Cumulative Effects: As described under alternative B, any construction activities have the potential to affect visitor use and experience. Ultimately, however, these actions would have or have had a beneficial effect on visitor use and experience because of long-term improvements to visitor use and experience. Past, present, and reasonably foreseeable future actions, and the potential rehabilitation of the sewage system would be the same as described under alternative B and would add an incremental minor cumulative benefit to the overall minor to moderate beneficial visitor use and experience effects at the park.

Conclusion: Impacts under the preferred alternative would be similar to those described under alternative B. The rehabilitation of the park's sewer system would have a long-term, minor to moderate beneficial effect on visitor use and experience. Construction related disturbances (noise, dust, restricted access) would have localized, minor, temporary adverse impacts to park visitors. Cumulatively, the preferred alternative would have an incremental minor beneficial effect to the overall minor to moderate visitor use and experience effects because ultimately this Project combined with other past, present, and reasonably foreseeable future actions would benefit visitor use and experience.

CONSULTATION AND COORDINATION

Internal Scoping

Internal scoping was conducted by the BRCA Interdisciplinary Compliance Team with consultation from the NPS Intermountain Region Planning & Environmental Quality Office. Interdisciplinary team members met on June 23, 2009 to discuss the purpose and need for the Project, various alternatives, potential environmental impacts, and possible mitigation measures.

External Scoping

External (public) scoping was conducted to inform various agencies and the public about the proposal to rehabilitate the park's sewer system at BRCA, and to generate input on the preparation of this EA. External scoping was initiated with the distribution of a scoping letter that was mailed in July 2009 to over 225 addressees, including landowners adjacent to the park, various federal and state agencies, affiliated Native American tribes, local governments, and regional and local news/media organizations. The recipient list was developed over time and is regularly updated to elicit feedback from a large spectrum of stakeholders, both in the private and public sector, within and outside of Utah.

Information on the proposed Project and EA was also posted on the NPS Planning, Environment, and Public Comment website (PEPC) at <http://parkplanning.nps.gov/>. The public was given 30 days to comment on the Project ending August 20, 2009.

During the 30-day scoping period, four public responses were received:

- A representative from the Five County Association of Governments, a voluntary association of local governments consisting of Beaver, Garfield, Iron, Kane and Washington Counties, requested that the feasibility of connecting the sewer system to a regional waste water treatment facility that would accommodate the park, Bryce Canyon City and other land users atop the plateau be addressed in the EA. This alternative was not analyzed within this EA because a connection to a regional waste water treatment facility was beyond the scope of the objective of the EA to repair the existing sewer system within the park.
- A representative from the Utah Department of Transportation requested notification if there would be a direct effect to State Route 63. No direct effects would be anticipated with any of the proposed alternatives.
- The Hopi Tribe responded with requests for results of cultural resource surveys and treatment plans for review and comment if prehistoric cultural resources are identified that will be adversely affected by Project activities.
- USACE requested wetland delineations and avoidance of impacts to wetlands or other waters of the United States within the range of alternatives. Wetland delineations were conducted June 9, 2010 and a wetland delineation report for USACE review and verification was submitted by BRCA to USACE on August 3, 2010. Otherwise, no concerns or issues were raised.

In addition to the aforementioned public entities, the following agencies were contacted for information regarding the Project:

Federal Agencies

U.S. Department of the Interior – Fish and Wildlife Service (USFWS)

A Biological Assessment was prepared in accordance with legal requirements set forth under Section 7 of the Endangered Species Act (16 USC 1536 (c)) and followed the standards established in the NPS NEPA guidance (NPS DO 12) and NPS Policy regarding endangered and threatened species (NPS *Management Policies 2006*, Section 4.4.2.3). The Biological Assessment was submitted by BRCA to USFWS on September 23, 2009. On October 21, 2009, USFWS requested additional information to complete the Section 7 consultation initiation package. In response, a final addendum to the Biological Assessment was submitted by BRCA to USFWS on February 1, 2010 with a request to initiate formal consultation.

A final Biological Opinion that the proposed action and the cumulative effects are not likely to jeopardize the continued existence of the UPD was submitted by USFWS to BRCA on May 11, 2010. The Biological Opinion is included in Appendix A.

State Agencies

Utah Historical Society (office of the State Historic Preservation Officer)

In accordance with Section 106 of the National Historic Preservation Act (36 CFR 800.3), a request for concurrence of a determination of no adverse effect to historic properties was submitted by BRCA to the State Historic Preservation Office on August 3, 2010. Concurrence from State Historic Preservation Office to BRCA was received on August 19, 2010.

Environmental Assessment Review and List of Recipients

The EA will be released for public review on October 25, 2010. To inform the public of the availability of the EA, the NPS will publish and distribute a letter or press release to various agencies, tribes, and members of the public on the BRCA mailing list, as well as place an ad in the local newspaper. Copies of the EA will be available for review at the following locations: Panguitch Library; Salt Lake City Library; Tropic Centennial Hall; Southern Utah University Library, Cedar City; Brigham Young University Library, Provo; University of Utah Library, Salt Lake City; and Utah State University Library, Logan. Copies will be provided to interested individuals upon request. Copies of the document will also be available for review at the BRCA visitor center and on the internet at the NPS PEPC website (<http://parkplanning.nps.gov/>).

The EA is subject to a 30-day public comment period ending November 26, 2010. During this time, the public is encouraged to submit written comments online at the NPS PEPC website at <http://parkplanning.nps.gov/>. If you are not able to submit comments electronically through this website, then you may also mail comments to: Superintendent Bryce Canyon National Park, P.O. Box 640201, Bryce, UT 84764. Following the close of the comment period, all public comments will be reviewed and analyzed, prior to the release of a decision document. The NPS will issue responses to substantive comments received during the public comment period and will make appropriate changes to the EA, as needed.

List of Preparers



National Park Participants

Sean Eagan, Resource Management Chief (current), BRCA, Bryce, UT
Kelly Fuhrmann, Resource Management Chief (former), BRCA, Bryce, UT
Daniel Cloud, Chief of Maintenance Facilities, BRCA, Bryce, UT
Sarah Haas, Compliance Biologist, BRCA, Bryce, UT
Laura Schrage, Natural Resource Specialist, BRCA, Bryce, UT
Juanita Bonnifield, Cultural Resources Specialist, BRCA, Bryce, UT
Elaine Rideout, NEPA Project Manager, Denver Service Center, Denver, CO
Margo Davis, Cultural Resource Specials, Denver Service Center, Denver, CO

Consultant Participants

Tom Campbell, Project Manager, URS Group, Inc., Denver, CO
Pamela McWharter, NEPA Specialist, URS Group, Inc., Denver, CO
Susan Hall, Ecological Resources Specialist, URS Group, Inc., Denver, CO
Amber Ballman, Biological Resources Specialist, URS Group, Inc., Denver, CO

List of Environmental Assessment Recipients

Federal Agencies

Advisory Council on Historic Preservation
Bureau of Land Management
 Cedar City Field Office
 Grand Canyon-Parashant National Monument
 Grand Staircase-Escalante National Monument
 Kanab Field Office
 Utah State Office
 Vermilion Cliffs National Monument
National Forest Service
 Dixie National Forest
 Kaibab National Forest
 North Kaibab Ranger District
National Park Service
 Arches National Park
 Canyonlands National Park
 Capitol Reef National Monument

Cedar Breaks National Monument
Glen Canyon National Recreation Area
Grand Canyon National Park
Pipe Spring National Monument
Utah State Coordinator
Zion National Park
U.S. Corps of Engineers
U.S. Environmental Protection Agency Region VIII
U.S. Fish and Wildlife Service
U.S. Geological Survey

State and Local Agencies and Governments

Anasazi Indian Village State Park
Five County Association of Governments
Garfield County Commissioners
Iron County Commissioners
Kane County Commissioners
Kane County Water Conservancy District
Mayor of Cedar City, UT
Mayor of Canyonville, UT
Mayor of Hatch, UT
Mayor of Kanab, UT
Mayor of Panguitch, UT
Mayor of Tropic, UT
Utah Department of Environmental Quality
Utah Department of Natural Resources
Utah Division of Air Quality
Utah Division of Drinking Water
Utah Division of Water Resources
Utah Division of Wildlife Resources
Utah Office of the Governor
Utah School and Institutional Trust Lands Administration
Utah State Clearinghouse
Utah State Historic Preservation Officer

Indian Tribes

Goshute Indian Tribe
Navajo Tribe
Northern Band of the Shoshoni Tribe
San Juan Southern Paiute
Shivwits Paiute Band
Skull Valley Goshute
Ute Mountain Ute
White Mesa Ute

Organizations

Back Country Horsemen of Utah
Bryce Canyon Natural History Association
Canyon Trail Riders
Daily Spectrum
Defenders of Wildlife
Desert News
Garfield County News

Grand Canyon Trust
Grand Canyon Wildlands Council
National Audubon Society
National Parks and Conservation Association
National Trust for Historic Preservation
National Wildlife Federation
Partners in Parks
Salt Lake Tribune
Sierra Club
Southern Utah Wilderness Alliance
Southwest Forest Alliance
The Access Fund
The Nature Conservancy
The Wilderness Society
Wilderness Watch

Local Businesses

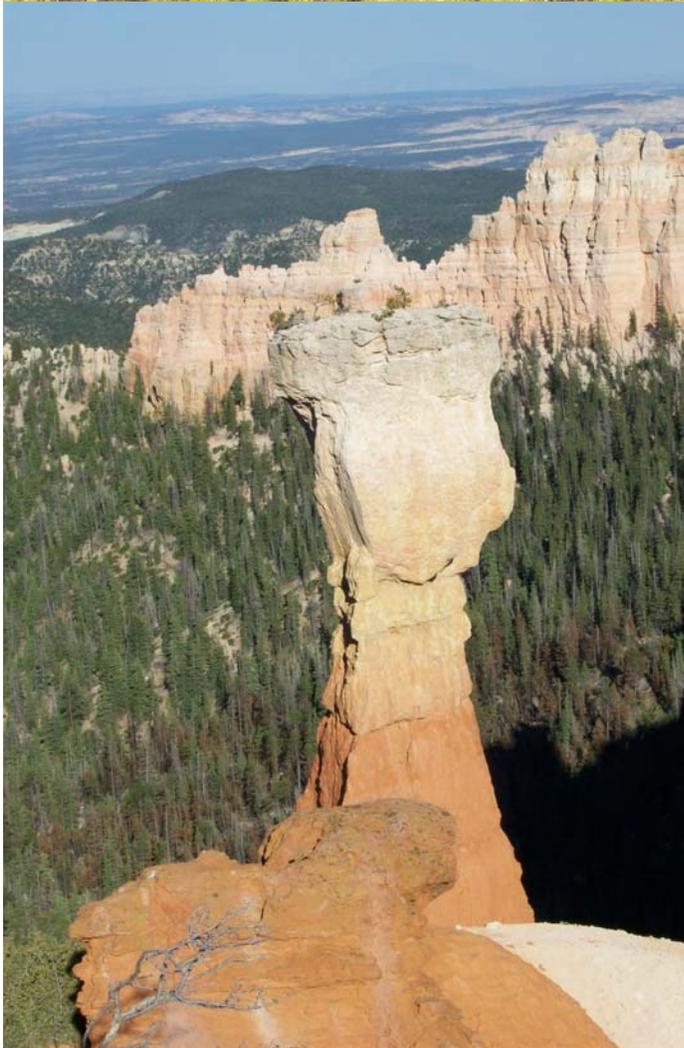
Backcountry Horsemen of Utah
Best Western Resort
Bryce Canyon Airport
Bryce Canyon Livery
Bryce Canyon Lodge
Bryce Canyon Pines
Bryce Country Cabins
Bryce Junction Inn
Bryce Pioneer Village
Bryce Point Bed & Breakfast
Bryce Resorts
Bryce Trails Bed & Breakfast
Bryce Valley Business Association
Bryce Valley KOA
Bybee's Stepping Stone
Canyon Trail Rides
Cedar Breaks Lodge
Color Country Travel Council
Doug's Place and Country Inn
Fox's Bryce Trails Bed & Breakfast
Francisco's Farm Bed & Breakfast
Garfield County Travel Council
Golden Hills Motel
Grand Staircase Inn
Horizon Motel
Iron County Travel Council
Kane County Travel Council
Lewis Brothers Stages
M&S Aero
Ruby's Inn
Scenic Flights
Utah State Chambers of Commerce Association
Western Town Resorts

REFERENCES

- Ambrose, Skip. 2004. Acoustic Data for Fairyland, Bryce Canyon National Park. Memo to Kristen Legg, Bryce Canyon Resource Management from Skip Ambrose, NPS Natural Sounds Program. October 20, 2004. 7 pp.
- Bezy, John. 2004. Bryce Canyon: The Story Behind the Scenery. KC Publications, Inc. Las Vegas, NV. 64 pp.
- Bryant, R. 1995. Prairie Dogs at Bryce Canyon National Park.
- Bryce Canyon National Park (BRCA). 2010. Final Vegetation Management Plan; July 10, 2010. Available at the park.
- BRCA. 2007. Project Proposal for Project Title: Develop a Utah Prairie Dog Management and Conservation Strategy.
- BRCA. 2002. Observation Sheet for Yellow-Billed Cuckoo: May 29, 2002. Available at the park.
- BRCA. 1996-2002. Survey Results for Southwestern Willow Flycatcher: February 1996; February 8, 1998; June/July 1999; November 2002. Available at the park.
- Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS. NTIS No. AD A176 912.
- Haas, S. 2009. Email Correspondence. Message to Amber Ballman, Tom Campbell, Pam McWharther, Jeffrey Dawson, Elaine Rideout, Daniel Cloud, Kelly Fuhrmann, and Laura Schrage. August 19, 2009.
- Hirshmann, Fred. 1991. A Natural History Guide to Bryce Canyon. Published by the Bryce Canyon Natural History Association.
- Hoogland, J.L. 1995. *The Black-Tailed Prairie Dog: Social Life of a Burrowing Animal*. The University of Chicago Press: Chicago and London. 26 pp.
- Kershaw, Kameron et al. 1998. Herpetology Study – Bryce Canyon National Park. Southern Utah University, Department of Biology.
- NatureServe. 2009. *NatureServe Explorer*. Available at <http://www.natureserve.org/explorer/>. Accessed on July 1, 2009.
- National Park Service (NPS). 2010. Wetland Findings for Rehabilitation of the Failing Park Sewage System. Prepared in accordance with legal requirements set forth under Section 404 of the Clean Water Act (CWA) (US Code Title 33, 1344) – Bryce Canyon National Park, July.
- NPS. 2006. *Management Policies 2006*. U.S. Department of the Interior. Washington, D.C. Available at <http://www.nps.gov>.
- NPS. 1996. Resource Management Plan – Bryce Canyon National Park. December 1996.
- NPS. 1987. General Management Plan – Bryce Canyon National Park, Utah. August 31, 1987.

- Schrage, L. 2009. E-mail Correspondence: Re BRCA - Updated Calculation Tables. Message to Sarah Haas, Amber Ballman, and Jeffery Dawson. August 25, 2009.
- Stebbins, G. 1971. The current and previous status of the Utah prairie dog in the Bryce Canyon National Park area of Utah.
- Utah Division of Wildlife Resources. 2007. Utah's Sensitive Species. Utah Division of Wildlife Resources, Salt Lake City, UT.
- UDWR. 2005. Utah's Comprehensive Wildlife Conservation Strategy. Utah Division of Wildlife Resources, Salt Lake City, UT.
- United States Fish and Wildlife Service (USFWS). 2006. "California Condor (*Gymnogyps californianus*)." Available at <http://www.fws.gov/hoppermountain/CACORecoveryProgram/PDF%20Fact%20Sheets/CALIFORNIA%20CONDOR%20flyer-%20with%20long%20links.pdf>. Accessed on July 1, 2009.
- USFWS. 2004. "Southwestern Willow Flycatcher." Available at http://www.fws.gov/southwest/es/arizona/Documents/SpeciesDocs/SWWF/CH_Final_Oct05/SWWFC%20Fact%20Sheet%20V3.pdf. Accessed on July 1, 2009.

This page intentionally left blank.



Rehabilitate Failing Park Sewage System Environmental Assessment

Appendix A Agency Consultation

This page intentionally left blank.

USFWS Biological Opinion

This page intentionally left blank.



United States Department of the Interior
FISH AND WILDLIFE SERVICE

UTAH FIELD OFFICE
2369 WEST ORTON CIRCLE, SUITE 50
WEST VALLEY CITY, UTAH 84119

May 11, 2010

In Reply Refer To
FWS/R6
ES/UT
6-UT-10-F-005
09-F-0122

To: Superintendent, Bryce Canyon National Park, P.O. Box 640201, Bryce, Utah
84764

From: Field Office Supervisor, Ecological Services, Utah Field Office, West Valley
City, Utah

Subject: Final Biological Opinion for the Rehabilitation of Failing Park Sewage System
Project in Bryce Canyon National Park, Garfield County, Utah

This document transmits our final biological opinion for your proposed Rehabilitation of the Failing Park Sewage System Project in Bryce Canyon National Park, Utah, and effects on the Utah prairie dog (*Cynomys parvidens*), in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 et seq.) and the Interagency Cooperative Regulations (50 CFR 402).

The Utah prairie dog is federally listed as a threatened species and occurs within the proposed project area. This biological opinion is based on information provided in your September 23, 2009, Rehabilitation of Failing Park Sewage System Project in Bryce Canyon National Park Biological Assessment (BA) and January 26, 2010, final addendum to the BA; field surveys performed between May 26 and July 9, 2009; telephone conversations and email correspondence between our offices; and other sources of information. A complete administrative record of this consultation is on file at our office.

Consultation History

This section summarizes significant steps in the consultation process:

- March 25, 2009; we received your letter, introducing the proposed project.
- July 2009 through January 2010; phone calls, meetings, and emails were exchanged between our offices and URS Corporation to evaluate project impacts and develop mitigation and minimization measures.

- August 31, 2009; we conducted a site visit to view the proposed project area.
- September 25, 2009; we received the final Rehabilitation of Failing Park Sewage System Project in Bryce Canyon National Park Biological Assessment (BA) with a request to initiate formal consultation from your office. The BA included the results of the Utah prairie dog surveys conducted in the project action area between May 26 and July 9, 2009.
- October 21, 2009; we requested additional information to complete the section 7 consultation initiation package.
- December 23, 2009; we received your draft addendum to the BA.
- February 1, 2020; we received the final addendum to the BA with a request to initiate formal consultation from your office.

BIOLOGICAL OPINION

Description of Proposed Action

The proposed action includes replacing, rehabilitating, and repairing the existing gravity fed sewage collection and lagoon treatment systems located within the northwestern portion of Bryce Canyon National Park in Garfield County, Utah. Currently, sewage from staff housing, the lodge, and the visitor center flows through clay pipes built in 1958 into the sewage treatment lagoon system. Over time, the clay that was used to build the pipes and manholes has deteriorated. Pieces of clay pipe clog the system causing raw sewage to back up, leak into the groundwater, and leach up to the ground surface. The condition and capacity of the existing sanitary sewage collection system are deficient.

The replacement, rehabilitation, and repair of the existing sanitary sewage collection system and sewage lagoon treatment system will include the following improvements: replacement of 20,390 feet of sewer pipeline; replacing manholes where necessary; lining sewage lagoon cell 2 with a high density polyethylene liner; lining cells 3 and 4 with bentonite clay; adding a head gate to cell 3, installing a small wash station; installing an inline grinder pump; and repairing the fence around the lagoons, including the existing 4-foot deep Utah prairie dog enclosure fence. In addition, a new 2,500 linear foot water supply pipeline will be installed. To reduce surface disturbance, the entire water supply pipeline will be installed using horizontal directional drilling technology and pipe bursting techniques will be used to replace the sewer pipe within occupied Utah prairie dog habitat (NPS 2009a). If horizontal directional drilling cannot be used to install the water supply pipeline or pipe bursting cannot be used to install the sewer pipeline, then open-cut trenching method will be used to install the pipe. Surface disturbances include a 50-foot wide sewer pipeline right-of-way, 30-foot wide water pipeline right-of-way, and 30-foot wide radiuses surrounding each manhole being replaced. The action area for this biological opinion thus includes the extent of these rights-of-way plus a 350 foot buffer around the rights-of-way to evaluate direct and indirect disturbances to the Utah prairie dog.

Construction will begin in 2011 using a three-phased construction approach. Portions of the project with the most immediate need of replacement, rehabilitation, and repair will be fixed first. As funds become available the remaining portions of the pipelines will be fixed. The manholes will be replaced and the water supply pipeline will be installed within the same timeframe estimated for the sanitary sewage pipeline replacement.

A complete description and maps of the proposed action and the results of the Utah prairie dog surveys conducted in the project action area between May 26 and July 9, 2009, are included in the final September 2009 Rehabilitation of Failing Park Sewage System Project in Bryce Canyon National Park Biological Assessment (BA) (see sections 4-7 and Appendices A and B of the September 2009 BA), and in the February 1, 2020, final addendum to the BA. The BA, survey results, and addendum are on file in our office.

Applicant Committed Conservation Measures

The following measures will be implemented by Bryce Canyon National Park (BRCA) for all construction and maintenance activities:

Habitat Mitigation

- For all acres of direct disturbance within Utah prairie dog habitat that will involve underground impacts (i.e., pipe bursting for sewer pipeline replacement and horizontal directional drilling for waterline installation), BRCA will mitigate at a 2:1 acreage ratio.
- For all acres of direct disturbance within Utah prairie dog habitat that will involve surface disturbance (i.e., if underground methods fail or if manholes require replacement), BRCA will mitigate at a 5:1 acreage ratio.

Portions of three occupied Utah prairie dog colonies will be temporarily impacted by this project. Table 1 summarizes the amount of mitigated acreage for the proposed action, depending on the method used to install and replace the pipelines. The final acreage will be determined following project implementation based on success of underground pipe bursting, success of horizontal directional drilling, and the number of manholes requiring replacement.

Table 1: Mitigation for Impacts to Utah Prairie Dog Habitat within the Action Area.

Utah Prairie Dog Colony Name	Disturbance Activity & Acreage Overlapping Colony			Habitat within ROW (acres)	Mitigation if Using Underground Technology	Mitigation if Open Trenching Required
	Sewer Line	Water Line	Manhole Repair ¹		Mitigation Ratio 2:1	Mitigation Ratio 5:1
Dave's Hollow West #215A	1.5	0.6	0.3	2.1	4.2	10.5
Historic Housing #215B	0.5	0.0	0.1	0.5	1.0	2.5
Mixing Circle Intersection #215C	1.4	0.0	0.3	1.4	2.8	7
Total				4	8	20

¹The area disturbed by replacing manholes occurs largely within the sewage pipeline right-of-way with minor additional acreage (~.005ac/manhole) to account for the larger disturbance radius (30ft) around manholes. A maximum of 11 manholes may need to be replaced within occupied Utah prairie dog habitat. If manholes need to be replaced, disturbance will be mitigated at a 5:1 ratio.

Rights-of-way within occupied Utah prairie dog habitat will be flagged prior to project initiation. If project related equipment needs to go outside the flagged corridor, those impacts will be mitigated at a 2:1 ratio.

Conditions of Proposed Mitigation

BRCA will restore at least 8 acres of habitat within the park to offset project impacts, assuming that all underground technology is successful and no manholes require replacement in Utah prairie dog habitat. If manholes require replacement, the mitigated acreage would be increased slightly and be mitigated at a 5:1 ratio to account for surface disturbances. A maximum of 11 manholes may require replacement within occupied Utah prairie dog habitat. Actual total mitigation acreages will be determined once each phase is completed to account for final technologies used, either underground or surface disturbing, and to account for the number of manholes that may require replacement, if any.

BRCA will submit updated Utah prairie dog survey data to the U.S. Fish and Wildlife Service (USFWS) prior to the commencement of each phase of construction. If census numbers change substantially, the park is aware that re-initiation of consultation and an updated Biological Assessment may be required.

Proposed Mitigation - Habitat Improvements within the Park

In addition to implementing conservation measures following project completion in Utah prairie dog habitat (e.g., raking and seeding disturbed area with a native seed mix), BRCA will conduct habitat improvements within two meadow complexes inside the park: Dave's Hollow Meadow and East Creek Meadow. Habitat improvements will be conducted on approximately 8 to 20 acres (depending on final direct disturbance impacts) in these two meadow complexes and would improve forage quality and quantity as well

as provide more attractive habitat that could potentially connect a small, isolated Utah prairie dog colony in East Creek Meadow with larger established colonies to the west. Habitat treatments are anticipated to begin during the summer of 2010 and will continue for at least four years, or until restoration objectives are achieved (NPS 2009c). The majority of activities in East Creek Meadow can be conducted within one season, as there are few active colonies currently in this area. However, follow up treatments for several years will be required to remove non-native invasive plant species and ensure establishment of appropriate Utah prairie dog forage. Habitat restoration in Dave's Hollow will require multiple years to complete as there are several sub-colonies throughout the meadow and yearly habitat disturbance limits (not to exceed 20% of habitat within 500' of active colonies) will require multiple seasons to complete the work.

Proposed habitat improvement measures will consist of removing non-native invasive plant species (using chemical and mechanical treatments), removing shrubs (primarily via mechanical treatments with follow-up chemical treatment of stumps) that are determined to be in greater abundance than the desired condition for optimum Utah prairie dog habitat conditions, and seeding with an appropriate plant mixture to enhance Utah prairie dog foraging opportunities. BRCA anticipates applying at least 10 pounds of seed per acre to effectively rehabilitate the meadows.

The following measures will be taken to improve habitat while minimizing any negative impacts to Utah prairie dog colonies within the park during mitigation activities:

- All project participants would be informed about the special status of the Utah prairie dog and what actions are authorized within active Utah prairie dog colonies, including distance restrictions, burrow avoidance and approved tool use.
- Vegetation treatments (mechanical/herbicide treatments) within 500' of active Utah prairie dog colonies would not occur until pups have emerged from burrows (~June 15) and would be completed by August 31st to reduce interference with pre-hibernation foraging. This would reduce impacts to Utah prairie dogs during especially critical life history periods for the species.
- The use of motorized equipment within 500' of active Utah prairie dog colonies for vegetation treatments (that do not involve ground disturbance) would be conducted during the dormant season when possible. If motorized equipment is necessary during the active season, treatments would occur after the pups emerge and be completed in time to reduce interference with pre-hibernation foraging (June 15 – August 31) and would be limited to two hours per day during the less active period of the day (approximately 10 a.m. to 2 p.m.). Motorized equipment used for vegetation treatments includes such items as string trimmers and chainsaws.
- No motorized vehicles (including ATVs, cars/trucks, tractors, heavy equipment, etc.) would be used overland (off existing roads and trails) within 0.5 miles of occupied Utah prairie dog habitat.

- Only hand-pulling of weeds is authorized within 50' of an active Utah prairie dog burrow.
- Only Plateau, RoundUp, Milestone, Fusilade, and Habitat (or the generic equivalents) will be used between 50' and 500' of active Utah prairie dog colonies. These herbicides are rated 'practically nontoxic' according to EPA's toxicity scale. Outside of 500' from active Utah prairie dog colonies, BRCA may use Garlon (or the generic equivalent) to treat non-native invasive species. Only one application using Garlon will be conducted within the same year, per treated site. If additional herbicides are developed or discovered to be more effective at treating exotic plants, BRCA will contact the USFWS for authorization of those products.
- All application instructions in the herbicide applicator manual will be followed. To prevent drift, herbicide will not be applied during windy conditions or when rainfall is threatening.
- No more than 20% of habitat within 500' of active Utah prairie dog colonies would be treated within one season; follow-up treatments can occur for up to 2 years after the initial treatment in the same 20% area with reseeding efforts to occur following the last year of treatment. New treatment areas within the same colony will not be selected until rehabilitation is completed on previously treated sites (i.e. previously treated areas were reseeded and no further vegetation removal is expected for at least a 5 year period). This method ensures that no greater than a 20% loss in vegetation would occur in the area surrounding active colonies. A maximum of 40% of habitat would be treated between 500' and 0.5 mile from an active Utah prairie dog colony within one season. First year/initial treatments will not be performed on two colonies in the same season if those colonies have functional connectivity.
- Rehabilitation efforts of Utah prairie dog habitat will strive to produce vegetation characteristics that optimize colony establishment and success¹ including the following parameters:
 - 1-20% ground cover of warm season grasses
 - 12-14% ground cover of cool season grasses
 - 1-10% ground cover of forbs
 - 0-8% ground cover of shrubs (<10% canopy cover)
- Reseeding of treated areas within 500' of active Utah prairie dog colonies will use a native seed mix (seed collected from plants from within BRCA or a local genetic strain).

Measures To Minimize Utah Prairie Dog Mortality

- Construction in Utah prairie dog habitat will not occur until after June 15, after the Utah prairie dog pups have emerged from the burrows. Construction in Utah prairie dog habitat

¹USFWS Recommended Translocation Procedures for Utah prairie dogs, January 2006 (edited September 2009)

will continue and be completed by August 31 when the pre-hibernation period begins. Pipeline replacement activities in Utah prairie dog habitat will occur in different phases, however all work within each affected colony will be completed within one season.

- BRCA will ensure a qualified biologist from the park's Resources Stewardship and Science Division (Division) will be onsite during all excavation activities. This individual will monitor the numbers and locations of Utah prairie dog individuals in or immediately adjacent to the project footprint prior to and during construction.
- All project employees will be informed of the occurrence of Utah prairie dogs in the project area, and of the threatened status of the species. All project employees will be advised as to the definition of "take" and the potential penalties for taking a species listed under the Endangered Species Act. Take is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct; may include significant habitat modification or degradation if it kills or injures wildlife by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering."
- Construction equipment and/or materials:
 - Staging of construction materials and/or equipment will be placed in designated locations away from the Utah prairie dog habitat areas, in order to minimize impacts.
 - Within 1,000 feet of occupied Utah prairie dog habitat, all stored or placed pipes within suitable habitat will be immediately capped to prevent prairie dogs from entering.
 - Construction and maintenance vehicles will be operated in a manner as to minimize impacts to Utah prairie dog habitat. Vehicles used to access the project site or equipment used on the project will not be parked within any Utah prairie dog habitat. All project employees will be instructed to operate vehicles within the area of Utah prairie dog only when necessary for construction and to remove the vehicles from the area as quickly as possible. Speed will not exceed 10 miles per hour within or adjacent to Utah prairie dog colonies. Within occupied Utah prairie dog habitat, all vehicles will be confined to fenced areas.
 - To the maximum extent possible, all vehicle maintenance activities will be conducted in maintenance facilities outside of occupied or potential Utah prairie dog habitat. Precautions will be taken to ensure that contamination of maintenance sites by fuels, motor oils, grease, etc. does not occur and such materials are contained and properly disposed of off-site. Inadvertent spills of petroleum based or other toxic materials will be cleaned up and removed immediately.
 - Upon project completion, all construction refuse, including, but not limited to, fencing materials, broken equipment parts, wrapping material, cords, cables, wire, rope, strapping, twine, buckets, metal or plastic containers, and boxes will be removed from the site daily and disposed of properly.
- No project-related personnel will be permitted to discharge firearms or have pets in their possession while on the project site.
- Construction personnel will be responsible for ensuring trash is properly disposed of and not left uncontained onsite overnight. A trash abatement program will be initiated during pre-construction phases of the project, and will continue through the duration of the project.

- If the open-cut trenching method is necessary during a pipeline break and/or manhole replacement procedure, appropriate dust abatement practices (using water trucks) will be performed to minimize the amount of dust settling on the surrounding vegetation (i.e., Utah prairie dog food sources).
- Invasive Weeds:
 - To avoid the spread of non-native invasive plant species, construction equipment will be washed prior to entering the work site for the first time.
 - Upon completion of construction within occupied Utah prairie dog habitat, the disturbance area will be raked and seeded with an approved seed mix.
 - Currently, an invasive species vegetation management plan is being drafted by BRCA in order to control the spread and introduction of exotic vegetation within park boundaries. Additionally, the vegetation management plan will provide construction contractors with information on how to reduce the spread of non-native invasive species.
- BRCA will continue to perform management activities that sustain a healthy population of Utah prairie dog, such as the utilization of delta dust treatments to control the outbreak of sylvatic plague and the completion of a Utah prairie dog management and conservation strategy.

The following additional measures will be taken to minimize impacts to Utah prairie dogs and their habitat during construction and maintenance activities occurring in the sanitary sewage lagoon area:

- All ground disturbance work will stay within the sewer lagoon fence until the emergence of Utah prairie dog pups (~June 15th). Once pups are above ground, work adjacent to the fence (including installation of a wash station and associated plumbing) as well as pipe bursting of the existing sewer line outside of the lagoon area and construction of the water line using horizontal directional drilling can commence. Work outside of the sewer lagoon fence will be completed by August 31st to reduce impacts to Utah prairie dogs prior to hibernation. Work inside the sewer lagoon fence may continue past August 31st if necessary (weather dependent).
- All contracted workers will be required to attend a Utah prairie dog briefing prior to project initiation and will receive information on the status of the species, project conservation measures, contacts for Utah prairie dog incident reporting and acceptable actions while working near colonies. All workers in the project area will be required to sign a sheet indicating their attendance at this training.
- Vehicle speed limit is 10 m.p.h. along the lagoon access road. Violation of this restriction will result in a warning to the driver (1st violation) and removal from the project (2nd violation). A staff member from the Bryce Canyon Resources Stewardship and Science Division will periodically inspect the construction area and access road to monitor compliance to required conservation measures.

- Vehicles will not be allowed to leave the sewer access road corridor unless a biological monitor is on site. A monitor will be on site during project work within Utah prairie dog habitat outside of the sewer lagoon fence.
- Designated vehicle parking areas will be delineated by park staff and will be outside of active Utah prairie dog colonies.
- Vehicles/equipment will not be maintained/repared within the sewer lagoons or the access road in Dave's Hollow. A separate staging area (outside of the meadow) will be established for any necessary vehicle maintenance.

Status of the Species/Critical Habitat

Species/Critical Habitat Description

The Utah prairie dog (*Cynomys parvidens*) is the smallest species of prairie dog with individuals that are typically 305 to 360 millimeters (mm) (12 to 14 inches (in)) long (Hollister 1916) and weigh about 640 to 1410 grams (1.4 to 3.1 pounds) (Wright-Smith 1978). Utah prairie dogs range in color from cinnamon to clay. The Utah prairie dog is distinguished from other prairie dog species by a relatively short (30 to 70 mm / 1.2 to 2.8 in) white- or gray-tipped tail (Pizzimenti and Collier 1975; Hoogland 2003) and a black “eyebrow” above each eye.

The Utah prairie dog was listed as an endangered species on June 4, 1973 (38 FR 14678), pursuant to the Endangered Species Conservation Act of 1969. At the time of listing, the species was threatened with extinction due to habitat destruction; modification or severe curtailment of habitat; over exploitation; disease; and predation. The species was reclassified as threatened on May 29, 1984 (49 FR 22330), with a special rule to allow take of prairie dogs on agricultural lands.

Life History and Population Dynamics

Utah prairie dogs are true hibernators and spend four to six months underground each year during harsh winter months (Hoogland 2001). Adult males usually cease surface activity in September, followed by adult females several weeks later. Juvenile prairie dogs remain active as late as November. Utah prairie dogs are not totally dormant in winter and are observed above ground during all months of the year. Emergence from hibernation usually begins in mid-March to mid-April, and is thought to be triggered by temperature. Mating occurs soon after emergence.

One half to two thirds of the adult population of the Utah prairie dog is female (Mackley et al. 1988); the skewed sex ratio is attributed to a higher mortality rate for young males due to conflicts with adult males (USFWS 1991). Approximately 67 percent of females wean a litter (Hoogland 2001). Each female produces an average of 3.88 pups which are born in April after a gestation period of 30 days (Pizzimenti and Collier 1975; Wright-Smith 1978; Mackley et al. 1988; Hoogland 2001). Young appear above ground at five to seven weeks of age, are full grown by October of their first year, and reach sexual maturity at one year. Less than 50 percent of both males and females survive the first year (Hoogland 2001). Only about 20 percent of females and less than 10 percent of males survive to age 4 (Hoogland 2001). Due to their limited

reproductive rates, short life span and high mortality rates, numbers of individuals within a colony can fluctuate greatly throughout the year with low points in the spring and peaks in the late summer when both adults and pups are above ground.

Natal dispersal (movement of first year animals away from their area of birth) and breeding dispersal (emigration of sexually mature individuals from the area where they copulated) are male-biased, leading to loss of young males from the colony and higher mortality through predation (Hoogland 2003). Young male Utah prairie dogs disperse in the late summer with average dispersal events of 0.56 kilometer (0.35 mile), long-distance dispersal events of up to 1.2 kilometers (0.75 mile), and unusually long-distance dispersals of 1.7 kilometers (1.1 miles) (Mackley 1988). We believe some dispersal events may exceed these documented distances.

Utah prairie dogs are organized in social groups, or clans, consisting of an adult male, several females, and their young (Wright-Smith 1978). Clans are loosely organized with no observable dominance hierarchy. Geographic boundaries of clans remain fairly constant within a colony, and young prairie dogs are the only ones to regularly cross boundaries. Utah prairie dogs will use common feeding grounds, but still maintain elements of territoriality in those areas (Wright-Smith 1978). The typical home range of the Utah prairie dog is 750-feet (Crocker-Bedford 1975; Wright-Smith 1978) and the distance at which disturbance affects a prairie dog's normal behavior is estimated to be 350-feet (Ashdown 1995). Social behaviors, especially socially facilitated vigilance and warning vocalizations, are important to survival of individuals in colonies and to the overall well-being of the colony. Adult female Utah prairie dogs play the major role in caring for young and warning of danger (Wright-Smith 1978).

Utah prairie dogs forage primarily on grasses and forbs, and tend to select those with higher moisture content (Crocker-Bedford 1976). They often select colony sites in swales where the vegetation can remain moist even in drought conditions (Collier 1975; Crocker-Bedford and Spillet 1981). Vegetation must be short stature to allow the prairie dogs to see approaching predators as well as have visual contact with other prairie dogs in the colony (Collier 1975; Crocker-Bedford and Spillet 1981). Prairie dogs will avoid areas where brushy species dominate, and will eventually decline or disappear in areas invaded by brush (Collier 1975; Player and Urness 1983). Well-drained soils are a habitat requirement for Utah prairie dogs to excavate burrow sites. Burrows must be deep enough to protect the prairie dogs from predators and environmental and temperature extremes.

Predators of Utah prairie dogs include: badgers (*Taxidea taxus*), coyotes (*Canis latrans*), raptors, fox, and weasels. In an established prairie dog colony, predators do not have a significant impact; conversely they have a huge impact on translocation sites where an established social system or burrow system is not present.

Utah prairie dog populations are susceptible to sylvatic plague (*Yersinia pestis*), a bacterium introduced to the North American continent in the late 1800's (Cully 1993). There is a limited understanding of the variables that determine when sylvatic plague will impact prairie dog populations. Fleas are the vectors that spread the disease and can be brought into the vicinity of a prairie dog colony by a suite of mammals. Plague outbreaks generally occur when populations increase to high densities causing increased stress among individuals and easier transmission of disease between individuals.

Status and Distribution

There are five species of prairie dogs native to North America (Hoogland 2003). Taxonomically, prairie dogs (*Cynomys spp.*) are divided into two subgenera: the white-tail and black-tail. The Utah prairie dog (*C. parvidens*) is a member of the white-tail group, subgenus *Leucocrossuromys*. Other members of this group, which also occur in Utah, are the white-tailed prairie dog (*C. leucurus*) and the Gunnison prairie dog (*C. gunnisoni*).

The Utah prairie dog is the westernmost member of the genus *Cynomys*. Historically, Utah prairie dog colonies were found as far west as Pine and Buckskin Valleys in Beaver and Iron Counties, and may have occurred as far north as Nephi, southeast to Bryce Canyon National Park, east to the foothills of the Aquarius Plateau, and south to the northern borders of Kane and Washington Counties (Pizzimenti and Collier 1975). Factors that resulted in the historical decline of Utah prairie dogs were poisoning; drought; habitat alteration, primarily in the form of cultivation to agricultural crops; shooting; and disease (Collier and Spillett 1972).

The Utah prairie dog currently occurs in three areas within southwestern Utah, which are designated as recovery areas: (1) the Awapa Plateau; (2) the Paunsaugunt region, along the east fork and main stem of the Sevier River; and, (3) the West Desert region of eastern Iron County, with a few isolated colonies existing in mountain and desert valleys in eastern Iron and Beaver Counties (Pizzimenti and Collier 1975). Utah prairie dogs are found in elevations from 5,400-foot on valley floors up to 9,500-foot in mountain habitats. For more information on these recovery areas, refer to our recovery plan for the species (USFWS 1991).

Rangewide adult counts were as high as 7,527 in the 1989 spring census count (UDWR unpublished data 2010a) with a low count of 1,291 animals in 1990, largely due to climatic and disease factors (McDonald 1993). Adult numbers continue to exhibit fluctuating, but stable trends. Counts of adult Utah prairie dogs conducted by the UDWR from 2005 to 2009 are 5,375; 5,524; 5,991; 5,816; and 5,827, respectively (UDWR unpublished data 2010b).

Around 1976, the UDWR began mapping occupied Utah prairie dog habitat throughout their range (Brown pers. comm. February 8, 2010 in Jacobs 2010). The UDWR has mapped 59,656 acres as Utah prairie dog habitat (UDWR 2010b). Mapped Utah prairie dog habitat includes any area where Utah prairie dog activity has currently or historically been observed since 1976 rangewide. Occupied habitats are areas actively inhabited by Utah prairie dogs as of the previous spring. There are 10,172 acres of occupied habitat and 16,841 acres of mapped habitat in the West Desert Recovery Area; 9,670 acres of occupied habitat and 15,620 acres of mapped habitat in the Paunsaugunt Recovery Area; and 13,183 acres of occupied habitat and 27,195 acres of mapped habitat in the Awapa Recovery Area (UDWR 2010b).

Recovery Efforts

The primary objective of the 1991 Utah prairie dog Recovery Plan (USFWS 1991) is to reestablish Utah prairie dog populations on public lands and ensure the continued existence of the species. In 1972, the UDWR initiated a transplant program to move animals from private agricultural lands to areas of historical occupancy on public lands. Over a 31-year period from 1972 to 2002, over 19,561 Utah prairie dogs were translocated to public land sites (Bonzo and Day 2003). Despite efforts to establish new Utah prairie dog colonies on federal lands,

approximately 71% of Utah prairie dogs still occur on private lands (UDWR unpublished data 2008). Efforts are now underway to encourage the conservation of existing colonies on private lands – e.g., safe harbor agreements, conservation banks. In addition, recovery actions include continued habitat improvements and research to improve success of translocations on federal lands, plague research and management, adaptive management strategies to respond to unpredictable threats such as changing climate conditions, and expanding public education and outreach efforts.

In 2006, a Recovery Team was established to oversee a revision of the 1991 Recovery Plan and implement recovery actions. We anticipate that a draft revised recovery plan will be available for public comment in 2010. All Recovery Team members are involved in efforts to conserve and recover the Utah prairie dog using the best available information and adaptive management practices. In addition, a rangewide Utah prairie dog Recovery Program was initiated in 2009.

Environmental Baseline

This project occurs in the Paunsaugunt Recovery Area. The Paunsaugunt Recovery Area is primarily in Garfield County, with a small area within Iron County. The Paunsaugunt Recovery Area supports approximately 17% of all adult Utah prairie dogs (979 of 5,827) (UDWR unpublished data 2010a), with 34% of the adults occurring on public lands. Since 1976, spring counts varied from 549 to 2,205 adult prairie dogs (UDWR unpublished data 2010a). From 1993 to 2005, this area experienced an overall downward trend (total spring counts decreased from 2,072 to 654 prairie dogs) (UDWR unpublished data 2009). Recently, the population appears to be rebounding.

The Utah prairie dog was eradicated from BRCA in the 1950s (Stebbins 1971). Reintroduction of the species into BRCA started in 1974 and continued through 1988 (Bryant 1995). Since this reestablishment period, Utah prairie dogs have colonized new areas within the open, grassy meadows of the central and northern portions of BRCA. Utah prairie dog numbers fluctuate within the park because of natural predators; fire suppression; road fatalities; sylvatic plague; habituation; and longer and more extreme winters that decrease the time available during the active season for foraging (NPS 2009a). The BRCA biologists perform management activities in order to sustain healthy populations of Utah prairie dog, such as the utilization of delta dust treatments to control the outbreak of sylvatic plague (Haas 2010, pers. comm.). In addition, BRCA conducts annual population counts of adult prairie dogs each spring to monitor active colonies and population trends. Between 2004 and 2006, BRCA park staff counted on average 209 animals from six to ten colonies (BRCA 2007). There are eight active Utah prairie dog colonies (in approximately 400 acres) within the park (BRCA 2007).

Status of the Utah Prairie Dog Within the Action Area

There are three occupied Utah prairie dog colonies that overlap the project action area; their habitat encompasses 48.5 acres (Table 2). Of this, 39.3 acres occur within the action area; 4.0 acres occur in the rights-of-way that will be directly impacted by construction activities (Table 1).

Depending on the time of year, either spring or summer, population estimates are made based on the number of individual prairie dogs observed during survey efforts. During the summer, both

adults and juveniles can be observed, thus the population estimate is derived by multiplying the summer count by two, as only 40 to 60 percent of individual prairie dogs are above ground at any one time (Crocker-Bedford 1975).

$$\text{Pop Est.}_{(summer)} = 2 * (\text{Summer Count})$$

Spring surveys are conducted prior to pups emerging from the burrows. Therefore population estimates derived from spring surveys need to take into account the adult spring count and productivity estimates as follows:

$$\text{Pop Est.}_{(spring)} = [2\text{SAD} * 0.67\text{PAF} * 0.97\text{PBF} * 4\text{YBF}] + 2\text{SAD}$$

- Where: SAD = Spring Adult Count
 PAF = Proportion of Adult Females
 PBF = Proportion of Breeding Females
 YBF = Average Number of Young per Breeding Female

Population estimates for the portions of the three colonies that overlap the action area were derived using both spring and summer counts for this project. Dave's Hollow West #215A and Historic Housing #215B were surveyed in July 2009 while Mixing Circle Intersection #215C was surveyed in May 2009. To determine the number of Utah prairie dogs that may directly be impacted by project activities, the rights-of-way for the proposed action were surveyed in July 2009.

Based on the May and July 2009 Utah prairie dog surveys, a total of 56 Utah prairie dogs are estimated to occur within the portions of the three colonies that overlap the action area. The population estimate within the rights-of-way, where Utah prairie dogs could be directly impacted, is 10.

Colony	Total Habitat (acres)	Habitat within Action Area (acres)	Estimated Number of Utah Prairie Dogs in Action Area		Estimated Number of Utah Prairie Dogs Directly Impacted	
			Adult	Juvenile	Adult	Juvenile
Dave's Hollow West #215A	29.5	21.0	10	6	2	2
Historic Housing #215B	4.7	4.3	4	0	4	0
Mixing Circle Intersection #215C	14.3	14.0	36	0	2	0
Total	48.5	39.3	50	6	8	2

Factors Affecting Species within the Action Area

Current factors that may affect Utah prairie dogs within the action area include:

- Human activity, including disturbances from park staff, researchers, and recreational visitors (i.e. hiking and horseback riding);
- Disease – Utah prairie dogs in BRCA are susceptible to sylvatic plague as they are throughout their range, however BRCA has made efforts to manage potential plague outbreaks by dusting colonies with an insecticide to control fleas in 2005 and 2008;
- Impacts from existing roads near or adjacent to habitat, including: vehicular collisions and disturbances from road construction or improvement;
- Construction activities for public facilities; and
- Park maintenance activities including trapping and translocation of up to 5 Utah prairie dogs per year that enter the fenced sanitary sewage lagoon treatment system boundary.

Effects of the Action

The proposed action includes fixing both the sanitary sewage collection system and the sanitary sewage lagoon treatment system as well as installing a water pipeline. Activities associated with the project include the use of personnel, vehicles, and construction equipment (see *Description of Proposed Action*). Construction activities within occupied Utah prairie dog habitat are authorized to occur after pups have emerged from burrows (around June 15th) and will be completed by August 31st to reduce interference with pre-hibernation foraging (see Applicant Committed Conservation Measures).

There is a total of 39.3 acres of occupied Utah prairie dog habitat within the project action area, of which 4 acres will be directly and temporarily impacted by the proposed action (see *Description of Proposed Action* and Table 1). Project activities will result in reduced forage in the project area due to direct loss from construction activities or from reduced plant vigor from trampling. These impacts will be minimized by reseeding the disturbed areas after construction to promote re-growth of native vegetation (see *Applicant Committed Conservation Measures*).

Project related activities will result in disturbance to individual Utah prairie dogs from noise, ground vibrations, and increased human presence while construction activities are occurring. Utah prairie dogs may be temporarily displaced away from the project area. We anticipate Utah prairie dogs will return to the disturbed areas once project related activities are completed. Ground vibrations from project equipment and activities and direct impacts from trenching and underground technologies may damage existing burrows. This may result in the need for prairie dogs to excavate new burrows or relocate to other areas in the park. When prairie dogs are excavating or relocating to new burrows, they may be more vulnerable to predation. Although some burrows may be damaged, the prairie dogs will retain the ability to maintain a functional burrow system in the disturbed areas. The three colonies that overlap the action area are likely desensitized to human activity to some degree because they are adjacent to park roads, buildings, and other facilities where there is substantial human activity, and vehicle and heavy equipment traffic. We anticipate that the level of additional disturbance to prairie dogs from project related activities associated with this proposed action will be minimal.

Use of trenching, horizontal directional drilling, and pipe bursting equipment may result in injury or mortality of individual animals. However, because the project is designed to occur during the active season, physical impacts are less likely as adults and juveniles are more mobile and thus less prone to injury or mortality from heavy equipment. To further reduce the potential for direct mortality, BRCA has incorporated conservation measures into the project design (see *Applicant Committed Conservation Measures*).

Cumulative Effects

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. We do not anticipate any cumulative effects to occur as all of the land in the action area is federal land managed by BRCA.

Conclusion

After reviewing the current status of the Utah prairie dog, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the Utah prairie dog. No critical habitat is designated for this species.

We have reached this opinion based on the following reasons:

- 1) The proposed project will directly but temporarily disturb 4.0 acres of occupied Utah prairie dog habitat. This acreage is 0.04% of the estimated acreage of occupied habitat in the Paunsaugunt Recovery Area; we consider this impact to be a very small portion of the recovery area, and thus the scope of impacts caused by the project is limited. Once project construction is complete, the habitat will still be available for use by Utah prairie dogs.
- 2) The proposed project minimizes the potential for take of Utah prairie dogs and occupied habitat by incorporating pipeline installation techniques (pipe bursting and horizontal directional drilling) that minimize surface and ground disturbance, providing an alternative to open-cut trenching.
- 3) Direct impacts to Utah prairie dog habitat will be mitigated as stipulated in the *Applicant Committed Conservation Measures*. This includes a minimum of 8 acres of Utah prairie dog habitat restoration within the park to offset project impacts. These conservation measures will be beneficial toward our efforts to conserve and recover Utah prairie dogs.

INCIDENTAL TAKE

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by us to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by us as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of Section 7(b)(4) and Section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by you and any contractors hired by you for the exemption in section 7(o)(2) to apply. We have a continuing duty to regulate the activity covered by this Incidental Take Statement. If you (1) fail to assume and implement the terms and conditions or (2) fail to require any contractor to adhere to the terms and conditions of the Incidental Take Statement through enforceable terms that are added to any grant document, the protective coverage of Section 7(o)(2) may lapse. In order to monitor the impact of incidental take, you or your contractor must report the progress of the action and its impact on the species to us as specified in the Incidental Take Statement [50 CFR §402.14(i)(3)].

Amount or Extent of Take Anticipated

Based on the information provided in the BA, addendum to the BA, and phone and email communications with you, there are no permanent impacts to occupied Utah prairie-dog habitat associated with the proposed project. There is a total of 39.3 acres of occupied Utah prairie dog habitat within the action area that may be indirectly impacted, of which 4.0 acres will be temporarily and directly impacted by project activities.

Incidental take is expected to be in the form of harm (injury or mortality related to construction activities, habitat degradation or loss, loss of forage) and/or harassment (resulting from disturbance of individuals during foraging or encouraging animals to move out of harm's way). Based on the May and July 2009 Utah prairie dog counts from this area, approximately 56 Utah prairie dogs may be impacted within the action area in the form of harassment due to project activities. Harassment may occur due to the indirect effects of construction noise levels, ground vibration, and increased human activity. Harassment is anticipated to be temporary, and confined to the length of construction. There is also a small potential for inadvertent mortality from being crushed by construction equipment. Within the rights-of-way, we estimated 10 Utah prairie dogs occur. However, because project related activities will occur during the active season when Utah prairie dogs are more mobile and thus less prone to injury or mortality from heavy equipment, we anticipate that no more than six Utah prairie dogs would be killed by project related activities.

Effect of Take

In the accompanying biological opinion, we determined that this level of anticipated take is not likely to result in jeopardy to the species. This biological opinion does not authorize any form of take that is not incidental to the construction associated with the proposed project.

Reasonable and Prudent Measures

We believe that the following reasonable and prudent measures are necessary and appropriate to minimize incidental take of Utah prairie dogs:

1. Measures must be implemented to prevent Utah prairie dogs from being killed or harmed by any project-related activity.
2. Measures must be implemented to minimize loss, degradation, and fragmentation of Utah prairie dog habitat.

Terms and Conditions

In order to be exempt from the prohibitions of Section 9 of the Act, BRCA must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

- a) BRCA must ensure that all project related activities comply with the *Applicant Committed Conservation Measures* included in the *Description of the Proposed Action* of this biological opinion.
- b) BRCA must designate one or more individuals to be responsible for overseeing compliance with the *Applicant Committed Conservation Measures* included in the *Description of the Proposed Action* of this biological opinion, and provide coordination with the USFWS.
- c) A qualified biologist² approved by the USFWS must be on site during construction within 350-feet of occupied Utah prairie dog habitat:
 - The qualified biologist must ensure that all construction activity is closely monitored to comply with these terms and conditions.
 - If BRCA or the contractor(s) fail to comply with these terms and conditions, the qualified biologist will have the authority to halt activities until BRCA and the contractor(s) are in compliance with these terms and conditions.
 - The qualified biologist must monitor and document take and suspected take of Utah prairie dogs.

² A biologist with a bachelor's degree or graduate degree in biology, ecology, wildlife biology, mammalogy, or related fields. In addition, he/she must have a minimum of 20 hours of documented field experience surveying, monitoring, or researching prairie dogs OR have completed the official FWS Utah Prairie Dog Survey Training every 4 years.

- The qualified biologist must provide us with a post-construction compliance report containing information concerning the construction (daily construction times), how the terms and conditions of this biological opinion were implemented, and how many Utah prairie dogs were taken or suspected of being taken, along with their locations and times. This report must be submitted to us within one month of project completion.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring re-initiation of consultation and review of the reasonable and prudent measures provided. You must immediately provide an explanation of the causes of the taking and review with us the need for possible modification of the reasonable and prudent measures.

REPORTING REQUIREMENTS

Upon locating a dead or injured Utah prairie dog, initial notification must be made within one business day to our Division of Law Enforcement in Cedar City, Utah, at telephone (435) 865-0861, our Ecological Services Office at telephone (801) 975-3330, and the Cedar City office of the Utah Division of Wildlife Resources at telephone (435) 865-6120. This reporting requirement will allow our Division of Law Enforcement or the UDWR to collect and process dead prairie dogs if necessary to determine cause of death. Instructions for proper handling and disposition of such specimens will be issued by our Division of Law Enforcement consistent with the provisions of the Incidental Take Statement.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

As described in the *Applicant Committed Conservation Measures* section of this biological opinion, BRCA committed to mitigate for impacts to Utah prairie dog habitat by improving habitat conditions on 8 to 20 acres in the vicinity of the proposed action. We identified poor habitat quality as a limiting factor for the Utah prairie dog in our Recovery Plan (USFWS 1991). We believe BRCA's efforts will help us to achieve on-the-ground conservation benefits for the Utah prairie dog that will ultimately contribute to recovery of the species. We recommend that BRCA continue to look for these types of habitat improvement opportunities whenever feasible during project planning efforts. This commitment on the part of BRCA meets responsibilities under sections 7(a)(1) and 7(a)(2) of the Act.

RE-INITIATION STATEMENT

This concludes formal consultation on the proposed Rehabilitation of the Failing Park Sewage System Project in Bryce Canyon National Park, Garfield County, Utah. As provided in 50 CFR §402.16, re-initiation of formal consultation is required where discretionary Federal agency involvement or control over the action is retained (or is authorized by law) and if: 1) the amount or extent of incidental take is exceeded; 2) new information reveals effects of the agency action that may impact listed species in a manner or to an extent not considered in this opinion, 3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion, or 4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded or if the terms and conditions of this Biological Opinion are not fully implemented, any operations causing such take must cease immediately pending re-initiation.

Thank you for your interest in conserving threatened and endangered species. If you have any questions please contact Jennifer Fox at 801-975-3330 ext.128.

A handwritten signature in black ink, appearing to read "J. Fox", is positioned to the right of the text block.

LITERATURE CITED

- Ashdown, J., 1995. "Visitor impact on avoidance responses in Utah prairie dogs (*Cynomys parvidens*) in Bryce Canyon National Park". Unpublished report, Weber State University, Ogden, Utah. 19pp.
- Bonzo, T., and K. Day, 2001. Utah Prairie Dog Recovery Efforts 2000 Annual Report. Utah Division of Wildlife Resources. Publication No. 02-02. 27 pp.
- Bonzo, T., and K. Day, 2003. Utah Prairie Dog Recovery Efforts 2002 Annual Report. Utah Division of Wildlife Resources. Publication No. 03-47. 26 pp.
- Bryant, R. 1995. Prairie Dogs at Bryce Canyon National Park.
- Bryce Canyon National Park (BRCA) 2007. Project Proposal for Project Title: Develop a Utah Prairie Dog Management and Conservation Strategy.
- Chesser, R. K. 1984. Final Report to U.S. Fish and Wildlife Service.
- Collier, G.D., and J.J. Spillett. 1972. Status of the Utah prairie dog (*Cynomys parvidens*). Utah Acad. Sci., Arts, Lett. 49:27-39.
- Collier, G. D., and J. J. Spillett. 1973. The Utah prairie dog--decline of a legend. Utah Science 34:83-87.
- Collier, G. D., and J. J. Spillett. 1975. Factors influencing the distribution of the Utah prairie dog, (*Cynomys parvidens*). The Southwestern Naturalist, Vol. 20, No. 2, pp. 151-158.
- Collier, G. D. 1975. The Utah prairie dog: abundance, distribution and habitat requirements. Pub. No. 75-10. Salt Lake City, Utah. 94 pp.
- Crocker-Bedford, D. 1975. Utah prairie dog habitat evaluation. Proc. Utah Wildl. Tech. Mtg. 7 pp.
- Crock-Bedford, D.C., and J.J. Spillett. 1981. Habitat relationships of the Utah prairie dog. Publication No. 1981-0-677-202/4. U.S. Dept. of Agric., Forest Service, Intermountain Region, Ogden, Utah. 29pp.
- Crocker-Bedford D. 1976. Food interactions between Utah prairie dogs and cattle. M. S. Thesis, Utah State University, Logan.
- Cully, J.F., Jr., A.M. Barnes, T.J. Quan and G. Maupin. 1993. Dynamics of Plague In a Gunnison's Prairie Dog Colony Complex from New Mexico. Journal of Wildlife Diseases 33:706-719.
- Cully, J.F., Jr., A.M. Barnes, T.J. Quan and G. Maupin. 1997. Dynamics of Plague In a Gunnison's Prairie Dog Colony Complex from New Mexico. Journal of Wildlife Diseases 33:706-719.

- Heggen, A.W., and R.H. Hasenyager. 1977. Annual Utah prairie dog progress report to U.S. Fish and Wildlife Service by the Utah Division of Wildlife Resources. Unpubl. Rep. Salt Lake City, Utah. 4 pp.
- Hollister, N. 1916. A systematic account of the prairie dogs. N. Amer. Fauna 40:1-37.
- Hoogland, J. L. 2001. Black-tailed, Gunnison's, and Utah prairie dogs all reproduce slowly. *Journal of Mammalogy* 82:917-927.
- Hoogland, J. L. 2003. Black-tailed Prairie Dog. In *Wild Mammals of North America, Biology, Management and Conservation*. Second Edition. Edited by Feldhamer, G., B. Thompson, and J. Chapman.
- Jacobs Engineering Group. 2010. Utah Public Airport Operations on the Utah Prairie Dog Biological Assessment. 46pp.
- Mackley, J.W., S.G. Whisenant, and J.T. Flinders. 1988. Dispersal and Life history of the Utah prairie dog (*Cynomys parvidens*) following habitat modifications. Unpubl. Report, Dept. of Botany and Range Sci, Brigham Young Univ., Provo, Utah. 24pp.
- McDonald, K.P. 1993. Analysis of the Utah prairie dog recovery program, 1972-1992. Publication No. 93-16. Utah Division of Wildlife Resources, Cedar City, Utah. 81 pp.
- National Park Service. 2009a. Biological Assessment. Rehabilitation of Failing Park Sewage System Project in Bryce Canyon National Park. September 2009.
- National Park Service. 2009b. Addendum to the Biological Assessment. Rehabilitation of Failing Park Sewage System Project in Bryce Canyon National Park. January 2009.
- National Park Service. 2009c. Draft Vegetation Management Plan and Environmental Assessment. November 2009.
- Pizzimenti, J. J. 1975. Evolution of the prairie dog genus *Cynomys*. *Occasional Papers of the Museum of Natural History. University of Kansas, Lawrence, Kansas.* 39: 1-73.
- Pizzimenti, J.J., and G.D. Collier. 1975. *Cynomys parvidens*. *Mammal. Species* 56:1-2.
- Player, R. L., and P. J. Urness. 1983. Habitat Manipulation for Reestablishment of Utah Prairie Dogs in Capitol Reef National Park. *Great Basin Naturalist* 42(4): 517-523.
- Richie, M. E., and N. Brown. 2005. Interim Progress Report toward the Recovery of the Utah Prairie Dog. Unpubl. Report for U.S. Bureau of Land Management.
- Stebbins, G. 1971. The current and previous status of the Utah prairie dog in the Bryce Canyon National Park area of Utah.

- Turner, B. 1979. An evaluation of the Utah prairie dog (*Cynomys parvidens*). Unpubl. Rep. Prepared for the Utah Division of Wildlife Resources. 53 pp.
- U.S. Fish and Wildlife Service. 1973. Endangered and Threatened Wildlife and Plants; Final Rule to List the Utah Prairie Dog. 38 Federal Register 14678 (June 4, 1973).
- U.S. Fish and Wildlife Service. 1991. Utah prairie dog recovery plan. U.S. Fish and Wildlife Service, Denver, Colorado. 41 pp.
- U.S. Fish and Wildlife Service. 1984. Endangered and Threatened Wildlife and Plants; Final Rule to Reclassify the Utah Prairie Dog as Threatened, With Special Rule To Allow Regulated Taking. 49 Federal Register 22330 (May 29, 1984).
- Utah Division of Wildlife Resources. 2010a. Unpublished data from 1976 to 2009. Prairie dog count data. Transmitted to the Service on March 22, 2010.
- Utah Division of Wildlife Resources. 2010b. Unpublished data from 1976 to 2009. Prairie dog counts by landownership data. Transmitted to the Service on March 22, 2010.
- Utah Prairie Dog Recovery Implementation Team. 1997. Utah Prairie Dog Interim Conservation Strategy. Members of team in collaboration with Dr. Mark Ritchie, Utah State University.
- Wright-Smith, M.A. 1978. The ecology and social organization of *Cynomys parvidens* (Utah prairie dog) in south central Utah. MA. Thesis, Indiana University, Bloomington. 44pp.

SHPO Concurrence

This page intentionally left blank.



United States Department of the Interior
NATIONAL PARK SERVICE
BRYCE CANYON NATIONAL PARK
Highway 63, #1 Park Road
PO Box 640201
Bryce Canyon, UT 84764-0201



09-0987
RS

In reply refer to:
D2217(BRCA-DSC-114306)
Utah SHPO

Received

AUG 26 2010

Bryce Canyon National Park

CERTIFIED MAIL—Return Receipt Requested

August 3, 2010

In Reply Refer to:
D2217 (BRCA-DSC-114306 Rehabilitate Failing Park Sewage System)

Utah State Historic Preservation Office
300 S. Rio Grande Street
Salt Lake City, Utah 84101
Phone: 801/533-3555
Fax: 801/533-3503

Attention: Lori Hunsaker

Subject: Proposed National Park Service Undertaking to Rehabilitate Failing Sewage System at Bryce Canyon National Park

Dear State Historic Preservation Officer:

The purpose of this correspondence is to initiate standard Section 106 consultation (36 CFR 800.3) with your office regarding the National Park Service (NPS) proposed undertaking to rehabilitate the failing sewage system at Bryce Canyon National Park Utah. The park's existing sewage collection system has deficiencies with both condition and capacity. The sewer line is badly deteriorated and some portions of clay pipe, originally built in 1958, are deteriorating into pieces that regularly clog the system and cause raw sewage to back up, leak out of the system into the groundwater, and spill onto the ground from backed-up manholes.

The NPS is also seeking your concurrence with the Area of Potential Effect (APE) for the current undertaking and your concurrence with the NPS finding of effect.

Undertaking

The proposed project would address those elements of the system that have the most immediate need of replacement, rehabilitation, or repair. Recommended repair includes:

- Replacement of approximately 20,400 linear feet of sewer line
- Repair or replacement of approximately 90 manholes
- Installation of a liner system for three of the four existing lagoons



Received

AUG 12 2010

USHPO

- Installation of a wash station, grinder pump, and flow meter at the lagoon site
- Repair of fencing around lagoons
- Installation of a 2,500 linear foot water supply line from the visitor center to the existing dump station located at the lagoons
- Removal of the existing septic tank and leach field in the lodge area

Area of Potential Effect (APE) for Current Undertaking:

The APE for the rehabilitation of the park's aging sewage collection system encompasses an area approximately 1.9 miles long (south to north) and 0.7 miles wide (east to west). The existing and proposed system collects sewage flows from campgrounds, dorms, and housing units and other facilities. The main trunk-lines of the sewage collection system flow to the northwest and north toward the lagoon treatment system (Enclosure A).

While the park includes areas of rugged terrain and dramatic topographic features, the area serviced by the sewage collection system is characterized by relatively low topographic relief. The high elevation of the park at 7,910 feet above sea level influences climate and weather conditions, which in turn, affect operation of the sewer system and potential construction activities.

Identified Cultural Resources

In 2000 and 2001 NPS archeologists conducted an archeological survey of the Paunsaugunt Plateau (upper elevations or one-third of the park) in support of the park's ecological restoration programs. The archeological survey area is enclosed by the western park boundary and the Pink Cliffs escarpment, the east-west park boundary that crosses the Pink Cliffs rim north of Fairyland Point, and the narrow ridge extending southward from the western side of Yovimpa Pass. A total of 4,370 hectares or 10,799 acres of park land was intensively surveyed by two four-person survey crews under the supervision of a qualified archeologist over a period of two summer seasons. Survey units were investigated by parallel transects 15-meters apart. Where cultural materials or anomalies in the natural landscape were observed, the area received intensive investigation.

The APE for the current undertaking to rehabilitate the park's sewer system was included in the Paunsaugunt Plateau investigation. Archeological sites occurring either very near or within the corridor for the proposed sewer line rehabilitation include (see attachment B):

- 42GA5277 consists of a 100 x 17 meter scatter of historic Euroamerican refuse also in a southern tributary of Daves Hollow. This site may be a dump site related to the concession utility area or the Bryce Canyon Lodge. The site is determined eligible for listing on the National Register of Historic Places under criterion D because the site has yielded or has the potential to yield information important to history. The Utah SHPO concurred with this determination of eligibility. This site may be within the APE for a manhole replacement.
- 42GA5278 this site covers a 53 by 50 meter area along the western edge of Daves Hollow and consists of a pre-historic artifact scatter and the ruins of a NPS cabin. The historic component of this site, the NPS cabin ruins, represents the location of building HS-1 in the park's list of classified structures. This structure was park housing constructed in 1929 and burned in 1988. The prehistoric artifact scatter covers a 20 by 4 meter area on the east side of the site. This site has been determined eligible for the National Register under criterion A because of its association with events that have made a significant contribution to the broad patterns of American history and criterion D because of the sites potential to yield information important to prehistory or history. The Utah SHPO concurred with this determination of eligibility. The site is near the sewer line and in the location of a manhole replacement.
- 42GA5264 consists of a 162 by 90 meter dense scatter of historic Euroamerican refuse that has been determined not eligible for listing in the National Register. This determination is being re-



visited by NPS archeologists. The site is located in a meadow southwest of Bryce Canyon Lodge. The site is near the sewer line corridor in the meadow near Sunset Campground.

- 42GA5263 covers a 150 by 125 meter area and includes a dense scatter of historic refuse representing the ruins of the concession utility area (power house, garage, studio). These buildings were dismantled in 1961 and removed from this site and may have been relocated to other areas in the park. The concession buildings may have been constructed as early as 1925, and were dismantled when the park Rim Road was realigned. The site has been determined eligible for listing in the National Register under criterion D because it is likely to yield information important to history. This site is near the sewer line corridor and manhole replacements.
- 42GA5276 consists of a 72 by 23 meter pre-historic lithic scatter located in Daves Hollow. The site has been determined eligible for listing in the National Register under criterion D because it is likely to yield information important to history. This site is near the sewer line corridor.

There are two Historic Districts in Bryce Canyon National Park that are listed on the National Register of Historic Places. These historic districts are the Bryce Canyon Lodge Historic District, and the Old NPS Housing Historic District. Both of these historic districts were added to the register in 1994, both are located in the heart of the existing developed area of the park, and both are eligible for listing under criterion A and C for their association with events that have made a significant contribution to the broad patterns of American history, and criterion C because they are representative of NPS rustic design. In 2006 two Cultural Landscape Reports (CLRs) were completed by the NPS for these historic districts. Bryce Canyon Lodge was built between 1924 and 1925 using local materials and construction techniques and is representative of the development of concession facilities and partnerships between the NPS and the Union Pacific Railroad. The period of significance for Bryce Canyon Lodge is 1924 through 1944 an era characterized by the development of visitor facilities by the concessioner and the NPS. The period of significance for the NPS Housing District is 1932 through 1944 characterized by work programs established during the New Deal era in American History.

The National Park Service is aware that special affiliated traditional groups may have concerns related to Bryce Canyon National Park sewage system rehabilitation. XX tribes are culturally affiliated or associated with the park and the NPS has and continues to consult with affiliated and associated tribes. This consultation is intended to ensure that mutually held goals for management of important natural and cultural resources are met. To date no ethnographic cultural landscapes have been identified within the APE for this undertaking.

Finding of Effect

There are known archeological features near and in the APE that meet eligibility criteria for listing in the National Register of Historic Places. Three sites are either in or very close to the APE for the project. Because it is a NPS goal to avoid impacts to resources in our care, alternative installation techniques such as pipe-bursting or directional drilling could be used in areas where known resources, including archeological resources, are present. Ground disturbing activities in archeologically sensitive areas would be monitored by an archeologist meeting Secretary of the Interior's standards.

Sewer line replacement would also occur within Bryce Canyon Lodge Historic District and the Old NPS Housing Historic District. The sewer system rehabilitation work in these areas would be primarily accomplished by open cut trenching to replace damaged or deteriorated infrastructure. New pipe would be installed in trenches adjacent to the existing sewer line alignment. Although there would be disruption of the historic scene within the historic districts during construction, following construction the landscapes within the historic districts would be restored. Sewer line replacement within the park's historic districts would not represent a change to the existing landscapes or structures of the historic districts such that the overall integrity of the historic districts or cultural landscapes at the park would be degraded and the



eligibility of the historic districts and cultural landscapes at the park for listing in the National Register would not be in jeopardy.

After applying the Advisory Council on Historic Preservation's regulations for the protection of historic properties 36 CFR 800 the NPS finds that there would be an effect to historic properties that meet eligibility requirements for listing on the National Register of Historic Places but that this effect would not be adverse.

We hope that you can concur with the delineation of the APE and identification of historic properties, and with the NPS finding of no adverse effect to historic properties and for your convenience have provided concurrence lines below.

If you have any comments, or if you would like to schedule a meeting to further discuss the proposed project at this time, please contact Juanita Bonnifield at the above address or by telephone at (435) 834-4752. Your continued participation in the planning process for this project is important to us and I look forward to hearing from you.

Sincerely,

Sean Eagan acting sup.

8/8/10

Kathleen Gonder, Acting Superintendent
Bryce Canyon National Park

Enclosure:

Attachment A. Map of Existing Sewer System (APE)
Attachment B. Ape in relationship to known archeological sites

cc:

John Fowler, Executive Director
Advisory Council on Historic Preservation
Old Post Office Building
1100 Pennsylvania Avenue NW, Suite 809
Washington, DC 20004

APE

[Signature]
Concur
Historic Preservation Officer, Utah Office of Historic Preservation

8-19-2010

Date

No Adverse Effect to Historic Properties

[Signature]
Concur
Historic Preservation Officer, Utah Office of Historic Preservation

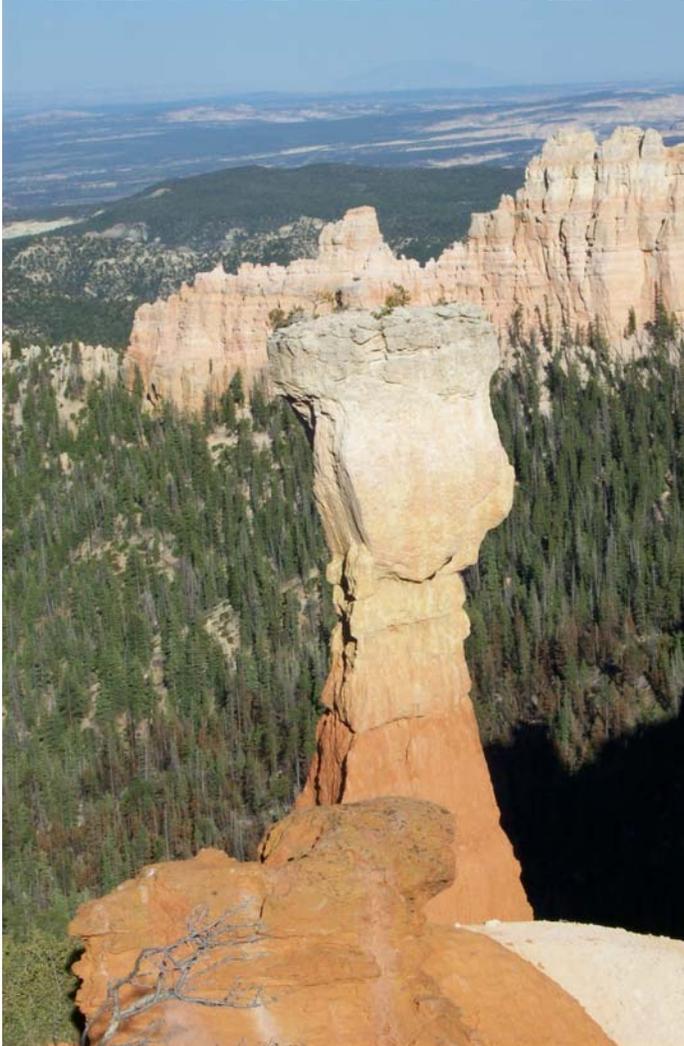
8-19-2010

Date

Bcc:

NPS - BRCA Bonnifield
NPS - DSC Shields, Davis





Rehabilitate Failing Park Sewage System Environmental Assessment

Appendix B Impairment

This page intentionally left blank.

APPENDIX B

IMPAIRMENT

National Park Service (NPS) *2006 Management Policies* (NPS 2006) requires analysis of potential effects to determine whether or not actions would impair park resources. The fundamental purpose of the national park system, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. NPS managers must always seek ways to avoid, or to minimize to the greatest degree practicable, adversely impacting park resources and values.

However, the laws do give the NPS the management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the NPS the management discretion to allow certain impacts within park, that discretion is limited by the statutory requirement that the NPS must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of these resources or values. An impact to any park resource or value may, but does not necessarily, constitute an impairment, but an impact would be more likely to constitute an impairment when there is a major or severe adverse effect upon a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- Key to the natural or cultural integrity of the park; or
- Identified as a goal in the park's general management plan or other relevant NPS planning documents.

An impact would be less likely to constitute an impairment if it is an unavoidable result of an action necessary to pursue or restore the integrity of park resources or values and it cannot be further mitigated.

The park resources and values that are subject to the no-impairment standard include:

- The park's scenery, natural and historic objects, and wildlife, and the processes and conditions that sustain them, including, to the extent present in the park: the ecological, biological, and physical processes that created the park and continue to act upon it; scenic features; natural visibility, both in daytime and at night; natural landscapes; natural soundscapes and smells; water and air resources; soils; geological resources; paleontological resources; archeological resources; cultural landscapes; ethnographic resources; historic and prehistoric sites, structures, and objects; museum collections; and native plants and animals;
- Appropriate opportunities to experience enjoyment of the above resources, to the extent that can be done without impairing them;
- The park's role in contributing to the national dignity, the high public value and integrity, and the superlative environmental quality of the national park system, and the benefit and inspiration provided to the American people by the national park system; and
- Any additional attributes encompassed by the specific values and purposes for which the park was established.

Impairment findings are not necessary for visitor use and experience, socioeconomics, public health and safety, environmental justice, land use, and park operations, because impairment findings relate back to park resources and values, and these impact areas are not generally considered park resources or values according to the Organic Act, and cannot be impaired in the same way that an action can impair park resources and values.

Impairment may result from NPS activities in managing the park, visitor activities, or activities undertaken by concessioners, contractors, and others operating in the park. The NPS's threshold for considering whether there could be an impairment is based on whether an action would have major (or significant) effects. The following analysis evaluates whether or not the applicable resources carried forward in this document would be impaired by the preferred alternative.

- Threatened and Endangered Species (Utah Prairie Dog Only) – Utah Prairie Dogs (UPDs) (*Cynomys parvidens*), which are federally threatened, have colonized areas within the open, grassy meadows of the central and northern portions of Bryce Canyon National Park (BRCA). At the present time there are eight active UPD colonies (in approximately 400 acres) within the park. Three UPD colonies (Dave's Hollow West, Historic Housing, and the Mixing Circle intersection) consisting of approximately 3.4 total acres, are located in areas of proposed sewer line replacement. Using the above criteria, UPD are a resource that is key to the natural integrity of the park. Sewer rehabilitation is an action necessary to restore the integrity of park resources. Because the preferred alternative would result in only site-specific, short-term, and minor adverse impacts during construction there would be no impairment to UPD. A final Biological Opinion that the proposed action and the cumulative effects are not likely to jeopardize the continued existence of the UPD was submitted by USFWS to BRCA on May 11, 2010. The Biological Opinion is included in Appendix A.
- Wildlife – The diverse habitats within BRCA support a variety of wildlife species. The park is home to four species of amphibians, 11 reptile species, 59 mammal species, and 175 bird species. Wildlife would be temporarily affected by construction crews and their equipment. Using the above criteria, wildlife are a resource that is key to the natural integrity of the park. Sewer rehabilitation is an action necessary to restore the integrity of park resources. Because the preferred alternative would result in only site-specific, short-term, and negligible to minor adverse impacts during construction, there would be no impairment to wildlife.
- Vegetation – Five major vegetation communities occur at BRCA: pinyon-juniper woodlands, breaks communities, ponderosa pine forests, mountain grasslands, and fir-spruce-aspen forests. Ponderosa pine forest and mountain grassland communities are located within the proposed Project area. During construction, there would be a potential introduction of invasive species from contaminated soils, construction equipment, and vehicles driving into the park. Trenches would be cut through mountain grassland communities and some ponderosa pine forest. Using the above criteria, vegetation is a resource that is key to the natural integrity of the park. Sewer rehabilitation is an action necessary to restore the integrity of park resources. Because the preferred alternative would result in only site-specific, short and long-term, and negligible to minor adverse impacts, there would be no impairment to vegetation.

In addition, mitigation measures for these resources would further lessen the degree of impact to and help promote the protection of these resources. Specifically, mitigation measures provided in the USFWS Biological Opinion (Appendix B) and those listed within this EA would lessen impacts to UPD and UPD habitat. Construction in the UPD habitat would not occur until after June 15, after the UPD pups have emerged from the burrows, and be completed by August 31, when the UPD pre-hibernation period begins. In addition, BRCA would ensure a qualified biologist would be onsite during all excavation activities. If construction activities are scheduled within the nesting season for birds protected under the MBTA, generally April 1 through July 15, pre-construction surveys would be conducted for nests. No construction activities

would be conducted in identified nesting areas until the young have fledged. To protect vegetation, weed control methods would be implemented to minimize the introduction of noxious weeds. Construction equipment would be washed prior to entering the work site for the first time. Since the lagoon areas contain noxious weed, dirt from the lagoon areas would not be stockpiled or transported to other areas of the park. Revegetation efforts after construction activities would strive to reconstruct the natural spacing, abundance, and diversity of native plant species using seeds native to BRCA.

In conclusion, as guided by this analysis, good science and scholarship, advice from subject matter experts and others who have relevant knowledge and experience, and the results of public involvement activities, it is the Superintendent's professional judgment that there would be no impairment of park resources and values from implementation of the preferred alternative.