



National Park Service
U.S. Department of the Interior
Yellowstone National Park
Idaho, Montana, Wyoming

Canyon Rim Overlooks & Trails Rehabilitation Environmental Assessment

August, 2015



Canyon Rim Overlooks and Trails Rehabilitation

Environmental Assessment

Summary

Yellowstone National Park (Park) proposes to rehabilitate a number of existing overlooks and trails situated along the rim of the Grand Canyon of the Yellowstone River. These overlooks and trails are located on both the north and south rims of the canyon. Areas to be rehabilitated include: Uncle Tom's, Brink of the Upper Falls, Brink of the Lower Falls, Red Rock Point, Inspiration Point, Sunset Point, Crystal Falls, and portions of the North and South Rim Trails. Parking areas at Brink of the Upper Falls and Uncle Tom's would be reconfigured slightly to improve/increase parking and pedestrian circulation efficiency and parking capacity. Many of the parking areas and overlooks were rehabilitated in 2008 including Artist's Point, and this project would carry on this effort for the remaining areas located along the Canyon Rim.

The proposal to rehabilitate the Canyon overlooks and trails is needed in part to address aged and failing infrastructure, improve the visitor experience, and reduce the safety risks associated with the use of this area. In particular, walking surfaces are uneven and full of potholes and erosion has undermined asphalt pavement and created many potholes on the trails. Log rails on many of the bridges and along the trail are rotted and need replaced. Gravel and debris on steep sections of asphalt makes for a treacherous situation while descending some trail sections. The proposed rehabilitation project would minimize these health and safety risks, and would also improve the visitor experience of using this area.

This Environmental Assessment (EA) evaluates two alternatives: a no action alternative and an action alternative. The no action alternative describes the current condition if no improvements of rehabilitation of existing facilities were completed. The action alternative addresses the rehabilitation of trails, overlooks, parking areas, restroom facilities, rails, stone retaining walls, trail edging and signage in the area.

This EA has been prepared in compliance with the National Environmental Policy Act (NEPA) to provide the decision-making framework that 1) analyzes a reasonable range of alternatives to meet objectives of the proposal, 2) evaluates potential issues and impacts to the Park's resources and values, and 3) identifies mitigation measures to lessen the degree or extent of these impacts. Resource topics included in this document because the resultant impacts may be greater-than-minor include: soils; geothermal resources; vegetation, rare plants, and wetlands; wildlife; cultural resources; human health and safety; visitor use and experience; and park operations. All other resource topics were dismissed because the project would result in negligible or minor effects to those resources. No major effects are anticipated as a result of this project. Public scoping was conducted to assist with the development of this document and comments were received, mostly in support of the proposed project, while others expressed that "improvements" might diminish the visitor experience.

Public Comment

If you wish to comment on the EA, you may post comments online at <http://parkplanning.nps.gov/CanyonOverlooks> or mail comments to: Superintendent; Yellowstone National Park, P.O. Box 168, Yellowstone National Park, Wyoming 82190, or hand-deliver during normal business hours to the mailroom in the park's Administration Building. This EA 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. Comments will not be accepted by fax, email, or in any other way than those specified above. Bulk comments in any format (hard copy or electronic) submitted on behalf of others will not be accepted.

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PURPOSE AND NEED

Introduction

Yellowstone National Park encompasses 2.2 million acres and is located primarily in the northwest corner of Wyoming, with portions extending into southwestern Montana and southeastern Idaho. The park is the core of the Greater Yellowstone Area (GYA), an area of approximately 18-million-acres that includes Grand Teton National Park and John D. Rockefeller Jr. Memorial Parkway to the south, seven national forests, three national wildlife refuges, three American Indian reservations, state lands, towns, and private property. The GYA is the largest and most nearly intact temperate ecosystem in the contiguous United States. Established by an Act of Congress on March 1, 1872, YNP was designated as the first national park in the world, and as a United Nations Biosphere Reserve and a World Heritage Site nearly 100 years later. Through subsequent legislation and administrative guidelines, including the *NPS Management Policies 2006*, Yellowstone's fundamental purpose continues to be the preservation of its cultural and natural resources.

The Grand Canyon of the Yellowstone expresses the park's complex geologic history in dramatic colors and shapes. Puffs of steam mark active thermal features in the canyon's walls. The Upper and Lower Falls of the Yellowstone River add to the grandeur of this unique natural treasure. Visitors experience the Canyon from a variety of overlooks, at different times of day, and at different seasons (NPS 2000).

The Grand Canyon of the Yellowstone was first introduced to the American public through the artistry in the painting of Thomas Moran and the photographs of William Henry Jackson. The significance of view and the forethought of preserving this natural wonder along the many other significant geologic features of the Yellowstone area culminated in the creation of our nation's first National Park.

The Canyon trails and overlooks use this basic tenant and philosophy of view preservation while addressing the challenges of managing visitor experience and safety for the millions of people who visit these sites.

The visitor experience is a central element of Yellowstone National Park's mission, since the Park was established over 140 years ago. Early Park architects and engineers were challenged with creating tourist facilities in concert with nature, through the use of local materials such as stones and logs, known today as "rustic-style architecture."

As a result, ten overlooks and five miles of connecting pathways were etched into the rims of the Grand Canyon of the Yellowstone River in the 1930s in rustic style architecture. Over time, the harsh Yellowstone weather, erosion, and visitation have taken their toll, and several of these magnificent areas might close.

Three overlooks have been restored: Artist Point, Lookout Point, and Grandview Point. The remaining seven overlooks – two at Uncle Tom's Overlook, the Brink of the Upper Falls, the Brink of the Lower Falls, Inspiration Point, Red Rock Point, and Crystal Falls – and the connecting trails are in need of significant rehabilitation or replacement. In order to restore these overlooks and trails to their former grandeur, significant resources are necessary, including:

- Creating safe, accessible viewing areas with more informational signage;
- Replacing and rehabilitating deteriorating historic elements;

- Utilizing rustic architecture and natural materials to integrate the infrastructure into the spires and Canyon cliff;
- Connecting the historic overlooks along the North and South rims with new walkways; and
- Rerouting trails away from dangerous areas with stone and boulder barriers.

The purpose of this Environmental Assessment (EA) is to examine the environmental impacts associated with the proposal to rehabilitate the overlooks and associated trails located on the canyon rim. The overlooks and trails to be rehabilitated are all existing. In order to improve safety, visitor experience, and accessibility while retaining the historic integrity of the area, some changes would be considered. Potential changes include: short re-routes and trail alignment shifts, slight expansion of overlook viewing platforms, additional view locations, and closing some locations would all be considered. This EA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, regulations of the Council on Environmental Quality (CEQ) (40 CFR §1508.9), and NPS Director's Order (DO)-12 (*Conservation Planning, Environmental Impact Analysis, and Decision-Making*).

Background and Need

Yellowstone National Park by its establishment act of March 1, 1872 (17 Stat. 32), was “dedicated and set apart as a public park or pleasuring-ground for the benefit and enjoyment of the people” and “for the preservation, from injury or spoliation, of all timber, mineral deposits, natural curiosities, or wonders...and their retention in their natural condition.”

The 1973 Yellowstone Master Plan translates this original purpose statement as: “To perpetuate the natural ecosystems within the park in as near pristine conditions as possible for their inspirational, educational, cultural, and scientific values for this and future generations.

Further interpretation of the Park's purpose is stated in a Foundation for Planning Statement derived in 2004 by a joint effort of Yellowstone's park management team as follows:

The world's first national park, Yellowstone:

- preserves geologic wonders, including the world's most extraordinary collection of geysers and hot springs and the underlying volcanic activity that sustains them;
- preserves abundant and diverse wildlife in one of the largest remaining intact wild ecosystems on earth, supporting unparalleled biodiversity;
- preserves an 11,000-year-old continuum of human history, including the sites, structures, and events that reflect our shared heritage; and
- provides for the benefit, enjoyment, education and inspiration of this and future generations.

A goal established by Yellowstone National Park in its Strategic Plan (NPS 2000a) is to “provide for the public use and enjoyment and the visitor experience in Yellowstone National Park.”

There are two defining parts to this particular goal. The first stating that “visitors to Yellowstone National Park safely enjoy and are satisfied with the availability, accessibility, diversity, and quality of park facilities, services, and appropriate recreational opportunities.” The second stating that “park visitors and the general public understand and appreciate the preservation of Yellowstone National Park and its resources for this and future generations.”

Park roads, trail, overlooks, and associated facilities such as those in Yellowstone National Park, are intended to accommodate park visitors safely and efficiently while enhancing visitor

experiences. The National Park Service is responsible for constructing, operating, and maintaining its facilities in a safe and aesthetically pleasing condition to the greatest extent possible.

In keeping with this mandate, the National Park Service, in cooperation with the Federal Highway Administration, is continuing a process of rehabilitating the overlooks, trails, and parking areas situated along the Canyon Rim of the Grand Canyon of the Yellowstone River. Projects such as these within Yellowstone generally take many years to complete because of, resource concerns, limited funding, a relatively short construction season and, to the extent possible, the park's desire to allow continued visitor use near the construction zones as much as possible.

This proposed project would occur in two phases. The first phase of work would include overlook and trail work at (Brink of the Upper Falls, Inspiration Point, and Uncle Tom's; parking area rehabilitation at Brink of the Upper Falls and Uncle Tom's (including Sunset Point and Crystal Falls); and widening and repaving the access road into Brink of the Upper Falls. Work on the first phase is proposed to begin in early 2016 and be completed in two years, subject to availability of funding. Additional phases would be scheduled in future years as funding permits. This Environmental Assessment, "Canyon Rim Overlooks and Trails Rehabilitation" describes the proposed project, the alternatives considered, and the associated environmental effects. The proposals in this document are based on standards and guidelines used when the park rehabilitated the trails and overlooks at Artist's Point, Grandview, and Lookout Point in 2009. This environmental assessment evaluates the effects of rehabilitating the remaining overlooks, trails, and parking areas along the Canyon Rim that were not rehabilitated in the 2009 project.

The Canyon Rim Drives parallel the north and south rims of the Grand Canyon of the Yellowstone River just east and south of the Canyon developed area. These rim drives are very popular with the visiting public, often exceeding capacity, at the parking areas, during the busy summer months. The Canyon area roads provide access to trailheads and overlooks, which offer views into the Grand Canyon of the Yellowstone River, and the Upper and Lower Falls (see Project Location Map – Figure 1).



At an elevation of approximately 7,100 feet, the rims are characterized by moderate to steep slopes dropping to the Yellowstone River. Viewing overlooks into the canyon occur at: Inspiration Point, Grandview, Lookout Point, Upper and Lower Falls, Uncle Tom's Trail, and Artist's Point with various trail access points and viewing opportunities located along the Canyon Rim Trails.

Park Visitation:

Recreational visitation to YNP has increased in the last 15 years, from 2,889,513 in 1997 to 3,513,484 in 2014 (NPS, 2014c). The summer months (June, July, and August) are the primary visitation season in Yellowstone, although the spring and fall have grown in popularity. During the peak season, facilities such as campgrounds, lodges, visitor centers, restaurants, service stations, and shops are used at or beyond capacity.

More than 75 percent of visitor use within the park is concentrated in the major developed areas. The primary recreational activities that visitors participate in include viewing wildlife, photography, walking, and exploring visitor centers. Other activities include fishing, camping, hiking, horseback riding, and boating.

Engineering:

Rehabilitation of the Canyon Rim overlooks and trails presents engineering challenges due to their proximity to the Canyon edge, mountainous terrain and weather. Erosion and failure of walls on the steep slopes adjacent to these areas has started to undermine the overlook and trail structures in some areas. Some shifts in the alignment and wall rehabilitation would likely be required to stabilize some of these structures. Drainage systems along the trails need to be repaired to ensure water is moving positively away from trails, not onto them or across them. Due to the elevation and location, the winters in the Canyon area are long, leaving only a short season for construction.

Some minor enlargement of parking areas at Brink of the Upper Falls and Uncle Tom's would occur, as would slight widening to 24 feet of the Brink of the Upper Falls access road. Both of these parking areas are presently not designed to accommodate large or oversized vehicles, or vehicles towing trailers. Parking numbers and turning radii are insufficient throughout the area and contribute to congestion during peak seasons, resulting in deteriorated curb structures, impacts to surrounding vegetation, pedestrian vs. vehicular conflicts and ineffective traffic flow.

Site Features:

Features within the visitor use areas along the Canyon Rim Drives is a collaboration of improvised techniques which have evolved to address social trails, informal parking, erosion, revegetation, seating, repairs, and other needs. Part of the need for the Canyon Rim overlooks and trails rehabilitation project is to restore the rustic character of the area by replacing rotting log rails, failing masonry posts and walls, dangerous and uneven walking surfaces, curbing, fencing, and safety barriers. The project designs would be consistent with the concepts of the 1927 *Yellowstone National Park Master Plan's* "sacred area" – defined as, a designated 1/8 mile around the perimeter of the canyon rim where facilities were removed in favor of simple overlooks, roads and trails that accommodated quiet contemplation of magnificent canyon views. Facilities in the "sacred area" deemed "appropriate", blend into the surrounding landscape following NPS rustic architectural principles. The rehabilitation and replacement of modern facilities would follow these same rustic principles.

Overlooks, Trails, Parking Areas, and Access Roads:

The project area includes: Brink of the Upper Falls, Inspiration Point, Uncle Tom's, Brink of the Lower Falls, Red Rock Point, Sunset Point, Crystal Falls, and the North and South Rim Trails.

Way-finding and orientation:

Due to the configuration of the Canyon roads, parking areas, and trails, visitors are generally confused and disoriented; numerous signs have installed to assist visitors in locating and identifying trails and facilities. The intent of the proposed design is to allow visitors to intuitively become oriented to each area and to receive the knowledge needed to evaluate the various experiences available to them. The current lack of information keeps visitors from visually orienting themselves, and therefore they are less likely to explore the area.

Brink of the Upper Falls Access Road: Turning radiuses are tight for oversized vehicles and culverts need repairs. Turning radiuses within the parking areas need to be increased to

minimize impacts to the road structure and surrounding vegetation. Oversized vehicle and bus parking is not designated and needs to be clearly marked to facilitate traffic flow. Accessibility for pedestrians and vehicle parking should be improved.

Social trails throughout the Uncle Tom's area have denuded areas of vegetation and resulted in improvised pedestrian control features such as fences, boardwalk, benches and signage. Access to restroom facilities and the viewing platform for people with disabilities is substandard.

The overlooks at the canyon are sites that are eligible for listing on the National Register of Historic Places. Features contributing to their eligibility are in need of repair or rehabilitation. Erosion is the leading cause for instability and is undermining masonry walls, asphalt trails, and concrete stairways. Informal trails and viewing areas skirting the edges of these viewing areas have led to trampling of the vegetation and are an additional source of erosion. Non-contributing features such as metal handrails and chain-link fencing need to be replaced with more compatible features. In addition, the transition area between the parking areas and viewing areas needs to be improved to better facilitate access for people with disabilities.

A Design Competition

During August of 2014, an interdisciplinary team of National Park Service employees met for the purpose of developing project goals and arranging a design competition. This meeting resulted in the definition of project objectives as described in the *Purpose and Need*, provided the basis for a design completion for a firm that would ultimately design the project that would rehabilitate the historic Canyon Rim Overlooks and trails. Five firms were ultimately chosen to participate in the completion and meet the following outline for success:

The objective of the competition was to choose the appropriate architectural landscape design concept and to select the design firm that would develop the construction documents for the designated overlooks and trails of the North and South Rim of the Grand Canyon of the Yellowstone. The firms needed to develop a plan that would allow the overlooks and trails to continue to offer a visitor experience as a central element of Yellowstone National Park's mission. Early Park architects and engineers were challenged with creating tourist facilities in concert with nature, through the use of local materials such as stones and logs, known today as "rustic-style architecture." The competing firms were expected to do the same. The areas to be considered in the design were Uncle Tom's Overlook, the Brinks of the Upper Falls, the Brinks of the Lower Falls, Inspiration Point, Red Rock Point, and Crystal Falls -- and their connecting trails. In order to restore these overlooks and trails to their former grandeur, significant resources are necessary, including:

- Creating safe, accessible viewing areas with more informational signage;
- Replacing and rehabilitating deteriorating historic elements;
- Utilizing rustic architecture and natural materials to integrate the infrastructure into the spires and Canyon cliff;
- Connecting the historic overlooks along the North and South rims with new walkways; and
- Rerouting trails away from dangerous areas with stone and boulder barriers.

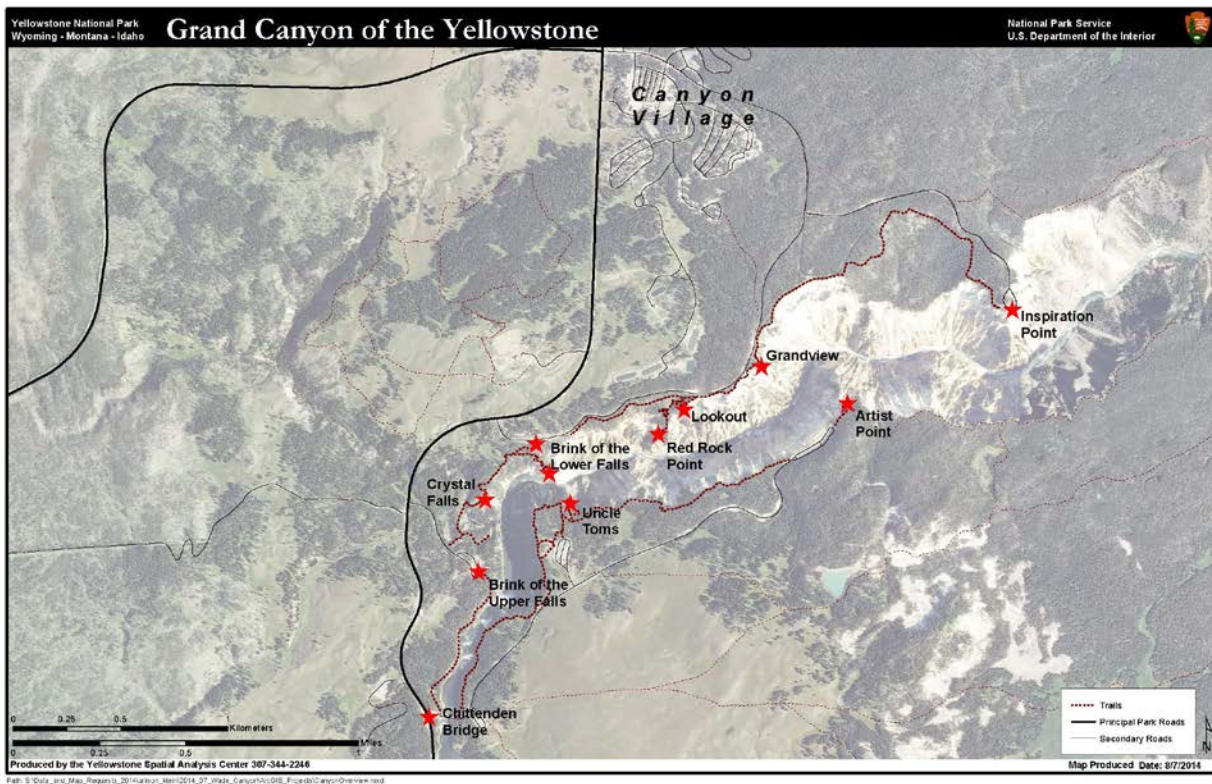
A Selection Committee apprised of Yellowstone National Park Leaders, Yellowstone Park Foundation Leaders and a select group of Design Professionals judged the completion through an anonymous open jury. OTAK, a design firm from Redmond, Washington won the opportunity to further the design. OTAK's schematic design is included as Appendix C of this EA.

Purpose and Objectives

The purpose of the proposal is to provide a safe, healthy, and functional and efficient system of trails and overlooks for all who visit the Grand Canyon of the Yellowstone area of the park while complying with the goals and objectives of current plans and policy. The project is needed to accomplish the following objectives:

1. Retain the historic integrity of the area.
2. Provide a safe and healthy experience for those venturing for a view of the canyon that meets current health and safety standards and structural requirements.
3. Improve the accessibility of the overlooks and associated trails.
4. Repair and maintain existing historic masonry walls, rails, and surfaces of the overlooks and trails.
5. Better direct pedestrian flow and provide improved definition to the edges of pathways and trails.

Figure 1 – Project Location



Relationship to Other Plans and Policies

Current plans and policy that pertain to this proposal include the Park's 1973 *Master Plan* (MP) (NPS 1973), the 1992 *Parkwide Road Improvement Plan* (NPS 1992), and the 2006 *Management Policies* (NPS 2006). Following is more information on how this proposal meets the goals and objectives of these plans and policies:

- **Yellowstone National Park Master Plan (NPS 1974)**—This plan on page 25 discusses visitor protection as follows: Challenge in some degree is a fundamental ingredient of a wilderness experience. The Service therefore must come to see its role in visitor protection as on that features varied levels of risk and hardship, rather than one that promotes ease

and comfort. The visitor must be made to see that if Yellowstone's unique wilderness essence is to survive, he must be willing to accept nature on her own terms, rather than his own, contrived within the framework of contemporary ethics.

Before such a concept can be implemented, however, better integration of the design and managements professions with the natural and behavioral sciences is essential. For the present, however, the best hope is to separate the visitor from exposure to real hazards, especially those he is unaccustomed to experiencing at home.

- **Parkwide Road Improvement Plan EA (NPS 1992)** — This plan calls for a long-term program of road improvement consisting of a combination of major reconstruction projects, resurfacing, restoration, and rehabilitation projects needed to preserve and extend the service life of principal park roads, and to enhance their safety. The Canyon Rim Parking area improvements would be consistent with the intent of this plan.
- **NPS Management Policies 2006 (NPS 2006)** — Management decisions regarding transportation facilities require a full, interdisciplinary consideration of alternatives and a full understanding of their consequences. The Service must find transportation solutions that will preserve the natural and cultural resources in its care while providing a high-quality visitor experience.

8.2.4 Accessibility for Persons with Disabilities – All reasonable efforts will be undertaken to make NPS facilities, programs, and services accessible to and usable by all people, including those with disabilities.

9.1.2 Accessibility for Persons with Disabilities - Accessibility will be provided consistent with preserving park resources and providing visitor safety and high-quality visitor experiences. In most instances, the degree of accessibility provided will be proportionately related to the degree of human-made modifications in the area surrounding the facility and the importance of the facility to people visiting or working the park.

1.9.5.2 Facilities – The National Park Service will provide visitor and administrative facilities that are necessary, appropriate, and consistent with the conservation of park resources and values. Facilities will be harmonious with park resources, compatible with natural processes, esthetically pleasing, functional, energy- and water-efficient, cost-effective, universally designed, and as welcoming as possible to all segments of the population.

Scoping

External scoping was initiated with the distribution of a scoping letter to inform the public of the proposal to rehabilitate the overlooks, trails, and some associated parking along the rim of the Grand Canyon of the Yellowstone River and to generate input on the preparation of this environmental assessment. This effort was initiated with the distribution of a scoping letter, in September 2014. In addition, the scoping letter was posted on the NPS Planning, Environment, and Public Comment (PEPC) website. A press release was also sent to local news organizations and the public was given until October 2014 to comment on the project. Comments included topics such as the poor condition of existing infrastructure, a desire to improve accessibility, and cautionary statements to avoid degrading the natural visitor experience. During the 33-day scoping period, approximately twenty public responses were received. The remaining responses included some in favor of the project, some opposed to the project. During tribal consultation, no objection to the proposed project was received. More information regarding external scoping and Native American consultation can be found in *Consultation and Coordination*.

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.

Yellowstone National Park conducted internal scoping with appropriate National Park Service staff, as described in more detail in the *Consultation and Coordination* chapter. The park also conducted external scoping with the public and interested/affected groups and Native American consultation.

Impact Topics Retained For Further Analysis

Impact topics for this project were identified on the basis of federal laws, regulations, and orders; 2006 *Management Policies*; and NPS knowledge of resources at the Park. Impact topics that are carried forward for further analysis in this EA include:

- Soils
- Vegetation, Rare Plants, and Wetlands
- Wildlife
- Threatened and Endangered Species
- Cultural Resources
- Human Health and Safety
- Visitor use and Experience
- Park Operations

Impact Topics Dismissed From Further Analysis

In this section, NPS takes a “hard look” at all potential impacts by considering the direct, indirect, and cumulative effects of the proposed action on the environment, along with connected and cumulative actions. Impacts are described in terms of context and duration. The context or extent of the impact is described as localized or widespread. The duration of impacts is described as short-term, ranging from days to three years in duration, or long-term, extending up to 20 years or longer. The intensity and type of impact is described as negligible, minor, moderate, or major, and as beneficial or adverse. The NPS equates “major” effects as “significant” effects. The identification of “major” effects would trigger the need for an EIS. Where the intensity of an impact could be described quantitatively, the numerical data is presented; however, most impact analyses are qualitative and use best professional judgment in making the assessment.

The NPS defines “measurable” impacts as moderate or greater effects. It equates “no measurable effects” as minor or less effects. “No measurable effect” is used by NPS in determining if a categorical exclusion applies or if impact topics may be dismissed from further evaluation in an EA or EIS. The use of “no measurable effects” in this EA pertains to whether NPS dismisses an impact topic from further detailed evaluation in the EA. The reason NPS uses “no measurable effects” to determine whether impact topics are dismissed from further evaluation is to concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail in accordance with CEQ regulations at 1500.1(b).

In this section of the EA, 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, or
- 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.

Due to there being no effect or no measurable effects, there would either be no contribution towards cumulative effects or the contribution would be low. For each issue or topic presented

below, if the resource is found in the analysis area or the issue is applicable to the proposal, then a limited analysis of direct and indirect, and cumulative effects is presented.

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 Management Policies 2006* and Director's Order 77-2 *Floodplain Management* will strive to preserve floodplain values and minimize hazardous floodplain conditions. According to Director's Order 77-2 *Floodplain Management*, certain construction within a 100-year floodplain requires preparation of a statement of findings for floodplains. The project area for the proposed project is not within a 100-year floodplain; therefore, a statement of findings for floodplains will not be prepared. Because there are no floodplains in the project area, this topic has been dismissed from further analysis.

Water Resources

The Clean Water Act establishes the basic structure for regulating discharges of pollutants into the waters of the United States and for regulating water quality standards for surface waters. The purpose of the Clean Water Act is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." National Park Service's 2006 Management Policies require protection of water quality consistent with the Clean Water Act and state that NPS will perpetuate surface waters and ground-waters as integral components of park aquatic and terrestrial ecosystems.

The proposed project does contain a few small creeks though is mostly dry, except for periodic runoff during storm events. Water quality, water quantity, and drinking water are not expected to be affected by the project. All current creek crossings are currently bridged with small pedestrian bridges on foot trails. Any rehabilitation activities on these bridges would avoid work below the high water line. To further assist with erosion control and water quality, disturbed areas would be revegetated and re-contoured if needed following construction.

Water pumped from the Yellowstone or Gibbon rivers for use in dust control, aggregate washing, or in asphalt production would be limited in quantity and would have imperceptible effects on streamflow, and no reductions in water quality. The proposed action would result in negligible effects to water resources. Because these effects are minor or less in degree, this topic is dismissed from further analysis in this document.

Geothermal Resources

Yellowstone contains three-fifths of the world's geysers and countless examples of other geothermal features such as hot springs, travertine terraces, mud pots, and fumaroles. Thermal areas influence Yellowstone's flora and fauna in the winter. Hot water creates microclimates that allow certain plants and insects to remain active and growing. Hot springs flowing into lakes and rivers keep some waters from freezing, increasing habitat for waterfowl and bald eagles during the winter. The Canyon development occurs within the Yellowstone caldera, but there are no geothermal features within this development. Geothermal areas near the development include Washburn Hot Springs 6 kilometers (4 miles) north of Canyon, Mud Volcano 15 kilometers (10 miles) South of Canyon. There are also geothermal and hydrothermal resources in the Grand Canyon of the Yellowstone River. However, this project would not affect these resources and so this topic was dismissed from consideration.

Cultural Resources

Archeological Resources

In addition to the National Historic Preservation Act, NPS Director's Order-28A Archeology affirms a long-term commitment to the appropriate investigation, documentation, preservation, interpretation, and protection of archeological resources inside units of the NPS. Archeological resources are nonrenewable and irreplaceable, so it is important that all management decisions and activities throughout the NPS reflect a commitment to the conservation of archeological resources as elements of our national heritage.

NPS completed archeological inventory of the area of potential effect in order to document any sites present and to determine site eligibility to the National Register of Historic Places. Prehistoric archeological sites exist in the Canyon rim drives area to a minor extent, but the area contains archeological remains of early historic period developments. Archival research was conducted prior to archeological investigations in to facilitate identifying buried building foundations.

Much of the project area had existing inventories and site determinations of eligibility. For those areas not previously surveyed, new inventories were completed in 2015, including surface survey and sub-surface testing on a previously identified but unevaluated site. As a result of these investigations, NPS has determined that no sites eligible for listing on the National Register of Historic Places will be adversely impacted. Because no impacts greater than minor will occur, this topic is dismissed from further analysis.

Ethnographic Resources

Tribal contacts (76 persons) of all 26 Native American Tribes associated with Yellowstone National Park were individually contacted in the initial scoping stage of this project to request information about any ethnographic concerns they may have about this undertaking. To date, no concerns or additional information about ethnographic concerns in the project area have been received by the park. An individual letter to each of the tribes will also be sent with the Environmental Assessment providing an additional opportunity to comment.

Yellowstone National Park has previously completed an Ethnographic Inventory, *American Indians and Yellowstone National Park: A Documentary Overview*, Nabokov and Loendorf, 2002, and further developed an Ethnographic Resource Inventory (ERI) for use when undertakings are proposed.

A variety of common plants found throughout the Park have been identified as having been used for food, medicinal and other purposes, many of which are still used today. Some of the plants are located near the project area and include berries, roots, greens, pine nuts, seeds, bitterroot, chokecherries, wild carrots, wild onions, sage, and mint. Medicinal plants such as sage, "cedar" (Juniper), yarrow, fir, balsam, and mint were gathered and used in teas and to treat bruises, cuts, sores, infections, headaches, and toothaches. Juniper "cedar" was used for purification, prayer, and curing. All of the plants identified are common and are plentiful in many locations within and outside the park.

Similarly, a wide variety of animal resources have played a large role in the subsistence practices of many Native American people. These animals, such as bison, bear, big horn sheep, elk, antelope, deer, rabbit, and a variety of other smaller mammals are found throughout the park and outside the park in all directions. There are no unique concentrations of ethnographically used plants or animals within the Canyon Rim area. Therefore, this topic has been dismissed from further analysis.

Cultural Landscapes

According to NPS's Director's Order-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. A cultural landscape inventory (CLI) was completed for the Artist's Point Overlook, the only documented cultural landscape within the area of potential effect (APE). The Artist's Point Overlook was rehabilitated in 2008 and will not be affected by any actions proposed in this project. The five overlooks within the APE were documented as contributing to a historic district and determined eligible in 2010. Because no further cultural landscapes have been documented within the APE, and because the overlooks and trails that are being considered for rehabilitation work are adequately discussed in the cultural resources section of Chapter 3, this topic is dismissed from further analysis in this document.

Museum Collections

According to NPS Director's Order-24 *Museum Collections*, 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. Many of the park's museum collections are stored in the Heritage and Research Center in Gardiner, Montana, or within one of the visitor centers of the park. The alternatives in this plan would not impact museum collections. Therefore, this topic has been dismissed from further analysis.

Air Quality

The NPS has a responsibility to protect air quality under both the 1916 Organic Act and the Clean Air Act. The 1963 Clean Air Act, as amended (42 USC 7401 et seq.) requires federal land managers to protect Park air quality while the *NPS Management Policies 2006* address the need to analyze air quality during Park planning. The Clean Air Act requires superintendents to take actions consistent with their affirmative responsibilities to protect air quality related values in Class I areas. Class I areas include all NPS units designated as national parks with more than 6,000 acres and all national wilderness areas with more than 5,000 acres that were in existence on August 7, 1977, and any other area redesignated as Class I by the governing state or Native American authority. The act also establishes a national goal of preventing any future and remedying any existing man-made visibility impairment in Class I areas. Yellowstone National Park extends into five counties in three states, including Park and Teton in Wyoming, Park and Gallatin in Montana and Fremont in Idaho. None of the five counties have air pollution levels that persistently exceed the national ambient air quality standards and are designated as nonattainment status (EPA, 2011). Impacts derived from this project on air quality would be short-term and negligible in a local and regional context. Impacts would be temporary and come from construction equipment emissions and dust from work for the parking lots, trails, and overlooks. Overall, the Class I air quality would not be affected. Because the effects on air quality would be negligible, this topic has been dismissed from further analysis.

Soundscape Management

In accordance with *NPS Management Policies 2006* and Director's Order-47 *Sound Preservation and Noise Management*, an important component of the NPS mission is the preservation of natural soundscapes associated with national park units (NPS 2006). 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 varies among NPS units as well as potentially throughout each park unit, being generally greater in developed areas and less in undeveloped areas.

Existing sounds in this area are most often generated from vehicular traffic and wind. Sound generated by the short-term rehabilitation of the parking areas, trails, and overlooks would include an increase in sound from construction crews, equipment, and vehicular traffic. Some temporary displacement of wildlife could occur, but concentrated noise levels would only be expected to appreciably increase in an area that currently has a steady level of vehicular traffic. Any sounds generated from the rehabilitation would be temporary, lasting only as long as the reconstruction activity is generating the sounds. Because these effects are minor or less, this topic has been dismissed from further analysis.

Lightscape Management

In accordance with *NPS Management Policies 2006*, NPS strives to preserve natural ambient lightscapes, which are natural resources and values that exist in the absence of human-produced light. The NPS would limit the use of artificial outdoor lighting to that which is necessary for basic safety requirements. In addition, NPS would ensure that all outdoor lighting is shielded to the maximum extent possible to keep light on the intended subject and out of the night sky so that the contribution to surrounding light sources would be minimal. No additional lighting is proposed as part of this project, therefore, lightscape management has been dismissed as an impact topic.

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 (NRCS), 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 there would be no effects on prime and unique farmlands, this topic has been dismissed from further analysis.

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. The Park's lands and resources related to this project are not held in trust by the Secretary of the Interior for the benefit of Native Americans. Because there are no Indian trust resources related to this project, this topic has been dismissed from further analysis.

Socioeconomics

The proposed action would neither change local and regional land use nor appreciably impact local businesses or other agencies. Any increase in workforce and revenue, however, would be temporary and negligible, lasting only as long as the reconstruction. Because the impacts to the socioeconomic environment would be negligible, this topic has been dismissed.

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 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 has been dismissed from further analysis.

Climate Change and Sustainability

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 would likely affect winter precipitation patterns and amounts in the park, 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. Therefore, the analysis in this document is based on past and current weather patterns and the potential effects of future climate changes are not discussed further.

Wilderness

The project area has not been recommended for wilderness designation and is not managed by the NPS as wilderness. As per *NPS Management Policies 2006*, regardless of the category of wilderness, NPS “will take no action that would diminish the wilderness eligibility of an area possessing wilderness characteristics until the legislative process of wilderness designation has been completed. Until that time, management decisions will be made in expectation of eventual wilderness designation.” Because the project area occurs along a roadway and is not likely to be designated a wilderness area, this topic has been dismissed from further analysis.

ALTERNATIVES

During August 2014, an interdisciplinary team of National Park Service 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 two 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. One action alternative 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 Alternative A, there would be no improvements or changes to the existing trails, overlooks, and associated parking areas at the Canyon Rim. None of the overlooks or associated trails would be rehabilitated. Issues related to the aging of the existing infrastructure would not be addressed. The NPS would still complete short-term and periodic minor repairs and/or improvement activities for continued operation of the facilities on the Canyon Rim, such as patching, rail maintenance, and repair of the walking surfaces. Deterioration of the trails, surfaces, retaining walls, and structural elements such as rails, benches, and trail edging would continue until safety concerns would eventually cause the closure of these facilities. Additionally, improvements would not be made to the existing Brink of the Upper Falls and Uncle Tom's parking areas. The asphalt parking lots would not be reconfigured to allow for better efficiency, oversized vehicles, improved pedestrian routes, and they would not be resurfaced. Safety concerns would not be improved. Drainage inlets and culvert pipes would not be replaced as needed.

Figure 2 – Alternative A, No Action (Existing Conditions at Inspiration Point)



Alternative B – Upgrade and Improve Canyon Rim Trails, Overlooks, and associated Parking Areas

Alternative B consists of improving the trails and overlooks associated with the Canyon Rim. This alternative attempts to incorporate materials and workmanship techniques that reflect the historic Rustic Style of many park structures, while addressing the maintenance, safety, and

durability of any new elements. In 2008 Artist's Point, Grand View, and Lookout Point were all rehabilitated and are not included in this project. While these areas would have no further work done under this alternative, they serve as an example of the standards for which this alternative would continue.

Overlooks and trails that would be rehabilitated in this alternative include:

- Inspiration Point Overlook
- Brink of the Upper Falls overlooks, trail, parking lot, and entry drive
- Uncle Tom's overlooks, trails, and parking lot
- Crystal Falls overlook and trail
- Brink of the Lower Falls overlook and trail
- Red Rock Point overlook and trail
- South Rim trail and overlooks
- North Rim trail and overlooks

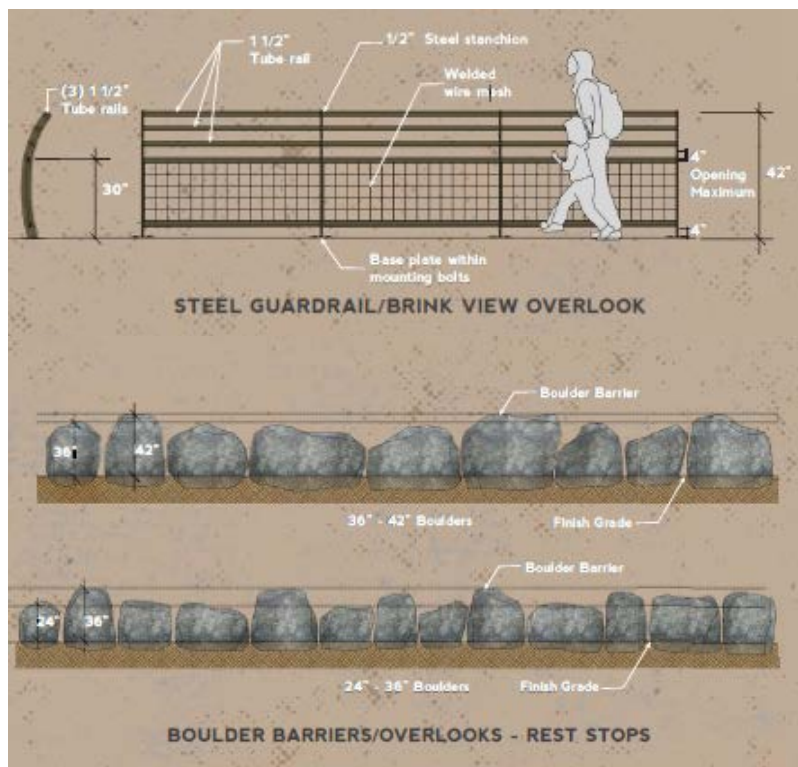
The design focused on enhancement of the visitor experience while drawing on the historical use of stone, wood, steel, and asphalt paving, with the intent of maintaining a very simple palette of materials and style. This simplicity, it is hoped would allow the visitor to focus on the extraordinary views of the canyon while maintaining a situational awareness based on messaging and material cues that are consistently applied throughout the trails and overlooks. The materials and design details, including color selections, allow for a transparency of built structure and thus an enhancement and preservation of views which is a baseline design tenant of this alternative. To further enhance the visitor experience, the design emphasizes the interconnectivity of overlooks.

Alternative B is based on the final schematic design by OTAK and represents the best information available at the time of this writing. Specific distances, areas, and layouts used to describe the alternative are the best estimates and are likely to change slightly, to lessen impacts, during final design development. If changes during final design are inconsistent with the intent and effects of the described for this alternative, then additional compliance or resource surveys would be completed, as appropriate.

The following text further describes the components of Alternative B (A complete overview of this alternative is found in Appendix C – *Schematic Design*:

- **Trail Features** – The typical trail treatment would include work up to seven and a half feet from the centerline of the existing trail to complete the work. Work within this area would include retaining walls that are required to allow for minor regrading of steep sections, installation of trail edging constructed of stone, log, or rails. Edging treatments would help to define areas to reduce off-trail resource damage, improve safety, and direct pedestrian flow. Trail work would include a goal of maintaining a 36 inch width minimum for unpaved trails, with some exceptions. In a few areas (i.e. Red Rock Point trail), trees, boulders, or rock outcrops narrow the existing trail. In order to avoid cutting trees, removing natural stone features, or creating other resource impacts, widths less than 36 inches would be allowed if necessary, but would not occur along greater than 5% of the trail distance.. Most high use, hard surfaced trails (i.e. Brink of the Upper Falls trail, and Brink of the Lower Falls Trail) would be maintained at a minimum width of six feet in order to accommodate the high usage and allow for pedestrians to pass by each other. Existing paved trails would have asphalt removed, and be repaved. Some non-paved trails would be improved with pavement surfacing (i.e. Crystal Falls trail from parking lot to overlook).

- Accessible Features** – Many of the trails at Inspiration Point, Brink of the Upper Falls, Uncle Tom's, Crystal Falls, and Sunset Point would be rehabilitated to allow them to conform to the Access Boards newly released "*Outdoor Developed Area Accessibility Guidelines*". These trails would be designed with firm and stable surfaces with pullouts for pedestrians to pass each other and rest. Hard surfaces would consist of asphalt, concrete, pavers, flagstone, geometric recycled product glass and fly ash (pavers). Handrails would be used on some of the steepest slopes on frontcountry trails only. No handrails would be installed on the backcountry trails. Some grading would occur on trails when possible to reduce steep sections if the work can be done without excessive grading that would cause extensive resource damage. Some short retaining walls could be installed in select areas such as on the Brink of the Lower Falls trail, and Inspiration Point trails. Existing narrow sections on many pathways and trails would be widened to allow for a minimum of 36 inches required to meet the Access Boards guidelines for pedestrian trails. Most paved trails in high use areas would be 6 feet wide. A few trail segments have areas that would be difficult to widen to 36 inches for their entire length due to topography, ravines, and rock cliffs. While accessibility improvements is a goal for all trails in the area, steepness of grade in some areas may limit or prohibit accessibility improvements of a degree that would meet the new guidelines (i.e. Red Rock Point trail).
- Safety Edging at Overlooks** – Safety edging would be installed to meet a minimum 32 inches in height for distant view overlooks (Uncle Tom's, Sunset Point, Crystal Falls) and 42 inches in height for view areas that require you to look down (Brink of the Upper Falls, Brink of the Lower Falls) to see the view or feature. Edging and safety barriers would be constructed of a variety of materials including wood, metal, stone, and deadfall (tree trunks and branches). Heavily used overlooks that have the highest degree of danger would also have the highest degree of safety designed into the rail or edging system.
- Parking Areas** – The parking areas at Brink of the Upper Falls and Uncle Tom's would be reconfigured to increase capacity and efficiency. Generally the new footprint of these parking areas would remain within their existing footprints, though some expansion beyond the existing footprint would occur. The schematic design for these parking areas anticipates about 0.23 acre for the Uncle Tom's parking area, and 0.18 acre for the Brink of the Upper Falls parking area. The reconfiguration of the parking areas is to address a lack of parking spaces designated for oversize vehicles, improve pedestrian flow from the parking areas to an orientation area, improve accessibility and define accessible parking spaces. See the figures under each of the site component descriptions for further detail on what is being proposed.



- **Utilities** – Some drainage culverts across roads (Brink of the Upper Falls entrance road), trails, and parking areas (Brink of the Upper Falls and Uncle Tom's) may need to be replaced. Condition of existing culverts would be assessed prior to construction and any required permits would be obtained in advance of any replacement activities. Some water, sewer, and electric lines may need minor relocations or extensions to accommodate updating and rehabilitation of existing restroom buildings at Uncle Tom's and Brink of the Upper Falls. Connecting existing utilities to the rehabilitated restroom buildings near the parking areas at these locations would require excavation for trenching to place additional underground piping/wiring. Excavation depths would typically be from 3 feet to 8 feet in depth and usually not more than 50 feet in length to make these connections.
- **Access** - Access to the parking areas and overlooks would be signed with a hierarchy of new signs designed to help improve wayfinding (finding one's way) in the area. Signs would be placed to help visitors know ahead of time the type of area they are entering, give information about what to expect on the trail, and give an overview of what other opportunities they might encounter in the area. Some minor changes to the current configuration of trails (such as near the Uncle Tom's parking area) would reduce confusion for visitors. Changes would include actions such as reducing the number of trail choices from a single point by removing or combining short trail segments, removal of short connector trails when other more prominent trails lead to the same destination, and the addition of orientation areas at the intersection of many trails and near parking areas. All would help to reduce the number of decision points a visitor encounters. Signs would also be erected to direct visitors using these trails.
- **Revegetation** – Revegetation is an integral part of this alternative. Within the project limits revegetation efforts would address social trails, informal parking, steep cut slopes, slope stabilization and erosion. It is critical vegetation is managed and maintained to prevent the infestation of weeds, loss of screening contributing to the historic district, stabilization of highly erodible slopes and hazard tree management. See Appendix A for *Yellowstone's Revegetation Guidelines*.
- **Water Sources** – The water sources for this alternative would be either from treated water from fire hydrants in the Canyon developed area, or from pumping water from the Yellowstone River near the Otter Creek confluence located about three miles south of Canyon Junction or another site on the Yellowstone River if approved. Water would be used for dust control, compaction of trail/road base material, washing of aggregate materials at the Grebe Lake Pit area, and for water needed in the production of asphalt at the plant that would also be located at the Grebe Lake Pit or the Norris Pit. Whirling disease is known to infect some fish in the Yellowstone River. If the Norris pit is to be used for aggregate washing, then a source from the Gibbon River would be identified.
- **Temporary Offices During Construction** – A temporary office facility (trailer) would be erected in the Canyon government administrative area, within the Canyon Contractor Camp, or an already existing NPS maintenance area that is within an already disturbed site. This office trailer would be self-contained and use utility hook ups that are already on site. This office space would provide a space for contractor employees to conduct business during construction of the rehabilitated overlooks and trails project. This trailer would be removed following completion of the project.
- **Construction Staging** – To implement this alternative, construction staging, material stockpiling, and equipment storage would occur within the existing parking areas, within areas of the project that are proposed for rehabilitation, the Grebe Lake Pit, the Canyon administrative corral area, the canyon administrative area, and existing administrative maintenance areas would be available for construction staging. These areas would be sited

in previously disturbed areas and typically away from active visitor use areas. No new areas would be developed for construction staging of materials and equipment.

- **Construction Closures** – Full closure of up to two overlooks at a time would occur. Efforts would be made to schedule closures such that two overlooks of the same feature (such as the Upper Falls) would not be closed at the same time. An example would be Uncle Tom's Overlook and Brink of the Upper Falls Overlook. Closures of a single overlook could be up to the entire visitor season. Night work may be allowed as long as sound does not impact nearby lodging units or campgrounds.
- **Construction Methods** – The use of motorized carts and ATVs or other small vehicles that would fit on the narrow trails would be used in construction. In some cases larger construction equipment such as small dozers, backhoes, and front end loaders may be needed in areas where larger quantities of earth and stone needs to be moved. In some cases large cranes may be needed to transfer building materials to overlooks or trail sections that would be difficult to access with other construction equipment.
- **Material Sources** – Materials including stone and aggregate would be generated within the job site, purchased from commercial sources outside the park, obtained from existing stockpiles within existing maintenance storage and work areas within the park, obtained from ongoing road construction sites that require excavation of slopes to accommodate slightly wider roads, from road ditch cleaning activities from roadside rock fall catchment ditches within the park, from rock readily available within existing NPS maintenance pits to allow for improved efficiency of the operation by removing the stone (as in leveling an existing work area), or pulling stone from existing areas used as dumping zones for asphalt and other construction debris to facilitate grading operations to rehabilitate these disturbed areas. Other materials such as commercial items, rails, logs, culverts, pipes, etc. would be purchased by the contractor from commercial sources outside the park. Brush and logs used in erosion control would be generated from within the job site, or come from stockpiled sources within the park.
- **Subsurface Investigations** – Investigations of the conditions below the surface are needed in order to properly design paving systems, foundations, and for structures. Drilling to approximately 20 feet in depth will be required during the final design stages to ensure that engineers have the information to properly design any footings or other elements of the design. In most cases truck mounted drilling would occur within parking lots or on roads, and only in a few instances would truck mounted equipment (4 to 6 inch diameter holes up to 20 feet in depth) be needed any distance (less than 100 yards) off roads. One instance may be for investigation of subsurface layers in the area of Sunset Point overlook. In this location, a few trees (3-5) might need to be cut in order to facilitate access directly off the South Rim Drive. Most investigative holes for trails, overlooks, and trail reroutes would occur using handheld augers to a depth of 4 to 6 feet in depth and only an inch or two in diameter. Any of these drill holes would be in direct proximity to infrastructure locations shown in this *Alternatives* section.

WORK PROPOSED AT VARIOUS LOCATIONS:

North Rim Trail, The edge of the trail is difficult to discern along its two and a half mile length due to additional social trails (unofficial trails created by use in different areas than intended). Trail edge treatments would include stone edging, log edging, low walls, and rails, to better identify where the official maintained trail is. Wide sections of trail (bump outs) would be created in five to ten areas that have good view opportunities of the canyon. Some of the overlooks on the North Rim Trail would be redeveloped to better identify the limits of the overlook, and address safety concerns using these same treatments. Surfacing of these overlooks, safety rail systems, and safety assessments of the location of existing trail in relation

to the canyon edge would all be addressed. In approximately 5-10 instances, minor reroutes of no more than 100 yards of the North Rim trail would occur to pull it back from the canyon edge, in other areas the trail could be located closer to the canyon rim with a better defined view area.

Brink of the Upper Falls, In order to accommodate the rehabilitation of an existing trail segment to the Crystal Falls overlook making it an accessible pedestrian trail, the 1,000 foot long access road to the Brink of the Upper Falls parking lot would be shifted to the south, widened from its existing 21 feet to 24 feet. The pedestrian trail would be located to the north side of the road where the road crosses a large concrete culvert and headwall just west of the parking lot. Additional road fill would be placed to build the wider top needed for the road and pedestrian trail. The road fill would catch on top of a topographic bench before reaching the creek below or any of its adjacent wetlands. This particular area directly above the culvert would result in a road/walkway pavement widening to 30 feet for a distance of about 200 feet. Shifting the southern edge of the road would widen the road from its existing 21 feet to 24 feet. The wider road would allow the park to also address inadequate turning radiuses of the large buses and recreational vehicles that also use this narrow road to access the area.

A broken water drainage culvert on this entrance road is causing soil to erode adjacent to the roadway and would be repaired or replaced as part of this alternative. This replaced culvert would stop the erosion in the area that has already resulted in a large ravine to form.

Some reconfiguration of the parking lot would occur to provide increased turning radiuses for the larger buses that use the area. The larger turn radius would increase the size of the parking area and provide for striping the area for some oversize vehicle parking. The larger turning radiuses would increase the parking lot paved area by approximately 15% (0.18 acre). The turning radiuses would be increased to prevent the trailing wheels on large buses and RVs from running over curbs and adjacent vegetation. A bus drop-off area (sized for one bus) would be incorporated near an orientation area on the north edge of the parking lot. Additional car spaces (6-8) would be fit in where space permits.

The restroom building currently located adjacent to the parking lot would be rehabilitated when funding permits. This rehabilitation would include changing out plumbing fixtures within the building interior, replacing floor wall and ceiling finishes, replacing exterior siding and replacing roof shingles.

If future use of the area increases, extra capacity could be accommodated via a new parking lot to be constructed near the entry point to the Crystal Falls trail, located just north and west of the creek crossing on the Brink of the Upper Falls access road. This lot would have a capacity of approximately 20 vehicles. If this parking lot is constructed, further compliance and surveys would be needed prior to its construction.

The pedestrian route (approximately 400 feet) from the Brink of the Upper Falls parking lot to the overlook would be regraded to reduce the slope and improve accessibility for visitors. The pedestrian route in this location would be lowered or filled by up to 2 feet to improve accessibility. Three new resting/interpretive areas (large enough for 4-6 people) are planned along this segment of paved trail. These areas would have one or two resting benches, and interpretive panels for visitors to use and learn from. The 400 foot long trail from the parking lot to the overlooks would also have either a low stone masonry wall, or stone masonry posts with a log rail suitable for sitting and resting on, along its length on the right left side when heading towards the overlooks. The existing stone stairs that are parallel to the carriage road would be incorporated into the design and used in the main route to the existing lower viewing platform.

An existing overlook (located above the lower platform) would be made accessible by leveling the grade, improving the access route, and removing a small stone outcrop that presents a tripping hazard in the middle of what would be the paved view area. The overlook would be contained by boulders from the local area. This overlook would allow viewing of the falls and river by those not able to negotiate the stairs to the lower viewing platform.

A new mid-level overlook would be constructed that would view the Brink of the Upper Falls from directly above the lowest most existing overlook (see figure at right). This new overlook would also be accessible to those with mobility impairments.



The existing stone stairs leading to the lower overlook platform would have small bump-outs or alcoves adjacent to the stairs constructed to allow for other pedestrians to pass, and photo opportunities of the upriver views. These alcoves would be paved and have safety rails and be sized for approximately five people each.

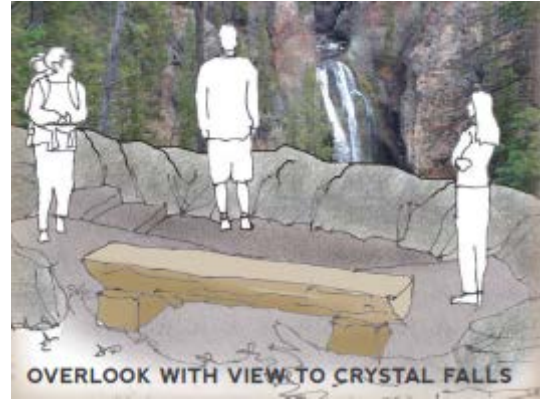
A large stone masonry retaining wall located just above and upriver of the stairs to the lower viewing platform would be repaired. This stone wall supports the roadbed, now a pedestrian walkway directly southwest of the existing stone stairs to the lower overlook. Some stone are missing from the wall, the lowest portion of the wall is being undermined from erosion, and some cracks are appearing. This wall would be repaired by replacing missing stone, repointing of mortar and filling of voids in the wall. Additional structural improvement to the wall may be necessary and could include pin pile borings and/or a concrete sherry wall behind the existing masonry.

The existing stone barrier wall located at the perimeter of the lower platform would also be rehabilitated to ensure stability. This wall would have a rail system installed that tie into the existing boulders and stone to provide a safe experience for those viewing the Brink of the Upper Falls. Stone would be placed to ensure that the top of the wall undulates up and down across its top surface. This would allow for viewing of the brink of the falls from both adults and children. A horizontal top rail and successive lower rails would fill the space between the boulders to prevent accidental falls (see photo-simulation below). The existing asphalt surface



of the overlook is in poor condition and would be replaced. The new surface would be asphalt, concrete, flagstone, or pavers. Some seating of stone or log benches would be developed at the backside of the viewing platform.

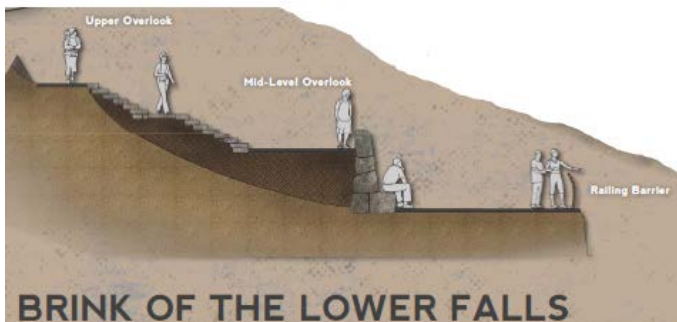
Crystal Falls Trail/Overlook The existing trail from the entrance road to an informal overlook (about 375 feet in length), and the overlook itself would be formalized and designed to accommodate visitors that have mobility impairments. As the existing unpaved trail is wide, no additional clearing would be required. The trail connection and overlook would be paved to 6 feet in width. A designated route from the existing Upper Falls Parking area to the Crystal Falls/North Rim Trail would also be constructed (total length of approximately 600 feet, 0.014 acre of new disturbance). This route would also be paved to 6 feet wide and located adjacent to the north side of the Brink of the Upper Falls Entrance Road and above a drainage culvert as shown at right. A trailhead parking lot could be constructed in the future as described earlier if increased use of this area warrants parking lot expansion.



Brink of the Lower Falls, No changes are proposed for the parking lot at this location. Elements to improve wayfinding are proposed and would include items such as: additional or changed signage; pedestrian elements such as striping, or a new 50 foot section of new trail from the south end of the parking lot, slight shifts in trail alignment (up to 10 feet); and an orientation area (0.031 acre) for visitors located adjacent to the beginning of the trail to the Lower Falls overlook just off the parking lot.

Sloughing of soils, rock, and gravel are commonly found on the trail surface. Trail edges would be built up to prevent these materials from falling onto the trail. The proposed edge treatment on the uphill side of the trail (cut side) is a stone masonry wall that would be range from less than a foot to approximately two or three feet in height. This wall is anticipated to run almost the entire length of the Brink of the Lower Falls trail (approximately 1,800 feet), from the parking lot to the overlook platform. The downhill side (fill side) of the trail would be better defined using

placed stone at the edges of the trail. Other trail edging that could be used depending upon the conditions include: stone walls, rock edging, boulders or timber curbs could be added to help prevent material from falling onto the trail, and to stabilize the trail surface. Drainage issues along the trail would be addressed with small culverts, ditches, and features to direct the water off the trail and towards larger drainages into the canyon.

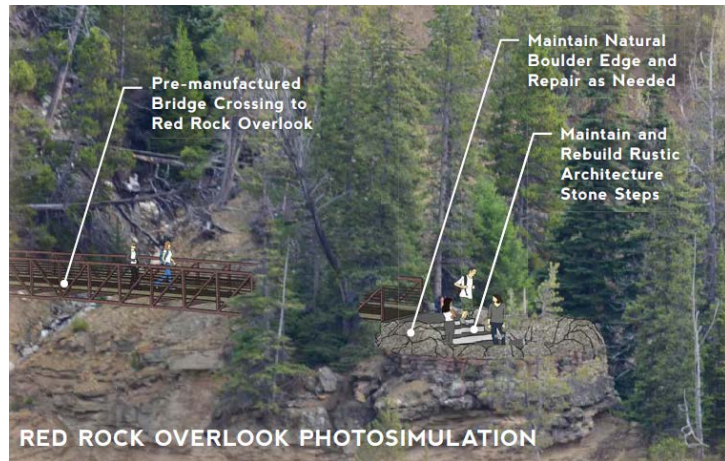


A new mid-level platform (approximately 0.035 acre) would be constructed between the larger lower main platform and the upper platform at the Brink of the Lower Falls Overlook. A connecting stone stairway would join all three platforms. The existing barrier rails would be

replaced with a system that meets current building codes and uses materials that would reduce their visibility from views across the canyon or from other overlooks. The concrete surface of the overlook is in good condition and would likely only need a thin overlay of concrete or asphalt.

Red Rock Point, The Red Rock Point overlook and trail would be rehabilitated as part of this project. The existing asphalt trail would be re-graded, re-surfaced, and lined as needed at the edges to identify the trail extents. The existing boardwalk stairway would be removed and replaced with either a metal staircase

that would require less maintenance, or stone stairs at grade. An option that will also be explored further would be to approach the Red Rock Point overlook from the new bridge (60-70 feet in length) spanning the ravine just north of the existing overlook. The existing overlook location would not change from its existing location, or in size. A trail re-route of approximately 300-500 feet in length and 6 feet wide would be needed on the north and west side of this ravine in order to tie back into the existing Red Rock Trail. This trail reroute would be relocated into the trees in this area. This re-route would be completed in order to reduce the amount of maintenance that could be required in the future if the existing ridge that the existing stairway is located on continues to erode in the near future.



Grandview Point to P Loop Trail, Definition of this 1,800 foot long trail edge would be completed by using stone and log elements as needed to define the edge and keep users on the trail tread. Placement of logs and brush would be done to keep users from short-cutting switchbacks and curves in the trail. Trail tread would be maintained to allow for proper water drainage from trail, and to ensure a near-level surface. Trail edging would not be constructed on the entire length of this trail, but only on the areas needing better definition (approximately 10-20 percent of the trail distance).

Inspiration Point, The existing concrete stairs are severely spalling, cracking, and some undermining has occurred from soil erosion. The observation platform at the bottom of the stairs is presently closed due to its poor condition. The existing stairway and platform would be replaced with a 6-foot wide walkway (approximately 800 feet in length) that uses switchbacks to allow for a shallower grade and increased accessibility for those with mobility impairments. Surface material would likely be either asphalt or concrete. Approximately five viewpoints (totaling 0.007 acre) would be constructed along this trail. One of these overlooks would be accessed by a short spur trail about 90 feet in length and 6-foot wide. If needed handrails along one or both sides of this trail may be added. The proposed walkway would be of a design similar to other formalized trail sections on the North and South Rims. Local stone would be used at the trail edges to construct short walls that would contain both soil and pedestrians. A more direct 6-foot wide stairway from the parking lot would be constructed that would short-cut a portion of this switchback trail. A couple of small pine trees would likely be removed in the vicinity of the lowest viewing platform to allow for a 180 degree view of the Yellowstone River and Canyon. A new vault toilet (single) would be installed in the forested island contained within

the existing loop circulation road of the parking area. An area of about 100-150 square feet of mature lodgepole pine trees would be cut and removed, and some grading of this area would be required in order to construct a level pad for the single stall vault toilet structure. Excavation to about 8 feet in depth would be required to install a concrete vault for the toilet located directly above the vault.

Uncle Tom's, The parking area at Uncle Tom's would be reconfigured to allow for increased efficiency of large vehicle and pedestrian movements, and to allow for oversize vehicle parking. The parking area would increase in size by about 0.23 acres in size. A bus unloading zone would be provided that allows for safe unloading of passengers. Accessible parking spaces would be designed, and a central pedestrian route would be



marked and identified from the parking area to a visitor orientation area adjacent to the parking lot. No or only a negligible net increase in parking spaces is anticipated.

The two existing overlooks (approximately 300-400 square feet in size) of the Upper Falls would be reconstructed to create bi-level terraced viewing platforms (approximately 400-800 square



feet in size). The terracing would allow for better unobstructed viewing of the falls by more visitors. A new viewing platform would be constructed just north of the existing Upper Falls overlooks with a view of Crystal Falls across the canyon. A few trees or branches directly in front of this proposed overlook would need to be removed to allow an unobstructed view of the falls from this south side of the canyon.

In order to reduce the grade of the South Rim trail between the existing overlooks and the Sunset Point Overlook, about 200 feet of trail would be re-routed to make it accessible for those users with mobility impairments. Clearing limits of about 8 feet wide would be required to construct this re-routed trail segment that would be 6-feet wide.

The existing metal staircase would have continuing maintenance in order to extend its useful life. Maintenance items would include but are not limited to: re-welding of joints and connections, painting elements to prevent corrosion, replacement of bent stairs and rails, attention to rust, inspections to ensure structural stability, and other tasks as needed.

Sunset Overlook, The existing Sunset Overlook, with its steel I-beam supports would be removed and a new Sunset Overlook would be reconstructed on the canyon edge just above it. The existing overlook is anchored to the side of a nearly vertical soil cliff, and once removed the area would be rehabilitated to blend with the surrounding cliff face. The new overlook would be a two-tiered platform to maximize viewing opportunities. The overlook (400-600 square feet) would be enclosed by stone to contain visitors and provide for safety and would continue to offer an excellent view of the Upper Falls from the south side of the canyon. The trail accessing this overlook from the Uncle Tom's overlooks would have some minor reroutes to reduce the grades to meet accessibility standards and allow visitors with a greater number of abilities to visit this site. Two options are being considered for the final 350 feet of trail. The first would be to add stairs along the existing trail alignment on the final decent to Sunset Point Overlook. The second option would be to create a large sweeping layout of the trail (approximately 500 foot) that would include a 125 foot section of boardwalk to span a wetland prior to



arriving at the overlook. A short section of trail would be re-routed to the south rim trail heading south, and an equal section of trail would be obliterated in an area where a number of social trails have developed that are causing damage to vegetation near the river in this area. Each option includes paved surfacing of the trail as it extends from Uncle Tom's Overlook. All obliterated trail sections would be rehabilitated to as natural appearing condition as feasible.

South Rim Trail, Some of the overlooks on the two and a half mile long South Rim Trail would be redeveloped to better identify the limits of existing viewing areas from the trail, and address safety concerns. Surfacing of these overlooks, safety rail systems, and location of existing trail in relation to the canyon edge would all be addressed. In some cases minor reroutes (in approximately 5-10 locations) of the South Rim trail to pull it back from the canyon edge would occur. Most of these trail re-routes would be 100 feet or shorter in length.



Figure 3 – Alternative B, Rehabilitate Canyon Rim Overlooks and Trails

Mitigation Measures

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

General Construction

- Minimize ground disturbance in all aspects of the construction process. Make use of previously disturbed sites whenever possible to avoid new impacts. Keep construction-related sites away from core visitor use and residential areas to the greatest extent possible.

Return all disturbed sites used for construction-related administrative uses and/or activities to pre-construction conditions following construction.

- Construction zones would be identified and fenced with construction tape, snow fencing, or some similar material prior to any construction activity. Fencing would define the construction zone and confine activity to the minimum area required for construction. All protection measures would be clearly stated in the construction specifications and workers would be instructed to avoid conducting activities beyond the construction zone as defined by the construction zone fencing.
- Fugitive dust generated by construction would be controlled by spraying water on the construction site if necessary. Any water used for dust control would be taken from hydrants in park administrative areas, or a local source approved by the park.
- Any water pulled from the Yellowstone River drainage to be used for dust control or other construction purposes, such as wash water for aggregate or asphalt production, would not be used where it could potentially run into any tributaries other than the Yellowstone River.
- To minimize possible petrochemical leaks from construction equipment, the contractor would regularly monitor and check construction equipment to identify and repair any leaks.
- Fuel would be stored in fuel trucks or aboveground storage tanks, and all fuel storage would be in staging areas. Refueling would take place in staging areas and might occur at material sites. Some stationary equipment (cranes, trackhoes, pumps) may require fueling within 150 feet of streams. In these cases, special precautions (spill kits, training of operators in fuel containment) would be put in place to alleviate the risk of fuel spills.
- Construction workers and supervisors would be informed about the special sensitivity of Park's values, regulations, and appropriate housekeeping (trash storage and disposal, securing lunches, food, and beverages, keeping a clean jobsite).
- The NPS project manager would be responsible for ensuring that the project remains within the construction limits.

Soils

- 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.
- Construction zones would be identified and fenced with construction tape, snow fencing, or some similar material prior to any construction activity. The fencing would define the construction zone and confine activity to the minimum area required for construction. All protection measures would be clearly stated in the construction specifications and workers would be instructed to avoid conducting activities beyond the construction zone as defined by the construction zone fencing.
- Topsoil conservation measures would be employed prior to construction in accordance with Yellowstone's Vegetation Management Guidelines. Topsoil would be stripped and replaced wherever possible to enhance revegetation following the construction phase.
- Disturbed soils are more susceptible to erosion and until revegetation takes place, standard erosion control measures such as silt fences and/or sandbags would be used to minimize any potential soil erosion.

Vegetation

- Disturbance to existing vegetation at the site would be avoided to the greatest extent possible.
- Re-vegetation and re-contouring of disturbed areas would take place following construction and would be designed to minimize the visual intrusions. Re-vegetation efforts would strive to reconstruct the natural spacing, abundance, and diversity using native species. All disturbed areas would be restored as nearly as possible to pre-construction conditions

shortly after construction activities are completed (see Appendix A – *Yellowstone's Revegetation Guidelines*).

- The potential for proliferation of non-native plants during construction operations is a concern. Weed control methods would be implemented to minimize the introduction of noxious weeds (see Appendix A – *Yellowstone's Revegetation Guidelines*).
- Contractors would be required to adhere to proper construction and precautions, including washing of equipment before it enters the park. Reclamation and revegetation efforts would follow Yellowstone's Revegetation Guidelines for construction, which also includes procedures for long-term management of non-native vegetation (see *Yellowstone Revegetation Guidelines* in Appendix A).
- The Park's Branch of Resource Management would monitor and control any new exotic plant infestations that might occur and are associated with this project.
- Equipment used would be cleaned using NPS protocols for reducing the spread of any non-native plant species.
- All trips over wetlands require plywood planning to be laid down first to alleviate any compaction concerns, and the number of trips required would be minimized to the least number required to complete the task.

Wildlife

- All outdoor food storage would adhere to park policies already in place to ensure no unattended food sources are available to wildlife.
- Construction workers and supervisors would be informed about special status species. Contract provisions would require the cessation of construction activities if a species were discovered in the project area, until park staff re-evaluates the project. This would allow modification of the contract for any protection measures determined necessary to protect the discovery.
- All project-related employees, such as contract and government construction employees would be given orientation and educated about working in grizzly bear country and on how to avoid disturbing or encountering bears and how to minimize unavoidable effects or encounters. Orientation would include information about park regulations regarding food storage, disposal of garbage and other bear attractants, safety measures, and approaching or harassing wildlife.

Birds

- Within the Canyon proposed construction area from Chittenden Bridge to Inspiration Point the typical dates for nesting birds is between May 1 and July 31. Per the Migratory Bird Treaty Act, no cutting of trees, vegetation clearing, grubbing, or other site preparation and construction activities which could affect nesting birds would occur between those dates unless qualified biologists from Yellowstone National Park survey them prior to any of these listed activities.

Federally Threatened, Endangered and Special Status Species

- Construction workers and supervisors would be informed about special status species. Contract provisions would require the cessation of construction activities if a species were discovered in the project area, until park staff re-evaluates the project. This would allow modification of the contract for any protection measures determined necessary to protect the discovery.

Soundscapes and Air Quality

- To reduce noise and emissions, construction equipment would not be permitted to idle for more than 10 minutes while not in use according to the Superintendent's Compendium, based on CFR 36 § - 5.13 Nuisances.

Historic Resources

- Designs for new structures within the boundaries of the landmark and historic districts, or in close proximity to the districts, would be well executed and sensitive to the cultural and natural environment. The NPS would identify the district's character-defining features in its design planning process, and use a project-specific design recognizing the unique visual and cultural features that qualified the district for listing in the National Register of Historic Places.
- New construction would be consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties, and the Secretary of the Interior's Standards for Rehabilitation & Illustrated Guidelines on Sustainability for Rehabilitating Historic Buildings. Any construction activity with the potential to affect historic properties would be contingent upon completion of Section 106 responsibilities including consultation with the Wyoming SHPO.
- Should construction unearth previously undiscovered cultural resources, work would be stopped in the area of the discovery and the park would consult with the Wyoming SHPO 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) and NPS Director's Order 28 would be followed.
- The NPS would ensure that all contractors and subcontractors are informed of the penalties for illegally collecting artifacts or intentionally damaging archeological sites or historic properties. Contractors and subcontractors would also be instructed on procedures to follow in case previously unknown archeological resources are uncovered during construction.
- Should operations uncover or find any paleontological remains, operations would immediately be suspended and the park geologist notified. Any paleontological remains found within the project area are the property of the NPS and would be removed only by NPS staff or designated representatives.
- Small structures such as vault toilet(s), information kiosk(s), and a shade structure would be placed in/near parking areas and away from the canyon rim in order to avoid visibility from other contributing overlooks and trails.
- This project would be similar to the rehabilitation project implemented at Artist Point Overlook, which received WY SHPO concurrence (SHPO file #0307JPP005). This rehabilitation maintained the NPS Rustic design philosophy by utilizing natural stone materials as much as possible, blending built and natural features, and conforming to the 1930s layout.

Archeological Resources

- 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.
- The portions of site 48YE637 adjacent to the Uncle Tom's Overlook which remain unevaluated will be fenced off for the duration of the project and not disturbed.
- Prior to any investigative borings, archeological surveys would be completed ahead of time.

Geothermal Resources

- It is the contractor's responsibility to stop work in the immediate vicinity and contact the park geologist if any of the following conditions are encountered: 1. A pre-existing hole in the ground the size of a basketball, or larger, 2. Standing or flowing water, either hot or cold, 3. Any concentrations of either carbon dioxide or hydrogen sulfide are measured, 4. If during excavation a red clay layer is encountered, or 5. Ground temperatures above 80 degrees Fahrenheit are measured (early morning).
- Prior to any investigative borings ensure a review of the drilling plan by the park geologist and ensure the previous mitigation measures regarding geothermal concerns are adhered to. Work would be stopped if any of the five conditions listed above are encountered.

Visual Quality

- Colors, textures, and reflectivity of materials used to accomplish this project would be chosen to keep them as unobtrusive as possible, especially when viewed from across the canyon.

Visitor Use and Experience

- As much as possible, all construction activities would be conducted during daylight hours, to avoid loud and disruptive work at night.
- To minimize the potential for impacts to park visitors, variations on construction timing would be considered. One option includes conducting the majority of the work in the off-season (winter) or shoulder seasons. Another option includes implementing daily construction activity curfews such as not operating construction equipment between the hours of 6 PM to 7 AM in summer (May – September), and 6 PM to 8 AM in the winter (October – April). The National Park Service would determine this in consultation with the contractor.

Alternatives Considered and Dismissed

The following alternatives were considered for project implementation, but were ultimately dismissed from further analysis. Reasons for their dismissal are provided in the following alternative descriptions.

- **Closure of the Inspiration Point Overlook and the Red Rock Point Overlook** – This alternative was considered to alleviate the problems associated with erosion of soils and rock in these areas that have caused damage to paths, trails, stairs, and overlook platforms. Costs to maintain all overlooks in the Canyon area is expensive, and a reduction of facilities would save NPS maintenance funds and time.

This alternative was dismissed because of the existing heavy visitation to this area from park visitors. Most overlooks in the area could be described as at or beyond capacity on any given day during the high visitation period of Late-May through Mid-September. Closing these two overlooks would increase demand on the remaining overlooks and trails on the Canyon Rim. During public scoping, many comments favored repairing and rehabilitating the overlooks and trails in the area. None suggested closing any of them. For these reasons, closure of the Inspiration Point and the Red Rock Point Overlooks was dismissed as an alternative.

Alternative Summaries

Table 1 summarizes the major components of Alternatives A and B, 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, Alternative B meets each of the objectives identified for this project, while the No Action Alternative only meets two of the objectives.

Table 1 – Summary of Alternatives and How Each Alternative Meets Project Objectives

Alternative Elements	Alternative A – No Action, Only Minor Maintenance of Overlooks and Trails Would Occur	Alternative B – Repair and Rehabilitate the Overlooks and Trails Along the Canyon Rim
Overlooks	Uneven surfaces would continue through much of the area. Needed rehabilitation would not occur.	Overlooks would be rehabilitated, a few additional overlooks would be added, some existing overlooks at Uncle Tom's and Sunset Point would be constructed to have tiered viewing platforms
Trails	Accessibility issues would not be addressed. Poor trail definition in some areas would continue. Re-surfacing of trails would not occur.	Trails would be resurfaced, trail definition at edges would be installed, changes or small re-routes would allow grade reductions, safety improvements by minor trail re-routes would occur.
Accessibility	No improvements for accessibility would be constructed.	Accessibility would be improved, new accessible trails would be constructed at Inspiration Point. Grade changes would improve accessibility at Brink of the Upper Falls, New accessible viewing opportunities would be constructed at Brink of the Upper Falls, Crystal Falls, Sunset, and Inspiration Point.
Signs/Wayfinding	Existing signs would remain, no to signs, or new signs would be installed.	This alternative would include a sign placement design for the Canyon area. It would make recommendations for location signs, safety messaging, orientation maps, and interpretive signs to be installed.
Parking	The existing parking lots would continue to be used as they are presently with no change in function or capacity.	The existing parking lots at Uncle Tom's and Brink of the Upper Falls would be expanded slightly and striped to improve efficiency and capacity. Parking for oversized vehicles would be accommodated. A new parking lot for the Crystal Falls trailhead

		would be added if needed in the future.
Utilities/Construction Staging	New utility connects and construction staging would not be needed.	Some excavation would be required to route existing utilities to the rehabilitated restroom buildings at Uncle Tom's and Brink of the Upper Falls.
Project Objectives	Meets Project Objectives?	Meets Project Objectives?
Retain the historic integrity of the area.	Yes. The existing trails, overlooks and parking areas would remain as constructed, not changes to existing infrastructure would occur.	Yes. Any new or rehabilitated facilities, trails, masonry walls, log rails, bridges, would be rehabilitated or constructed in adherence to the Secretary of the Interior Standards for the Treatment of Historic Properties.
Provide a safe and healthy experience for those venturing for a view of the canyon that meets current health and safety standards and structural requirements.	Yes. Though improvements could be done to further promote visitor awareness of hazards/dangers in the area.	Yes. Additional rails, warning signs, trail definition would be added to promote visitor's awareness of hazards/dangers that exist.
Improve the accessibility of the overlooks and associated trails.	No. Trail grades and widths would remain the same as presently constructed. No additional improvements to improve accessibility would be completed.	Yes. Some switchback trails would be added to Inspiration Point (an area where stairs only exist presently), A new accessible viewing platform would be constructed at Brink of the Upper Falls, regarding of the route to Brink of the Upper Falls would reduce the grade, improved routes from parking areas would be constructed.
Repair and maintain existing historic masonry walls, rails, and surfaces of the overlooks and trails.	No. The existing masonry walls, rails, and surfaces would remain in their current condition.	Yes. The historic walls, rails, and surfaces would be rehabilitated providing less chance for tripping, twisting ankles, and reducing chances for historic wall failures in the future.
Better direct pedestrian flow and provide improved definition to the edges of pathways and trails.	No. The trail edges, pedestrian signs, and widths of existing walks, trails, and overlooks would not change.	Yes. New trail edge definition features would be added or rehabilitated, new pedestrian wayfinding signs would be installed, and some widening of certain trails/walks would occur.

Table 2 summarizes the anticipated environmental impacts for Alternatives A and B. 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 – Environmental Impact Summary by Alternative

Impact Topic	Alternative A – No Action	Alternative B – Preferred Alternative
Soils	Impacts to soils and slopes would be considered minor and adverse and the result of activities associated with the replacement of trail drainage structures, asphalt replacement, or minor utility repairs.	Impacts to soils would occur from some slight expansion of parking areas at Uncle Tom's and Brink of the Upper Falls, slightly expanded overlooks, new overlooks, and additional trails or widened trails, new bumpouts along trails for resting and viewing opportunities. Under Alternative B, local, minor, short and long-term, adverse and beneficial impacts on soils would occur.
Vegetation, Rare Plants, and Wetlands	The no-action alternative would have minor and adverse impacts from the potential for continued erosion from broken culverts, and parking lot storm water runoff. No changes would occur to forest canopy and understory. The no-action alternative would not affect exotic vegetation.	Proliferation of non-native plants during construction operations is a concern; Park Staff would monitor and control any new exotic plant infestations that might occur. Wetlands found within the project area would be avoided to the extent possible, impacts would be 0.07 acres. Not expected to affect any rare plants in the area. The effects on exotic vegetation would be minor, direct, and long-term after completion of the revegetation efforts and monitoring and control of exotic plants.
Wildlife	Both ongoing administration activities and continued visitor use could lead to impacts to wildlife populations throughout the park that are short-term and negligible.	Under Alternative B, negligible to minor, short- and long-term adverse impacts to wildlife would be expected to occur.
Threatened and Endangered Species	There would be no new impacts to Threatened or Endangered Species from the "No Action" alternative.	This project would have "no effect on Canada lynx or Canada lynx critical habitat" it "may affect, but would not adversely affect" gray wolves, and "may affect, but would not adversely affect" grizzly bears.
Cultural Resources;	Alternative A does not proposed any change to overlooks and trails within the APE and would not impact historic properties. Therefore, Alternative A would not incrementally add to an overall cumulative effect to cultural resources. Under Alternative A, <i>no historic properties would be affected</i> .	This alternative would result in minor, long-term, direct and indirect beneficial impacts to cultural resources, which is considered a <i>No Adverse Effect</i> under §106.
Visual Resources	Alternative A would not impact scenic resources.	Minor, long-term adverse and beneficial impacts on visual resources in the Canyon.

Impact Topic	Alternative A – No Action	Alternative B – Preferred Alternative
Human Health and Safety	Hiking off the maintained official trails can put visitors in more dangerous situations due to close proximity to the canyon edge. Under this alternative these effects would continue and would result in a minor to moderate, short- and long-term adverse impact to human health and safety.	Better delineated trails, better safety messaging, and additional safety elements at overlooks would all improve safety. Therefore, impacts to public health and safety related to construction activities would be negligible. The overall effect of Alternative B would be minor to moderate, short- and long-term beneficial.
Visitor Use and Experience	Trails in some areas may need to be closed due to continued deterioration due to a lack of a dedicated funding source to focus on these needs, or due to ever increasing maintenance work to keep the trails in a passable condition. These impacts would be moderate, long-term and adverse.	During construction, noise from heavy equipment and vehicles associated with the project could be disruptive to some park visitors, including hikers and campers. This could result in minor, short-term, adverse impacts. There would be minor, long-term, beneficial impacts to visitor use and experience due to improved trail conditions, improved viewing opportunities, improved restrooms, improved efficiency of parking areas, and improved signage to help with orientation, safety messaging, and improved interpretive education. These impacts would be a moderate, long-term, and beneficial.
Park Operations	Impacts to park operations from this alternative would be minor to moderate and adverse.	The addition of improved signage, parking lot improvements, and rehabilitate restrooms, trails, overlooks, and increased capacity at some overlooks would benefit National Park Service operations by allowing visitors to intuitively gain the information they need from readily available information kiosks, and an intuitive design to aimed to help visitors easily understand where they are heading. Impacts to park operations from implementing this alternative would be long-term, moderate, and beneficial.

Environmentally Preferable Alternative

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

Alternative B (Rehabilitation of the Canyon Rim Overlooks and Trails) is the environmentally preferable alternative for several reasons: 1) The rehabilitated overlooks and trails would require much less time to maintain than the existing infrastructure in the long term; 2) While there would be some new ground disturbance that would damage the previously undisturbed elements of the biological and physical environment, the design rehabilitates the overlooks and trails and helps stunt the deterioration of historic fabric that continues over time. The footprint of the existing overlooks and trails have only minor adjustments to the original design to address safety issues and to improve accessibility, thereby reducing impacts to previously undisturbed lands as much as possible; 3) The design of the new improvements (rails, boulder edges) would meet the tenants of the original design intent of keeping these viewing areas as invisible as possible when viewing from across the canyon; 4) This alternative includes improving accessibility and improving on safety measures to protect the public while increasing the availability of this experience for visitors to the park; and 5) This alternative maintains, preserves, and improves the historic experience far into the future, a historically significant experience for many of the visitors to the Park. For these reasons, Alternative B causes the least damage to the biological and physical environment and best protects, preserves, and enhances historical, cultural, and natural resources, thereby making it the environmentally preferable alternative.

By contrast, Alternative A (No Action) is not the environmentally preferable alternative because, although there would be no construction or ground disturbing activities that would damage previously undisturbed elements of the biological and physical environment 1) the existing overlooks and trails are not sustainable in the long term; 2) many safety issues such as uneven trail surface, poor edge definition at trail edge, lack of edge barriers or barriers of improper height would not be addressed; 3) this alternative does not formalize the existing social trails or encourage people to stay on one trail and minimize damage to sensitive resources, or for the safety of the visitor; and 4) this alternative would allow the historic overlooks, important historic properties, to deteriorate.

Preferred Alternative

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. Alternative B is the environmentally preferable alternative and better meets the project objectives; therefore, it is also considered the NPS preferred alternative. For the remainder of the document, Alternative B will be referred to as the preferred alternative.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the affected environment (existing setting or baseline conditions) and analyzes the potential environmental consequences (impacts or effects) that would occur as a result of implementing the proposed project. Direct, indirect, and cumulative effects are analyzed for each resource topic carried forward. Potential impacts are described in terms of type, context, duration, and intensity. General definitions are defined as follows, 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. Effects may be 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 Impact Scenario

The CEQ regulations which implement NEPA 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 preferred alternatives.

Cumulative impacts were determined by combining the impacts of the preferred alternative with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other ongoing or reasonably foreseeable future projects at the Park and, if applicable, the surrounding region. Because the scope of this project is relatively small, the geographic and temporal scope of the cumulative analysis is similarly small. The geographic scope for this analysis includes actions 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, listed from past to future:

- **Canyon Rim Drives EA** – The North and South Rim Drive roads were rehabilitated along with many of the existing overlooks and their associated trails and parking areas in 2008.

These included Artist's Point, Lookout Point, and Grandview Point. At this time the traffic flow pattern of the North Rim Drive was also reversed such that traffic flowed from South to North terminating at Canyon Village.

- **Canyon Contractor Camp** – A contractor camp was constructed in 2001 to provide a space for contractor RVs and trailers for employees working on construction contracts within the park to reside during the construction season of the projects. This area was sited adjacent to an area that was already used for summer RV use by park concessioner employees working in the park in the Canyon area.
- **Non-native Vegetation Management Plan (2013)** – This plan provides guidance to prevent, eradicate, and control the spread of non-native plants through the use of manual and herbicide methods.
- **Wild and Scenic Rivers EA (in progress)** - The National Park Service and U.S. Fish and Wildlife Service are developing a comprehensive river management plan for 99 miles of designated river segments within and along the boundary of Grand Teton and Yellowstone national parks, the John D. Rockefeller, Jr. Memorial Parkway, and the National Elk Refuge.
- **Canyon Lodging/Cabin Redevelopment Project (in progress)** – The concessioner has begun a project to replace a number of deteriorating (Mission 66 era) guest cabins at Canyon. Many of the visitor lodging cabins at Canyon have been removed and are being replaced by multi-unit lodges. This work is being performed within the existing developed area footprint and the first two lodge buildings are expected to be available for occupancy by visitors by August 2015. Three additional lodges would be constructed in a second phase of this project.
- **Canyon Ranger Station/Emergency Services Building** – The National Park Service (NPS) constructed a ranger station and emergency services building (ESB) facility for the Canyon Village area. These facilities were needed to provide ranger offices, storage space, a public contact area, and an operations base for emergency response. The project was approved in September 2004 and constructed shortly thereafter.
- **Canyon Visitor Center** – The Canyon Visitor Center was rehabilitated in 2006. This project updated exhibits within the 22,000 square-foot building, added a much larger auditorium for viewing films, and increased and updated office space for employees.
- **Canyon to Tower Junction (Dunraven Road) Road Improvement Project** – This road reconstruction project began in late summer 2003. The first phase from Chittenden road to Canyon Village was completed in 2005. The second phase from Roosevelt to Tower Fall was completed in 2013. The third phase will begin when funding and scheduling allows (likely beyond 2018). This project's Finding of No Significant Impact (FONSI) was approved 2002. The segment of the Grand Loop Road that comprises the Dunraven Road Reconstruction Project covers a total of 18.4 miles (29.3km). The road is being widened from its existing 19-22 feet to 24 feet.
- **Canyon to Fishing Bridge Road Resurfacing, Restoration, and Rehabilitation** – This project approved in 2002 was completed in 2004 as one of many phases of road refurbishment identified in Yellowstone National Park's 1992 Parkwide Road Improvement Plan. Resurfacing, restoration, and rehabilitation, of this road were necessary to correct road deterioration and numerous safety hazards.

- **Canyon Contractor Camp** – This project was completed in 2002 and expanded an existing trailer park for 50 additional contractor camp sites. These sites are occupied by contractor's workers completing construction projects within Yellowstone National Park. The location of the camp is immediately northeast of the Canyon employee residential area and the employee ball field, just west of the Canyon-to-Tower road.
- **Wildland Urban Interface Fuels Management** – The FONSI for this project was approved May 2003. The project has been ongoing to remove vegetation that poses a danger of helping spread wildfire to existing buildings and infrastructure, in the Canyon Developed area.

Project Location:

The project is generally located within 1/8 of a mile of the developed portion of the rim of the Grand Canyon of the Yellowstone, and within the Grand Canyon of the Yellowstone Historic District. It encompasses portions of the road and trail network including: the North Rim Trail, the South Rim Trail, the overlooks and their connecting trails.

Soils

Affected Environment

Yellowstone National Park lies in a geologically dynamic region of the northern Rocky Mountains. The park is noted for its geologic features that are the result of volcanism, glaciation, and continued geological processes fueled by a continental hotspot. The Canyon area itself is located in the caldera of a huge, collapsed volcano. Throughout geologic time numerous lava flows have filled the caldera with subsequent periods of glacial flows covering and further sculpted the landscape. Canyon Rim Drives and Canyon Village are situated between the Washburn Range to the north and Hayden Valley to the south. Elevation is approximately 2,408 meters (7,900 feet). Terrain is predominantly flat to gently rolling. At the rims of the canyon the terrain drops sharply into the Grand Canyon of the Yellowstone.

The Canyon area is situated between the Washburn Range to the north and Hayden Valley to the south. The elevation ranges between 7,000-8,000 feet and the topography is dominated by the deeply incised Grand Canyon of the Yellowstone River. Fast currents through the Canyon prevent ice from freezing over completely, creating winter habitat for overwintering bird species.

Soils

Soils are an integral component of terrestrial ecosystems that form over time from interactions among source material, climate, topography, and biotic organisms. Soil is derived from four main parent materials in Yellowstone, primarily volcanic. The soils in the western and central plateau areas formed from parent materials derived from rhyolite lava flows and ash flow tuffs. Andesitic parent material from the Eocene Absaroka Volcanics is weathering into soil along the northwest, northeast, and eastern boundaries. Andesitic soils have better moisture-holding capacity and higher levels of nutrients than do rhyolitic soils. Climax lodgepole pine is generally associated with rhyolitic soils, while climax spruce and fir are typically associated with andesitic soils. Soils from loess, evolved from glacial episodes, are found in river floodplains. About 6% of the soil in the park is derived from the fourth parent material, sedimentary rocks consisting of limestones, sandstones, and shales.

More than 80 soil types and 6 soil orders found in the park have been described (Rodman et al. 1996). Most of these types fall into three soil orders: Inceptisols, Mollisols, and Alfisols. Inceptisols, which have weakly developed soil profiles, are the most common soil order in the park and dominate within the caldera in the central and southwestern parts of the park. Mollisols have thick, dark surface horizons and are rich in organic matter. They occur primarily in grasslands in the park, but also in forests across the north and east boundaries of the park. Alfisols have thin surface horizons and subsoil accumulations of clay. They occur throughout the forested north and east parts of the park and dominate in areas weathering from sedimentary rocks.

Soils in the Canyon are derived from rhyolitic sands and gravels that were originally deposited as glacial till or glaciofluvial alluvium. The resulting soils are moderately coarse textured inceptisols with medium to loose base saturation. Inceptisols are soils that exhibit minimal horizon development and lack the features that are characteristic of other soil orders. The dominant slopes have gradients of 20 to 75 percent. The soils are well drained and not subject to flooding after prolonged high intensity storms.

Environmental Consequences

Methodology and Intensity Level Definitions

Analysis of the potential intensity of impacts to geology and soil resources were derived from *Soils of Yellowstone National Park*, park staff's observations, the Natural Resources Conservation Web Soil Survey, and park staff's past observations of the effects on soils from both visitor use and construction activities. The thresholds of change for the intensity of impacts to soils may be adverse or beneficial and are defined as follows:

- Negligible:** Soils would not be affected by compaction, trampling, erosion, removal, etc., or the effects to soils would be below or at the lower levels of detection. Any effects to soils would be slight with no measurable or perceptible changes.
- Minor:** Effects to soils due to compaction, trampling, erosion, removal, etc., would be detectable, small, and localized. Changes would not be expected to be outside the natural range of variability and would be short term. Mitigation measures, if needed to offset adverse effects, would be simple and successful.
- Moderate:** Effects to soils due to compaction, trampling, erosion, removal, etc., would be readily apparent and result in a long-term change to the soils character, including erosion patterns in a localized area. Mitigation measures, if needed to offset adverse effects, could be extensive but would likely be successful.
- Major:** Effects on soils due to compaction, trampling, erosion, removal, etc., would be readily apparent, substantially change the character of the soils and erosion patterns over a large area, and likely would be permanent. Extensive mitigation measures would be needed to offset any adverse effects and their success could not be guaranteed.

Impacts of Alternative A – No Action

The existing drainage system from some parking areas would continue to allow storm water runoff to flow down trails during some heavy storm events that would continue existing erosion leading to gully formation. This storm water runoff has in the past caused damage to trails,

increased erosion of topsoil and subsoils, and lead to a short-term trail closure due to rock fall and debris on trails.

The existing trail, overlook, and parking facilities lack sufficient design elements for controlling heavy storm water runoff and reducing erosion during such events. Spring snowmelt coupled with heavy spring rains has in the past caused parking lot water runoff to flow to the area of the trailhead and down the canyon slope causing erosion and undermining of the paved trail and causing increased waterflow to natural drainages. If not addressed, over time, these storm water and erosion control deficiencies would require the increased expertise and time of maintenance crews to solve and repair, leading to increased workloads of employees, and increased erosion of natural drainages than would have occurred naturally. In time, and left unchecked, these issues could lead to very obvious and difficult issues to repair, and still maintain a safe and usable trail system in order to access the viewing areas of the canyon. As storm and snowmelt events like these do not happen every year, or even every several years, impacts to soils and slopes would be considered minor to moderate and adverse.

Cumulative Effects: Cumulative impacts on soils are based on the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. In YNP ongoing administrative activities such as road reconstruction and maintenance, backcountry operations, facilities maintenance, and hazard fuels reduction projects would continue to have adverse effects on soil resources in the park and the Canyon area. Most of the actions listed in the cumulative scenario in the introduction of this chapter would have, or have had, some degree of effect on soils though the park has a policy of rehabilitating disturbed soils after construction. Under this alternative, there would be some small amounts of earth moving needed to accommodate maintenance functions in the future to maintain existing infrastructure. Trail maintenance would involve localized removal/relocation of soil though the impacts would be minor. These impacts when considered with other past, present, and reasonably foreseeable future actions would be moderate, short-term, and adverse.

Conclusion

Alternative A would have a minor adverse effect on soils at the Park.

Impacts of Alternative B– Upgrade and Improve Canyon Rim Trails, Overlooks, and associated Parking Areas

Alternative B would provide improvements to trails and overlooks to better provide access and additional viewing opportunities to visitors. In order to accomplish this though, some re-grading of existing trails, grading to construct new trails, or grading to make changes to existing parking lots, entry roads, or for the installation of utilities would be needed.

Location of a temporary office trailer would be in an already disturbed area within an existing maintenance yard or pit and would not impact soils. Collection of aggregate and rock materials from stockpiles within existing NPS maintenance areas or commercial sources would not impact soils as these areas are previously disturbed and in most cases have a gravel work base already in place.

Disturbance to soils would occur from the relocation of some segments of trail, construction of new or changed viewing platforms, slight parking lot expansion, and additional pedestrian areas for information kiosks and walkways would total approximately 2.0 acres for the installation of alternative B. Adverse effects to soil from compaction, mixing of soil horizons, and introduction

of soil from one area to another, would be direct, local, long-term, minor, and would be mitigated by stockpiling any topsoil in areas of disturbance, to be reapplied after construction. The construction of a new trail route at Inspiration Point, and a possible re-route of the lower portion of the Red Rock Point trail would have minor short-term adverse impacts to the hillside within the canyon as they would be expected to blend with their surrounding soil conditions quickly, as the steep side slopes cause material from above to cover soils below them from storm water erosion, and wind transport. Impacts from subsurface investigative borings would be minor-short-term and adverse since they are very localized and would be mitigated by removal of any excess cuttings that might litter the surface in these areas.

Cumulative Effects: As described under Alternative A, any construction project that occurs in the Park has the potential to affect soils; therefore, most of the actions listed in the cumulative scenario in the introduction of this chapter would have some degree of effect on these resources. Reconstruction of road and building replacing structures churns up, displaces, and to some extent erodes soils. The mixing or relocation of soils impacts microbes that live in it, plants that grow on it, and colors that are part of it. Impacts to soils would occur from some slight expansion of parking areas at Uncle Tom's and Brink of the Upper Falls, slightly expanded overlooks, new overlooks, and additional trails or widened trails, new bumpouts along trails for resting and viewing opportunities. Implementation of Alternative B, cumulatively would have a moderate adverse impact to park topography, geology, and soils when considered with other past, present, and reasonably foreseeable future actions.

Conclusion

Alternative B would have minor adverse and beneficial impacts on soils of the park.

Vegetation, Rare Plants, and Wetlands Vegetation

More than 1,300 native plant species and an additional 218 non-native plant species can be found in Yellowstone. Yellowstone is home to three endemic species: Ross's bentgrass (*Agrostis rossiae*), Yellowstone sand verbena (*Abronia ammophila*), and Yellowstone sulfur wild buckwheat (*Eriogonum umbellatum* var. *cladophorum*). There are also 97 rare plant species within the park. Yellowstone's 97 rare plant species (vascular plant species, subspecies, and varieties) reflect the park's complex geologic substrate, thermal influence, diverse topography, and wide elevation range found in the park. They also include species on state heritage lists and sensitive plant species designated by park staff. No federally listed threatened or endangered plants have been documented in Yellowstone National Park. In June 2011, the USFWS determined that the whitebark pine warrants protection under the ESA but adding the species to the federal list was precluded by the need to address higher priority listing actions. Whitebark pine is discussed in the *Special Status Species* section of this EA. This species is currently a candidate species eligible for ESA protection and its status reviewed annually.

The elevation of the Grand Canyon of the Yellowstone ranges between 7,000-8,000 feet and receives approximately 16-18 inches of precipitation per year. Canyon vegetation is characterized by mature forest dominated by lodgepole pine *Pinus contorta* with occasional subalpine fir *Abies bifolia*, Englemann spruce *Picea englemannii*, and Whitebark pine *Pinus albicaulis* comprising the upper canopy. The forest understory is variable, but often includes such species as pinegrass *Calamagrostis repens*, elk sedge *Carex geyeri*, grouse whortleberry *Vaccinium scoparium*, and bluejoint reedgrass *Calamagrostis canadensis*. Other species present include arnica *Arnica cordifolia*, arrowleaf groundsel *Senecio triangularis*, and a variety of other grasses and mosses. Bear foods in the Canyon area include yampa *Perideridia gairdneri*, strawberries *Fragaria virginiana*, sedges *Carex* sp., and Timothy Phleum sp. The

forest is interspersed with meadows of various sizes that contain numerous shrub, grass, and forb species.

Methodology and Intensity Thresholds

Analyses of the potential intensity of impacts to vegetation were derived from the available historic reports, research projects, current management action summaries and park staff's observations. Site specific surveys were conducted by park plant specialists for rare plants, exotic vegetation, and wetlands in late May and early June 2015.

Intensity Level Definitions

The thresholds of change for the intensity of impacts to vegetation may be adverse or beneficial and are defined as follows:

- Negligible:** The impact is at the lowest levels of detection and causes very little perceptible change to a plant population or individuals of species or a resource.
- Minor:** The impact is slight, but detectable with few perceptible effects to a plant population or individuals of species or a resource.
- Moderate:** The impact is readily apparent and has measurable effects to a plant population or individuals of species or a resource.
- Major:** The impact is severe or adverse impact of exceptional benefit and has severe effects to a plant population or individuals of species or a resource.

Rare Plants

One species of special concern known to occur in the Canyon area is Thread Rush *Juncus filiformis*, which occurs on the north side of the employee housing area, and would not be affected by this proposed project. There are no federally listed or candidate (category I) plant species that are known to occur in the park. However, there are two endemic plant species that occur only in Yellowstone National Park—Ross' bentgrass *Agrostis rossiae* which occurs in geothermal areas along the Firehole and in the Shoshone Geyser Basin, and Yellowstone sand verbena *Abronia ammophila* which is restricted to sandy lakeshores around Yellowstone Lake. Neither species was found in the Canyon area. Hall's Rush *Juncus hallii* – is found in Canyon area seeps and springs.

Ross's Bentgrass

In 2011, the USFWS concluded adding Ross's bentgrass (*Agrostis rossiae*) to the Lists of Endangered and Threatened Wildlife and Plants was not warranted (USDI, USFWS 2011a). This plant is a thermal species occurring in three geyser basins (upper, midway, and lower) along the Firehole River and one at Shoshone Lake in YNP (USDI, USFWS 2011a). This plant is one of the first to green up in YNP (sometimes as early as January) because the temperature near the soil surface is usually about 100 degrees Fahrenheit (38 degrees Celcius; USDI, NPS 2010c). Full bloom occurs in late May and early June, after which the plants dry out and die due to the sun's heat and geothermal heat (USDI, USFWS 2011a). The total population is about 5,000 to 7,500 plants and potential threats include development, trampling, nonnative invasive plants, climate change, thermal fluctuations, fire, and drought (USDI, USFWS 2011a).

Yellowstone Sulfur Wild Buckwheat

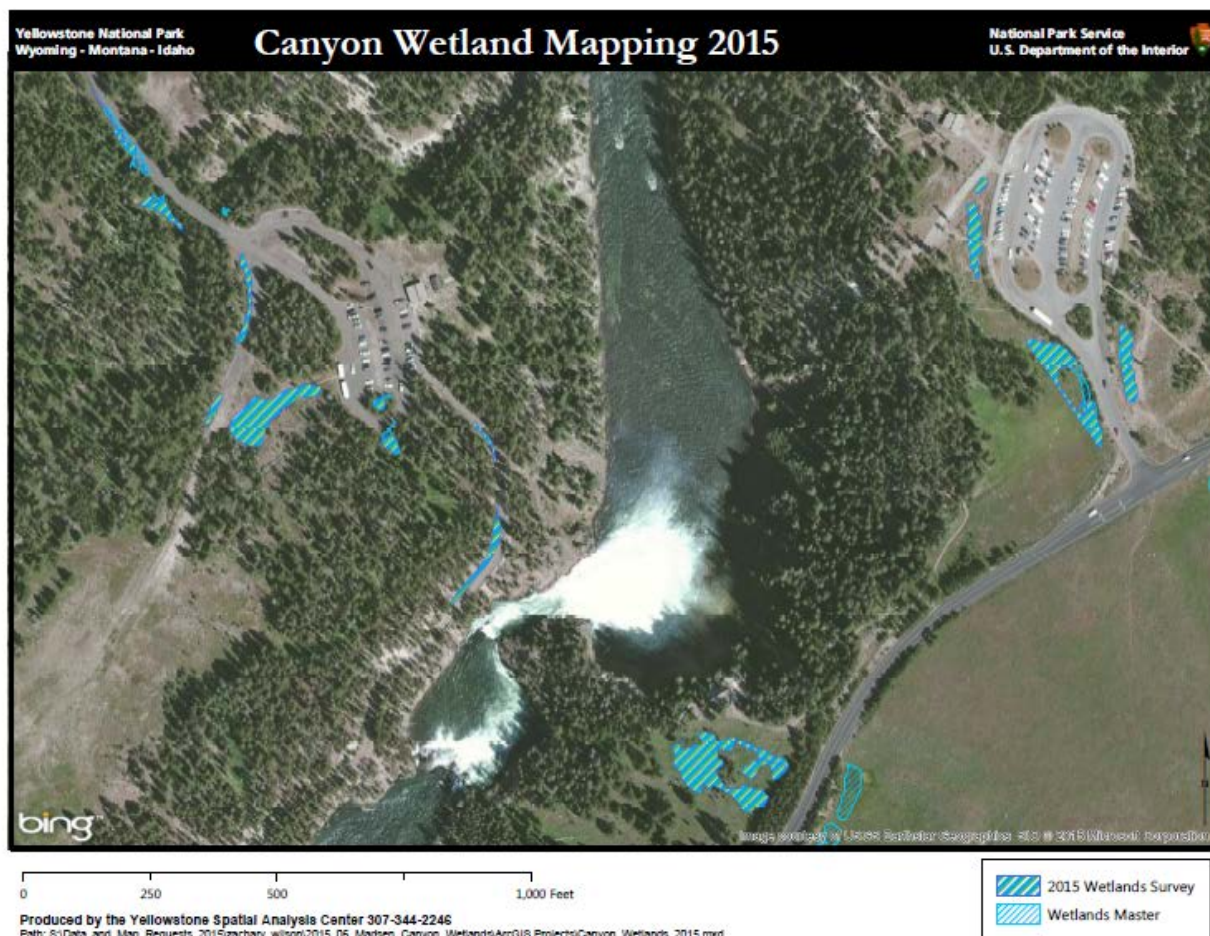
This plant (*Eriogonum umbellatum* var. *cladophorum*) is one of several varieties of sulfur buckwheat in YNP. It grows in the Firehole River drainage on barren ground along the edges of thermally influenced sites from Madison Junction to the Upper Geyser Basin (Whipple 2012). Yellowstone sulfur wild buckwheat primarily occurs in glacial till with obsidian sand on the surface, though it can grow on other soil types (Whipple 2012). However, the exact distribution and potential threats to this plant are not well known (Whipple 2012).

Exotic Vegetation

At least 187 species of non-native plants are known to have occurred in Yellowstone National Park, and many of these species are invading natural communities (Whipple et al. 2001). While the Canyon area has experienced less severe invasions of non-natives plants than other areas of the park due to its distance from park boundaries and higher elevation, several of these exotic species are found in the Canyon area, including Canada thistle, butter-and-eggs, yellow sweet clover, Orange hawkweed, and spotted knapweed. Most non-native plants are found in disturbed areas such as developments and road corridors.

Wetlands and Riparian Areas

Wetlands cover 357 square miles of Yellowstone and include lakes, rivers, ponds, streams, seeps, marshes, fens, wet meadow, forested wetlands, and hydrothermal pools. Wetlands and riparian areas in Yellowstone provide essential habitat for rare plant species as well as reptiles, amphibians, and numerous insects, birds, mammals and fish in the park. Approximately 38% of



the park's plant species are associated with wetlands, and 11% grow only in wetlands (NPS 2011a). The National Park Service uses a system created by the USFWS (Cowardin, Carter et al. 1979) to define, classify, and inventory wetlands. As part of the National Wetlands Inventory, in 1997 the USFWS published a map that identified 118,528 acres as palustrine wetlands; the total wetlands habitat in Yellowstone, including deepwater habitat such as lakes and rivers, was 228,766 acres (Elliott and Hektner 2000). Since then, wetland surveys and more precise mapping has been done by NPS staff in the Mammoth, Canyon, Old Faithful, and Lake developed areas, as well as along some road corridors.

Wetland surveys were performed in the area around the parking lots for Brink of the Upper Falls and Uncle Tom's Parking lot in June of 2015. Wetlands and "other waters of the US" were identified within the survey area and determinations for the areas were performed as outlined in the April 2008 Corps of Engineers' Interim Regional Supplement to the Corps of Engineers *Wetland Delineation Manual: Western Mountains, Valleys and Coast Region*. Most of the wetlands identified in the survey area are seasonally wet meadows and had a large amount of clay in the soil. A few of the wetlands identified likely are inundated with water all year. None of the wetlands were geothermally influenced nor did any of the wetlands identified have an organic soil. A few of the wetlands are spring fed and were directly connected to a perennial stream that eventually connects to the Yellowstone River. Other wetlands were in the middle of the parking lot and received water from the parking lot. Yet other wetlands were ditches that connected to a wetland. No rare plants were found within the wetlands.

• **Hydrothermal Communities.** Plant communities have developed in the expanses of thermally heated ground. Many of the species found in the geyser basins tolerate tremendously different conditions, and grow all over the western United States while others are typical of the central Rockies and a few are endemic to the region (NPS, 2011a). Geothermal areas, especially those with neutral acid systems, are fertile ground for invasions by nonnative species due to the extreme conditions (often high or low pH, little soil development, and high temperatures due to the thermal influence and lack of shade), no hydrothermal plant communities are found within the project area.

Impacts of Alternative A – No Action

The no-action alternative would continue the status quo with potential impacts from ditch cleaning, roadside vegetation removal, trail maintenance, and culvert repairs. No new impacts to wetlands would occur. The potential exists that some weeds or exotics could seed in areas disturbed by roadside ditch cleaning and from trail maintenance activities that disturb soils. The Park's resource management crews would be tasked with exotic weed control, thus keeping impacts to a negligible to minor range.

This alternative would have no effect on the forest canopy and understory, and would not affect exotic vegetation.

Some storm water runoff from existing roads, parking areas, and paved trails would continue to find its way to adjacent tributaries and waterways. This runoff could have minor impacts to vegetation by covering over small plants with deposited sediments, or negligible amounts of petroleum products carried by storm water from parking areas near trail heads.

Cumulative Effects: Negligible to minor wetland impacts from backhoe use during ditch cleaning would occur to ditch wetlands along the existing road from road maintenance work that would include vegetation removal and rock fall removal. Vegetation and wetland impacts from

this alternative in conjunction with past and foreseeable future projects would be minor. Past and future trail maintenance activities have and would have minimal effects past road reconstruction activities, and exotic weed removal on vegetation, waterways and wetlands. Past projects have had minor beneficial effects on vegetation and wetland in the long-term. The short-term effects of trail and overlook rehabilitation would have minor adverse impacts.

Conclusion

The no-action alternative would continue to have minor adverse impacts on vegetation, and wetlands due work performed at trail edges, and storm water runoff from paved areas into established waterways.

Impacts of Alternative B – Upgrade and Improve Canyon Rim Trails, Overlooks, and associated Parking Areas

A wetland survey of the project area, that included potential wetland impacts, was completed in June 2015. The survey was used during initial design to avoid and then to minimize impacts to wetlands in the project area. The wetland survey confirmed that some wetlands located adjacent to parking areas or in the area of proposed new trail alignments and within road ditches would be disturbed by proposed design changes. Proposed widening of the turning radii of the entrance road and parking areas to improve pedestrian safety while accommodating buses and RVs would result in the loss of approximately 0.03 acre of adjacent wetlands on the inside and outside of curves. The rehabilitation of an existing trail to an accessible pedestrian trail would cause a shift in the entrance road at Brink of the Upper Falls resulting in impacts to a ditch wetland adjacent to the road. These ditch wetlands were originally an outgrowth of previous disturbance to construct the road ditch and are supported by seeps found on embankments immediately adjacent to the road and in the ditch. Areas directly adjacent to the existing ditch would be re-contoured to allow the original roadside ditch hydrological conditions to be reestablished and maintained. Approximately 15 square feet of permanent impacts to wetlands would occur in the area of proposed elevated boardwalk sections due to piles used to support two short sections of boardwalk accessing an overlook of the Upper Falls on the Yellowstone River. The boardwalk would be elevated to allow vegetation to grow under the boardwalk. Impacts to wetlands here would equal about 150 square feet as some shading would occur to vegetation under the two 24' sections of 6' wide.

Under the preferred alternative approximately 0.07 acres of wetlands would be permanently impacted. Of this total, some impacts might be considered temporary in nature, and would occur in the construction of culvert headwalls (rehabilitation of structures at water's edge), shifts in roadway and parking lot alignments, and the construction of boardwalks. These impacts are included in the total wetland disturbance described earlier, but vegetation is expected to readily return and no loss of wetland function would occur. Some impacted wetlands would be restored to pre-disturbance conditions following construction by maintaining the same grade as the existing wetland, maintaining hydrology and planting wetland vegetation. One such wetland that may be temporarily impacted is a wetland ditch that receives water from an adjacent wetland. The adjacent wetland would not be impacted and the wetland ditch is expected to reestablish due to existing seeps and reapplication of conserved wetland topsoil. The ditch would be re-established at the same grade parallel to the road (Brink of the Upper Falls). The road shift prompting the ditch wetland impact would occur due to the road shift required in order to accommodate a new accessible pedestrian trail. Wetlands have been avoided to the extent possible in this alternative. In areas where wetlands would be impacted by the construction of two 24-foot sections of boardwalk, the boardwalk would be constructed at a minimum height of 18 inches. The raised boardwalk in these areas would help maintain wetland hydrology and at least 5% cover of wetland vegetation, as shading can many time reduce vegetation under

boardwalks to even less by reducing sunlight. The proposed boardwalk would only permanently impact the wetland with the pilings. The wetland that the proposed boardwalk would impact is a wetland that likely stays wet from most of the growing season. It is on a slight slope and has a large component of nonnative species such as Canada thistle (*Cirsium arvense*).

A total of 8 individual wetlands would be affected. The total area of wetlands lost would be approximately (0.07 acre). These wetlands are classified as palustrine emergent, or palustrine forested wetlands, either saturated or seasonally flooded. Affected roadside ditch wetlands would have existing topsoil stripped, the fill removed and the topsoil replaced. In some cases wetlands would be temporarily disturbed during construction of two short 24-foot sections of permanent raised boardwalk near Sunset Overlook. In both types of areas, wetland species would be planted and the wetlands would be restored to near pre-disturbance conditions following construction. Any access across wetlands would require plywood planking to first be placed to avoid as much compaction as possible.

In general, limited short-term erosion within the construction zones could occur during the construction period. Erosion control features would minimize any eroded material from entering water bodies or wetlands before vegetation became established. Scheduling and standard erosion control measures and barriers would be implemented to prevent runoff from degrading water quality. The emphasis would be on techniques that do not need to be removed later (mulch vs. silt fences).

Some storm water runoff from existing roads, parking areas, and paved trails would continue to find its way to adjacent tributaries and waterways though armored waterways and energy dissipaters would slow water allowing more to infiltrate prior to reaching surface waters. Drainage conveyances off the parking areas at Uncle Toms and Brink of the Upper Falls would be hardened if needed to reduce or eliminate any concerns from erosion off these paved areas. Impacts from implementing Alternative B on waterways or wetlands would be negligible from small amounts of petroleum products from asphalt and leaking vehicles found in parking areas near trail heads.

In compliance with the Clean Water Act, a Section 404 permit would be obtained from the Army Corps of Engineers for all work within waters of the United States and adjacent wetlands. A National Pollutant Discharge Elimination System (NPDES) permit would also be obtained. As the wetland impacts are caused by portion of the project that meet exceptions to the NPS

After construction activities are completed, revegetation with native plant materials would return the two acres of disturbed areas to a more natural state. Plant species used would reflect the vegetation native to the area and would not include plants known to attract bears. The long-term effects on exotic vegetation of either action alternative would be minor after completion of the revegetation efforts and the monitoring and control of exotic plants.

Present estimates of wetland impacts are approximately 0.07 acre. As the wetland impacts of this alternative are less than 0.1 acre, and the impacts result from design exceptions 4.2.1a, and 4.2.1 g, listed in DO77-1 *National Park Service Procedural Manual: Wetland Protection*, a Statement of Findings for Wetlands would not be prepared. The 15 Best Management Practices and Conditions, listed in Appendix 2 of DO 77-1 would be followed. Boardwalks would be elevated, planking would be used if crossing wetlands when crossing cannot be avoided, native seed would be used in any revegetation efforts, topsoil would be stockpiled and replaced, no stockpiles in wetlands would occur, and erosion and silt controls would be used.

The long-term effects on exotic vegetation would be minor after completion of the revegetation efforts and monitoring and control of exotic plants.

The alternative would remove approximately 2.0 acres of lodgepole pine overstory, along with its associated understory vegetation due to the impacts of the construction proposed in this alternative. When the forest canopy is opened for a construction project, remaining trees may become more vulnerable to wind-throw and could become hazards to human safety and property. Hazard trees would be removed before they would fall and cause damage or injury.

Disturbance to vegetation would be mitigated by topsoil conservation, revegetation and noxious weed monitoring and control efforts. The project would have a minor long-term effect on the vegetation directly adjacent to the trails, overlooks, and parking areas where construction efforts would be focused. This project is not expected to affect any rare plants because none exist in the project area

Cumulative Effects: All wetland impacts from the cumulative impact scenario would have come from lodging replacement and road and bridge related projects in the area. Impacts occurred from culvert replacement, road widening directly adjacent to wetland areas when the road was unable to be shifted away from the wetland, and from slight construction caused erosion into wetlands. Out of the park's total 357 square miles of wetlands, approximately 1.13 acres of wetlands have been impacted by projects in the canyon vicinity (Dunraven Pass to Canyon Rims) over the last 15 years., the 0.07 acre of wetland impacts from this alternative added to impacts of previous and future projects listed in the cumulative impacts scenario, would be considered moderate and adverse to park vegetation, rare plants and wetland resources.

Conclusion

The preferred alternative taken individually would result in minor adverse long-term impacts to (0.07 acre) within portions of 8 wetlands.

Wildlife

The park is home to the largest concentration of mammals in the lower 48 states with 67 different mammals living within the park (NPS, 2011b). Yellowstone mammals include the black bear (*Ursus americanus*), grizzly bear (*Ursus arctos*), wolves (*Canis lupus*), cougars (*Puma concolor*), coyote (*Canis latrans*), fox (*Vulpes vulpes*), bobcat (*Lynx rufus*), marten (*Martes americana*), striped skunk (*Mephitis mephitis*), mule deer (*Odocoileus hemionus*), bighorn sheep (*Ovis canadensis*), moose (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), bison (*Bison bison*), elk (*Cervus canadensis*), beaver (*Castor canadensis*), river otter (*Lontra canadensis*), red squirrel (*Sciurus vulgaris*), porcupine (*Erethizon dorsatum*), snowshoe hare (*Lepus americanus*) and many species of rodents. There are also eight species of bats that may be present in the park including the little brown bat (*Myotis lucifugus*), the big brown bat (*Eptesicus fuscus*), and the silver-haired bat (*Lasionycteris noctivagans*) (NPS, 2011c).

Methodology and Intensity Thresholds

Analyses of the potential intensity of impacts to wildlife were derived from all available research studies, historic reports and park staff's observations of mammals, birds, amphibians and reptiles, fish, threatened and endangered species, and species of special concern. Discussions with park wildlife specialists occurred for wildlife groups listed above to determine affects to various species. Map locations of sensitive resources were compared between alternative locations.

Intensity Level Definitions

The thresholds of change for the intensity of impacts to wildlife may be adverse or beneficial and are defined as follows:

- Negligible:** Neither wildlife nor fish would be affected, changes would be either non-detectable or, if detected, would have effects that would be considered slight and short-term.
- Minor:** Temporary displacement of a few localized individuals or groups of animals or fish; mortality of individuals that would not impact population trends; mitigation measures, if needed to offset adverse effects, would be simple and successful.
- Moderate:** Effects to wildlife would be readily detectable, long-term and localized, with consequences affecting the population level(s) of specie(s). Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful
- Major:** Effects to wildlife would be obvious, long-term, and would have substantial consequences to wildlife populations in the region; mortality of a number of individuals that subsequently jeopardizes the viability of the resident population; extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.

Mammals

Red fox are present in Yellowstone National Park and in meadows and forests near Canyon junction. There have been isolated reports of fisher in the Canyon area. Badgers are rare but have been reported near Canyon. Although bobcats are rarely seen in the park, the habitat near Canyon may support these animals. Mountain lions have been reported in the Canyon area. This area is generally summer range for mountain lions. Wolves hold territories around the Canyon area and are routinely observed. River otters have been sighted on the Yellowstone River between Fishing Bridge and Canyon.

Small groups of bison are found in the Canyon area throughout the year. Wintering population of bison are found in this area mainly along wind swept ridges and stream bottoms of the Yellowstone River and within geothermal areas such as Mud Volcano south of Canyon and Norris Geyser Basin west of Canyon.

Elk, mule deer, and moose make use of habitats in the Canyon area. Bighorn sheep are found on the slopes of Mount Washburn, north of Canyon. One mountain goat was sighted in 2001 on top of Dunraven Peak, four miles north of the Canyon developed area. Pronghorn are not known to occur in the Canyon area.

Black bears are dispersed throughout the park. Although there is some habitat overlap with grizzly bears, black bears are more likely to be found in forested cover types than grizzly bears, which dominate the meadows. Spring foraging includes winter-killed or weakened ungulates and early emergent vegetation. Summer foods include numerous grass and forb vegetation species found in wet and moist sites, roots such as those from biscuit root and Yampa in moist to dry open meadows, and insects such as ants in mature forests. Fall foods for bears include mostly Whitebark pine seeds found in high elevation timber stands (Mattson et al. 1992). No loss of bear habitat from this project is anticipated. The impact on grizzly bears is analyzed in the "Threatened and Endangered Species" section.

Birds

Records of bird sightings have been kept in Yellowstone since its establishment in 1872. These records document 330 species of birds to date, including raptors, songbirds, shorebirds, and waterfowl. Approximately 150 species nest in the park. The variation in elevation and habitat types found within Yellowstone contribute to the relatively high diversity. Many of the birds are migratory. The YNP bird program monitors a small portion of its breeding bird species to gather information like reproduction, abundance, and habitat use, on multiple species from a wide variety of taxonomic groups; and maintain data from 20 or more years for several species. Long-term monitoring efforts help inform park staff of potential shifts in ecosystem function (e.g., climate change effects) for Yellowstone's bird community and guide future management decisions.

Two threatened or endangered bird species occur in Yellowstone National Park (See "Threatened and Endangered" section). The black-backed woodpecker is primarily found in conifers, particularly spruce-fir forests or mixed lodgepole pine/spruce-fir forests. This bird is rarely observed along the Canyon area because the habitat is almost exclusively lodgepole pine. The three-toed woodpecker is more frequently found than the black-backed woodpecker. The habitat requirements of this species primarily include coniferous forests, especially disturbed or recently burned sites with dead or dying trees.

Neotropical species may use areas around the Canyon rim for breeding between May 1-July 31. Two bird species of special concern to Yellowstone National Park are found within the confines of the proposed development—the boreal owl and the great gray owl. Both utilize coniferous trees for nest sites and cover, yet hunt the open meadows. Nesting surveys would be conducted prior to any tree-cutting work.

No effect on avian species would be expected from the no-action alternative. Long-term, direct effects of either action alternative would be negligible to bird populations due to the small area of land affected. Most construction would occur within the footprint of the existing trail system. Trees would be sparingly removed, and the construction footprint minimized to the greatest extent possible. No disturbances would occur in important raptor hunting areas such as open areas or wet meadows.

Amphibians and Reptiles

Impacts on amphibian and reptile species were cited as a concern during the scoping phase of this project.

A survey of amphibian and reptile populations in the Canyon area was conducted in 1995 along the Grand Loop Road near Canyon (Patla 1998). Breeding ponds for the (boreal) chorus frog and the Columbia spotted frog were found in ponds south and west of the Canyon junction, and in a forested pond north and west of the junction. Blotched tiger salamanders are known to exist in a man-made concrete cistern approximately 1,200 meters (1097 yards) south of the junction and west of the Grand Loop Road. The western (boreal) toad, a species that has been declining in the Yellowstone area (Koch and Peterson 1995), was not found during amphibian surveys but a dead western (boreal) toad was found recently in the Canyon area.

The pathogen *Batrachochytrium dendrobatidis*, which causes the disease chytridiomycosis, has been found in boreal toad populations throughout the species' range (Pearl et al. 2007). This fungal disease is suspected to be responsible for severe decreases in numbers of toads within the southern Rocky Mountains (Muths et al. 2003). However, the severity of impacts from

chytridiomycosis on infected toad populations has not been consistent across their range. In the GYE, a high incidence of chytridiomycosis infection was associated with a negative rate of population growth, but not the population crash or extinction observed in other toad populations with high prevalence of chytridiomycosis (Pilliod et al. 2010, Corn et al. 2011). In YNP, chytridiomycosis is widespread in amphibian populations, with a high prevalence of infection in boreal toads (Treanor et al. 2012). Several factors, including host susceptibility and environmental conditions, may determine if infections become lethal and cause decreases in toad abundance (Murphy et al. 2009). Therefore, further monitoring is being conducted to determine whether chytridiomycosis is negatively affecting toad survival. Wandering garter snake, and rubber boa have also been documented in the Canyon area.

Fish

Yellowstone's native fish have underpinned natural food webs, had great local economic significance, and provided exceptional visitor experiences. Native cutthroat trout are thought to be among the most ecologically important fish of the Greater Yellowstone Ecosystem and highly regarded by anglers. Several factors, nonnative species and disease among them, are threatening the persistence of native fish. The ranges and densities of Yellowstone's native trout and grayling were substantially altered during the 1900s due to exploitation and introduction of nonnative species. Nonnative species in the park include brook trout, brown trout, lake chub, lake trout, and rainbow trout. YNP's goal is to restore the ecological role of native species, including fluvial Arctic grayling, west slope cutthroat trout, and Yellowstone cutthroat trout, while ensuring sustainable native fish angling and viewing opportunities for visitors.

Despite changes in species composition and distribution, large-scale habitat degradation has not occurred. Water diversions, water pollution, and other such impacts on aquatic ecosystems have rarely occurred in Yellowstone. Consequently, fish and other aquatic inhabitants continue to provide important food for grizzly and black bears, river otters, mink, ospreys, bald eagles, pelicans, and many other birds and other species.

Aquatic nuisance species disrupt ecological processes because they are not indigenous to the ecosystem. Invasive organisms can cause species extinction, with the highest extinction rates occurring in freshwater environments. Aquatic nonnative species that are having a significant detrimental effect on the park's aquatic ecology include lake trout in Yellowstone Lake; brook, brown, and rainbow trout in the park's streams and rivers; and the parasite that causes whirling disease. Though there are other aquatic nonnative species in the park, their effects are less dramatic.

The Yellowstone River in the Canyon is not critical habitat for Yellowstone cutthroat trout habitat.

Special Status Species

The species listed below are either federally listed as endangered, threatened, proposed, or candidate species or are listed by the park as a species of management concern. The evaluation of effects included direct, indirect, interrelated, interdependent, and cumulative impacts as defined by the Endangered Species Act (ESA). Mitigation proposed by the park for impacts on threatened or endangered species could include avoidance, minimization, and conservation measures as agreed upon by the USFWS.

Four species protected under provisions of the Endangered Species Act of 1973 (as amended) are present in Yellowstone National Park. The grizzly bear and Canada lynx are classified as threatened. The gray wolf was reintroduced into Yellowstone in 1995 and 1996 and is classified

as a nonessential experimental population. Although additional flexibility for management of such a population is allowed under the final rule and special regulations promulgated in 1994 (59 FR 60252), wolves that are part of the experimental population are considered a threatened species on any National Park Service or National Wildlife Refuge System lands. The whooping crane is listed as endangered, but is no longer considered a species found in Yellowstone National Park. The U.S. Fish and Wildlife Service (USFWS) removed the peregrine falcon from the list of threatened and endangered species in 1999. Although no longer endangered, the peregrine falcon (as with other migratory birds), their eggs, parts, and nests would continue to be protected from unauthorized killing, possession, transportation, and importation by the Migratory Bird Treaty Act.

Boreal toad (*Anaxyrus boreas boreas*) - The range of the boreal toad extends from southern Alaska through British Columbia, Washington, Oregon, and northern California and east through Idaho, western Montana, western and south-central Wyoming, Nevada, the mountains and higher plateaus of Utah, and portions of the mountains of Colorado (Koch and Peterson 1995, Keinath and McGee 2005). The boreal toad is listed as Near Threatened on the **International Union for Conservation of Nature's** Red List of Threatened Species because toad populations have decreased in western North America (Hammerson et al. 2004), with isolated populations in the southern Rocky Mountains (Colorado, New Mexico, Wyoming) being particularly vulnerable to extinction (Keinath and McGee 2005; **International Union for Conservation of Nature** 2014).

The pathogen *Batrachochytrium dendrobatidis*, which causes the disease chytridiomycosis, has been found in boreal toad populations throughout the species' range (Pearl et al. 2007). This fungal disease is suspected to be responsible for severe decreases in numbers of toads within the southern Rocky Mountains (Muths et al. 2003). However, the severity of impacts from chytridiomycosis on infected toad populations has not been consistent across their range. In the GYE, a high incidence of chytridiomycosis infection was associated with a negative rate of population growth, but not the population crash or extinction observed in other toad populations with high prevalence of chytridiomycosis (Pilliod et al. 2010, Corn et al. 2011). In YNP, chytridiomycosis is widespread in amphibian populations, with a high prevalence of infection in boreal toads (Treanor et al. 2012). Several factors, including host susceptibility and environmental conditions, may determine if infections become lethal and cause decreases in toad abundance (Murphy et al. 2009). Therefore, further monitoring is being conducted to determine whether chytridiomycosis is negatively affecting toad survival.

Yellowstone Cutthroat Trout (*Oncorhynchus clarkii bouvieri*): Yellowstone cutthroat trout (*Oncorhynchus clarkii bouvieri*) occupy more than 3,915 miles (6,300 kilometers) within their native range in Idaho, Montana, Nevada, Utah, and Wyoming (May et al. 2007). The largest population of Yellowstone cutthroat trout occurs in Yellowstone Lake (surface area = 84,283 acres or 34,108 hectares), where this shallow-spawning subspecies provides an important food source for many animal and bird species (Varley and Schullery 1998, USDI, NPS 2010b, Gresswell and Tronstad 2013). Streams in the northern portion of YNP also support large concentrations of Yellowstone cutthroat trout (USDI, NPS 2010b). There are serious threats to Yellowstone cutthroat trout, however, including interbreeding with introduced rainbow trout (*Oncorhynchus mykiss*), the illegal introduction of lake trout which prey on cutthroat trout, and several outbreaks of whirling disease caused by the *Myxobolus cerebralis* parasite in major spawning tributaries (Koel et al. 2006; USDI, NPS 2010b). Also, a recent drought in the GYE made several spawning tributaries run dry in late summer, preventing cutthroat fry from migrating to Yellowstone Lake and making them more susceptible to predators such as gulls (*Larus californicus*) and pelicans. These threats have substantially reduced cutthroat

populations in Yellowstone Lake and adjacent parts of the Yellowstone River (Koel et al. 2005; USDI, NPS 2010b).

The NPS is currently working to restore Yellowstone cutthroat trout in Yellowstone Lake and the northeastern portion of YNP as part of its Native Fish Conservation Plan for YNP (USDI, NPS 2010b). Ongoing actions include aggressively suppressing lake trout by killing hundreds of thousands per year and implementing actions (e.g., electroshocking) to kill embryos on spawning areas. The NPS is also attempting to restore Yellowstone cutthroat trout to the Elk Creek complex near Tower Junction and create barriers to further rainbow trout invasion of cutthroat trout habitat in upper Slough Creek, upper Soda Butte Creek, and the upper Lamar River (USDI, NPS 2010b). In addition, the NPS is suppressing brook trout in cutthroat trout habitat by electrofishing on Soda Butte Creek and encouraging anglers to remove rainbow trout from the Slough Creek meadows (USDI, NPS 2010b).

West slope Cutthroat Trout (*Oncorhynchus clarkii lewisi*): This subspecies currently occupies only 19 to 27% of its historical range east and west of the Continental Divide in Montana and about 36% of its historical range in Idaho (Shepard et al. 2003, 2005). Some of the historically most secure populations in Glacier National Park and the Flathead Basin of Montana are in jeopardy, and in the upper Missouri river drainage, westslope cutthroat trout now occupy less than 5% of their historic range (Shepard et al. 2003, 2005). The remaining population persists in small streams, occupying isolated habitats ranging from several hundred meters to a few kilometers in extent. Numerous stressors, including stocking of nonnative fish and habitat degradation and fragmentation from land use activities have reduced the distribution and abundance of westslope cutthroat trout (Shepard et al. 2003, 2005).

Streams along YNP's western boundary are within the historic range of westslope cutthroat trout, but the only aboriginal westslope cutthroat trout persist in approximately 2 miles (3 kilometers) of a small, remote tributary to Grayling Creek (Koel et al. 2006). Also, westslope cutthroat trout are present as a recently restored population in East Fork Specimen Creek and as a population stocked in Geode Creek within the Yellowstone River drainage in the 1920s (USDI, NPS 2010b). As part of the Native Fish Conservation Plan for YNP, the NPS is attempting to restore westslope cutthroat trout to Grayling Creek and has constructed a barrier near Highway 191 to enable and/or preserve the restoration of westslope cutthroat trout to the North Fork and mainstem of Specimen Creek (USDI, NPS 2010b). Also, the NPS is creating a secure, genetically-unaltered westslope cutthroat trout brood source within the Goose Lake chain of lakes near the Firehole River Drive (USDI, NPS 2010b).

Arctic Grayling (*Thymallus arcticus*): The arctic grayling is considered a Species of Special Management Concern by the NPS and the USFWS. Stream-dwelling grayling are restricted to less than 5% of their native range in the contiguous United States (Steed et al. 2011). They were once widespread in the Missouri River drainage, but wild grayling persist only in the Big Hole River, representing approximately 4% of their native range in Montana (USDI, NPS 2010b). In 2014, however, the USFWS found listing the upper Missouri River distinct population segment of arctic grayling under the federal Endangered Species Act was not warranted because habitat-related threats have been ameliorated and 19 of 20 populations are stable or increasing (USDI, USFWS 2014c).

In YNP, grayling historically occupied rivers in the Madison and Gallatin drainages on YNP's west side. However, arctic grayling currently exist in YNP only as lake-dwelling populations introduced into Wolf and Grebe lakes, which form the headwaters to the Gibbon River (Varley and Schullery 1998). A study during 2005 and 2006 found a small number of grayling in the

Gibbon and Madison rivers, which were likely downstream emigrants from Wolf and Grebe lakes (USDI, NPS 2010b; Steed et al. 2011). Successful spawning and fry were not detected within the Gibbon River below the headwater lakes, indicating a reproducing stream-dwelling population does not exist (Steed et al. 2011). Streams along YNP's western boundary are within the historic range of arctic grayling and the NPS is currently working to restore this species to Grayling Creek as part of its Native Fish Conservation Plan for YNP (USDI, NPS 2010b).

Whitebark Pine (*Pinus albicaulis*) - Status - Candidate Species for T&E: In 2011, the USFWS concluded whitebark pine warranted being added to the Lists of Endangered and Threatened Wildlife and Plants, but such listing was precluded by higher priority actions. Instead, whitebark pine was added to the candidate species list (USDI, USFWS 2011b). Whitebark pine is a 5-needled conifer species with a life-span of up to 500 years. It occurs at elevations over 8,005 feet (2,440 meters) and periodically produces abundant crops of high quality seeds consumed by more than 20 species of vertebrates, including grizzly bears (Felicetti et al. 2003, Schwartz et al. 2013). Whitebark pine is threatened by the mountain pine beetle (*Dendroctonus ponderosae*), white pine blister rust (*Cronartium ribicola*), and climate warming (Logan et al. 2010, Tomback and Achuff 2010, Olliff et al. 2013). The native mountain pine beetle periodically causes widespread mortality of pine trees, including whitebark pine. Since the early 2000s, the mountain pine beetle has caused substantial tree mortality in the GYE (Logan et al. 2010). However, high levels of mountain pine beetle mortality are not unprecedented. Large-scale, epidemic outbreaks of mountain pine beetle also occurred in the GYE in the 1930s and 1970s (Despain 1990, Olliff et al. 2013).

The exotic white pine blister rust was introduced in North America in the late 1920s. Since its arrival, the fungus has killed many whitebark pine trees in the Pacific Northwest and northern Rocky Mountains, including Glacier National Park (Tomback et al. 2001). White pine blister rust has been less lethal in the GYE than other areas, but does continue to spread. Surveys suggest approximately 25% of the whitebark pine trees in the GYE are infected with rust, but rust-caused mortality of infected trees is less than 6%; much lower than in other ecosystems (Greater Yellowstone Whitebark Pine Monitoring Working Group 2011, Olliff et al. 2013). Recent climate warming trends may also contribute to the decrease in whitebark pine through competition from species such as lodgepole pine that are more successful on warmer sites (Logan et al. 2010). A warmer climate may also aid the spread of mountain pine beetle and blister rust by producing more favorable conditions for them (Olliff et al. 2013). These threats would likely reduce the numbers and distribution of whitebark pine in the GYE (Logan et al. 2010, Tomback and Achuff 2010, Olliff et al. 2013).

Golden Eagle (*Aquila chrysaetos*) - The golden eagle is a species of concern in YNP and throughout the western U.S. due to wind and other energy development, loss of habitat, and human disturbance (Philips and Beske 1984, Scott 1985, Kochert et al. 1999, Pagel et al. 2013). Although the population across the west appears stable based on aerial surveys and breeding bird surveys administered by the U.S. geological survey, population declines have been reported for some areas (Millsap et al. 2013). Because of concerns over their status and limited data on reproduction, the USFWS has initiated a study investigating golden eagle movements, habitat use, and nest success in Region 6 which includes Yellowstone. In 2011, biologists began monitoring golden eagles to obtain information on population size and reproduction. Few historical data exists for golden eagles in Yellowstone. The park currently supports a minimum of 27 golden eagle pairs (Smith et al. 2015). The majority of territories are occupied annually however; reproduction fluctuates widely from year to year. In 2011, 50% of eight pairs fledged at

least one young but in 2012, none of the 12 pairs produced young (Smith et al. 2012, 2013a). In 2013, 63% of 15 pairs fledged at least one young, but in 2014 only one of 19 pairs produced young (Smith et al. 2013b, 2015). The relatively high density of golden eagles may limit productivity through competition for limited food resources in late winter and early spring. Furthermore, late winter and early spring weather conditions likely interact with prey availability to influence productivity.

Peregrine Falcon (*Falco peregrines anatum*) - The American peregrine falcon (*Falco peregrinus anatum*) was removed from the List of Endangered and Threatened Wildlife and Plants in 1999. The USFWS implemented post-delisting monitoring of peregrine falcons at 3-year intervals beginning in 2003 and ending in 2015. Monitoring estimates from 2003 indicated territory occupancy, nest success, and productivity were above target values set in the monitoring plan and the peregrine falcon population is secure and vital (USDI, USFWS 2006b). Peregrine falcons reside in YNP from April through October, nesting on large cliffs. The numbers of nesting pairs and fledglings in YNP steadily increased from zero in 1983 to 32 pairs and 47 fledglings by 2007 (Smith et al. 2012).

During 2014, biologists monitored 23 of 36 known peregrine territories and confirmed nesting at 15 sites. Thirteen of these sites fledged at least one young (60% success) for a total of 21 fledglings (Smith et al. 2015). Overall, peregrine falcons in YNP have relatively high nesting success and numbers are considered stable (Smith et al. 2015). Nesting success has decreased slightly in recent years, but remains above the threshold outlined in the post-delisting monitoring plan (USFWS 2003).

There are three pairs of peregrine falcons nesting in the canyon. Peregrine falcons are summer residents and are found nesting in and near the Canyon area during the summer season. They are also known to occasionally hunt in the Canyon area meadows.

Bald Eagle (*Haliaeetus leucocephalus*) – USFWS removed the bald eagle from the list of endangered and threatened wildlife on August 8, 2007. The bald eagle is currently designated as delisted-recovered, with a recovery plan calling for monitoring of their status every 5 years from 2008 to 2028.

Current data indicate populations of bald eagles have recovered in the lower 48 states, with an estimated minimum of 9,789 breeding pairs now compared to 417 active nests in 1963 (USFWS 2006). Nesting and fledgling bald eagles in Yellowstone increased incrementally from 1987 to 2011 (Smith et al. 2012). Resident and migrating bald eagles are now found throughout the park, with nesting sites located primarily along the margins of lakes and shorelines of larger rivers. The bald eagle management plan for the Greater Yellowstone Ecosystem achieved the goals set for establishing a stable bald eagle population in the park, with a total of 26 eaglets fledged from 34 active nests during 2007 (McEneaney 2006). This is the most fledged eaglets ever recorded in Yellowstone and the increasing population trend indicates habitat is not presently limiting the growth of the population. During 2014, biologists monitored 18 nesting pairs and confirmed successful production of 16 young at 10 sites (Smith et al. 2015).

Osprey (*Pandion haliaetus*) - are large raptors whose diet consists primarily of fish. Nesting sites in YNP have been observed in the Canyon area, near Yellowstone and Grebe lakes, Pelican Creek, and the Yellowstone, Lamar, Madison, Firehole, and Gibbon rivers. There are five pairs of ospreys nesting in the Canyon. Ospreys in YNP feed primarily on cutthroat trout (*Oncorhynchus clarki*), (Baril et al. 2013). However, the introduction of nonnative lake trout into

Yellowstone Lake during the late 1980s, along with other factors such as whirling disease and drought, caused substantial decreases in numbers of cutthroat trout (Koel et al. 2005). In turn, the productivity, nesting success, and number of breeding pairs of ospreys near Yellowstone Lake and its tributaries decreased during 1987 to 2009 (Baril et al. 2013). Since 2003, however, reproductive measures have increased parkwide for areas other than Yellowstone Lake. In 2014, biologists monitored 30 nesting pairs and confirmed successful production of 44 young in 22 territories (Smith et al. 2012, 2015).

Bison (*Bison bison*): Plains bison at Yellowstone have been petitioned for listing as an endangered species twice in the past 15 years and both times the U.S. Fish and Wildlife Service has declined to list the species. The Yellowstone bison population has been identified as a distinct population by USFWS definition. The population is comprised of plains bison that historically occupied about 20,000 square kilometers (km²) in the headwaters of the Yellowstone and Madison rivers of the western United States. While nearly extirpated in the early 20th century, Yellowstone National Park provides sanctuary to the only wild and free-ranging bison population to continuously occupy historic range. Yellowstone bison are managed as a single population having two distinct breeding areas with individuals that move across an extensive landscape (220,000 acres).

The central herd occupies the central plateau of Yellowstone National Park, extending from the Pelican and Hayden valleys in the east to the lower elevation and thermally influenced Madison headwaters area in the west. Central herd bison congregate in the Hayden Valley for breeding. Most bison move between the Madison, Firehole, Hayden, and Pelican valleys during the rest of the year. Some of these bison are likely to migrate north to the Gardiner Basin during the winter months and return to the Hayden Valley to breed. Emigration has been observed with more bison emigrating north from the central range than vice versa. The northern herd occupies the area commonly referred to as the northern range, extending from the high elevations along the east boundary from Cook City south to the Needle (a small number of males summer in the upper Lamar Valley to Saddle Mountain) westward to include the Mirror Plateau, Specimen Ridge and Upper Slough Creek all the way to the lower reaches of the Gardiner Basin at Yankee Jim Canyon. This sub-population breeds at the eastward end of their range and slowly moves down in elevation as the fall and winter months pass. By late winter and early spring the majority of the

northern range group is located west of Tower and follows the chronology of spring green up conditions back to the high country for the July/August breeding period.

Bison tend to be observed in open grassland or shrub steppe habitats but due to the juxtaposition of these habitats in Yellowstone there are many travel corridors along rivers and over high elevation passes that provide connections to all of the major watersheds throughout the park. The bison population is more commonly found in the northern 2/3 of the park but small numbers (mostly males) move in to the Thoroughfare and portions of the Caldera between Lewis Lake and West Thumb. As late as the 1970's there was a remnant group of bison that used the Pitchstone Plateau and portions of the Bechler Valley. That area has not been routinely monitored but use of meadows in this portion of the park would not be unexpected. A recent evaluation of potential habitat identifies the southern 1/3 of Yellowstone as suitable but not extensively occupied at this time.

Wolverine (*Gulo gulo*): The USFWS proposed to list the wolverine as a threatened species under the Endangered Species Act in February 2013, while finding critical habitat was not determinable (USDI, USFWS 2013a). The southern portion of the species' range extends into portions of Idaho, Montana, and Wyoming. The wolverine naturally exists at low densities ranging from one animal per 25 to 130 square miles (65 to 337 square kilometers; Hornocker

and Hash 1981, Banci 1994). Wolverines are adapted to extreme cold and life in environments with snow on the ground for much of the year (Aubry et al. 2007). Persistent snow cover from mid-winter through mid-May maintains the warmth and security of offspring in dens and avoids high summer temperatures (Magoun and Copeland 1998, Aubry et al. 2007, Copeland et al. 2010). Persistent snow cover generally occurs at mountainous elevations above 8,005 feet (2,440 meters) in the contiguous United States, though wolverines are found at lower elevations (Copeland et al. 2007).

Wolverines travel long distances and are opportunistic scavengers on carrion (Hornocker and Hash 1981). They are sensitive to human disturbance from February to May when young are born and cannot travel far (Magoun and Copeland 1998). Overexploitation through hunting and trapping, as well as predator poisoning, likely caused wolverine abundance and distribution to decrease since the early 1900s along the southern portion of their historical range (Banci 1994). However, recent surveys indicate they are widely distributed in remote mountain regions of Idaho, Montana, and parts of Wyoming (USDI, USFWS 2003). Current threats to wolverines include climate warming, human disturbance (e.g., recreational activities), and development (e.g., transportation corridors; USDI, USFWS 2013a).

Wolverines are rare and sparsely distributed in YNP and adjacent national forest areas (Beauvais and Johnson 2004, Inman et al. 2007, Murphy et al. 2011). During 2005 to 2009, wolverines were captured or detected in the Absaroka-Beartooth wilderness along the north boundary of YNP, the Thorofare region (southeast corner), and the adjoining Washakie and Teton wilderness areas (Murphy et al. 2011). No wolverines were captured or detected inside YNP in the Gallatin Range (northwest), the Central Plateau and Washburn Range (central), the Madison Plateau and Bechler region (southwest), and the Snake River Range (south). Also, no wolverines were detected in the North Absaroka wilderness and adjoining areas along the east boundary of YNP, including the upper Lamar River (Murphy et al. 2011). Radio-marked wolverines selected mountainous habitats above 8,038 feet (2,450 meters) with persistent snow cover and adequate ungulates during winter to provide carrion for food (Murphy et al. 2011). Home ranges in the GYE averaged 308 square miles (797 square kilometers) for adult males and 127 square miles (329 square kilometers) for adult females (Inman et al. 2007). In YNP, home ranges of radio-marked wolverines did not overlap, reproductive rates appeared low, and survival rates were similar to estimates for other populations in the conterminous United States (Murphy et al. 2011). Dispersal from other populations in the GYE may be necessary to maintain wolverines in YNP, given the low recruitment of offspring born to resident females (Murphy et al. 2011).

In 2014, the USFWS acknowledged the high-elevation range of wolverines is getting warmer, but concluded it was speculative to predict impacts to snow levels, and in turn, wolverine populations from climate change (USDI, USFWS 2014a). As a result, the USFWS issued a determination the wolverine does not warrant protection under the Endangered Species Act. The decision indicated the effects of climate warming are unlikely to endanger the wolverine now or in the future (USDI, USFWS 2014b).

Species Dismissed From Further Discussion:

The following species of special concern are not discussed in detail within this affected environment section as they would not be affected. After a review of park records, consulting subject matter experts, and conducting site visits, it has been determined that there would be no effect to these species, as there is no record of their occurrence within the project area, none of the project area is considered critical habitat for any of the following species, and the project area does not fall within the range of the species.

1. Alexander's Rhyacophilan Caddisfly
2. Artic Grayling
3. Westslope cutthroat trout
4. Yellowstone cutthroat trout
5. Plains Spadefoot toad
6. Boreal toad
7. Trumpeter Swan
8. American White Pelican
9. Double-crested Cormorant
10. Common Loon
11. Western Yellow-billed Cuckoo
12. Northern goshawk
13. Harlequin Duck
14. Pronghorn
15. Wolverine
16. Whitebark Pine
17. Yellowstone Sand Verbena

Impacts of Alternative A – No Action

Under the no action alternative operations and maintenance of existing overlook trails, parking areas, restrooms and associated infrastructure would continue. Maintenance of these facilities and infrastructure disturbs and temporarily displaces wildlife temporarily when crews access these sites. Routine maintenance activities would stay within the existing footprint of development, and would not significantly affect wildlife or wildlife habitat. All activities would be very localized, to address very localized problems and would be directly adjacent to the trails, overlooks, and parking areas and within the existing disturbance. All work would be completed by NPS park staff that is aware of the need to reduce impacts to park wildlife. Impacts to wildlife from routine maintenance would be negligible, short-term and adverse.

Cumulative Effects: Cumulative impacts on wildlife are based on the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions in YNP. Construction projects in YNP would continue to occur. Ongoing administrative activities such as hazing, wildlife monitoring, road construction, and facilities maintenance would continue to affect some wildlife resources. Hazing efforts are carried out by park personnel to discourage wildlife (e.g. bears, wolves, and coyotes). Some wildlife would be permanently removed from the population if they become habituated to human food and pose a threat to human safety. Wildlife monitoring practices are used to document various demographics of wildlife populations in the park and may cause adverse impacts ranging from generalized disturbance to sedation and handling of the animals. Noise from construction activities and facilities maintenance could cause disturbance to wildlife in localized areas. Impacts from these disturbances could range from no impact to movement away from the immediate area. Park visitation is expected to increase each year as a result of population growth in nearby communities and elsewhere. Past and ongoing recreational uses such as boating, angling, camping, and hiking would continue park wide. Hiking occurs throughout the park and could lead to generalized disturbance which could affect feeding and resting behavior. Both ongoing administration activities and continued visitor use could lead to impacts to wildlife populations throughout the park. Overall, impacts to wildlife are short-term and of limited scope and duration. Usually limited to the construction period of the project that is occurring. Some permanent loss of habitat occurs when road widening activities occur. An eight-mile segment of the Dunraven road has widened from an

existing 18-22 feet to a width of 24 feet within the last 10 years that has added incrementally to wildlife habitat loss in the Canyon area. When taken in conjunction with the no-action alternative, cumulative impacts regarding wildlife habitat loss would be considered minor to moderate and adverse.

Most projects in the cumulative impact scenario have occurred within developed areas of the park. Maintenance activities along trails, overlooks, and parking areas may temporarily displace wildlife and cumulative impacts to wildlife resources resulting from implementing the no-action alternative would have both short- and long-term negligible to minor level impacts.

Conclusion

Implementation of the no-action alternative would result in short-term habitat-related effects to wildlife resources. Modification or loss of wildlife habitat associated with the project would be short-term, negligible, and insignificant.

Impacts of Alternative B – Upgrade and Improve Canyon Rim Trails, Overlooks, and associated Parking Areas

The NPS is responsible for maintaining native wildlife as an integral component of natural ecosystems. Human activity and noise would increase during construction, which may disturb wildlife. Some small and large animals may be displaced during construction activities needed to maintain or rehabilitate trails and overlooks. Small mammals could be harmed and their habitat altered during ground disturbing activities. Impacts to fish would not occur as there are no waters or waterways that would be disturbed from this alternative. Construction related activities and noise would be temporary and pre-construction sound conditions would resume following reconstruction of the bridge. Construction would take place in already developed areas along the canyon rim. Numerous wildlife species inhabit the seven sites proposed for construction, with presence varying on a seasonal basis. Those that are most common in the forests and meadows adjacent to developed areas during the summer months when visitation is highest would generally be species that are tolerant of, if not habituated to, human presence and activity. For example, ravens, magpies, chipmunks, squirrels, and jays are attracted to food sources provided by the human activity around the park. Wildlife present within the immediate vicinity of most of the proposed activities are habituated to human activity and adverse effects on these animals as a result of the activities proposed under Alternative B are generally expected to be short-term, negligible to minor, and adverse. The species that use this area could be temporarily displaced by construction activity and equipment, but they would be expected to return following completion of the project.

Approximately 11,000 cubic yards of material would need to be hauled over park roads for the completion of this project. Materials would include rock for masonry work and walls; aggregate materials such as gravel, sand or fill soil; asphalt; and concrete. This material would equate to about 1,100 dump truck loads. Haul trucks would be spaced throughout the job so as not to back up or cause excessive traffic delays. As this project is proposed to be phased for construction over numerous years, not all hauling would occur during a single season. Trucks would be required to follow all park regulations regarding speed. The small amount of increased traffic on roads from haul activities would likely result in a negligible adverse impact to wildlife due to potential temporary displacement due to backup alarm noise, increased activity from construction, or insignificant increases in roadkill due to construction traffic.

The construction involved in the rehabilitation of the canyon rim trails and overlooks could have a minor effect on migratory birds. The impacts on birds from construction activities have been well documented (cite). Under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703), it is illegal

to “take” migratory birds, their eggs, feathers, or nests. In order to avoid violations of the MBTA, bird habitat would be surveyed prior to clearing activities during the nesting season, May 15 - August 1 and occupied habitat would not be removed during the nesting season. If an active nest were encountered at any time, it would be protected from removal. Where previously undisturbed ground is developed, a permanent loss of habitat occurs. Under this alternative, tree cutting activities are proposed but would be small, approximately 2.0 acres in total. The area would be surveyed for nesting activity. No nesting birds should be affected. No known amphibian breeding sites would be affected by the construction.

The potential impacts from construction activities are expected to be short-term (temporary) and confined to the immediate project areas. As with all Yellowstone construction projects, the NPS would direct contractors to manage food and garbage so that they are not available to grizzly or black bears. Contractor staff would have to attend bear/food management orientation sessions and abide by the normal bear management guidelines. Under Alternative B, minor, short- and long-term adverse impacts to wildlife would be expected to occur.

Cumulative Effects: The impacts from past, present and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A. An eight-mile segment of the Dunraven road has widened from an existing 18-22 feet to a width of 24 feet within the last 10 years that has added incrementally to wildlife habitat loss in the Canyon area. When taken in conjunction with the 2 acres of habitat loss from this alternative, impacts of this alternative on wildlife and habitat would be considered moderate, , short- and long-term adverse impacts to wildlife.

Conclusion

As with Alternative A, under Alternative B, Modification or loss of wildlife habitat associated with this alternative would be short-term, negligible, and insignificant.

Threatened and Endangered Species

The species listed below are either federally listed as endangered or threatened, or proposed for listing. Candidate species are included above.

Methodology

Impacts to USFWS Threatened and Endangered Species are analyzed in this impact topic based on the knowledge of park resource specialists, current literature, and consultation with USFWS. Park biologists have made effect calls for threatened and endangered species for the preferred alternative to be used during Section 7 consultation with the USFWS. Intensity impacts on threatened and endangered species fall into three categories: no effect, may affect, not likely to adversely affect, and may affect, likely to adversely affect.

Yellowstone National Park biologists familiar with each of the threatened and endangered species present in Yellowstone were consulted for their knowledge and opinion on potential project impacts. These biologists consulted records of threatened and endangered species sightings within Yellowstone National Park historic records of sightings, publications, and their detailed knowledge of the life habits of the species in question. The evaluation of effects included direct, indirect, interrelated, interdependent, and cumulative impacts as defined by the Endangered Species Act (ESA).

Intensity Level Definitions

The thresholds of change for the intensity of special status species impacts to wildlife are defined as follows:

Negligible: Adverse or beneficial impacts to individuals or population of threatened and endangered species or species of concern or to the species habitat that is not measurable or perceptible and would be unlikely to occur. For USFWS consultation purposes, this would equate to a **No Effect**. The action would not cause any discernable effect on the species or critical habitat if present.

Minor: Adverse or beneficial impacts to individuals or population of threatened and endangered species or species of concern or to the species habitat that are measurable, small, and localized may occur. The overall viability of the species would not be affected. Short- or long-term disturbances to individuals or population and/or a small amount of habitat could be permanently modified or removed. Impacts would not measurably affect the migration patterns, or other demographic characteristic of the population (i.e., age/sex structure, recruitment rates, survival rates, movement rates, population sizes, population rates of change). (For USFWS consultation purposed, this would equate to a • **May affect but not likely to adversely affect**. The action would be expected to result in discountable effects on a species or critical habitat (i.e., extremely unlikely to occur and not able to be meaningfully measured, detected, or evaluated), or the effect would be completely beneficial.)

Moderate: Adverse or beneficial impacts to individuals or population of threatened and endangered species or species of concern or to the species habitat that are measurable, localized, and of consequence would affect a moderate portion of the species/range in the park. Short- or long-term disturbances could measurably affect the migration patterns or other demographic characteristics of a population (i.e., age/sex structure, recruitment rates, survival rates, movement rates, population sizes, population rates of change). Impacts would not significantly increase the susceptibility of populations(s) in or near the park to environmental or demographic uncertainties (e.g., severe winters, droughts, disease epidemics, and skewed age or sex ratios). The change would be measurable and of consequence to the species or resource; however, the impact would remain localized. For USFWS consultation purposes this would equate to a **May affect but not likely to adversely affect**, or a **May affect, but likely to adversely affect**. The action would result in a direct or indirect adverse effect on a species or critical habitat, and the effect would not be discountable or completely beneficial. Formal consultation with the USFWS may be required.

Major: Adverse or beneficial impacts to a large number of individuals or population of threatened and endangered species or species of concern or to the species habitats that are measurable, large, long-term, and cause a widespread change across a widespread geographic area or region. The susceptibility of populations(s) throughout the region to environmental or demographic uncertainty would significantly increase. For USFWS consultation purposes this would equate to a **May affect, likely to adversely affect**. The action may result in “**Take**” or direct or indirect adverse effect of an individual, a large number of individuals or a population or critical habitat. Formal consultation with the USFWS would be required.

Canada Lynx (*Lynx canadensis*) - **Status Threatened:** Lynx require cold boreal and montane conifer forests with dense understories and snowshoe hares (*Lepus americanus*), the lynx's principal prey (USDI, USFWS 2000). The distinct population segment of lynx in the contiguous United States was listed as threatened under the Endangered Species Act in 2000 because existing regulatory mechanisms in USFS Land and Resource Management Plans were inadequate to protect lynx or lynx habitat (USDI, USFWS 2000). Critical habitat for lynx was designated in YNP and surrounding lands in southwestern Montana and northwestern Wyoming (Unit 5; USDI, USFWS 2009a).

Lynx in the contiguous United States are considered part of a larger metapopulation whose core is located in the northern boreal forest of Canada. Lynx disperse from Canada into the United States and help bolster populations in the northern Rocky Mountains and North Cascades range (McKelvey et al. 2000). Three lynx populations occur from western Montana to Washington, but survey data are not sufficient to estimate population sizes or trends (USDI, USFWS 2000).

Historical information suggests lynx were present, but uncommon, in YNP during 1880 to 1980 (Murphy et al. 2004). The presence and distribution of lynx in YNP was documented during 2001 to 2004, when several individuals were detected in the vicinity of Yellowstone Lake and the Central Plateau (Murphy et al. 2004, 2006). Another lynx was photographed near the Indian Creek Campground in the northwestern portion of YNP during 2010, and lynx tracks were verified near the Northeast entrance in the winter of 2014. Reliable detections of lynx continue to occur in surrounding National Forest System lands. Evidence suggests lynx successfully reproduce in the GYE, though production is limited.

In accordance with the Canada Lynx Conservation and Assessment Strategy (Ruediger et al. 2000), personnel from YNP mapped suitable lynx habitat—typically late successional or mature forests dominated by mesic subalpine fir (*Abies lasiocarpa*), Engelmann spruce (*Picea engelmanni*), and lodgepole pine (*Pinus contorta* var. *latifolia*)—and lynx habitat currently in an unsuitable condition (successional forests one to 20 years after disturbance). Twenty Lynx Analysis Units were identified. These units were primarily associated with andesitic and sedimentary soils in the northern and eastern portions of YNP (Despain 1990). No Lynx Analysis Units were identified in the central and west-central portions of YNP where dry lodgepole pine stands predominate. Lynx Analysis Units typically occurred in the backcountry of YNP, though seven were transected by major roads.

Managers use the standards and guidelines provided in the Canada Lynx Conservation and Assessment Strategy to gauge the effects of projects on lynx. Under the strategy, projects occurring outside Lynx Analysis Units have no effects on lynx. Projects inside Lynx Analysis Units may affect lynx, but not adversely, if the location occurs: 1) outside of lynx habitat; 2) in habitat currently unsuitable for lynx foraging; or 3) in lynx foraging habitat, but ample suitable habitat is otherwise available.

Grizzly Bear (*Ursus arctos horribilis*); **Status - Threatened:** The park is responsible for protecting grizzly bear populations and habitat as mandated by the Yellowstone Park Act (1872) creating the park, the National Park Service Organic Act (1916), the National Environmental Policy Act (1969), the Endangered Species Act (1973) (ESA), and the National Parks Omnibus Management Act (1998). National Park Service policy mandates that the park perpetuate native animal populations as part of the natural ecosystem and protect native animal populations against destruction, removal, harassment, or harm through human actions (NPS 1998, 1991). A recovery plan for grizzly bear populations in the lower forty-eight contiguous United States was implemented because grizzly bears were listed in 1975 under the Endangered Species Act

(USFWS 1982). The plan was developed to provide direction for the conservation of grizzly bears and their habitat to federal agencies responsible for managing land within the recovery zone. That same year, YNP completed an Environmental Impact Statement (EIS) for a grizzly bear management program specifically designed to recover the subpopulation of grizzly bears inhabiting the park (NPS 1982). Management of grizzly bears in YNP has been successful in enabling grizzly bear recovery and reducing bear-human conflicts (e.g., property damage, incidents of bears obtaining human food, bear-inflicted human injuries) and human-caused bear mortalities in the park (Gunther 1994, Gunther and Hoekstra 1998, Gunther et al. 2000, Gunther et al. in press). The U.S. Fish and Wildlife Service removed grizzly bears in the Greater Yellowstone Ecosystem from the Federal List of Threatened and Endangered Wildlife on April 30, 2007. In 2009, a U.S. District Court returned the grizzly to the federal threatened species list, saying the Conservation Strategy was not enforceable and insufficiently considered the impact of climate change on grizzly food sources. The USFWS and the Department of Justice appealed. In 2012, a ruling was made to keep the grizzly bear on the federal threatened species list. The grizzly bear population in the GYA was estimated to range between 549 and 672 in 2012.

Gray Wolf (*Canis lupus*): Gray wolves were native to the Greater Yellowstone Area when the park was established in 1872. Historically hunted for their hides and as predators, they were eliminated from the ecosystem by the 1930s. The USFWS released an EIS on wolf reintroduction in May 1994. In 1995 and 1996, 31 gray wolves from Canada were released in the park. A total of 14 wolves were released in the winter of 1994-1995; 17 additional wolves were released in 1996 (Phillips and Smith 1996). On May 5, 2011, the USFWS removed gray wolves in a portion of the Northern Rocky Mountain Distinct Population Segment (DPS) encompassing Idaho, Montana, and parts of Oregon, Washington, and Utah from the Federal List of Endangered and Threatened Wildlife. Gray wolves in Wyoming remain on the List of Endangered and Threatened Wildlife and continue to be subject to the provisions of our experimental population regulations codified at 50 CFR 17.84(i) and (n). Wolves reintroduced into YNP and central Idaho were classified -nonessential experimental II according to section 10(j) of the ESA of 1973, as amended (16 U.S.C. 1531). In national parks and wildlife refuges, nonessential experimental populations are treated as threatened species, and all provisions of Section 7 of the ESA apply (50 CFR 17.83(b)). The gray wolf was removed from the federal list of endangered and threatened wildlife and from Wyoming's wolf population's status as an experimental population effective September 30, 2012. However, in September 2014, a District Court judge concluded it was unreasonable for the USFWS to determine it was necessary for Wyoming to manage for more than 10 breeding pairs and 100 wolves as a condition for delisting, but then accept a plan not including a requirement for a buffer above this minimum management target (U.S. District Court for the District of Columbia 2014a). Thus, the judge ordered the reinstatement of rules to govern the management of wolves in Wyoming as threatened pursuant to the Endangered Species Act (U.S. District Court for the District of Columbia 2014b).

In December 2014, at least 94 wolves in 11 packs occupied YNP (Smith et al. 2014). Suitable habitat appears to be saturated with resident wolf packs, and conflict among packs appears to be limiting abundance (Smith et al. 2011). Maintaining a wolf population above recovery levels in the GYE-segment of the northern Rocky Mountains area would depend on some wolf packs living outside YNP and surrounding wilderness areas (USDI, USFWS 2006a).

Currently, two gray wolves packs are known to frequent the Canyon area with the Wapiti Pack being the main user of the area. Wolves use the Canyon area trails and roads as travel corridors. Human-caused mortality and the availability of prey are the two most limiting factors

for wolf populations. Within Yellowstone National Park, human-caused wolf mortality is neither from management removals or poaching, but is exclusively caused by automobile collisions (a total of 26 wolves). One vehicle-caused fatality occurred in the Canyon area just west of Canyon Junction. The proposed project is not expected to increase any of these sources of mortality within the park and thus would not have any direct impact on wolves. Construction activities could cause wolves wandering through the area to be temporarily displaced, though the high human presence that occurs at the canyon rim reduces that likelihood. Prey species for wolves are considered abundant in the park. Elk are the primary prey species. While wolves have killed prey in the Canyon area, no wolf pack has focused its activities within the area of the project limits. Wolves follow prey and frequent the valleys near Canyon on established ungulate winter ranges because of the abundance of elk and bison.

Impacts of Alternative A – No Action

Alternative A would result in no new impacts to threatened or endangered species as the existing activities at the Canyon Rims. High visitor use of the area would continue, limited maintenance activities of the trails and overlooks would be done on an as needed basis.

Cumulative Effects: Cumulative impacts on threatened and endangered species are based on the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions in YNP. Construction projects in YNP would continue to occur. Construction of the new lodges in the Canyon development have likely had some effect on bears and wolves wandering through the area. As bears and wolves are periodically hazed from developed areas within the park, it is unlikely that this project in conjunction with other past and potential future projects would increase adverse impacts above a minor level. Ongoing administrative activities such as hazing, wildlife monitoring, road construction, and facilities maintenance would continue to affect some T&E species. Hazing efforts are carried out by park personnel to discourage wildlife (e.g. bears, wolves, and coyotes).

Conclusion

Impacts of the implementation of Alternative A to special status species would be negligible.

Impacts of Alternative B – Upgrade and Improve Canyon Rim Trails, Overlooks, and associated Parking Areas

Construction of the preferred alternative would introduce activities that would produce noise and vibrations. These activities would tend to keep listed species from using the Canyon Rim in close proximity to construction zones.

None of the recent historical lynx detections were located near the Canyon area, and the proposed sites are outside of Lynx Analysis Units and designated lynx critical habitat. No road-killed lynx have been reported either within or adjacent to the Canyon area and no sign of snowshoe hares (their primary food source) were detected at the proposed sites (Gunther et al. 2000). This project would have “**no effect on Canada lynx or Canada lynx critical habitat**”.

There are no bear management areas in the Canyon vicinity, though the Canyon area is considered one of the higher quality bear habitats in Yellowstone National Park (Gunther et al. 1998). The potential impacts from construction activities are expected to be short-term (temporary) and confined to the immediate project areas. As with all Yellowstone construction projects, the NPS would direct contractors to manage food and garbage so that they are not available to grizzly bears. Contractor staff would have to attend bear/food management orientation sessions and abide by the normal bear management guidelines.

Presently grizzly bears are seen only occasionally traveling through the project area along the canyon rims, displacement of resident populations is therefore unlikely. While there is a potential that bear-human conflicts may occur with a small added influx of workers during the construction work phase, this potential would be combatted by implementing contractor education, and “working in grizzly bear country” protocols mentioned above. All outdoor food storage would adhere to park policies already in place, ensuring no unattended food sources would be available to wildlife. There would be no impacts on bear populations, breeding, movement or designated critical habitat as the project area is located within one of the highest visitor use areas of the park. The amount of visitors, vehicles, noise, and movement make it an undesirable location during the seasons of highest use. Impacts to grizzly bears and their habitat would be minor and insignificant within the project area and **“may affect, but would not adversely affect”** grizzly bears.

Presently gray wolves are seen occasionally traveling through the area, and displacement of resident populations is therefore unlikely. All outdoor food storage would adhere to park policies already in place, ensuring no unattended food sources would be available to wildlife. There would be no impacts on wolf populations, breeding, movement or designated critical habitat as the project area is located within one of the highest visitor use areas of the park. The amount of visitors, vehicles, noise, and movement make it an undesirable location during the seasons of highest use. Impacts to gray wolves would be minor and insignificant within the project area and **“may affect, but would not adversely affect”** gray wolves.

Cumulative Effects: The impacts from past, present and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A. Alternative B, in conjunction with these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to wildlife.

Conclusion

Long-term, direct, and cumulative effects of either alternative would be negligible to minor on special status species due to the small area of land affected and its proximity to an existing developed area.

Visual Quality/Scenic Resources Affected Environment

Outstanding scenic character has always distinguished national parks from other areas. Yellowstone abounds with impressive viewsheds of the highest quality. The majority of Yellowstone’s landscape appears untouched by humans and retains its primeval characteristics. Less than two percent of the park is developed and visitor use facilities are predominantly grouped along the figure-eight road system and in a handful of small communities, leaving substantial acreage in its natural condition. Scenery has always been an integral part of the fundamental resources and values of national parks. Yellowstone’s enabling legislation from 1872 reserves the park as a “pleasuring-ground for the benefit and enjoyment of the people.” Historian Ethan Carr explains that “in the context of the 19th century landscape park, the preservation of unimpaired scenery could be identified with civic virtue.” The 1916 Organic Act that created the National Park Service sought to “conserve the scenery ... and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.” Thomas Moran’s paintings and William Henry Jackson’s photographs of Yellowstone scenery were instrumental in convincing the Congress to set this

area aside and "preserve it from injury or spoliation."

Despite being one of the oldest units in the park system, the majority of Yellowstone's landscapes appears untouched by humans and retains their primeval characteristics. The park's developed areas and facilities are predominantly grouped along the figure-eight Grand Loop Road system leaving substantial acreage in its natural condition.

Part of the allure and expectations associated with Yellowstone involve the reality and the impression that the park is predominantly in its natural condition. Because the primary viewsheds are natural, built structures often stand out in stark contrast to the scenery and thereby degrade part of the fundamental resource. In Yellowstone, staff has gone to great efforts to ensure that facilities are screened or invisible to park visitors.

Yellowstone strives to preserve its naturally dark nighttime skies, a valuable park resource. In developed areas, there is a delicate balance between providing the appropriate amount and level of human-generated light for the safety of visitors and staff and the protection of the dark night skies. Human vision is least effective when extreme lighting contrasts are presented (for example, when very bright areas transition to very dark areas), and these situations are avoided/corrected in developed areas.

Methodology

Analyses of the potential intensity of impacts to scenic resources were derived from available information regarding desired views in the action areas and park staff records and past observations of the effects to those desired views (visual quality) from development, visitor use, and area operations, including construction activities.

Intensity Level Definitions

The thresholds of change for the intensity of impacts to scenic resources are defined as follows:

Negligible: Changes to the visual quality of the landscape, including nighttime quality, would be barely detectable or changes would be short-term, small and localized.

Minor: Changes to the visual quality of the landscape, including nighttime quality would be short-term or long-term small and localized to an area in the park. The change is noticeable but does not negatively affect the character of the site or its relationship to or dominance in the surrounding natural setting.

Moderate: Changes to the visual quality of the landscape (including nighttime quality) would be long term and obvious in many areas of the park. There could be an effect of an area to other areas. Effects would noticeably change the impression of the immediate site and the character of the overall setting.

Major: Changes to the visual quality of the landscape) including nighttime quality, would be significant and occur park wide. Changes would be long term) considerable, and widespread, with negative changes considered obtrusive at the park wide level. Obvious differences would change the character and overall impression of the area, its association with and dominance within the surrounding natural setting.

Impacts of Alternative A – No Action

Alternative A would not introduce any new elements into the landscape that would have negative effects on visual resources of the park. No additional impacts to the scenic resources would occur, as there would be no change to current actions or direction under this alternative. No additional construction elements or changes to existing infrastructure would be installed. A negligible, long-term, adverse effect would continue from the presence of the existing infrastructure, such as fencing, rails, masonry walls, asphalt trails, stairways, and erosion control devices that have some limited impact on scenic resources presently.

Cumulative Effects: Cumulative impacts on scenic resources are based on the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions in Yellowstone National Park. Important views in the park include Yellowstone Lake, the Grand Canyon of the Yellowstone River, the Mammoth Terraces, multiple geyser basins, and many river and mountain vistas, among others.

Construction projects included in the cumulative effects scenario would continue to occur and could have minor impacts to scenic resources. The NPS fully recognizes the importance of preserving Yellowstone's scenic views and dark nighttime skies. Current visitor support operations have a minor effect on the visual quality of the park; continued operation of visitor facilities and support utilities would be expected to have a similar, minor cumulative effect. The impacts from past, present, and reasonably foreseeable action have had a minor, short- and long-term adverse impact on scenic resources.

Conclusion

Alternative A would not impact scenic resources and therefore would not incrementally add to an overall cumulative effect to scenic resources.

Impacts of Alternative B – Upgrade and Improve Canyon Rim Trails, Overlooks, and associated Parking Areas

Construction of the preferred alternative would have negligible short- and long-term adverse and beneficial impacts to scenic resources. The short-term visual effects would include disturbed land, construction equipment, and development activities. Contractors would be required to maintain an organized construction site and to minimize adverse visual impacts on park visitors and residents. Construction would cause visual disruptions around the project sites but these would be temporary.

In the long-term, the steel I-beam that supports an overlook platform at Sunset Point would be removed. This I-beam is completely visible from overlooks at Brink of the Upper Falls. The Sunset Point overlook would be reconstructed just above its present location, natural stone masonry walls would be constructed to help this overlook blend with its surroundings rather than having a sharp contrast as is the case presently.

A new rail design at the lower platform at Brink of the Upper Falls would be designed such that the rails terminate into large boulders that create a perimeter wall at the platform edge, thus helping to hide the rail by breaking up what would otherwise be a continuous horizontal line on the landscape.

Masonry stone selection would be made in order to get the best stone in terms of color, type, and texture to blend with the surroundings of the location it is used. Views of the overlook areas was a paramount design consideration when the overlooks were first constructed and that

concern is one of the foremost concerns with any rehabilitation or changes proposed as part of the alternative. Minimizing reflectivity of materials, ensuring proper color to blend with surroundings, and use of directional and interpretive signs designed to fit within the existing park theme to ensure effectiveness while blending into the natural landscape are all tenants of this proposed alternative design.



Figure 1 - Proposed Overlook and Trail at Inspiration Point

A new bridge or stairway at Red Rock Point would still be visible from the Brink of the Lower Falls viewing platform, though would not increase the visibility from the current wooden staircase presently used on the lower portion of this trail. The proposed infrastructure proposed along the trails and within the overlooks would be hidden from cross canyon views by masonry walls, or would blend with surroundings due to color and texture, but rarely would not be noticed by visitors as it is in the far background from most views.

The addition of an open shade structure near the Uncle Tom's restroom and parking area would have a negligible to minor long-term impact on the visual resources of this area as taller trees along the canyon rim would screen its view from across the canyon. The proposed changes to the restroom buildings at Uncle Tom's and Brink of the Upper Falls would be beneficial in that the existing structures are considered unsightly due to their lack of recent upgrades and continued maintenance needs.

Cumulative Effects: Cumulative impacts on scenic resources are based on changes that have occurred during past projects such as rehabilitation of the overlooks at Artist's Point, Grandview, and Lookout Point along with changes proposed from this alternative would have negligible to minor impacts on visual resources. Most infrastructure when viewed from across the canyon is done so as great distances, material choices, color, and placement all work to screen man-made elements. Cumulative impacts from this alternative along with past and future projects would be considered minor, long-term, and adverse on scenic resources.

Conclusion

The proposed project components would have minor, long-term adverse and beneficial impacts on visual resources in the Canyon Rim area. The views associated with historic overlooks are analyzed in the Cultural Resources section.

Cultural Resources

Affected Environment

Yellowstone National Park has been a focus of human activity for thousands of years. Natural resources such as forests, meadows, streams, lakes, and abundant fish and wildlife offered desirable conditions for human use and, later, tourism. As a result, this area is rich in cultural resources including archeological resources, historic structures, and cultural landscapes.

The area of potential effect (APE) includes the roads, parking, trails, and overlooks along the Grand Canyon of the Yellowstone Historic District (see Figure on the next page for a map showing the location of these historic properties). Cultural resources found within the APE have been evaluated and documented (or are in the process) in consultation with the Wyoming and Montana State Historic Preservation Offices (SHPO) and the Advisory Council on Historic Preservation.

Table 3 – Cultural Resources within the Area of Potential Effect (APE)

	Title/Name	Smithsonian Number	Site	Status/Comments
	Direct and Indirect Effects			
1.	North Rim/Inspiration Point Drive Historic District	48YE1550		Eligible
2.	Grand Loop Road Historic District	48YE520		Listed
3.	Grand Canyon of the Yellowstone Historic District; Contributing sites within the APE:	N/A		Eligible
	a. Inspiration Point	48YE1854		Eligible
	b. Red Rock Point Overlook	48YE1857		Eligible
	c. Brink of the Lower Falls Overlook	48YE1858		Eligible
	d. Brink of the Upper Falls Overlook	48YE1859		Eligible
	e. Uncle Tom's Trail/Lower and Upper Falls Overlook	48YE1860		Eligible
	f. North Rim Trail	48YE1862		Eligible
	g. South Rim Trail	48YE1863		Eligible
	Indirect (Visual) Effects Only			
	h. Grand View Point Overlook	48YE1855		Eligible
	i. Lookout Point Overlook	48YE1856		Eligible
	j. Artist Point Overlook	48YE1861		Eligible

Archeological Resources

Humans have occupied the GYA for more than 11,000 years. Currently archeological evidence indicates the majority of the use of the Park occurred during non-winter months, and was less intense during the recent Little Ice Age (A.D. 1400-1860) than in the previous millennia. At least 12,000 years before present, during what is now known as the Paleoindian Period, small, highly mobile human groups were present in the Yellowstone region. These groups crafted stone

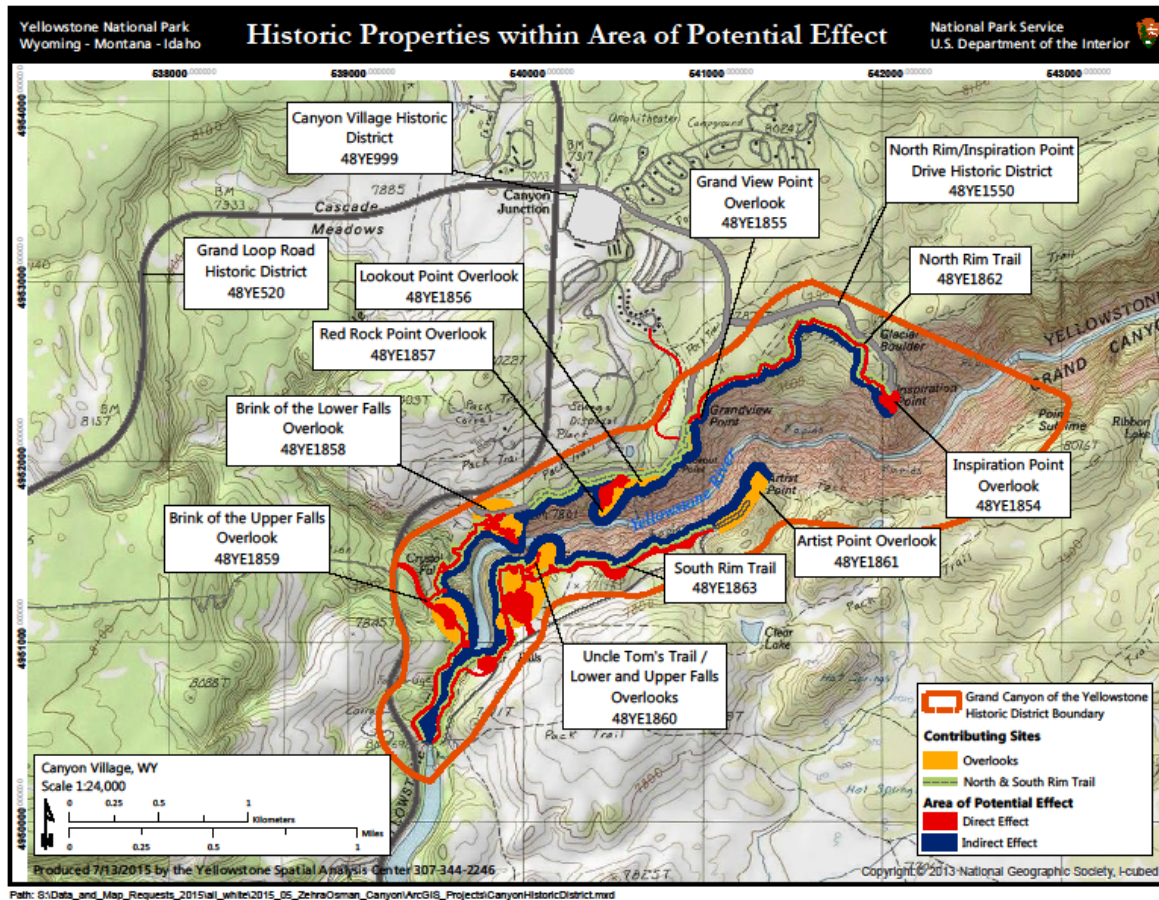
weapons and tools to pursue and utilize large game. Left behind are Clovis, Folsom, and Cody Complex sites. These sites consist of remains of camps, quarries and sites where animals were killed.

The Archaic Period in Yellowstone was characterized by mobile groups who utilized a greater variety of plant foods and small game. The Park area was most heavily used by these groups during the Late Archaic, from 1000 B.C. to A.D. 200. Later sites in the Park may be related to small groups who resided in lower valleys outside the Park but who sent parties into the area to hunt game and gather plant materials and other subsistence items. The Obsidian Cliff Plateau, an extruded lava flow that is approximately 180,000 years old, was of special importance to prehistoric peoples. Obsidian obtained from this site was widely used in not only the region, but was traded as far as Ohio and Canada.

More than 1,800 prehistoric and historic sites have been documented in Yellowstone, although less than five percent of Yellowstone's 2.2 million acres have been intensively inventoried for archeological resources. Included within the historic archeological sites are those of Euro-American origin such as soldier stations, hotels, and can dumps. Approximately one-third of the archeological sites have been evaluated for eligibility to the National Register of Historic Places. Obsidian Cliff, a prehistoric obsidian quarry, has been named a National Historic Landmark. Approximately 100 sites are added each year to the NPS Archeological Sites Management Information System database, and Determinations of Eligibility are completed when needed or when time permits.

Historic Districts, Structures, and Sites

Definitions: A historic structure is a constructed work, usually immovable by nature or design, consciously created to serve human activity. The term "structure" is used to distinguish from



buildings, those functional constructions made usually for purposes other than creating human shelter. A building, such as a house, barn, hotel, or similar construction, is created principally to shelter any form of human activity. A site is the location of a significant event, a prehistoric or historic occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself possesses historic, cultural, or archeological value regardless of the value of any existing structure. A district possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development.

A historic site, structure, or building is eligible for the National Register of Historic Places if it meets one or more of the following criteria A through D:

- It is associated with events that have made a significant contribution to the broad patterns of our history;
- It is associated with the lives of persons significant in our past;
- It embodies the distinctive characteristics of a type, period, or method of construction; or represents the work of a master; or possesses high artistic value; or represents a significant and distinguishable entity whose components may lack individual distinction;
- It has yielded, or may be likely to yield, information important in prehistory or history.

A historic building or structure must also possess integrity of location, design, setting, materials, workmanship, feeling, and association.

The Park's historic properties as described here relate to European-American exploration and occupation, military administration, National Park Service administration, and early concessions operations. Historic properties include roads, bridges, overlooks, and trails. The Canyon Village Historic District (48YE999) is near the APE, however it is not affected by the undertaking (see Map on previous page). There are ten contributing sites within the Grand Canyon of the Yellowstone Historic District, including eight overlooks and two trails. Five of the overlooks and both trails would be affected by the project (listed in Table 3) as would the two roads. These are described below.

Grand Canyon of the Yellowstone Historic District, with its eight overlooks and connecting North and South Rim Trails, is eligible for the National Register of Historic Places as a nationally significant district under Criteria A and C. The District is associated with historical events that occurred in the period from 1871-1872 and that led to the preservation of the Yellowstone region. In 1871, the views from the rim of the Grand Canyon of the Yellowstone gained significance when recorded by the painter Thomas Moran and the photographer William Henry Jackson. These works were instrumental in persuading Congress to preserve the Yellowstone region as the country's and the world's first national park in 1872, a pivotal event in the history of the United States and the conservation movement. The overlooks and trails that comprise the district are eligible under Criterion C in the areas of Architecture and Landscape Architecture. Landscape features constructed at the viewpoints during the NPS Rustic Style Construction Era remain historically significant as records of the handcrafted workmanship and the use of natural materials that characterize the NPS Rustic style. The Period of Significance begins in 1872 and ends in 1952, when the last overlook that was designed in the rustic style during the NPS Rustic era (1916-1942) was finally constructed after the war.

By 1926, the canyon area had already been overdeveloped with hotels and associated facilities, wooden observation decks, stairways, ramps, and railings that were visible from across the canyon. For example, the Brink of Upper Falls area was once an active government and concessionaire site with the original road alignment and junction for the Canyon to Norris road passing through the area, although today only a parking area and a public restroom remain. At various times, the Brink of Upper Falls area was the site of the first canyon tent camp (1883), the first Canyon Hotel (1886-1890), a Whittaker (later Pryor-Trishman) store, the store's warehouse, housekeeping cabins, a public campground, a soldier station (later ranger station), a gas station, a cafeteria and delicatessen, an Haynes photo shop, and the transportation building (and probably a few associated outhouses) owned by the Holm Transportation Company, as well as a Wylie (tent) Camp.

The historic district encompasses approximately 890 acres. The historic district boundary utilizes the 1932 Master Plan "sacred area" boundary, designated one-eighth mile back from both rims. This 1932 sacred area was to be protected from development and was the basis for the removal of facilities that intruded on cross-canyon views. The entire Canyon area was considered from a "landscape standpoint" and received attention in the next few years throughout the New Deal era. As a result, some of the concessionary and NPS facilities were removed from the canyon. Observation points, trails, and access roads were slowly redeveloped to replace wooden stairways and platforms with more naturalistic and harmonious construction of masonry parapet walls of native stone/boulders, stone steps, earthen paths, and flagstone flooring – in order to blend in with the surrounding cliffs. Subsequent master plans continued to encourage the removal of functions from the sacred area and relocate them to a new site for a new Canyon development that was identified in the master plans. However, it was not until the Mission 66 program that this vision was realized and these functions were eventually relocated

in the 1957-constructed Canyon Village Historic District (48YE999). Thus, the new Canyon development met both Yellowstone's long-standing plan and its Mission 66 goal of removing visitor facilities from the park's natural features.

The 2010 Determination of Eligibility for the Grand Canyon of the Yellowstone Historic District (2010 GCYHD DOE) identified poured concrete and metal overlook structures located at three contributing overlook sites: Uncle Tom's Trail/Lower and Upper Falls Overlooks (48YE1860), Inspiration Point Overlook (48YE1854), and Brink of Lower Falls Overlook (48YE1858 as being individually Mission 66-eligible. The NPS Mission 66 program, fully underway by 1956, was intended to modernize, enlarge, and even reinvent the National Park System by its 50th anniversary in 1966 while utilizing a new architectural style, modernism. Yellowstone National Park is in the last stages of completing a YNP Mission 66 historic context based on an updated draft Multiple Property Documentation Form (MPDF) for the NPS Mission 66 resources. Using the draft historic context and draft MPDF registration requirements, Yellowstone National Park has determined that the concrete and metal stair/platforms structures are not individually eligible as Mission 66 era resources, pending Wyoming State Historic Preservation Office (WYSHPO) review and concurrence. The reevaluation is reflected in the description of contributing resources, below.

Of the ten contributing sites within the Grand Canyon of the Yellowstone Historic District, seven would be rehabilitated and therefore directly affected by this undertaking. All ten contributing sites may potentially be indirectly affected by cross-canyon views to the rehabilitation of other overlooks and trails, including three overlooks were rehabilitated in 2008 (and are therefore not rehabilitated as part of this project): Artist Point Overlook (48YE1861), Grandview Overlook (48YE1855), and Lookout Point Overlook (48YE1856).

1. North Rim Trail (Site 48YE1862) begins at the southwest end of the parking lot at Inspiration Point and, heading west, ends at the west end of the Chittenden Bridge. The trail layout retains the NPS Rustic design philosophy by utilizing natural stone, timber and earthen materials as much as possible, and blending built and natural features. The North Rim Trail was laid out to take maximum advantage of canyon views and established viewpoints (which were renovated over time) while maintaining a reasonable grade for hiking. This contributing site is eligible under Criterion A in its association with the events that lead to the establishment of Yellowstone as the world's first national park. Under Criterion C, the viewpoint retains NPS Rustic Style elements.
2. South Rim Trail (Site 48YE1863) begins at the east end of the Chittenden Bridge and proceeds north-northeast along the east side of the Yellowstone River and ends at Point Sublime, an undeveloped overlook from which Inspiration Point can be seen across the canyon to the southwest. The trail layout retains the NPS Rustic design philosophy by utilizing natural stone, timber and earthen materials as much as possible, and blending built and natural features. The South Rim Trail was also laid out to take maximum advantage of canyon views and established viewpoints (which were renovated over time) while maintaining a reasonable grade for hiking. This contributing site is eligible under Criterion A in its association with the events that lead to the establishment of Yellowstone as the world's first national park. Under Criterion C, the viewpoint retains NPS Rustic Style elements.
3. Brink of Lower Falls Overlook (Site 48YE1858) is located on a natural rock formation about 600 feet below the north rim of the canyon and is reached via a switchback foot trail. The overlook is located directly above the Lower Falls of the Yellowstone River and was reconstructed in 1957, replacing an earlier 495-step wooden stair structure. Though

constructed after the NPS Rustic Style Era (1916-1941), most of the switchback trail utilizes some NPS Rustic Style materials and includes a stone-edged asphalt-paved trail and some stone retaining walls. Much of the trail has been reconstructed over recent years due to continuing problems with steep grade and erosion. The two viewing platforms do not utilize NPS Rustic Style and are considered non-contributing and non-compatible. They are constructed of poured concrete decks and tubular steel railings with cyclone fencing. The final viewing platform is poised nearly adjacent to the brink of the lower falls. This contributing site is eligible under Criterion A in its association with the events that lead to the establishment of Yellowstone as the world's first national park. Under Criterion C, the viewpoint retains some NPS Rustic Style elements such as stone-edged asphalt-paved trail and stone walls.

4. Brink of the Upper Falls Overlook (Site 48YE1859) is located on a natural rock formation immediately adjacent to the falls. The overlook was reconstructed in the rustic style in 1936-37. It is reached by a short trail that leads from the parking lot and a short section of the old highway, which is now part of the North Rim Trail. C.A. Lord, Park Engineer, wrote a final report on the reconstruction of the observation platform that stated, "...the principal aim was to provide a structure that would blend with the Canyon rim and walls. In order to find the proper stone, it was necessary to haul the boulders 25 miles from Gibbon Canyon. Many of the boulders weighed 2,500 to 3,000 pounds and were installed uncut; varying the height of the wall to eliminate straight lines." Lord stated the "...the work as a whole was a matter of trial and error, placing and replacing the rock work until a satisfactory blending was obtained." The trail to the overlook contains features such as flagstone steps and stone retaining walls. The trail crosses a log bridge to an observation platform that is shaped according to the contours of the rock cliff. It has a crumbling asphalt deck with mortared stone walls around the perimeter of large anchor boulders. The boulder parapet wall is capped by a newer steel railing. This contributing site is eligible under Criterion A in its association with the events that lead to the establishment of Yellowstone as the world's first national park. Under Criterion C, the viewpoint retains NPS Rustic Style elements such as the boulder parapet wall at the lower viewpoint (which blends into the cliff), stone walls along the trail, stone and flagstone steps, and the log bridge.
5. Inspiration Point Overlook (Site 48YE1854) consists of an overlook structure that was constructed in 1956. It consists of a poured concrete walkway with steps and platforms leading to a poured concrete rectangular-shaped observation platform overlooking the Grand Canyon of the Yellowstone. Damage from earthquakes in 1959 and 1975 resulted in the destruction of the south 100 feet of the viewing platform and walkway. Most of this section was never reconstructed. Improvements made to Inspiration Point Overlook in 1956 deviated from the long-standing NPS initiative to blend in all other overlooks and trails along the rim. While wooden observation decks, stairways, and railings at other overlooks were replaced with earthen paths and masonry parapets of native stone in order to blend in with the natural surrounding rockwork, Inspiration Point Overlook (previously constructed using wooden stairs and railings) was replaced in 1956 by the new concrete structure with metal pipe railings. This contributing site is significant under Criterion A in its association with the events that lead to the establishment of Yellowstone as the world's first national park. Under Criterion C, the viewpoint retains elements of NPS Rustic Style including integrity of setting, location, and feeling.
6. Red Rock Point Overlook (Site 48YE1857) is on a rock formation located about 500' below the North Rim of the Canyon and is reached via a foot trail; this trail branches off from the trail to Lookout Point about 300 feet southwest of the parking area. The asphalt-paved

portion of the trail includes features such as boulder edging, log edging, stone retaining walls, natural stone benches, and wooden foot bridges. The natural walkways, associated stonework and viewing platform were originally constructed in 1938-41 using the NPS Rustic Style. The remainder of the trail leading to the viewing platform consists of a modern continuous wood plank walkway with stairs and railings (5' wide) that were likely constructed after 1970. It is considered non-contributing and non-compatible. The viewing platform is circular-shaped with an asphalt-covered deck and log railings. It is built on a natural stone outcrop with mortared stone support walls underneath walls underneath. It provides an excellent view of the Lower Falls to the west-southwest. This contributing site is eligible under Criterion A in its association with the events that lead to the establishment of Yellowstone as the world's first national park. Under Criterion C, the viewpoint retains some NPS Rustic Style elements such as the boulder edging, stone retaining walls, and natural stone benches.

7. Uncle Tom's Trail/Lower and Upper Falls Overlooks (Site 48YE1860) evolved as a ladder-and-rope trail leading to the base of the Lower Falls built in 1898 by "Uncle" Tom Richardson, prior to the construction of the Chittenden Bridge. Today the trail and overlooks are located on natural rock formations near the base of the Upper Falls and above the Upper Falls. Both trail and overlooks are accessed from a large modern parking lot that was constructed on the site of the old Canyon Lodge, which was demolished in 1958. The asphalt trail contains some features such as natural boulder and rock edging and stone retaining walls; however most rustic style elements were not retained during a 1966 reconstruction. Modern elements include poured concrete platforms, steel pipe guardrail, steel mesh fencing, steel bridge, and concrete steps. The two concrete/metal overlooks near the parking lot are considered non-contributing and non-compatible. A steel stairway descends steeply along a sheer stone cliff on its east side and are anchored into the cliff by means of steel I-beam segments. This contributing site is eligible under Criterion A in its association with the events that lead to the establishment of Yellowstone as the world's first national park. Under Criterion C, the viewpoint retains some NPS Rustic Style elements such as stone retaining walls and stone-edged trails.

8. Artist Point Overlook (Site 48YE1861). Prior to the 1930s construction period, the Artist Point Road hugged the Canyon edge and terminated in a looped cul-de-sac at the base of the rock outcrop that was eventually developed as a formal wooden overlook structure. A 1930s design resulted in the creation of an intermediary pedestrian promenade, to separate the cars from the overlook area. After this 1930 design revision, the base of the overlook no longer served as a parking area and became a separate pedestrian zone – the lower platform. The walk is lined with large boulders approximately 3-4' high and wide and embedded in the earth. The boulder barrier helps to define the linear zone and provides a sense of security for the visitor traversing the Canyon rim. Stone stairs descend from the promenade to the lower viewing platform, which is lined with large boulders and has built-in log benches and steel hand railings. The elevated overlook is perched on a rock outcrop and is accessed by a set of stone stairs (25 risers) with steel hand railings. The elevated overlook is exposed, with no overhead plane and very little vegetation surrounding the structure. The stone parapet wall encloses the overlook platform and has built-in stone benches. It provides excellent views of the Yellowstone Canyon to the northeast and the Lower Falls to the southwest. The 2008 rehabilitation of the overlook and the parking area strives to maintain the NPS Rustic design philosophy by utilizing natural stone materials as much as possible, blending built and natural features, and conforming to the 1930s layout. This contributing site is eligible under Criterion A in its association with the events that lead to the establishment of Yellowstone as the world's first national park. Under Criterion C, the

viewpoint retains NPS Rustic Style elements such as the boulder parapet walls (which blends into the cliff), boulder edging along the trail, and stone and flagstone steps.

9. Lookout Point Overlook (Site 48YE1856), consists of an asphalt walkway, intermediate viewpoints, and a final viewpoint, which are all lined with large boulders on either side and natural stone parapets with asphalt decks. Some segments of the walkway also have steel pipe handrails on the side opposite the canyon where the stone walls are lower. At the beginning of the trail there is a set of flagstone steps about 10-12' wide that appear to be original. There is also an ADA ramp located north of the steps that provides a gradual descent to the trail from the parking area. The main observation platform is located at the end of the walkway about 400' from the parking area. It consists of an irregularly-shaped circular viewing area (about 100' N-S x 60' E-W) lined with large boulders and built-in stone benches. An "island" of trees (about 20' in diameter) is located in the middle of the platform that is encircled by boulders. The walkway and observation deck are paved with asphalt. The walkway to Red Rock Point branches off from the Lookout Point walkway about 200' from the parking area before the observation deck is reached. The observation platform and walkway were reconstructed in 1938-41. The overlook, with its natural stone parapets replaced a wooden platform constructed in 1920. The overlook was rehabilitated in 2008. This contributing site is eligible under Criterion A in its association with the events that lead to the establishment of Yellowstone as the world's first national park. Under Criterion C, the viewpoint retains NPS Rustic Style elements such as the boulder parapet walls (which blends into the cliff), boulder edging long the trail, and stone and flagstone steps.
10. Grand View Point Overlook (Site 48YE1855), consists of an asphalt path and viewpoints from a narrow asphalt parking area (reconstructed) to the overlook that is lined with large boulders on either side. The walkway passes a small oval intermediate viewpoint and terminates at the viewing platform (40' N-S x 15' to 18' E-W), also lined with large boulders overlooking the Grand Canyon of the Yellowstone. Features along the walkway consist of shaped stone benches with large flat backrests that extend in height above the stone retaining walls. The parking area was reconstructed by the NPS in 1950-51 and completed in 1952, which improved the overall canyon view. Despite the date, it was constructed using NPS Rustic Style Construction Era (1916-1941) elements. Grand View Point was named by the Hayden Survey of 1871-72. Historian Aubrey Haines suggests that the view of the lower falls from here was used by Thomas Moran in his great painting, The Grand Canyon of the Yellowstone, rather than the more accepted location at Artist Point. However, it is more likely that Moran created the painting as a composite of a series of views from around the canyon. The overlook was rehabilitated in 2008. This contributing site is eligible under Criterion A in its association with the events that lead to the establishment of Yellowstone as the world's first national park. Under Criterion C, the viewpoint retains NPS Rustic Style elements such as the boulder parapet walls (which blends into the cliff), boulder edging long the trail, and stone and flagstone steps.

Grand Loop Road Historic District was a 150-mile circuit system designed to connect the park's most popular attractions. It was listed on the National Register of Historic Places as nationally significant under Criterion A as one of the first, large-scale designed road systems planned by the federal government, and Criterion B, for U.S. Army Corps of Engineering Officer Hiram Martin Chittenden for his vital and innovative role in the development of Yellowstone's road system, his role in the very early recognition of Yellowstone's place in history in the United States, his important historical contributions to the literature of the American West, and his role toward the development of the design philosophy which the NPS later adopted for its roads and building programs. Under Criterion C, the Grand Loop Road is significant on a state level for the

continuing design philosophy of the Army Corps of Engineers of blending with nature and lying lightly on the land.

North Rim Drive/Inspiration Point (48YE1550), a one-way scenic drive with numerous observation points providing spectacular views of the Grand Canyon of the Yellowstone River. In 1895-96, the Army Corp of Engineers constructed a 5 to 6-mile road along the north rim of the canyon with a spur to Inspiration Point. The construction of this road opened up scenery to horse-drawn vehicles that was previously enjoyed only by those who could make the trip on horseback. In 1935, a spur road was constructed connecting the future site of Canyon Village to the Inspiration Point Road. This road eventually became the northern portion of North Rim Drive. Mission 66 era realignments of the North Rim Drive were associated with the 1957 opening of Canyon Village and the realignment of the Norris to Canyon intersection facilitating access to the new Canyon Village area. The western-most portion of Inspiration Point Road became part of the one-way North Rim Drive, a loop that began in the new Canyon Village and exited onto the Grand Loop Road. The eastern-most portion of Inspiration Point Road became a two-way spur road off of North Rim Drive. The historic masonry culvert headwalls rubble-stone retaining walls, and log cribbing support walls were retained and the road was not widened further. On 05/09/2005, the Wyoming State Historic Preservation Officer concurred with YNP that the North Rim Drive/Inspiration Point Road retained enough historic integrity to be eligible for the National Register of Historic Places. The South Rim (Artist Point) road lacked integrity and was found ineligible for listing on the National Register of Historic Places. The historic Chittenden Bridge, built in 1903, was replaced in the 1960s with the modern art deco style Chittenden Memorial Bridge to safely facilitate the wider and heavier vehicles currently used.

Guiding Regulations and Policies

Federal land managing agencies are required to consider the effects of their proposed actions on properties listed in, or eligible for inclusion in, the National Register of Historic Places, and allow the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment as per the National Historic Preservation Act, as amended and its implementing regulations found at 36 CFR Part 800. Agencies are required to consult with Federal, state, local, and tribal governments/organizations, identify historic properties, assess adverse effects to historic properties, and negate, minimize, or mitigate adverse effects to historic properties while engaged in any federal or federally assisted undertaking (36 CFR Part 800). Section 106 (§106) consultation (as described in the NHPA of 1966, as amended) with the State Historic Preservation Office (SHPO) would occur for a proposed project. The ACHP is invited to participate if a proposed project is considered a major undertaking.

Federal law and NPS management policies require full consideration of historical and architectural values whenever a project may affect historic properties. Additionally, the NPS “must to the maximum extent possible, undertake such planning and action as may be necessary to minimize harm to any National Historic Landmark that may be directly and adversely affected by an undertaking” (36 CFR 800.10).

Under the Advisory Council’s regulations, a determination of either adverse effect or no adverse effect must be made for affected historic properties and cultural landscapes that are eligible for or listed on the National Register of Historic Places. An adverse effect occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that would qualify it for inclusion in the National Register (e.g., diminishing the integrity of the resource’s location, design, setting, materials, workmanship, feeling, or association). Adverse effects also include reasonably foreseeable effects caused by the Preferred Alternative that would occur later in

time, be farther removed in distance, or be cumulative (36 CFR Part 800.5, Assessment of Adverse Effects). A determination of no adverse effect means there would be an effect, but the effect would not diminish the characteristics of the cultural resource that qualify it for inclusion in the National Register of Historic Places. The CEQ regulations and the National Park Service's Conservation Planning, Environmental Impact Analysis and Decision-Making (Director's Order 12, NPS 1992) also call for a discussion of the appropriateness of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact (e.g., reducing the intensity of an impact from major to moderate or minor). Any resultant reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation under NEPA only. It does not suggest that the level of effect as defined by §106 is similarly reduced. Although adverse effects under §106 may be mitigated, the effect remains adverse. It is important to note the definition for adverse impacts per the National Environmental Protection Act (NEPA) is not strictly correlated with the definition of adverse effects in the National Historic Preservation Act. Therefore, it is possible to have adverse impacts for the purposes of NEPA review that do not rise to the level of adverse effect per 36 CFR Part 800.

Methodology

In accordance with the Advisory Council on Historic Preservation's regulations implementing §106 of the NHPA (36 CFR Part 800, Protection of Historic Properties), impacts to historic properties including cultural landscapes for this project were identified and evaluated by (1) determining the area of potential effect (APE); (2) identifying cultural resources present in the area of potential effect that were either listed in or eligible to be listed in the National Register of Historic Places; (3) applying the criteria of adverse effect to affected cultural resources either listed in or eligible to be listed in the National Register; and (4) considering ways to avoid, minimize, or mitigate adverse effects.

The methodology used for assessing impacts to cultural resources was derived from available information and park staff. For purposes of analyzing potential impacts to cultural resources, the intensity of impacts is defined as follows:

Intensity Level Definitions (Historic Structures, Sites, and Cultural Landscapes)

The thresholds of change for the intensity of impacts to archeological resources are defined as follows:

- Negligible:** Impact(s) is at the lowest levels of detection with neither adverse nor beneficial consequences. The determination of effect for §106 would be *no adverse effect*.
- Minor:** Impact results in no loss of integrity. The determination of effect for §106 would be *no adverse effect*.
- Moderate:** Impact results in loss of integrity. The determination of effect for §106 would be *adverse effect*. A memorandum of agreement (MOA) is executed among the National Park Service and applicable state historic preservation officer and, if necessary, the Advisory Council on Historic Preservation in accordance with 36 CFR 800.6(b). Measures identified in the MOA to minimize or mitigate adverse impacts reduce the intensity of impact under NEPA from major to moderate.
- Major:** Impact results in loss of integrity. The determination of effect for §106 would be *adverse effect*. Measures to minimize or mitigate adverse impacts cannot be agreed upon and the National Park Service and applicable state historic

preservation officer and/or Advisory Council are unable to negotiate and execute a memorandum of agreement in accordance with 36 CFR 800.6(b).

Impacts of Alternative A – No Action

Alternative A does not proposed any rehabilitation to overlooks and trails within the APE. Comparing historic photographs of some of the overlooks to existing conditions, it is apparent that features such as boulder parapet walls, stone masonry, and pavement have deteriorated over time. Therefore, under Alternative A, the condition of these historic features would continue to deteriorate over time with the potential for eventual loss of integrity, or an adverse effect under §106. Under Alternative A, *historic properties would be adversely affected*. A MOA would be executed under the National Park Service, Wyoming State Historic Preservation Officer, and the Advisory Council on Historic Preservation in accordance with 36CFR 800.6(b). With mitigation from this MOA, there would be a long-term and direct moderate adverse impact under this alternative.

Cumulative Impacts: Cumulative impacts on historic resources are based on the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions in the Greater Yellowstone Area. In 2001, a new visitor center replaced a contributing structure in Canyon Village Historic District under a MOA, which was to mitigate adverse effect under §106. The Canyon to Tower Junction road improvements were made to the Grand Loop Historic District in 2003 (and will continue until 2018) with no adverse effect. The concessioner has begun a project to replace a number of deteriorating (Mission 66 era) guest cabins at Canyon Village under a MOA, which was to mitigate adverse effect under §106. Between 2007 and 2010, Artist Point Overlook (48YE1861), Grandview Point Overlook (48YE1855), Lookout Point Overlook (48YE1856), and portions of the North Rim Trail (48YE1862) were rehabilitated according to the Secretary of the Interior's Standards, which received WYSHPO concurrence for no adverse effect (SHPO file #0307JPP005). The rehabilitation of these three overlooks provided a beneficial direct, long-term impact to the district.

When taken in conjunction with these past, present, and reasonably foreseeable projects, Alternative A would result in moderate, long-term adverse impacts to historic resources. This would be considered a *historic properties adversely affected* determination under §106, requiring mitigation.

Conclusion

Since Alternative A allows contributing overlooks and trails within the Grand Canyon of the Yellowstone Historic District to continue to deteriorate over the long term, this alternative would diminish overall integrity of historic resources and result in long-term, direct, and moderate adverse impact to historic resources. This would be considered a *historic properties adversely affected* determination under §106, requiring mitigation through an MOA.

Impacts of Alternative B – Upgrade and Improve Canyon Rim Trails, Overlooks, and Associated Parking Areas

Over time, almost eighty years of harsh Yellowstone weather, erosion, and visitation has taken its toll on many of the overlooks and trails that contribute to the Grand Canyon of the Yellowstone Historic District. Many of the rustic style overlooks were designed at a time when annual park visitation peaked at 600,000. Today, well over 3 million people visit the park annually, mostly during the summer season.

Alternative B includes proposals that emphasize repair, safety, accessibility, and improved signage while preserving the overall NPS Rustic Style and natural materials that integrate the infrastructure into the spires and canyon cliffs. All planning and design work has been executed in adherence to the Secretary of the Interior Standards for the Treatment of Historic Properties; under which this undertaking is considered a “rehabilitation.” In order to apply appropriate treatments under these standards, historic photographs and plans were studied to determine distinctive materials, features, finishes, and construction techniques and examples of craftsmanship that characterize these contributing sites within the historic district. Historic photos were also used to determine where original boulders/stones were currently missing within parapet walls along cliffs so they may be replaced. Photographs were taken of existing cross-canyon views in order to determine mitigation measures where existing modern alterations were currently visible. All work was designed and constructed using a simple palette of compatible materials, colors, design and a stone masonry style that avoids straight lines in order to blend the new work into the canyon walls. For example, the historic NPS Rustic Style boulder and stone parapet walls, flagstone and asphalt paving, and stone steps that effectively blended overlooks and trails into the canyon wall would be repaired and preserved. Non-contributing structures that currently mar cross-canyon views would be replaced by structures that are more compatible and blend into the cliffs. The rehabilitation of overlooks and trails proposed in this EA is similar to the rehabilitation project implemented at Artist Point Overlook, which received WY SHPO concurrence (SHPO file #0307JPP005), and which maintained the NPS Rustic design theme by utilizing natural stone materials as much as possible, blending built and natural features, and conforming to the historic layout.

Components of this rehabilitation that are common to all overlooks and trails within the APE include the following:

- a. Portions of trails along contributing trails and overlooks would be rerouted away from dangerous cliffs. These trails have historically been rerouted several times due to the eroding nature of the canyon rim.
- b. Where needed, historically compatible stone/boulder barriers would be added where informal “social” viewpoints along trails are close to dangerous cliffs.
- c. Where steep cliffs require additional safety or where handrails are needed for accessibility, compatible metal railing would be added.
- d. Trail and overlook surfaces would be made firm and stable for improved accessibility and safety using historically compatible materials such as asphalt, concrete, and/or flagstone.
- e. Occasional small pullouts and compatible benches would be added along trails and steps to allow for resting.
- f. Interpretive waysides, orientation panels and signage would be installed to improve wayfinding, situations awareness, and safety.
- g. Existing historic boulder parapet walls along cliffs would be repaired, reset, and preserved, ensuring they are structurally sound and safe. In some cases, additional boulders and/or railing may be added to improve safety.
- h. New construction that would be viewed from contributing sites would blend into the cliff face through the use of boulder and stone parapet walls, flagstone and asphalt paving, and stone steps that effectively blended overlooks and trails into the canyon wall.
- i. Non-contributing structures that currently mar cross-canyon views would be replaced by structures that are more compatible.
- j. In order to minimize cross-canyon indirect visual effects, disturbance to existing vegetation at each site would be avoided to the greatest extent possible. Fencing would define the construction zone and confine activity to the minimum area required for

construction. Re-vegetation and re-contouring of disturbed areas would take place following construction and would be designed to minimize the visual intrusions.

- k. Small structures such as vault toilet(s), information kiosk(s), and a shade structure would be placed in/near parking areas and away from the canyon rim in order to avoid visibility from other contributing overlooks and trails.

Impacts to individual historic properties within the APE are described below.

Grand Canyon of the Yellowstone Historic District

The overlooks and trails that contribute to the district all contain similar character-defining elements such as the use of boulder parapet walls and stone steps rather than the straight lines of wooden stairs and railings, which achieved the 1930s goal of effectively blending the overlooks and trails into the cliff-faces so they were not visible from cross-canyon views.

Please note: The above description of Alternative B and list of components common to all overlooks and trails rehabilitation describe the changes proposed for under Alternative B and explains the methods utilized to ensure the rehabilitation remains consistent with the Secretary of the Interior Standards for Rehabilitation.

The impact analysis for each of the ten contributing overlooks and trails within the district that would be affected by the undertaking is described below.

1. North Rim Trail (48YE1862)

The above description of Alternative B explains the methods utilized to ensure the rehabilitation of contributing trails and overlooks are consistent with the Secretary of the Interior Standards for Rehabilitation. The above list of rehabilitation components common to all overlooks and trails describes the rehabilitation of the North Rim trail. The North Rim Trail was historically laid out to take maximum advantage of canyon views and established viewpoints (which were renovated over time) while maintaining a reasonable grade for hiking. Various incidental viewpoints and social trails that have developed along the trail over time would be rehabilitated to better identify the limits of the overlook and address safety concerns along the rim edge. For example, the informal viewpoint near the Brink of Upper Falls Overlook, referred to as “Crystal Falls Overlook” in the EA and Schematic Design, would be formalized with compatible boulder parapet walls. Surfacing of these overlooks, safety rail systems, and location of existing trail in relation to the canyon edge would all be addressed using rustic style design and materials in order to maintain the character-defining NPS Rustic theme within the district. In some cases minor reroutes of the trail would occur to pull it back from the canyon edge. Minor trail re-routes would not alter the overall integrity of the trails, which have historically been rerouted several times due to the eroding nature of the canyon rim. In order to avoid indirect effects caused by cross-canyon views of the undertaking from North Rim Trail, the rehabilitation of overlooks and trails within the Grand Canyon of the Yellowstone Historic District that are visible from this site would be designed and constructed to blend into the cliff face. For example, the historic NPS Rustic Style boulder and stone parapet walls, flagstone and asphalt paving, and stone steps that effectively blended the other contributing overlooks and trails into the canyon wall would be repaired and preserved. Non-contributing, non-compatible structures within other contributing sites that currently mar cross-canyon views and diminish integrity of the district, would be replaced by structures that are made of boulder parapet walls and are more compatible, such as at Uncle Tom’s Trail/Lower and Upper Falls Overlooks, and South Rim Trail. Consequently, under Alternative B, the historic integrity of the North Rim Trail, its views and its historic layout would all be preserved while new additions would be made

compatible through the use of NPS rustic-style stone and boulders, as described. Therefore, Alternative B would have a minor, long-term, and direct and indirect beneficial impact on the North Rim trail. Under §106, appropriate designs and choices of materials that follow the Secretary of the Interior Standards for the Treatment of Historic Properties in consultation with WYSHPO would result in a *No Adverse Effect* on North Rim Trail or the Grand Canyon of the Yellowstone Historic District.

2. South Rim Trail (48YE1863)

The above description of Alternative B explains the methods utilized to ensure the rehabilitation of contributing trails and overlooks are consistent with the Secretary of the Interior Standards for Rehabilitation. The above list of rehabilitation components common to all overlooks and trails describes the rehabilitation of the South Rim trail. Under Alternative B, the historic integrity of the South Rim Trail would be preserved. The historic integrity of views from the South Rim Trail would be preserved and restored. The trail would retain integrity with minor adjustments. Various incidental viewpoints and social trails that have developed along the trail over time would be rehabilitated to better identify the limits of the overlook and address safety concerns along the rim edge. For example, the informal wooden viewing area near Uncle Tom's Overlook, referred to as "Sunset Point Overlook" in the EA and Schematic Design, would be replaced with more appropriate boulder parapet walls, thereby improving character-defining cross-canyon views from Brink of Upper Falls Overlook. Surfacing of these overlooks, safety rail systems, and location of existing trail in relation to the canyon edge would all be addressed using rustic style design and materials. In some cases minor reroutes of the trail would occur to pull it back from the canyon edge. Minor trail re-routes would not alter the overall integrity of the trails, which have historically been rerouted several times due to the eroding nature of the canyon rim. In order to avoid indirect effects caused by cross-canyon views of the undertaking from South Rim Trail, the rehabilitation of overlooks and trails within the Grand Canyon of the Yellowstone Historic District that are visible from this site would be designed and constructed to blend into the cliff face. For example, the historic NPS Rustic Style boulder and stone parapet walls, flagstone and asphalt paving, and stone steps that effectively blended the other contributing overlooks and trails into the canyon wall would be repaired and preserved. Non-contributing, non-compatible structures within other contributing sites that currently mar cross-canyon views and diminish integrity of the district would be replaced by structures that are made of boulder parapet walls and are more compatible, such as at Inspiration Point Overlook and North Rim Trail. Consequently, under Alternative B, the historic integrity of the South Rim Trail, its views and its historic layout, and its effect on cross-canyon views would all be preserved while new additions would be made compatible using NPS Rustic –style boulders and stone, as described. Therefore, Alternative B would have a minor, long-term, and direct and indirect beneficial impact on the South Rim Trail. Under §106, appropriate designs and choices of materials that follow the Secretary of the Interior Standards for the Treatment of Historic Properties in consultation with WYSHPO would result in a *No Adverse Effect* on the South Rim Trail or the Grand Canyon of the Yellowstone Historic District.

3. Brink of Upper Falls Overlook (48YE1859)

The above description of Alternative B explains the methods utilized to ensure the rehabilitation of contributing trails and overlooks are consistent with the Secretary of the Interior Standards for Rehabilitation. In addition to the above list of rehabilitation components common to all overlooks and trails, the rehabilitation of this overlook would involve the following actions. The grade of the pedestrian route from the overlook to the parking lot would be made more ADA accessible and new stone walls that are compatible with the existing stone walls along this trail would be added where the trail comes

dangerously close to the cliff edge. Existing character-defining stone retaining walls, stone steps, and flagstone paving would be repaired and preserved. The character-defining boulder parapet wall of the main viewing platform would be reserved and repaired, replacing some large boulders that have been lost over the years. A new safety railing would replace the existing modern railing and would be designed to be compatible and blend better into the landscape without affecting integrity. A modest new accessible overlook would be added above the existing Brink of Upper Falls Overlook. It would utilize the same characteristic boulder parapet walls that effectively blends the structure into the cliff so that it would not be visible from cross-canyon views. In order to avoid indirect effects caused by cross-canyon views of the undertaking from Brink of Upper Falls Overlook, the rehabilitation of overlooks and trails within the Grand Canyon of the Yellowstone Historic District that are visible from this site would be designed and constructed to blend into the cliff face. For example, the historic NPS Rustic Style boulder and stone parapet walls, flagstone and asphalt paving, and stone steps that effectively blended the other contributing overlooks and trails into the canyon wall would be repaired and preserved. Non-contributing, non-compatible structures within other contributing sites that currently mar cross-canyon views and diminish integrity of the district would be replaced by structures that are made of boulder parapet walls and are more compatible, such as at Uncle Tom's Trail/Lower and Upper Falls Overlooks, and South Rim Trail. Consequently, under Alternative B, the historic integrity of the Brink of Upper Falls Overlook, its views, its historic layout, its boulder parapet walls, stone retaining walls, would all be preserved while new additions would be made compatible using stone/boulders. Therefore, Alternative B would have a minor, long-term, and direct and indirect beneficial impact on Brink of the Upper Falls Overlook. Under §106, appropriate designs and choices of materials that follow the Secretary of the Interior Standards for the Treatment of Historic Properties in consultation with WYSHPO would result in a *No Adverse Effect* on the Brink of the Upper Falls Overlook or the Grand Canyon of the Yellowstone Historic District.

4. Brink of Lower Falls Overlook (48YE1858)

The above description of Alternative B explains the methods utilized to ensure the rehabilitation of contributing trails and overlooks are consistent with the Secretary of the Interior Standards for Rehabilitation. In addition to the above list of rehabilitation components common to all overlooks and trails, the rehabilitation of this overlook would involve improving and stabilizing the steep switchback trail surface and side slopes, which commonly sluffs soils, rock, and gravel; creating an unstable walking surface – all while not changing the integrity of the historic layout or materials of the boulder/stone-edged trail. A new mid-level platform would be constructed between the larger lower main platform and the upper platform at the Brink of the Lower Falls Overlook using compatible Rustic-style boulder parapet walls. This new addition would blend into the cliff and not affect the design integrity of the site. A new connecting stone stairway constructed using compatible materials and masonry style would join all three platforms. The existing non-contributing, non-compatible poured concrete and metal overlook structures, which diminish the integrity of the site, would be replaced with more compatible boulder parapet walls. The design, materials, and color that would reduce their visibility and restore more natural cross-canyon views that are an important character-defining element within the district. In order to avoid indirect effects caused by cross-canyon views of the undertaking from Brink of Lower Falls Overlook, the rehabilitation of overlooks and trails within the Grand Canyon of the Yellowstone Historic District that are visible from this site would be designed and constructed to blend into the cliff face. For example, the historic NPS Rustic Style boulder and stone parapet walls, flagstone and asphalt paving, and stone steps that effectively blended the other contributing overlooks and trails into the canyon wall would be repaired and preserved. Non-contributing, non-compatible structures within other contributing sites

that currently mar cross-canyon views and diminish integrity of the district, would be replaced by structures that are made of boulder parapet walls and are more compatible, such as at Uncle Tom's Trail/Lower and Upper Falls Overlooks, and South Rim Trail. Consequently, under Alternative B, the historic integrity of the Brink of Lower Falls Overlook, its views, its historic layout, its boulder/stone-edged trail, and stone retaining walls, would all be preserved while the new additions such as the mid-level platform and stone steps, would be made compatible using materials such as boulders/stone. The non-compatible, non-contributing concrete/metal overlook structures that have diminished the integrity of the site would be replaced with boulder parapet walls that are more compatible and restore integrity of cross-canyon views. Therefore, Alternative B would have a minor, long-term, and direct and indirect beneficial impact on Brink of the Lower Falls Overlook. Under §106, appropriate designs and choices of materials that follow the Secretary of the Interior Standards for the Treatment of Historic Properties in consultation with WYSHPO would result in a *No Adverse Effect* on the Brink of the Lower Falls Overlook or the Grand Canyon of the Yellowstone Historic District.

5. Inspiration Point Overlook (48YE1854)

The above description of Alternative B explains the methods utilized to ensure the rehabilitation of contributing trails and overlooks are consistent with the Secretary of the Interior Standards for Rehabilitation. In addition to the above list of rehabilitation components common to all overlooks and trails, the rehabilitation of this overlook would include the following. The existing non-contributing, non-compatible deteriorated modern concrete stair and platform would be replaced by a new walkway that switchbacks (ADA accessible) to new viewing platforms that incorporate rustic style design, materials, and colors in order to blend them into the landscape and minimize visibility from other overlooks. This would effectively restore more natural cross-canyon views that are an important character-defining element within the district. A more direct 6-foot wide stairway from the parking lot to the overlook would be constructed using a rustic style stone masonry style that also blends into the cliff face. Smaller intermediate viewpoints would be constructed along the trail, culminating into a final viewing platform at approximately the same location as the existing platform. The new walkway would utilize stone and boulder edging that varies in height to avoid straight lines and, if needed, a modest handrail on one side. The viewing platforms would utilize boulder parapet walls that blend the facility into the cliff and the final platform would be retained/secured by a concrete stem wall faced with stone that blends into the cliff face. A new vault toilet would be set in the trees in a vegetated island across the parking lot from the rim where it would not be visible from other overlooks (an important character-defining element within the district). In order to avoid indirect effects caused by cross-canyon views of the undertaking from Inspiration Point Overlook, the rehabilitation of overlooks and trails within the Grand Canyon of the Yellowstone Historic District that are visible from this site would be designed and constructed to blend into the cliff face. For example, the historic NPS Rustic Style boulder and stone parapet walls, flagstone and asphalt paving, and stone steps that effectively blended the other contributing overlooks and trails into the canyon wall would be repaired and preserved. Non-contributing, non-compatible structures within other contributing sites that currently mar cross-canyon views and diminish integrity of the district, would be replaced by structures that are made of boulder parapet walls and are more compatible, such as along the South Rim Trail. Consequently, under Alternative B, the historic integrity of the Inspiration Point Overlook would be preserved by retaining integrity of setting, location, and feeling due to its continued use as a viewpoint. The historic integrity of views from Inspiration Point Overlook would also be preserved. The non-contributing, non-compatible modern concrete and metal structure that diminishes the integrity of feeling, setting, and association of the site and the district,

would be replaced with a switchback trail and viewing platforms that would be blended into the canyon wall using compatible natural materials such as stone edging and boulder parapet walls. Therefore, Alternative B would have a minor, long-term, and direct and indirect beneficial impact on Inspiration Point Overlook. Under §106, appropriate designs and choices of materials that follow the Secretary of the Interior Standards for the Treatment of Historic Properties in consultation with WYSHPO would result in a *No Adverse Effect* on Inspiration Point Overlook or the Grand Canyon of the Yellowstone Historic District.

6. Red Rock Point Overlook (48YE1857)

The above description of Alternative B explains the methods utilized to ensure the rehabilitation of contributing trails and overlooks are consistent with the Secretary of the Interior Standards for Rehabilitation. In addition to the above list of rehabilitation components common to all overlooks and trails, the rehabilitation of this overlook would include the following. Part of this structure straddles the top of an eroding hogback ridge down to the overlook and has been renovated several times, resulting in the current system of non-contributing, non-compatible wooden stairs constructed after 1970. The proposed rehabilitation would involve regrading and resurfacing of the existing asphalt trail and restoring the stone edging, thereby restoring this character-defining feature. The existing non-contributing boardwalk stairway would be removed and replaced with either a metal grated system of stairs and/or stone stairs, however the replacement structure cannot be determined until a topographic survey is completed for this site. A trail re-route may be a possibility in the future where the lower 300- to 500- foot portion of the trail may be relocated into the trees to protect cross-canyon views. On-going consultation with the WYSHPO would continue as the design of this trail and overlook progresses once the survey is complete. Under Alternative B, the historic integrity of the stone-edged trail, stone steps, and stone retaining walls of Red Rock Point Overlook would be preserved. The non-compatible, non-contributing boardwalk stairs that diminish the integrity of feeling, association, workmanship, and setting of the site would be removed. In order to avoid indirect effects caused by cross-canyon views of the undertaking from Red Rock Point Overlook, the rehabilitation of overlooks and trails within the Grand Canyon of the Yellowstone Historic District that are visible from this site would be designed and constructed to blend into the cliff face. For example, the historic NPS Rustic Style boulder and stone parapet walls, flagstone and asphalt paving, and stone steps that effectively blended the other contributing overlooks and trails into the canyon wall would be repaired and preserved. Non-contributing, non-compatible structures within other contributing sites that currently mar cross-canyon views and diminish integrity of the district, would be replaced by structures that are made of boulder parapet walls and are more compatible, such as at Uncle Tom's Trail/Lower and Upper Falls Overlooks, and South Rim Trail. Thus, the historic integrity of views from Red Rock Point Overlook would be preserved. Therefore, Alternative B would have a minor, long-term, and direct and indirect beneficial impact on Red Rock Point Overlook. Under §106, appropriate designs and choices of materials that follow the Secretary of the Interior Standards for the Treatment of Historic Properties with on-going consultation with WYSHPO would result in a *No Adverse Effect* on Red Rock Point Overlook or the Grand Canyon of the Yellowstone Historic District.

7. Uncle Tom's Trail/Lower and Upper Falls Overlooks (48YE1860)

The above description of Alternative B explains the methods utilized to ensure the rehabilitation of contributing trails and overlooks are consistent with the Secretary of the Interior Standards for Rehabilitation. In addition to the above list of rehabilitation components common to all overlooks and trails, the rehabilitation of this overlook would include the following. Two concrete and metal overlook structures adjacent to the parking lot

(determined to be non-contributing elements of the site) are non-compatible and diminish the integrity of the site. These would be replaced with boulder parapet walls that are more compatible with NPS Rustic Style. One of these structures (NW) is referred to as “Crystal Falls Overlook” in the EA and Schematic Design. They would be replaced with stone masonry walls and new railings that better blend into the landscape and are less visible from other canyon overlooks, thereby improving cross-canyon views. Incidental viewpoints that have developed along the trail over time would be rehabilitated to better identify the limits of the overlook and address safety concerns. Steep portions of the trail would be re-routed slightly to lessen the grade in order to make it more accessible. The existing modern restroom would be replaced by a more compatible structure near the parking area and in a location that would not be visible from cross-canyon views. A small orientation kiosk would be added near the parking area. In order to avoid indirect effects caused by cross-canyon views of the undertaking from Uncle Tom’s Trail/Lower and Upper Falls Overlooks, the rehabilitation of overlooks and trails within the Grand Canyon of the Yellowstone Historic District that are visible from this site would be designed and constructed to blend into the cliff face. For example, the historic NPS Rustic Style boulder and stone parapet walls, flagstone and asphalt paving, and stone steps that effectively blended the other contributing overlooks and trails into the canyon wall would be repaired and preserved. Non-contributing, non-compatible structures within other contributing sites that currently mar cross-canyon views and diminish integrity of the district, would be replaced by structures that are made of boulder parapet walls and are more compatible, such as at Brink of Lower Falls Overlook and North Rim Trail. Consequently, under Alternative B, the historic integrity of the Uncle Tom’s Trail/Lower and Upper Falls Overlooks would be preserved by repairing stone steps, stone retaining walls, and stone-lined trails; and restored by removing non-compatible structures that diminish integrity. Therefore, Alternative B would have a minor, long-term, and direct and indirect beneficial impact on Uncle Tom’s Trail/Lower and Upper Falls Overlooks. Under §106, appropriate designs and choices of materials that follow the Secretary of the Interior Standards for the Treatment of Historic Properties in consultation with WYSHPO would result in a *No Adverse Effect* on the Uncle Tom’s Trail/Lower and Upper Falls Overlooks or the Grand Canyon of the Yellowstone Historic District.

8. Artist Point Overlook (Site 48YE1861)

Artist Point Overlook would not be directly affected since it would not be rehabilitated as part of this undertaking. In order to avoid indirect effects caused by cross-canyon views of the undertaking from Artists Point Overlook, the rehabilitation of overlooks and trails within the Grand Canyon of the Yellowstone Historic District that are visible from Artist Point Overlook would be designed and constructed to blend into the cliff face. For example, the historic NPS Rustic Style boulder and stone parapet walls, flagstone and asphalt paving, and stone steps that effectively blended the other contributing overlooks and trails into the canyon wall would be repaired and preserved. Non-contributing, non-compatible structures within other contributing sites that currently mar cross-canyon views and diminish integrity of the district, would be replaced by structures that are made of boulder parapet walls and are more compatible, such as at Inspiration Point and the North Rim Trail. Consequently, under Alternative B, the historic integrity of views from Artist Point would be preserved and restored. Therefore, Alternative B would have a minor, long-term, and indirect beneficial impact on Artist Point Overlook. Under §106, this would be considered a *No Adverse Effect* on Artist Point Overlook or the Grand Canyon of the Yellowstone Historic District.

9. Lookout Point Overlook (Site 48YE1856)

Lookout Point Overlook would not be directly affected since it would not be rehabilitated as part of this undertaking. In order to avoid indirect effects caused by cross-canyon views of

the undertaking from Lookout Point Overlook, the rehabilitation of overlooks and trails within the Grand Canyon of the Yellowstone Historic District that are visible from Lookout Point Overlook would be designed and constructed to blend into the cliff face. For example, the historic NPS Rustic Style boulder and stone parapet walls, flagstone and asphalt paving, and stone steps that effectively blended the other contributing overlooks and trails into the canyon wall would be repaired and preserved. Non-contributing, non-compatible structures within other contributing sites that currently mar cross-canyon views and diminish integrity of the district, would be replaced by structures that are made of boulder parapet walls and are more compatible, such as at Uncle Tom's Trail/Lower and Upper Falls Overlooks, and South Rim Trail. Consequently, under Alternative B, the historic integrity of views from Lookout Point would be preserved and restored. Therefore, Alternative B would have a minor, long-term, and indirect beneficial impact on Lookout Point Overlook. Under §106, this would be considered a *No Adverse Effect* on Lookout Point Overlook or the Grand Canyon of the Yellowstone Historic District.

10. Grand View Point Overlook (Site 48YE1855)

Grand View Point Overlook would not be directly affected since it would not be rehabilitated as part of this undertaking. In order to avoid indirect effects caused by cross-canyon views of the undertaking from Grand View Point Overlook, the rehabilitation of overlooks and trails within the Grand Canyon of the Yellowstone Historic District that are visible from Grand View Point Overlook would be designed and constructed to blend into the cliff face. For example, the historic NPS Rustic Style boulder and stone parapet walls, flagstone and asphalt paving, and stone steps that effectively blended the other contributing overlooks and trails into the canyon wall would be repaired and preserved. Non-contributing, non-compatible structures within other contributing sites that currently mar cross-canyon views and diminish integrity of the district, would be replaced by structures that are made of boulder parapet walls and are more compatible, such as at Uncle Tom's Trail/Lower and Upper Falls Overlooks, and South Rim Trail. Consequently, under Alternative B, the historic integrity of views from Grand View Point would be preserved and restored. Therefore, Alternative B would have a minor, long-term, and indirect beneficial impact on Grand View Point Overlook. Under §106, this would be considered a *No Adverse Effect* on Grand View Point Overlook or the Grand Canyon of the Yellowstone Historic District.

Grand Loop Road Historic District (48YE520)

A hierarchy of new signs designed to help improve wayfinding (finding one's way) in the area would be added to the road. Signs that are compatible with the road historic district would be utilized.

Alternative B would have a negligible to minor, long-term, and direct adverse impact on the Grand Loop Road Historic District. Under §106, appropriate designs and choices of materials that follow the Secretary of the Interior Standards for the Treatment of Historic Properties in consultation with WYSHPO would result in a *No Adverse Effect* on the Grand Loop Road Historic District.

North Rim Drive (48YE1550)

Access drives to parking areas and overlooks would be signed with a hierarchy of new signs designed to help improve wayfinding (finding one's way) in the area. Signs that are compatible with the road historic district would be utilized.

Alternative B would have a negligible to minor, long-term, and direct adverse impact on the North Rim Drive. Under §106, appropriate designs and choices of materials that follow the Secretary of the Interior Standards for the Treatment of Historic Properties in consultation with WYSHPO would result in a *No Adverse Effect* on the North Rim Drive.

Cumulative Impacts for Alternative B: Cumulative impacts on historic resources are based on the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions in the Greater Yellowstone Area. In 2001, a new visitor center replaced a contributing structure in Canyon Village Historic District under a MOA, which was to mitigate adverse effect. The Canyon to Tower Junction road improvements were made to the Grand Loop Historic District in 2003 and will continue until 2018 with no adverse effect. The concessioner has begun a project to replace a number of deteriorating (Mission 66 era) guest cabins at Canyon Village under a MOA, which was to mitigate adverse effect. Between 2007-2010, Artist Point Overlook (48YE1861), Grandview Point Overlook (48YE1855), Lookout Point Overlook (48YE1856), and portions of the North Rim Trail (48YE1862) were rehabilitated according to the Secretary of the Interior's Standards, which received WYSHPO concurrence for no adverse effect (SHPO file #0307JPP005). The rehabilitation of these three overlooks provided a beneficial direct, long-term impact to the district.

When taken in conjunction with these past, present, and reasonably foreseeable projects, Alternative B would result in minor, long-term, and direct and indirect beneficial impacts to historic resources. This would be considered a *no adverse effect* determination under §106.

Conclusion

Under Alternative B, potential adverse effects to contributing overlooks and trails within the Grand Canyon of the Yellowstone Historic District would be avoided through adherence to the Secretary of the Interior Standards for the Treatment of Historic Properties as described above. The proposed rehabilitation would preserve and repair character-defining elements such as existing boulder parapet walls and stone steps. It would remove non-contributing, non-compatible structures that mar cross-canyon views and diminish overall integrity of the district. These would be replaced with structures that utilize stone/boulders that blend into the canyon walls, thereby preserving and restoring natural cross-canyon views, which are an important character-defining features within the district. Therefore, this alternative would result in minor, long-term, direct and indirect beneficial impacts to cultural resources, which is considered a *No Adverse Effect* under §106.

Human Health and Safety

The NPS is committed to providing appropriate, high-quality opportunities for visitors and employees to enjoy the parks in a safe and healthful environment. Further, the NPS strives to protect human life and provide for injury-free visits. Employee and volunteer safety within the workplace for the park and concessioners is a high priority. The park recognizes there are inherent dangers present in a large natural area such as Yellowstone National Park. These dangers have resulted in injuries and deaths to visitors and employees in the past and have resulted in concerns with human health and safety that the park is constantly trying to improve upon, and make the public aware of.

Slips, trips, rolled ankles, are common on many of the trails in Yellowstone, though the paved trails of the Canyon Rim area can be especially treacherous. The paved trails in the area are typically riddled with potholes, have gravel and many of the switchback turns, are steep, and generally lack handrails. The gravel on the trail tends to act like ball bearings making secure

footing difficult. The gravel flows onto the paved trails after frequent rains. Since the trails lack edging of any height along the upper edge of the trail, there is nothing to keep gravel off the trail tread.

The trails lead visitors down into the canyon to areas with frequent and steep drops. Trail edge definition is generally lacking and many social trails have made the task of staying on maintained trail routes even more difficult. Tragedies have occurred too frequently due to a simple slip on gravel in an area just adjacent to the trail. Both close calls and deaths have occurred by users that have kept close to maintained trail, and by those who have wander off trail to get closer to the canyon's edge. Methods to relay messages about being aware of your surroundings, hazards, and safety can always be improved.

Guiding Regulations and Policies

The National Park Service is concerned about the safety for visitors and employees and strives to enhance visitor and employee safety (NPS 2006). The *NPS Management Policies 2006* state that the NPS is committed to providing appropriate, high-quality opportunities for visitors to enjoy the parks. The policies also state, "While recognizing that there are limitations on its capability to totally eliminate all hazards, the National Park Service and its concessioners, contractors, and cooperators would seek to provide a safe and healthful environment for visitors and employees" (sec. 8.2.5.1). Further, the NPS would strive to protect human life and provide for injury-free visits (sec. 8.2.5).

Intensity Level Definitions

The intensity of impacts to human health and safety are as follows:

- Negligible:** The impact to visitor, park and contractor staff safety would not be measurable or perceptible.
- Minor:** The impact to visitor, park and contractor staff safety would be measurable and perceptible and would involve a large number of individuals in a localized area of the park.
- Moderate:** The impact to visitor, park and contractor staff safety would be measurable and perceptible and would involve a large number of individuals in many areas of the park.
- Major:** The impact to visitor, park and contractor staff safety would be substantial and park wide in occurrence. Accident rates in areas usually limited to low accident potential would be expected to substantially increase in the short and long-term and impacts to the safety of individuals would be readily apparent throughout the park.

Impacts of Alternative A – No Action

Adverse impacts on human health and safety would continue under Alternative A, particularly hazards associated with being near the canyon edge. Visitors hiking the North and South Rim trails encounter many unofficial social trails (formed when hikers leave maintained trails). Hiking off the maintained official trails can put visitors in more dangerous situations due to close proximity to the canyon edge. Under this alternative these effects would continue and would result in minor to moderate, short- and long-term adverse impact to human health and safety.

Cumulative Effects: Cumulative impacts on human health and safety are based on the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions in Yellowstone National Park. Throughout YNP there are areas of increased risk to health and human safety from on-going use of park facilities such as trails and overlooks. In addition, Yellowstone National Park is a wilderness park with a portion of the mission dedicated to providing enjoyment value to visitors. There are many inherent health and safety challenges for humans that pursue their recreational interests, especially in backcountry locations. Every year geothermal features scald a few people that get too close and contact the extremely hot water. The weather can turn cold, creating conditions for hypothermia and frostbite, and the high elevation can cause dehydration for those who fail to consume enough fluids. Falls account for injuries and deaths and some wildlife species can bite, gore, and trample people that approach too closely within the comfort zone of individual animals. While these same risks are present for employees, orientation to and familiarity with safety risks generally make employees more aware and cautious about health and safety needs. The cumulative impacts to health and human safety would be minor to moderate and adverse.

Conclusion

Implementation of Alternative A would result in continued minor to moderate adverse impacts to health and safety of park visitors and employees. No comprehensive safety messaging or facility improvements would be implemented.

Impacts of Alternative B – Upgrade and Improve Canyon Rim Trails, Overlooks, and associated Parking Areas

Alternative B would not only provide demarcation of trails and trail edges, it would also provide improved safety messaging signs to help educate visitors of inherent dangers that they may encounter. The uneven trail surface conditions commonly encountered on paved trails in the Canyon Rim area would be resurfaced, reducing the likelihood of slips, tripping, twisted ankles, and falls. Additional or improved edge protection would be installed at some of the most popular overlooks. Edge boulders would be installed in place of chain-link fence at the two existing lookouts at Uncle Tom's, and improved safety railing would be installed in some areas such as the Brink of the Lower Falls. During construction, there is always a potential for construction-related accidents. A health and safety program would be implemented by the construction contractors, based on industry standards for accident prevention. At a minimum, the construction health and safety program would comply with federal and local health and safety regulations. Elements of the safety program would include:

- Responsibilities of construction workers and subcontractors
- Job site rules and regulations
- Emergency response procedures
- Safety inspections and audits
- Location of medical services and first aid
- Safety meetings, employee training, and hazard communications
- Personal protective equipment
- Standard construction procedures
- Accident investigation and reporting.

Because a health and safety program would be implemented for construction activities and the public would be excluded from entering construction areas, potential construction impacts on public health and safety would not result in any greater safety risk. Better delineated trails, better safety messaging, and additional safety elements at overlooks would all improve safety.

Therefore, impacts to public health and safety related to construction activities would be negligible. The overall effect of Alternative B would be minor, short- and long-term beneficial.

Cumulative Effects: The impacts from past, present and reasonably foreseeable projects are the same as described in the cumulative effects section for A. Alternative B, in conjunction with these past, present, and reasonably foreseeable projects would result in minor, short- and long-term adverse impacts to human health and safety.

Conclusion

Implementation of Alternative B would allow for many safety improvements to occur within a short time frame. Safety messaging signs would improve visitor awareness of hazards, new rails and edging would allow for minor to moderate beneficial impacts re: human health and safety to occur from this alternative.

Visitor Use and Experience

Affected Environment

Recreational visitation to YNP has increased in the last 15 years, from 2,889,513 in 1997 to 3,513,484 in 2014 (NPS, 2014c). The summer months (June, July, and August) are the primary visitation season in Yellowstone, although the spring and fall have grown in popularity. During the peak season, facilities such as campgrounds, lodges, visitor centers, restaurants, service stations, and shops are used at or beyond capacity.

More than 75 percent of visitor use within the park is concentrated in the major developed areas. The primary recreational activities that visitors participate in include viewing wildlife, photography, walking, and exploring visitor centers. Other activities include fishing, camping, hiking, horseback riding, and boating.

According to the YNP Visitation Study in 2011, a typical YNP stay is 2.8 days, 66% of the people visit Canyon, and a stay in Canyon lasts a mean of 3 days (1 and 2 day stays were the highest).

Yellowstone National Park, in its Long-Range Interpretive Plan (NPS 2000), established a number of visitor experience goals that the park would like to be available to visitors. These, in part, include:

- To experience the essence of the park's wild nature;
- To behave in a manner that does not hurt themselves or park resources;
- To successfully plan their visits and orient themselves to facilities, attractions, features and experiences;
- To experience programs, media, and facilities that enhances their educational experiences;
- To understand the park's significance; and
- To enjoy themselves, have memorable experiences, and leave feeling enriched.

People from around the world come to YNP each year to experience its wonders. Visitation is highly seasonal. June, July, and August are the months of highest use, with 68% of the park's annual visitors arriving during this time. The shoulder-season months of September through November account for about 20% of park visitation; April and May account for 9%, with December through March (the winter season of oversnow visitation) accounting for only 3%.

The most common site visited in the park is Old Faithful (90%), followed by Mammoth Hot Springs (69%), Canyon Village (64%), Fishing Bridge/Lake/Bridge Bay (45%), West Thumb/Grant Village (49%), Madison (47%), and Tower-Roosevelt (45%). Seventy percent of visitors were in groups of two, three, or four; 25% were in groups of five or more. Of the visitor groups that spent less than 24 hours in the park, 82% spent five or more hours and 18% spent up to four hours. Of the visitor groups that spent more than 24 hours in the park, 53% spent two to three days and 44% spent four or more days (Manni et al. 2006).

A high percentage of park visitors (93%) are satisfied with facilities, services, and recreational opportunities in Yellowstone. Visitors were especially satisfied with ranger programs (100%), visitor centers (96%), opportunities for learning about nature, history, or culture (94%), assistance from park employees (94%), exhibits (93%), and opportunities for outdoor recreation (93%) (NPS 2007).

Greater than 95% of visitors to Yellowstone stay on park roads and within developed areas, the area the 1991 Yellowstone *Statement for Management* defines as the "Park Development Zone." Lands within this zone (10% of the park) are managed to provide and maintain developments that serve park management and visitor needs, although natural conditions are maintained to the greatest extent possible (NPS 1991).

According to *Management Policies 2006*, the enjoyment of park resources and values by people is part of the fundamental purpose of all park units (NPS 2006). The NPS is committed to providing appropriate, high quality opportunities for visitors to enjoy the parks, and maintain within the parks an atmosphere that is open, inviting, and accessible to every segment of society. Further, NPS would 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 NPS should strive to protect (NPS 2006).

Methodology

The methodology used for assessing impacts to visitor use and experience was derived from visitor surveys, available information, and park staff.

Intensity Level Definitions

The thresholds of change for the intensity of impacts to visitor use and experience are defined as follows:

- Negligible:** Management actions would result in impacts that would be barely detectable, or would occasionally affect the experience of few visitors in the applicable setting.
- Minor:** Management actions would result in impacts that would be slight but detectable; could be perceived as negative by visitors or would inhibit visitor experience. Impacts would negatively affect the experience of some visitors in the applicable setting.
- Moderate:** Management actions would result in impacts that would be readily apparent and perceived as somewhat negative. Impacts would negatively affect the experience of many visitors in the applicable setting.

Major: Management actions would result in impacts that would be highly negative, affecting the experience of a majority of visitors in the applicable setting.

Impacts of Alternative A – No Action

Under Alternative A, there would be no change in the visitor's experience. Routine maintenance would continue to occur. No changes to the configuration of trails and overlooks in the Canyon Rim area would occur. No improvements to visitor facilities such as upgraded restrooms, improved trail surfaces, improved wayfinding and messaging signage would occur. Accessibility would remain unchanged over present conditions. Additionally, parking lot improvements at Uncle Tom's and Brink of the Upper Falls would not be designed to accommodate large vehicles. Bus and RV parking would continue to take up multiple car spaces, continuing existing inefficient parking lot operations. These impacts are expected to be long-term and minor as the effects would be experienced by visitors until a redesign and implementation of these visitor facilities is accomplished.

Trails in some areas may need to be closed due to continued deterioration due to a lack of a dedicated funding source to focus on these needs, or due to ever increasing maintenance work to keep the trails in a passable condition. If these closures were to occur, visitors would have fewer choices to visit in the area. Remaining overlooks and trails would become busier and more congested. Visitor satisfaction with their experience would likely drop. These impacts would be considered moderate, long-term and adverse.

Cumulative Effects: Facilities and development that have been established in the past within Yellowstone have had beneficial effects on the visitor experience as they have provided access to the park and allowed visitors to enjoy amenities. As trails, overlooks and structures continue to degrade due to age, the impacts to the visitor use experience would continue to degrade as well. The major emphasis of these projects is to replace, repair, and rehabilitate existing facilities that are approaching the end of their service life. Where new facilities are proposed, they would be concentrated in areas that are popular but where existing facilities and size cannot accommodate present demand, and thus lower the probability of an enjoyable experience. Combined with known past, current and future projects and actions, there would be minor, adverse and moderate beneficial cumulative impacts on visitor use and experience.

Conclusion

Aging facilities are common at the Canyon Rim. Most facilities are in need of rehabilitation, repair, or replacement. Restrooms are closed for extended periods, trails have potholes, and erosion has created drops at trail edges. None of these issues would be addressed in this alternative. Moderate long-term adverse impacts to the visitor experience would continue for the foreseeable future.

Impacts of Alternative B – Upgrade and Improve Canyon Rim Trails, Overlooks, and associated Parking Areas

Alternative B would include implementing changes to Uncle Tom's and Brink of the Upper Falls parking lots to accommodate large vehicles. A re-contoured trail from the Brink of the Upper Falls parking area to the overlooks would allow for better access by those visitors with mobility impairments. A new viewing platform directly above the lower platform would allow a view of the falls by those seated in a wheelchair. Improved viewing opportunities of the Upper Falls would also be afforded from three terraced viewing platforms, two at Uncle Tom's and one at Sunset Point. All three of which would be accessible to all visitors. An accessible view area of Crystal Falls would be developed just a short distance from the parking area along the North

Rim trail. The stairway to the Inspiration Point viewing platform would be replaced by a new trail that would switch back upon itself dropping to a viewpoint in the same location of the existing. A new set of stairs from the parking area would allow for a more direct route by those wanting it. Additional viewpoints along this trail would allow for increased opportunities to experience the canyon in this most northern view area along the North Rim Road. Greatly needed maintenance activities would improve trail conditions on the trail to Red Rock Point, an improved stair system, or a new bridge would access the Red Rock Point overlook that would continue to be in the same area, offering a spectacular view of the Lower Falls. The brink of the Lower Falls viewing area would have a new mid-level platform developed with a stone stairway that connects this new platform with the existing upper and lower view areas. Most all of these changes would occur within high visitor use areas to help alleviate congestion problems, offer additional viewing opportunities, and improve accessibility to all visitors.

There would be minor, long-term, beneficial impacts to visitor use and experience due to improved trail conditions, improved viewing opportunities, improved restrooms, improved efficiency of parking areas, and improved signage to help with orientation, safety messaging, and improved interpretive education. These impacts would be a moderate, long-term, and beneficial. During construction, noise from heavy equipment and vehicles associated with the project could be disruptive to some park visitors, including hikers and campers. This could result in minor, short-term, adverse impacts.

Cumulative Effects: The impacts from past, present, and reasonably foreseeable projects are the same as described in the cumulative effects section for Alternative A. Alternative B, in conjunction with these past, present, and reasonably foreseeable projects would result in minor, short- and long-term, adverse and moderate, short-and long-term beneficial impacts.

Conclusion

Alternative B would allow for many existing facilities to be rehabilitated, improved, and made more safe and enjoyable. This alternative would address items such as trail and overlook surfacing, accessibility improvements, improved safety messaging and wayfinding, and increased opportunities to view the canyon's glory. Implementation of this alternative should result in an improved experience that would have minor to moderate beneficial impacts on the visitor experience in this area.

Park Operations

Affected Environment

Park operations consist of NPS, concessioner, and contractor operations which encompass protection of natural resources; maintaining facilities including: roads, trails, buildings and other structures in a safe and aesthetically pleasing condition; preventing deterioration that would render them unsightly, unsafe, or beyond repair and providing educational, dining, shopping, and lodging opportunities to park visitors.

National Park Service Operations

The NPS provides operations and support for administrative services, resource management, cultural and natural resources, visitor facilities, visitor protection, and emergency services throughout the park. NPS employee housing and administrative offices are located at developed areas including Mammoth Hot Springs, Norris, Canyon, Tower, Northeast Entrance, Lake, Grant, Madison, South, Old Faithful, and West Yellowstone. Park wide operations include maintenance of museums, ranger stations, housing, campgrounds, warming huts, vault toilets, water and sewage systems, housing and other buildings, road maintenance, garbage collection,

and maintaining the NPS vehicle fleet (snowmachines, snowcoaches, boats, cars, trucks and heavy equipment). In addition, NPS personnel maintain hundreds of miles of trails throughout the park. Resource and visitor protection operations in YNP include the backcountry office, communication center, corral operations, and law enforcement rangers. The backcountry office provides technical support for backcountry activities undertaken by both park visitors and park employees. The communication center is the central dispatch for all park communications. Corral operations provide support for backcountry trips. Law enforcement rangers regularly patrol frontcountry and backcountry areas and are responsible for visitor and resource protection, emergency services, and structural fire response to the park's developed areas.

Concession Operations

Xanterra Parks and Resorts operate lodging, gift shops, and dining and camping facilities in the park's developed areas. They also operate year-round bus tours during summer months and offer oversnow vehicle use in the winter. Delaware North operates stores that sell gifts and souvenirs, groceries camping supplies, Yellowstone fishing licenses, and fishing tackle and equipment, and offer limited food and beverage service. Yellowstone Park Service Station operates service stations in Mammoth Hot Springs, Canyon, Fishing Bridge, Grant Village, Old Faithful, and Tower that sell fuel, snacks, and refreshments. Most of the stations also offer vehicle towing and maintenance service for park visitors. Medcor, Inc. operates medical clinics at Old Faithful, Mammoth, and Lake that provide care for NPS and concessions employees as well as park visitors.

Methodology

Impacts to park operations focuses on (1) employee and visitor health and safety, (2) ability to protect and preserve resources, (3) staff size, whether staffing needs to be increased or decreased, (4) existing and needed facilities, trails, parking, etc. (5) communication (i.e., telephones, radio, computers, etc.), and (6) appropriate utilities (sewer, electric, water). Park staff knowledge was used to evaluate the impacts of each alternative and is based on the current description of park operations presented in the Affected Environment section of this document.

Intensity Level Definitions

The thresholds of change for the intensity of impacts to park operations are defined as follows:

- Negligible:** Park operations would not be affected or the effect would be at or below the lower levels of detection, and would not have an appreciable effect on park operations.
- Minor:** The effect would be detectable, but would be of a magnitude that would not have an appreciable adverse or beneficial effect on park operations. If mitigation were needed to offset adverse effects, it would be relatively simple and successful.
- Moderate:** The effects would be readily apparent and would result in a substantial adverse or beneficial change in park operations in a manner noticeable to staff and the public. Mitigation measures would probably be necessary to offset adverse effects and would likely be successful.
- Major:** The effects would be readily apparent and would result in a substantial adverse or beneficial change in park operations in a manner noticeable to staff and the public, and be markedly different from existing operations. Mitigation measures to

offset adverse effects would be needed, could be expensive, and their success could not be guaranteed.

Impacts of Alternative A – No Action

Implementation of the No-Alternative would mean that there would be no changes in the way park operations currently occur. Operations for the National Park Service and Park Concessioners would likely continue as they have in past years. Adverse impacts due to maintenance activities on current trails and overlooks may cause short-term closures. Increased pressure to use remaining areas would mean that additional and more maintenances would need to be done. Deterioration of the remaining areas would increase with time. Some impacts to concessioner-sponsored tours would only occur as they relate to congestion either on park roads, within parking areas, at overlooks. Personnel working on the trail and overlook facilities would continue as needed. Impacts to park operations from this alternative would be negligible in the short-term but begin to increase quickly with time to minor to moderate adverse levels.

Cumulative Effects: Cumulative impacts on park operations are based on the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions in Yellowstone National Park. A major source of impacts to operations and facilities is the continued use of the park by visitors and staff. Park infrastructure is in continual need of repair/replacement, mainly due to age and use. Past, ongoing, and future construction projects that would have an adverse impact on park staff include road construction of the North and South Rim roads and general maintenance associated with managing a large park. Park staff conduction operations activities are represented by most every division of the park to include staff by interpretation, maintenance, administration, visitor protection, and resource management divisions. Impacts to park operations by implementing this alternative are anticipated to be long-term beneficial and minor to moderate. When added to other past, present, and reasonably foreseeable future actions in the park, Alternative A would have direct, short-term, negligible to moderate adverse and beneficial impacts.

Conclusion

The longer facilities go without needed repairs the quicker they begin to deteriorate. Facilities in the Canyon Rim area would continue to degrade and with time this degradation would speed up. More maintenance staff time would need to be allocated to just keeping up. Improvements would be less likely to occur. Impacts would be minor to moderate and adverse on operations.

Impacts of Alternative B – Upgrade and Improve Canyon Rim Trails, Overlooks, and associated Parking Areas

Implementation of Alternative B would result in a decreased maintenance need in the short-term due to the improved condition of most of the infrastructure associated with the trails and overlooks in the Canyon Rim area. The addition of improved signage, parking lot improvements, and rehabilitate restrooms, trails, overlooks, and increased capacity at some overlooks would benefit National Park Service operations by allowing visitors to intuitively gain the information they need from readily available information kiosks, and an intuitive design to aimed to help visitors easily understand where they are heading. Impacts to park operations from implementing this alternative would be long-term, moderate, and beneficial.

Hauling of material (stone, gravel, asphalt, etc.) would cause some minor traffic delays due to increased truck traffic within the park. These delays would have a negligible adverse effect on all park operations.

Cumulative Effects: The impacts from past, present and reasonably foreseeable projects in conjunction with actions described in Alternative B, would result in direct moderate, short- and long-term beneficial impacts to park operations.

Conclusion

The rehabilitation of infrastructure including trails, overlooks, restrooms, and signs would allow increased staff hours to be used for other duties. Improvements to infrastructure would likely continue to function well for years to come with limited maintenance activities by staff. This collectively would result in minor to moderate beneficial impacts to park operations.

CONSULTATION AND COORDINATION

Internal Scoping

Scoping is a process used 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. Internal scoping was conducted by an interdisciplinary team of professionals from YNP. Interdisciplinary team members met in September 2014 to discuss the following: purpose and need for the project; various alternatives; potential environmental impacts; past, present, and reasonably foreseeable projects that may have cumulative effects; and possible mitigation measures. The team also gathered background information and discussed public outreach for the project. Over the course of the project, team members have conducted numerous individual site visits to view and evaluate the proposed construction site.

In the late summer of 2014, at the park's request, JLF & Associates of Bozeman, Montana was asked by the park through the Yellowstone Park Foundation to organize a design competition. The objective of the competition was to choose the appropriate architectural landscape design concept and to select a design firm that would develop the schematic design and construction documents for the designated overlooks and trails of the North and South Rim of the Grand Canyon of the Yellowstone River. Ultimately OTAK of Seattle, Washington was selected as the firm to carry the design forward. OTAK completed its schematic design for the project in June of 2015, and this design is posted for public review on the PEPC Website that will be used to collect public comment for this proposed project and its associated environmental assessment.

External Scoping

External scoping was conducted to inform the public about the proposal to rehabilitate the Canyon Rim overlooks, trails, and two parking areas, and to generate input for the preparation of this EA. This effort was initiated with the distribution of a scoping letter, in September 22, 2014, which was mailed to 169 interested parties. In addition, the scoping letter was posted on the NPS Planning, Environment, and Public Comment (PEPC) website. A press release was also sent to local news organizations and the public was given until October 24, 2014 (33) days to comment on the project. During the external scoping period, 20 pieces of correspondence from the public through postings on the PEPC website and letters. Many comments were in support of the project and others opposed stating that the proposal would degrade a wild and natural experience. Many of the comments favored increasing accessibility, others cautioned that improvements could diminish the experience. Some comments advocated for more rails and signage warning of dangers, others stated that you can't protect people from themselves.

Agency Consultation

In accordance with the Endangered Species Act, the NPS will submit a copy of this EA to the U.S. Department of the Interior, Fish and Wildlife Service, to allow for consultation as required by Section 7 of the Endangered Species Act. This will occur during the public review period of this EA.

In accordance with §106 of the National Historic Preservation Act, the NPS provided the Wyoming State Historic Preservation Officer an opportunity to comment on the initial effects of this project. Early consultation with WYSHPO on the design intent and direction for the rehabilitation of the Canyon Rim overlooks and trails and listed sites within the area of potential effect (APE) was submitted in April 2015. Consultation with the WYSHPO will continue with the park submitting a copy of this EA and the final schematic design produced by OTAK, the architectural/engineering firm hired to do the design for the rehabilitation. The schematic design

will be submitted by the park for concurrence of “No adverse effect to historic properties” during the public review period of this EA. Final plans would be submitted the WYSHPO for final review of project when they are completed.

Native American Consultation

A scoping letter describing the proposed action was mailed to 73 tribal members of Yellowstone’s 26 associated tribes in October 2014, to solicit concerns and comments for the proposed project. The park did not receive any responses. The following tribes were consulted:

Assiniboine & Sioux Tribes, Fort Peck
Blackfeet Tribe
Cheyenne River Sioux Tribe
Coeur d’Alene Tribe
Comanche Tribe of Oklahoma
Confederated Salish and Kootenai Tribes
Confederated Tribes of the Colville Indian Reservation
Confederated Tribes of the Umatilla Indian Reservation
Crow Creek Sioux Tribe
Crow Tribe
Eastern Shoshone Tribe
Flandreau Santee Sioux Tribe
Gros Ventre and Assiniboine Tribes
Kiowa Tribe of Oklahoma
Lower Brule Sioux Tribe
Nez Perce Tribe
Northern Arapaho Tribe
Northern Cheyenne Tribe
Oglala Sioux Tribe
Rosebud Sioux Tribe
Shoshone-Bannock Tribes
Sisseton-Wahpeton Sioux Tribe
Spirit lake Sioux Tribe
Standing Rock Sioux Tribe
Turtle Mountain Band of Chippewa Indians
Yankton Sioux Tribe

Environmental Assessment Review and List of Recipients

The EA is subject to a 30-day public comment period. To inform the public of the availability of the EA, NPS will publish and distribute a letter to various agencies, tribes, and the 150-person mailing list, as well as place an ad in the local newspaper. The document will be available for review on the PEPC website at [http://parkplanning.nps.gov/Canyon Overlooks](http://parkplanning.nps.gov/Canyon%20Overlooks). Copies of the EA will be provided to interested individuals, upon request.

During the 30-day public review period, the public is encouraged to submit their written comments to NPS, as described in the instructions at the beginning of this document. Following the close of the comment period, all public comments will be reviewed and analyzed, prior to the release of a decision document. The National Park Service will issue responses to substantive comments received during the public comment period, and will make appropriate changes to the EA, as needed.

Interdisciplinary Team and List of Preparers

The following persons assisted with the preparation of the EA. All are employees of NPS at the Yellowstone National Park:

The following persons assisted with the preparation of the EA.

Management:

- Dan Wenk, Superintendent, YNP
- Steve Iobst, Deputy Superintendent, YNP
- Jennifer Carpenter, Acting Chief Yellowstone Center for Resources, YNP
- Lindsay Robb, Chief of Administration, YNP
- Nancy Ward, Chief of Maintenance, YNP
- Linda Young, Chief of Resource Education and Youth Programs, YNP

Preparers (developed EA content):

- Doug Madsen, Outdoor Recreation Planner, YNP
- Zehra Osman, Landscape Architect/Historic Preservation Specialist, YNP
- Staffan Peterson, Archeologist, YNP
- Erik Oberg, Natural Resource Specialist, (detailed to YNP)

Interdisciplinary Team (developed alternatives, provided technical input and conducted review of the EA):

- Eric Ackley, Landscape Architect, YNP
- Heidi Anderson, Botanist, YNP
- Tami Blackford, Deputy Chief, Interpretive Planning and Media Development, YNP
- Shelby Coy, Canyon District Maintenance Foreman, YNP
- Mike Finken, Assistant Chief of Maintenance, YNP
- Chris Glenn, Trails Supervisor, YNP
- Glenn Kutzera, Senior Project Engineer, FHWA
- Connie Kratovil, Project Manager, FHWA
- Joe Regula, Landscape Architect, YNP
- Tobin Roop, Branch Chief Cultural Resources, YNP
- Scott Smithline, Environmental Specialist, FHWA
- YNP Dan Stahler, Wildlife Biologist, YNP
- Brian Suderman, North District Interpretive Ranger, YNP
- Timothy Townsend, Canyon District Ranger, YNP
- Pete Webster, Chief Ranger, YNP

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APPENDIX A: YELLOWSTONE REVEGETATION GUIDELINES

Revegetation efforts within the park have focused on careful management of topsoil as the only available growing medium and seed source. This is based on a park policy that seed obtained from sources outside the park would contaminate the park gene pools. Although it is a conservative method, the topsoil management approach has worked well. The park has an interagency agreement with the Bridger Plant Material Center to assist in the formation of a park seed bank. The park has also tested mulches and can make this information available upon request. All construction work within the park involving ground disturbance will meet the following criteria for revegetation accepted by the park:

1. All construction will be limited to that area necessary to complete required work. No activity, including vehicle or material use or storage, will be allowed outside the predetermined zone. If vehicles are to be traveling through an area numerous times, the same tracks will be used to prevent compaction in other areas. Compacted zones will be treated (raking, aerating, and replacement of topsoil) to assist revegetation. No one will drive up topsoil at any time.
2. Excavation and improvement will be handled in manageable sections that reflect changes in the soil and vegetation. Trenching routes and disturbance zones will be flagged and approved by the park. All flagging and debris will be removed from the area after work is completed.
3. Sections will be rehabilitated as soon as possible. Topsoil will not be stockpiled over the winter or for longer than three months in sagebrush/rabbitbrush zones or longer than six months in grass- dominated zones. Any deviation must be approved by the NPS.
4. Topsoil refers to the uppermost soil horizon; it is usually found in the top 5 to 15 centimeters (2 to 6 inches). Topsoil will be removed and replaced from the same area. Care will be taken to ensure that topsoil and fill material are not mixed and are stockpiled in separate areas (e.g., topsoil to the right of the trench and fill to the left).
5. Vegetation over 0.9 meters (three feet) in height will be removed before the removal of topsoil and in a manner that least disturbs the topsoil. No one will drive upon, gouge, or compact topsoil as vegetation is removed. Topsoil will be removed before stumps are pushed. The park must approve any deviation from this process.
6. After large trees are removed, topsoil will be removed from an area in a single cut, including any vegetation that is 0.9 meters (three feet) tall and under. Grubbing is not permitted.
7. Irregular land surfaces are recommended for a natural effect. Some rock outcropping and boulders may be left in place to create natural pockets for revegetation (see item 11). Deadfall snags may be stockpiled for later use on slopes that are very steep to provide catch points for soil.
8. Topsoil will not be used as bedding material. Separate bedding material will be obtained from sources approved by the park.

9. Topsoil will be replaced on- site in a mixture of topsoil and vegetation associated with the topsoil and will be reworked over the site in a manner that preserves the seed source while spreading the soil over the area.
10. No topsoil will be imported from outside the park or moved internally within the park unless approved by the NPS. Any imported fill will be checked for exotic plants.
11. Trees and shrubs will be avoided if possible during trenching or excavation. Any trees removed during construction will be removed from the site unless specified by the park.
12. If replacement seed is required for revegetation in an area, the park will provide seed at cost to the contractor. Advance notice of six months to one year is required on projects exceeding 93 square meters (1,000 square feet).
13. Boulders unearthed during construction may be reburied or left exposed (with lower third buried) depending upon the location and extent of rock naturally occurring in the area.
14. If a trench is required, the surface of the trench will be left mounded to allow for settling along the line.
15. If mulch is required in sensitive areas due to visibility or exotic plant infestation, the park will specify the type and depth of mulch to be used. Nitrogen may be added in small quantities to any wood product used on slopes to balance nitrogen lost through decomposition.
16. No fertilizer will be used in any revegetation work unless requested by the park.
17. If relocated due to road reconstruction, junction boxes or cans will be placed in the field and approved by the park. Locations should be well screened by vegetation, topography, or large boulders.
18. All access to the site and stockpiling or staging areas will be identified by the contractor and approved by the park. These areas will be revegetated using approved techniques upon completion of the project.
19. All debris will be removed from the site to an approved pit or hauled away as approved by the park.
20. Final review and inspection will be made by the park before the work is accepted.

APPENDIX B: IMPAIRMENT

National Park Service's *Management Policies, 2006* require 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. National Park Service 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 National Park Service 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 National Park Service the management discretion to allow certain impacts within park, that discretion is limited by the statutory requirement that the National Park Service must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the professional judgment of the responsible National Park Service 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 may result from National Park Service 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.

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 relates 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. After dismissing the above topics, topics remaining to be evaluated for impairment include: geology, and soils; vegetation, rare plants, and wetlands; wildlife; threatened and endangered species; cultural resources; and visual resources..

- **Geology, and Soils** – Yellowstone National Park is about 2.2 million acres in size, 98 percent of which is undeveloped. This project would impact about 2 acres of land adjacent to existing overlooks, trails, parking lots, and roads. Impacts are considered minor , short- and long-term, adverse and beneficial by reducing erosion potential and allowing for better revegetation of past disturbances. As long-term impacts are minor, there would be no impairment to geology, or soils.

- **Vegetation, Rare Plants, and Wetlands** – Yellowstone National Park has numerous wetlands located within its boundaries. Permanent impacts would occur to 0.07 acres within eight wetlands inside the project limits. The wetland impacts met the definition for the exceptions listed in DO 77-1 due to code and safety upgrades and an Statement of Findings would not be prepared. There would be no impairment to wetlands and other waters of the U.S. from the implementation of this project. Rehabilitation activities would impact about 2 acres of vegetation along existing overlooks, trails, roads, and parking lots. Impacts would be long-term and minor affecting minor portions of the species' population and restricted to a very small geographic area. No species of special concern would be adversely impacted. No impairment to park vegetation would occur.

- **Wildlife** – Yellowstone National Park has an abundance of wildlife within its 2.2 million acres. This project would cause approximately 2 acres of habitat to be lost following infrastructure rehabilitation and improvements. Displacement of wildlife during construction activities would be the primary impact. Impacts of this project to wildlife would be negligible to minor and adverse. No impairment to wildlife resources would occur.

- **Threatened and Endangered Species** – Yellowstone National Park is home to the threatened Canada lynx, and grizzly bear. The gray wolf is considered an experimental population and also considered threatened within the park. The rehabilitated infrastructure along the canyon rims would have minor negligible impact to threatened and endangered species. Because of the loss of about 2 acres of habitat and some short-term displacement of species wandering through the area, negligible adverse impacts to wolves and grizzly bears could occur. The project is outside any lynx analysis unit and Canada lynx would not be affected. No impairment of special status species would occur.

- **Cultural Resources** – Yellowstone National Park numerous historic structures that are eligible for the National Register of Historic Places. This project involves reconstructing or rehabilitating many of the historic overlooks and trails located along the rim of the Grand Canyon of the Yellowstone River. All work that would be done on these structures would be in accordance with the Secretary of the Interior's Standards for the Treatment of Historic Properties, and accomplished so that the rehabilitation does not diminish the integrity of the historic structures.

Implementation of the project would result in No Adverse Effect on structures or historic districts. Because the preferred alternative would result in minor, long-term, direct beneficial impacts to cultural resources, there would be no impairment to historic structures.

• **Visual Resources** – Yellowstone abounds with impressive viewsheds of the highest quality. The majority of Yellowstone's landscape appears untouched by humans and retains its primeval characteristics. Materials and colors choices for this project would be selected to blend with their surroundings. Views across the canyon are typically from long distances, material choices, color, and placement all work to screen man-made elements. Impacts from to visual resources would be considered minor, long-term, and adverse on scenic resources. There would be no impairment of visual resources within the park.

In addition, mitigation measures for these resources would further lessen the degree of impact to and help promote the protection of these resources. Park Service staff would monitor all rehabilitation activities to minimize potential damage to any of the park resources discussed above.

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.

APPENDIX C: OTAK SCHEMATIC DESIGN PROPOSED CANYON RIM OVERLOOKS AND TRAILS REHABILITATION PROJECT

Can be found at:

<http://parkplanning.nps.gov/CanyonOverlooks>

Click on the "Documents List" link at the left of the web page