National Park Service

U.S. Department of the Interior

BRYCE CANYON NATIONAL PARK
UTAH

TROPIC CANYON HIGHWAY STABILIZATION PROJECT

Environmental Assessment

June 2006

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TABLE OF CONTENTS

PURPOSE AND NEED 1
Legislative Mandates and Special Commitments 1
National Environmental Policy Act (NEPA) 2
Director's Order 12 (DO-12) 2
NPS Organic Act of 1916 2
Endangered Species Act 2
National Historic Preservation Act/§ 106 2
Bryce Canyon Legislative Background and the Purpose of the Park 2
Relationship to Other Planning 9
Issues 9
Impact Topics Retained for Consideration 9
Soils 9
Vegetation 9
Visitor Use and Experience 9
Water Resources 10
Impact Topics Considered but Dismissed from Further Analysis 10
Air Quality 10
Wilderness and Wild and Scenic Rivers 10
Wildlife 10
Threatened and Endangered Species 10
Cultural Resources 11
Prime or Unique Farmlands 11
Soundscapes 12
Night Sky or Lightscapes 12
Indian Trust Lands 12
Urban Quality and Design of the Built Environment 12
Energy Requirements and Conservation Potential 12
Environmental Justice 12
Socioeconomic Environment 12
Park Operations 12
Wetlands 13
Floodplains 13
DESCRIPTION OF ALTERNATIVES 14
Alternative A - No Action 14
Alternative B - Implement highway stabilization and erosion repair activities as proposed by UT DoT 14
Alternative C – Implement highway stabilization and erosion repair activities with modifications to those proposed by UT DoT 14
Alternatives Dismissed from Further Consideration 15
Identification of the Environmentally Preferred Alternative 15
Impact Summary 17
AFFECTED ENVIRONMENT 18
Soils 19
Vegetation 19
Visitor Use and Experience 19
Water Resources 19
ENVIRONMENTAL CONSEQUENCES 21
Introduction 21
Duration 21

Cumulative Impacts 21
Impairment of Park Resources or Values 21
Assessment of Anticipated Impacts 22
Soils 22
Vegetation 24
Visitor Experience 27
Water Resources 29
CONSULTATION AND COORDINATION 32
Public Involvement 32
National Historic Preservation Act 32
State Historic Preservation Office 32
U.S. Fish and Wildlife Service 32
Writers and Contributors 32
Reviewers 33
Consultation 33
Selected References 33
Appendix A. U.S. Fish and Wildlife Service Consultation 36
Threatened and Endangered Species 36
Plants 36
Wildlife 38
Appendix B. Utah Department of Transportation Design Drawings 41

PURPOSE AND NEED

The National Park Service (NPS) has prepared this Environmental Assessment (EA) in support of a highway stabilization project along Utah State Route 12 in Tropic Canyon. This EA focuses on stabilization repair activities at one site located in Tropic Canyon in Bryce Canyon National Park in order to evaluate the costs and benefits of proposed road stabilization activities to the natural and cultural resources located in this specific area. Utah Highway 12 runs east to west through approximately 4 miles of the northern portion of the park providing access to such communities as Tropic, Cannonville, Boulder, and Torrey, UT as well as access to areas such as Kodachrome Basin State Park and Capitol Reef National Park. Both visitors to the southern Utah area and local residents utilize this section of road to access work sites, lodging, restaurants, and various recreational activities. Utah Highway 12 is designated as a National Scenic Highway with preferred status. The goals of this project are: 1) to provide continued visitor and resident access to communities, attractions, and places of employment; 2) stabilizing and protecting the scenic highway from further erosion and potential failure and closure as a result of the road being undercut and collapsing; 3) minimize impacts to park resources as a result of proposed stabilization/repair activities; and 4) decrease the chance that non-native, exotic vegetation is introduced into the park as a result of stabilization/repair activities.

The proposed highway stabilization activities will be conducted by the Utah Department of Transportation as part of an agreement wherein they maintain Highway 12 and a 100 foot right-of-way from the center line. Although routine maintenance activities have been permitted in the past, there has never been a project of this magnitude and an assessment of the beneficial and/or adverse impacts the repair work may have on the resources in the area. The proposed stabilization activities would prevent further erosion of the road shoulder which is threatening to undercut the highway and will ensure continued access to the communities and destinations mentioned above. This is currently the only proposed highway stabilization project in the park. If other highway stabilization projects are proposed in the future, they will undergo the necessary NEPA compliance before being permitted. This EA is necessary to assess the impacts the proposed highway stabilization activities will have on park resources in the proposed project area.

Legislative Mandates and Special Commitments

Legislative mandates and special commitments include those measures that apply to the entire National Park Service, plus park-specific requirements.

The intent of these mandates and commitments is to establish sustainable conservation and avoid impairment of NPS lands and resources. As a result, public use of the park and operational support activies can occur only to the extent that they do not significantly adversely affect or impair the park or natural and cultural resources.

The National Park Service and its mandates are authorized under the NPS Organic Act (16 USC 1, 2-4) and the General Authorities Act (16 USC 1a-8). These acts direct the agency to conserve the scenery, the natural and historic objects, and the wildlife, and to provide for the enjoyment of those resources in such a manner as to leave them unimpaired for future generations. Amending the NPS Organic Act of 1916, the Redwood Act (March 27, 1978, 16 USC 1a-1) reaffirmed the mandates of the Organic Act and provided additional guidance on national park system management: “The authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established.”

If this highway stabilization repair project is approved, the NPS would comply with all applicable laws and executive orders, including the following:

National Environmental Policy Act (NEPA)

The purpose of NEPA is to encourage productive and enjoyable harmony between humans and the environment; to promote efforts that will prevent or eliminate damage to the environment and stimulate the health and welfare of mankind; and to enrich the understanding of the ecological systems and natural resources important to the nation. NEPA requirements are satisfied by successful completion of an Environmental Assessment (EA) or Environmental Impact Statement (EIS), in addition to a decision document.

Director's Order 12 (DO-12)

DO-12 is the NPS guidance for Conservation Planning, Environmental Impact Analysis, and Decision Making. DO-12 outlines the guidelines for implementing NEPA according to NPS regulations. DO-12 meets all Council on Environmental Quality (CEQ) regulations for implementing NEPA.

NPS Organic Act of 1916

Congress directed the U.S. Department of the Interior and the NPS to manage units "to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations" (16 USC § 1).

Endangered Species Act

Section 7 of the Endangered Species Act of 1973, as amended (16 USC 1531 et seq.) requires all federal agencies to consult with the U.S. Fish and Wildlife Service to ensure that any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of listed species or critical habitats. The NPS is in compliance with Section 7 and is coordinating all actions with the Fish and Wildlife Service.

National Historic Preservation Act/§ 106

Section 106 of the National Historic Preservation Act requires the NPS to identify and protect historic sites and structures located on lands under NPS management. The NPS is in compliance with Section 106 as there are no historic structures located in the area of the proposed project.

Bryce Canyon Legislative Background and the Purpose of the Park

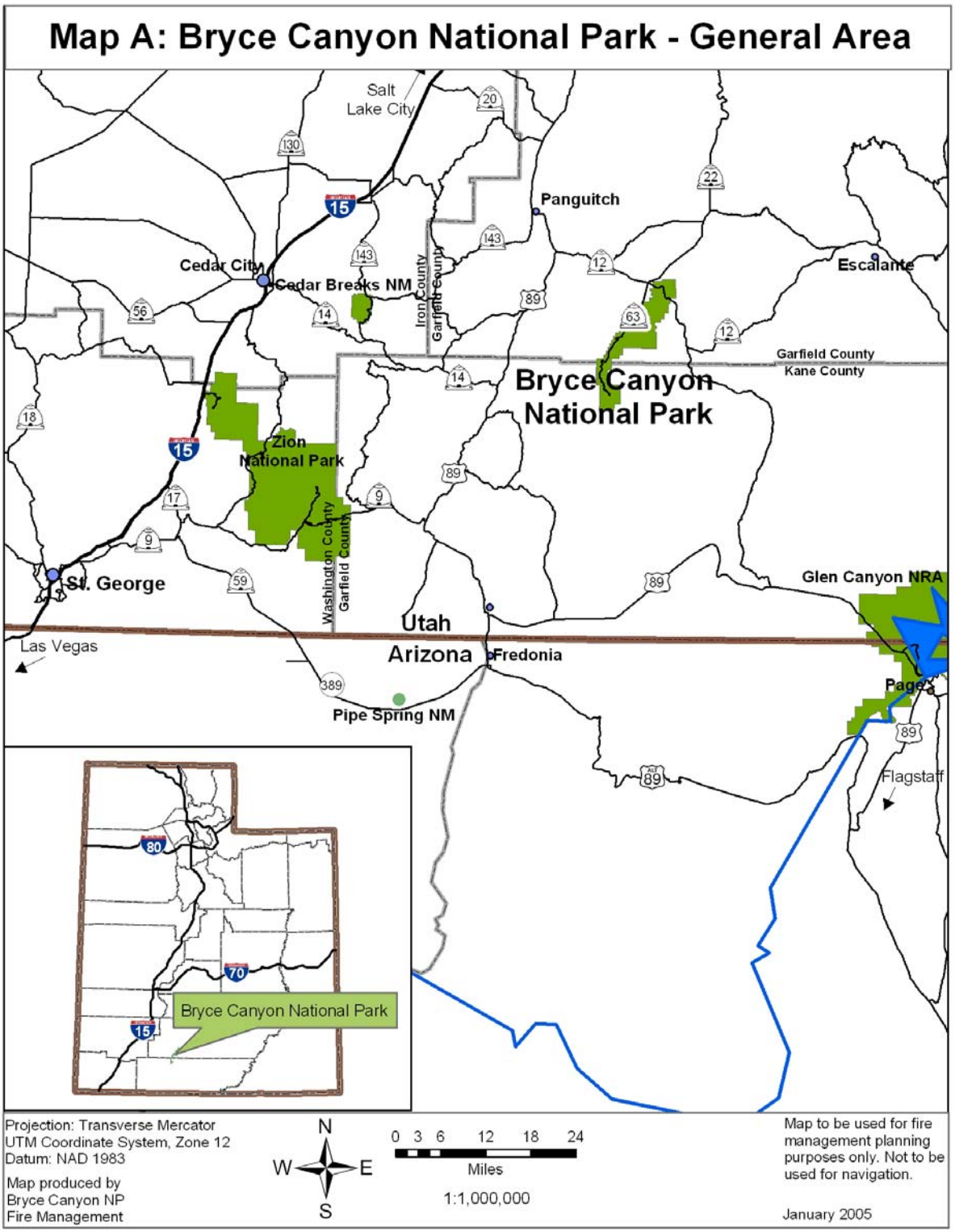
The area known as Bryce Canyon National Park was set aside as a national monument in 1923. Interest in the area continued to grow after the declaration of the new national monument. In 1924, Bryce Canyon National Monument was declared Utah National Park. An act of congress in 1928 increased the amount of protected land to double what was already protected by the national park (now 35,000 acres). This addition of land was accompanied by another name change as Bryce Canyon National Park was officially designated on February 25, 1928. The national monument, and later park, was established to protect the fascinating geologic structures known as hoodoos and other natural and cultural resources.

Bryce Canyon National Park is located on the western edge of the Colorado Plateau (Map A). The park lies in portions of two counties in Utah: Garfield and Kane Counties. The entrance of the park is approximately 210 miles southeast of Salt Lake City, Utah.

The park is located on the southeast escarpment of the Paunsaugunt Plateau where the plateau breaks abruptly to the east and south in a series of steep walls and slopes. The park is composed

of numerous natural amphitheaters cut into the Pink Cliffs formation on this eastern side of the plateau. There is great contrast between the colorful lowlands along the eastern flank of the park and timbered hillsides and tablelands to the west. Elevations range from 6,580 feet to 9,115 feet above sea level.

Most of the land surrounding Bryce Canyon National Park is federally owned and managed by the U.S. Forest Service (USFS) as part of the Powell Ranger District of Dixie National Forest. The Bureau of Land Management (BLM) manages land along the northern and eastern park boundaries. Remaining land in the area is owned by the State of Utah and private landowners (Map B). The location of Highway 12 and Tropic Wash, where the proposed highway stabilization repair work is proposed to occur, in relation to the rest of the park can be seen on Map C.


Map A: Bryce Canyon National Park - General Area
Salt Lake City
Panguitch
Escalante
Cedar City
Cedar Breaks NM
Iron County
Garfield County
Garfield County
Kane County
Bryce Canyon National Park
Zion National Park
Washington County
Garfield County
St. George
Glen Canyon NRA
Utah
Arizona
Fredonia
Las Vegas
Pipe Spring NM
Page
Flagstaff
Bryce Canyon National Park
Projection: Transverse Mercator
UTM Coordinate System, Zone 12
Datum: NAD 1983
Map produced by
Bryce Canyon NP
Fire Management
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Map to be used for fire management planning purposes only. Not to be used for navigation.
January 2005

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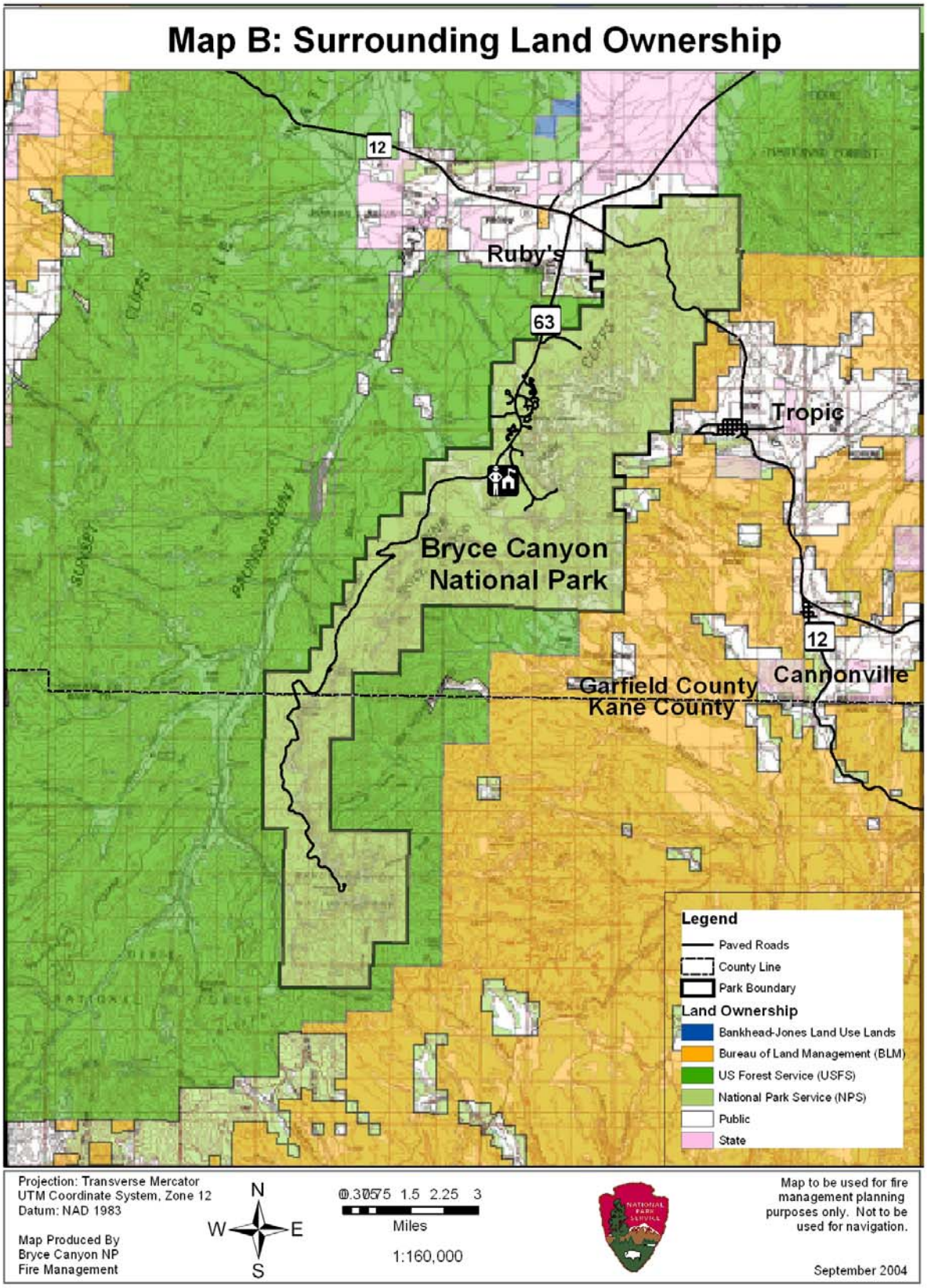
Map B: Surrounding Land Ownership
12
Ruby's
63
Tropic
Bryce Canyon
National Park
12
Cannonville
Garfield County
Kane County
Legend
Paved Roads
County Line
Park Boundary
Land Ownership
Bankhead-Jones Land Use Lands
Bureau of Land Management (BLM)
US Forest Service (USFS)
National Park Service (NPS)
Public
State
Projection: Transverse Mercator
UTM Coordinate System, Zone 12
Datum: NAD 1983
Map Produced By
Bryce Canyon NP
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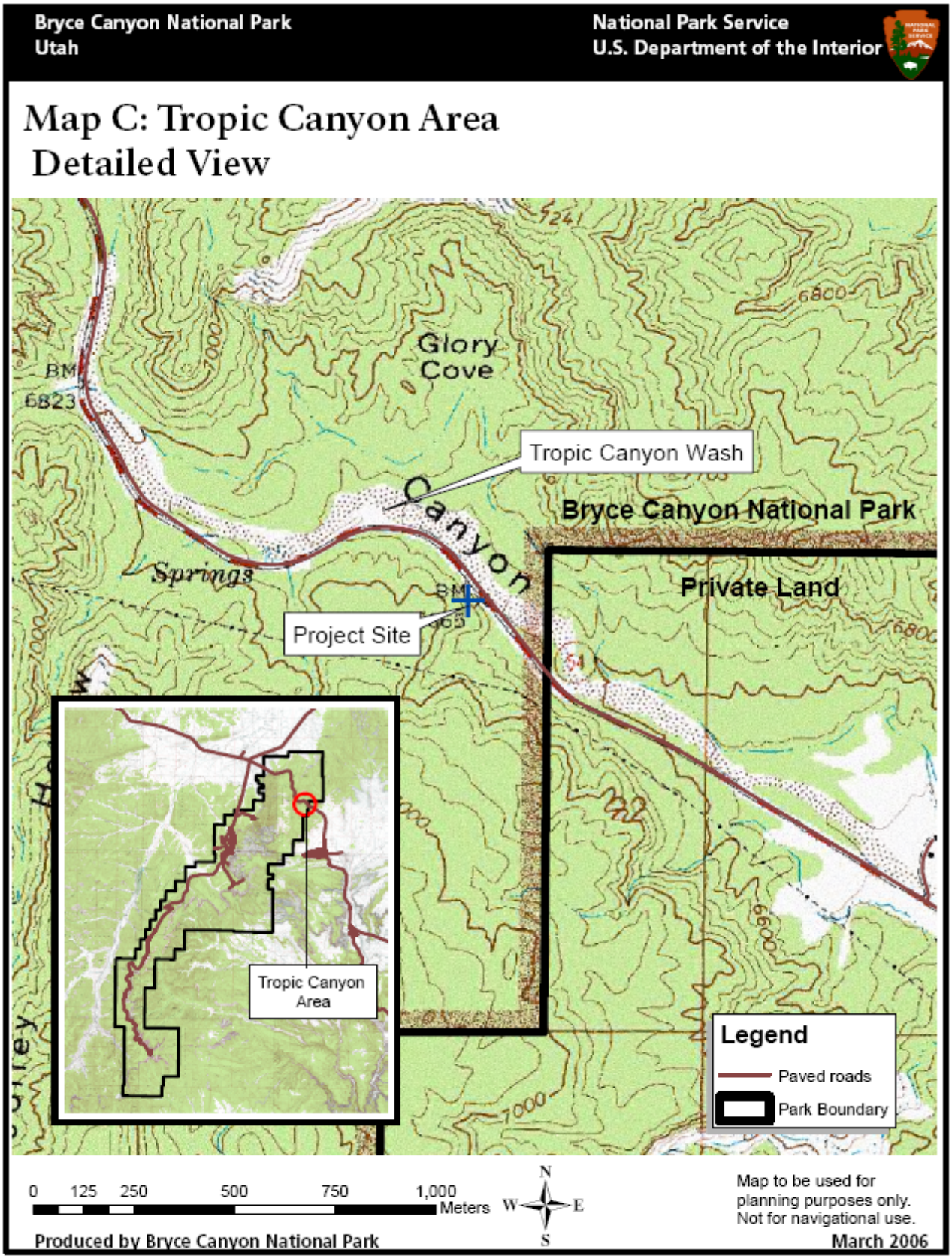
September 2004


Bryce Canyon National Park
Utah
National Park Service
U.S. Department of the Interior
Map C: Tropic Canyon Area
Detailed View
Glory Cove
Tropic Canyon Wash
Bryce Canyon National Park
Private Land
Canyon
Springs
Project Site
Tropic Canyon Area
Legend
Paved roads
Park Boundary
0 125 250 500 750 1,000 Meters
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W
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Map to be used for planning purposes only. Not for navigational use.
Produced by Bryce Canyon National Park
March 2006

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Relationship to Other Planning

This project has been developed in a manner consistent with NPS legal mandates and management policies. A review of these mandates and commitments is provided in this document. The Bryce Canyon National Park General Management Plan (1981) provides broad direction for management of the park and identifies actions to improve the quality of visitor experience, as well as improve management and protection of resources. Repairs completed as a result of this project could potentially have impacts on the hydrological and vegetative resources of the Tropic Wash while at the same time leading to improved protection of Highway 12, a major access route for the region.The proposed project analyzed in this document was reviewed for conformance with the General Management Plan (GMP) and has been determined to meet the goals of the GMP.

Issues

Issues are environmental concerns or problems that may result from implementation of any of the alternatives. Issues identified by NPS specialists and others were used to help formulate the alternatives and mitigation measures. The major issues involved with the proposed project are: methods used to divert water in the wash away from the road shoulder to reduce potential road damage, ensure future access to Dr. Goode Spring (located upstream from the proposed work area), and avoid adverse effects on future flows in the wash; sources of fill to be placed between the road shoulder and in the wash to reduce the risk of introduction of non-native vegetation into the park; sources, size and extent of intrusion (into the wash) of materials proposed to be placed to divert water away from the road shoulder to reduce further erosion; and strategies to minimize introduction of non-native plant species into the park such as requiring all construction equipment to be power-washed prior to entering the park and work zone. The goal is to develop a plan that is consistent with the guiding principles of the Endangered Species Act of 1973, U.S. Fish and Wildlife Service policy, the NPS Organic Act, and the National Historic Preservation Act.

Impact Topics Retained for Consideration

Impact topics, or those resources and values that could be affected by the proposed action or alternatives, were identified by specialists in the National Park Service, other state and federal agencies, and by the public. Topics were selected for detailed analysis based on substantive issues, environmental statutes, regulations, executive orders, and NPS management policies. A summary of specific impact topics and the rationale for their selection is given below.

Soils

Ground disturbance associated with the construction of stream barbs and importing fill material directly affects the soil. Therefore, soils are addressed as an impact topic.

Vegetation

Effects on vegetation are analyzed in this document because construction of stream barbs and the importing of fill material will affect the vegetation in the Tropic Wash and along the road shoulder. There is also potential for vegetation mortality caused by vehicles driving over individual plants or colonies of plants as well as due to vegetation being covered during the placing of fill material between the road shoulder and the wash. There is also potential for the introduction of non-native plant species as a result of contaminated seed for reseeding the fill area, soil used for fill, and construction vehicles. Because proposed repair and stabilization activities affect the regeneration and natural succession of native plant communities in the proposed work area, this topic is included for analysis.

Visitor Use and Experience

Visitor use would be affected by implementation of either alternative, so this topic is included for analysis. Factors that affect visitor experience are visual disturbance due to the obvious presence of construction vehicles during work activities, traffic delays while equipment is moved to necessary positions while dumping fill material along the road shoulder, the presence or visibility of manmade structures in the wash, and the presence of non-native vegetation as a result of soil disturbance and introduction via vehicles or seed. Visitor use could also be affected if the no-action alternative is chosen as a result of the roadway eroding away or being undercut to the point that it is unsafe to drive along this section of road thus preventing access to the numerous visitor destinations along Highway 12.

Water Resources

The proposed stabilization and repair project would occur in previously undisturbed areas of Tropic Wash and disturbed areas along Highway 12. There are potential effects on surface hydrology.

Impact Topics Considered but Dismissed from Further Analysis

The following resources would not be affected by any of the alternatives, or do not exist in the area and so will not be discussed further:

Air Quality

The 1963 Clean Air Act (CAA), as amended (42 U.S.C. 7401 et seq.), requires federal land managers to protect park air quality, while the 2001 NPS Management Policies addresses the need to analyze air quality during park planning.

Bryce Canyon National Park is designated a Class 1 area under the Clean Air Act. The park's air quality is among the best in the nation with occasional periods of regional haze, forest fire smoke, or widely dispersed industrial pollution.

Under any of the alternatives, local air quality would not be affected since new sources of air pollution would not be created. The construction crews will drive into the work area early in the morning and work throughout the day. Only equipment digging trenches or carrying fill material will be operating in the work area and only for a brief time to complete digging or deliver fill material, so vehicle emissions will be minimal and will have negligible impacts on air quality. Dust created by digging or dump fill would be of very short duration.

Wilderness and Wild and Scenic Rivers

These are congressionally designated areas and do not exist in the area of concern of this environmental assessment. Proposed wilderness and suitable wild and scenic rivers both occur in the park, but these would not be affected under any of the alternatives.

Wildlife

None of the alternatives is likely to have impacts to wildlife as a result of stabilization and repair activities during the proposed period. Wildlife in the proposed project area are currently exposed to vehicular traffic and related disturbance and this project would not result in an increase in disturbance to wildlife. Therefore this impact topic was dismissed in this document.

Threatened and Endangered Species

None of the alternatives is likely to have impacts to threatened species as a result of stabilization and repair activities during the proposed period, and no documented threatened or endangered species have been observed in this area, so this topic is not included for analysis. The USFWS and Utah Department of Wildlife Resources (UDWR) received scoping letters describing the

project and no responses were received from either agency. Both the UDWR and USFWS will receive copies of the draft EA for further review and comment during the public review period. A species list of threatened and endangered species was reviewed online (http://mountain-prairie.fws.gov/ut.html) and no species were found to occur within the proposed project area. If adverse impacts to a listed species are identified, consultation with the USFWS would be initiated. See Appendix A for a complete list of species considered in this review.

Cultural Resources

The 1966 National Historic Preservation Act as amended (NHPA, 16 USC 470 et seq.), the 1916 NPS Organic Act, and NPS planning and cultural resource guidelines call for the consideration and protection of historic properties (the term "historic properties" refers to all cultural resources, including archeological resources, cultural landscapes, ethnographic resources, and historic resources eligible for or listed on the National Register of Historic Places). The evaluation of potential impacts of proposed actions on historic properties is required by National Environmental Policy Act (NEPA) and NHPA, as is attention to the provisions of the Native American Graves Protection and Repatriation Act (NAGPRA) for sites where human remains or burials may be present. Intensive archeological surveys, meeting the Secretary of Interior's Standards for the Treatment of Archeological Properties, were conducted above the rim in Bryce Canyon National Park (MWAC 1986, Wenker 2002) as well as in proximity to the proposed highway stabilization project area (Whitfield 2005) and resulted in a negative finding. The proposed project area is located directly adjacent to Utah Highway 12 and receives extreme disturbance multiple times each year as a result of monsoonal and snow melt runoff episodes and any surface artifacts would have been washed away long ago.

No ethnographic research has been conducted to determine ethnographic resources; however, culturally affiliated groups received scoping letters, notification of the EA, and comments will be solicited in regard to ethnographic concerns. The area of potential effect would be restricted to the previously disturbed bottom of the wash and shoulder of Highway 12. If previously unknown archeological resources are discovered during stabilization and repair activities, work would be stopped in the area of the discovery, and the Utah Department of Transportation leader will contact the NPS. The NPS would consult with the Utah State Historic Preservation Officer (SHPO) and, as appropriate, the Advisory Council on Historic Preservation. If appropriate, provisions of the NAGPRA Act of 1990 would be implemented.
Based on formal evaluation (NPS 1998), no eligible cultural landscapes are in the Area of Potential Effect.

Based on the Cultural Resource Inventory conducted by Whitfield (2005), no historic structures are located in the Area of Potential Effect.

After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR Part 800.5, Assessment of Adverse Effects), the National Park Service concludes that implementation of any of the alternatives described in this document would result in a "no historic properties affected" determination. This is due to the fact that no archeological resources, historic resources, ethnographic resources or cultural landscapes are known to exist in the project area. Concurrence with this determination will be requested from the Utah SHPO during the public review process.

Prime or Unique Farmlands

In August 1980, the Council on Environmental Quality (CEQ) directed that federal agencies must assess the effects of their actions on farmland soils classified by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) as prime or unique. Prime

farmland 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. According to NRCS, none of the soils in the project area are classified as prime or unique farmlands. Since all of the alternatives will have no impact on prime or unique farmlands, this topic was dismissed in this document.

Soundscapes

The term “soundscapes” refers to the ambient or natural background sound of a given area. Analysis of potential impacts to natural soundscapes is required by NPS management policies. The proposed stabilization and repair activities would occur along an existing road corridor with a great deal of vehicle traffic. None of the alternatives would affect the long-term soundscape of the area.

Night Sky or Lightscapes

The NPS recognizes that a clear view of the night sky is an important value to park visitors. Artificial light pollution can affect opportunities for night sky viewing and enjoyment. There would be no adverse effects on night sky viewing under any of the alternatives. If an action alternative is chosen, stabilization and repair activities would not occur during night time hours. Under the No Action alternative, there would be no stabilization and repair activities and no potential for adverse effects on the night sky. Therefore, there are not expected to be any impacts to lightscapes.

Indian Trust Lands

No lands comprising Bryce Canyon National Park are held in trust by the Secretary of the Interior solely for the benefit of American Indians due to their status as American Indians, therefore this was dismissed from further consideration for this project.

Urban Quality and Design of the Built Environment

Consideration of this topic is required by 40 CFR 1502.16. Under all the alternatives, urban area quality is not an issue.

Energy Requirements and Conservation Potential

None of the alternatives would result in an increase in inherent energy needs. The stabilization and repair activities would not have a significant effect on energy availability or costs. Therefore this topic was dismissed from further consideration for this project.

Environmental Justice

Executive Order 12898 requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects on minorities or low income populations or communities. None of the alternatives are expected to cause adverse health or environmental impacts to minorities or low-income populations or communities and so will not be considered further.

Socioeconomic Environment

The proposed stabilization and repair activities would not change local and regional land use. Therefore, socioeconomic environment was dismissed as an impact topic.

Park Operations

Park operations were dismissed for further review since implementation of any of the alternatives requires the same level of assistance from park staff as well as from other federal and state agencies. There will be no additional workload requirements for park employees associated with implementation of any of the alternatives.

Wetlands

Wetlands were dismissed for further review since implementation of any of the alternatives would have no impacts on wetlands in the general area. In the specific area of the proposed stabilization and repair work no wetlands exist. Consultation with the NPS Hydrologist in Denver, Colorado was conducted by park staff. After review of photographs submitted by and phone conversations withpark personnel, it was determined that there would be no adverse effects to wetlands under Procedural Manual NPS 77-1 (Wetland Protection) Excepted Action 4.2 A(1)f which allows for **minor** (total of 0.1 acre or less) deviations in the structure's configuration or fill footprint due to subsequent changes in construction codes or safety standards (e.g., handicap accessibility), but does not apply to other types of reconstruction/expansion (e.g., road widening or re-routing) or conversion to other uses that would have additional adverse impacts on wetlands.

Floodplains

Floodplains were dismissed for further review since implementation of the proposed alternatives would not significantly impact floodplain resources. This determination was reached after consultation with the NPS Hydrologist in Fort Collins, Colorado and review of photographs and drawings of the proposed project area and conference calls to address any concerns on the part of the hydrologist. Since the proposed project would repair the project site to an existing condition (prior to the loss of soil between the road and wash) there is no potential to significantly impact the floodplain on which the road is located.

DESCRIPTION OF ALTERNATIVES

Alternative A - No Action

Under this alternative, the proposed highway stabilization and erosion repairs would not be conducted in Bryce Canyon National Park. Stream barbs would not be constructed and fill material would not be placed between the road shoulder and the wash. Existing conditions would continue as they are and erosional processes would be allowed to continue unabated. No action does not imply or direct discontinuing any present highway maintenance activities in the area. Any future proposed highway repair and stabilization activities would require the appropriate compliance prior to initiation.

Alternative B - Implement highway stabilization and erosion repair activities as proposed by UT DoT

This alternative would repair and stabilize Highway 12 and introduce water diversion apparatus into Tropic Wash.

There are three main components of this alternative (design drawings attached in Appendix B):

1. Repair approximately 210 feet of road shoulder with 1,800 cubic yards of fill material
2. Construct 5 stream barbs in the Tropic Wash to divert water away from the road shoulder to prevent future erosion
3. Re-vegetate the fill area with native vegetation and conduct site revegetation as needed

This alternative would allow stabilization and erosion repairs to occur as has been proposed by the Utah Department of transportation with the construction of stream barbs in Tropic Wash, the importing of fill material to build up the road shoulder between the highway and the wash, and reseeding the new fill and construction area with native seed. The construction crews would be required to strictly adhere to submitted stabilization and repair activities, and the procedural stipulations contained in this document. Any deviations from these methodologies and permits would require prior permission from the issuing agencies and appropriate Bryce Canyon National Park personnel. All construction equipment to enter the park and wash area would be required to be pressure washed to reduce the potential of introducing non-native vegetation into the construction site. Access and egress into and out of the wash would be limited to existing access points and only the absolute number of vehicles conducting essential tasks to successfully complete the proposed repairs.

Alternative C – Implement highway stabilization and erosion repair activities with modifications to those proposed by UT DoT

This alternative would allow for stabilization and repair activities to be conducted by Utah Department of Transportation with modifications to their original proposal.

There are three main components of this alternative:

1. No construction of stream barbs would occur
2. Large rocks and fill would be deposited, in a decreased quantity than in Alternative B, between the road shoulder and into the Tropic Wash area to slow further erosion
3. Reseeding of the fill area would occur utilizing native seed to prevent the introduction of non-native plant species into the park

This alternative would allow for fill material to be brought into the park and placed between the road shoulder and Tropic Wash, but the quantity would be reduced from the amount proposed in

Alternative B. No stream barbs would be constructed decreasing the disturbance to natural resouorces in Tropic Wash.

Alternatives Dismissed from Further Consideration

Two other alternatives were identified or considered through the internal and public scoping process for the Tropic Wash Stabilization Project. One of these alternatives addressed the possibility of installing gabion baskets along the length of the proposed project area. This was dismissed due to the cost of gabions and due to the fact that gabion baskets are unsightly and would detract from the scenery of the wash area. The other alternative that was identified was rerouting the road corridor away from the wash edge. This alternative was dismissed due to the cost of a project of this magnitude, impacts it would have on visitors, employees, and local communities, and due to the amount of resource damage that would occur in building a completely new roadbed. If further alternatives are identified prior to the completion of the EA process, they will be considered based on the same criteria as the prevuiously identified alternatives.

Identification of the Environmentally Preferred Alternative

The Council on Environmental Quality (CEQ) directs that "[t]he environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in NEPA Section 101. The environmentally preferred alternative is determined by applying the criteria suggested in the National Environmental Policy Act of 1969 (NEPA), which guides the CEQ:

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

Alternative A would disallow the proposed Tropic Wash stabilization and repair activities and not result in any disturbance of natural or cultural resources, which would meet Criterion 1. However, it would not allow for the maintenance and upkeep of a major thorofare that provides safe passage for local residents and visitors and contributes to the economic welfare of local businesses and communities. If this thorofare were not repaired and a road failure occurred, then this would potentially lead to larger impacts to park resources as a result of more intensive road repair activities being required to fix any failure. (Criteria 2, 3, 4, 5, and 6 not met).

Alternative B would allow the proposed stabilization and repair activities to be conducted in the Tropic Wash area of the park resulting in a safe roadway that provides access to local communities and public interest points, protects cultural resources from damage, and will prevent the need for future, more intensive repairs from being required (Criteria 1, 2, 3, 4, 5 met).

Potential adverse impacts to visitor enjoyment and indirect resource impacts would be minimal. These minimal impacts would occur along an existing road corridor utilized by park visitors and local residents. Enforcing proposed mitigation measures would reduce cumulative resource impacts (Criteria 2, 3, and 5 met).

Alternative C would allow the proposed stabilization and repair activities to be conducted but with less intrusion and disturbance allowed in Tropic Wash. Digging trenches would not be necessary as no stream barbs would be introduced into the wash and less fill material would be required than the amount proposed in Alternative B (Criteria 1,2, 3, 4, 5 met). Large boulders would be placed along the bottom of the road shoulder to act as a shield from future erosion action and fill material would then be placed upon these boulders and reseeded. (It is unclear how successful this method would be without the insertion of the stream barbs to deflect wash flow away from the base of the road.)

After careful review of potential resource and visitor impacts, and developing proposed mitigation for impacts to natural and cultural resources, the environmentally preferred alternative is Alternative B. Alternative B surpasses the other alternative in realizing the fullest range of national environmental policy goals as stated in §101 of the National Environmental Policy Act and is therefore the preferred alternative. Overall, Alternative B does (a) assure for all generations safe, healthful, productive, and aesthetically and culturally pleasing surroundings; (b) attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences; and (c) achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities.

Table 1. Methods Each Alternative Uses to Ensure Each Objective Is Met

Objective	Alternative A: No-Action	Alternative B: Repairs as Proposed by UDoT	Alternative C: Repairs with Changes to UDoT Proposal
1. Stabilize/ Protect Roadbed	Stabilization repairs will not be conducted. Routine maintenance will continue as needed in this section of road.	Repairs and reinforces eroded road shoulder with ~1,800 cubic yards of fill material and provides for the diversion of wash flow away from the repaired/ stabilized roadbed with stream barbs to slow future erosion.	Repairs and reinforces eroded road shoulder with placement of large boulders along roadbed and fill material on top of the boulders. No measures will be taken to divert wash flow away from the roadbed.
2. Continued access to local communities	Nothing is done to provide for continued access to local communities and area attractions.	Installation of stream barbs and fill material will slow future erosion thus providing continued access to local communities.	Placement of boulders and fill material will slow future erosion to a lesser degree than Alternative B but will still provide continued access to local communities.
3. Minimize Resource Impacts	No stabilization repairs will be conducted so no impacts to park resources other than those associated with routine maintenance by UDoT personnel.	Limited equipment access will be allowed into Tropic Wash and all equipment will be pressure washed prior to entering the park. Digging will be limited to that necessary for installation	Equipment access into Tropic Wash will be less than in Alternative B to place boulders along roadbed. No digging will be required in the wash since no stream barbs will be installed.

Objective	Alternative A: No-Action	Alternative B: Repairs as Proposed by UDoT	Alternative C: Repairs with Changes to UDoT Proposal
		of stream barbs.	
4. Prevent Introduction of Exotic Plants	No stabilization repairs will be conducted so no ground disturbance will occur. This will prevent the introduction of exotics due to this project.	All equipment will be required to be pressure washed prior to entering the park and project area. Fill and stream barb material will be required to be weed free. Seed used for revegetating the fill area will be provided by the park and will consist of native species.	All equipment will be required to be pressure washed prior to entering the park and project area. Seed used for revegetating the fill area will be provided by the park and will consist of native species.

Impact Summary

Table 2. Comparative Summary of Impacts

Impact Topic	Alternative A - No Action	Alternative B – UDoT Proposal (Preferred)	Alternative C- Modified UDoT Proposal
Soils	Under the no action alternative, soils in the park would continue to receive negligible-to-minor, long-term adverse impacts from existing natural erosional conditions in the wash a s a result of intermittent water flow throughout the year.	Under the preferred alternative, soils in the park would receive minor, short-term adverse impacts as a result of the proposed repair activities. Soils would continue to receive negligible-to-minor, long-term adverse impacts from existing Dr. Goode Spring access needs and natural erosional activities.	Under the modified preferred alternative, soils in the park would receive minor, short-term adverse impacts as a result of the proposed repair activities. Soils would continue to receive negligible-to-minor, long-term adverse impacts from existing Dr. Goode Spring access needs and natural erosional activities.
Vegetation	Under the no action alternative, vegetative communities would continue to receive negligible-to-minor, long-term adverse impacts from vehicles accessing Dr. Goode Springs by way of the wash, vehicles driving on Highway 12, and from the natural process of flood events scouring the wash bottom.	Overall, vegetative communities in the park would receive negligible, short-term adverse impacts and a minor beneficial impact as a result of the proposed project. There would be negligible project-related ground disturbance with the potential to impact vegetation due to the digging and placement of stream barbs and placing of fill material between the road shoulder nad wash. Vegetative communities would continue to receive negligible-to-minor, long-term adverse impacts by	Overall, vegetative communities in the park would receive negligible, short-term adverse impacts and a minor beneficial impact as a result of the proposed project. There would be negligible project-related ground disturbance with the potential to impact vegetation due to vehicular access in the wash and placing of fill material between the road shoulder and wash. Vegetative communities would continue to receive negligible-to-minor, long-term adverse impacts by vehicles accessing Dr. Goode Springs.

		vehicles accessing Dr. Goode Springs. The area would be reseeded with native vegetation to reduce the potential for non-native species to be introduced as a result of the stabilization activities.	The area would be reseeded with native vegetation to reduce the potential for non-native species to be introduced as a result of the stabilization activities.
Visitor Use and Experience	Under the no action alternative, there would be no impacts on visitors as long as the highway remains passable. No stabilization repair work would be conducted to alleviate the existing tenuous situation wherein the road shoulder is slowly eroding away due to flow in the wash and runoff from the roadway.	Under this alternative, there would be a negligible to minor, short-term adverse impact on visitors during the time that stabilization and repair activities occur and a minor, long-term beneficial effect on visitor experience after the stabilization and repair activities are completed and continued, uninterrupted access to the natural wonders and local communities of the area are maintained.	Under Alternative C, there would be a negligible to minor, short-term adverse impact on visitors during the time that stabilization and repair activities occur and a minor, long-term beneficial effect on visitor experience after the stabilization and repair activities are completed and continued, uninterrupted access to the natural wonders and local communities of the area are maintained.
Water Resources	Under the no action alternative, there would be no impacts on water resources. No stabilization repair work would be conducted to alleviate the existing tenuous situation wherein the road shoulder is slowly eroding away due to flow in the wash and runoff from the roadway.	Under this alternative, there would be negligible short-term adverse impacts to water resources in the immediate project area and minor, long-term beneficial effect on highway stability once the project is completed.	Under this alternative, there would be negligible short-term adverse impacts to water resources in the immediate project area and minor, long-term beneficial effect on highway stability once the project is completed.

AFFECTED ENVIRONMENT

The Tropic Wash area is located in the northern portionof Bryce Canyon National Park. It is a naturally occurring wash that drains the Paunsaugunt Plateau to the east. US Highway 12 parallels the wash for several miles until they both exit the park's eastern boundary. Over time erosion, resulting from the sporadic flows in the wash, has cut away at the banks of the wash creating a wide corridor for the water to cut courses through. This cutting action has resulted in an unstable, unsafe road shoulder that could give way if environmental conditions provide ample moisture in the form of rainfall and snow melt. The Utah Department of Transportation, in agreement with the park, has authority to conduct routine maintenance activities along Highway 12 extending out 100 feet from the centerline of the roadway on each side of the road. This road is a major transportation artery providing access for visitors and local residents to communities, businesses, and natural attractions in the area.

Soils

In general, the top of the Paunsaugunt Plateau is covered with gravely loam-type soils. These shallow, well-drained soils are derived predominately from limestone. These soils are classified for land-use capability as moderately productive rangelands. The mapping units below the rim of the Paunsaugunt Plateau are very general and largely ignore small areas of soil located in the drainageways and small alluvial fans between the hoodoos. (BRCA 1990). Soils in the Tropic Wash are mostly void of vegetation and compacted, disturbed, or carried away by multiple flood events as a result of monsoonal precipitation or snowmelt. Elsewhere in the project area, soils have been disturbed by construction and use of the road that passes through the park adjacent to Tropic Wash.

Vegetation

The Tropic Wash bottom is largely unvegetated with widely scattered forbs and grasses. Certain sections along the margins of the wash do contain low density patches of narrowleaf willow (*Salix exigua*). The vegetation on the bench consists of scattered grasses, forbs, and shrubs, including Bitterbrush (*Purshia tridentata*), and shrubby cinquefoil (*Potentilla fruticosa*) (Roberts et al 1992). Overstory composition is typically two-needle pinyon (*Pinus edulis*) with associated Utah juniper (*Juniperus ostesperma*). All of the species growing within the wash and bench are adapted in different ways to the natural disturbance of flood events which maintain the wash environment.

Vegetation in this area is also heavily impacted by Utah Highway 12 that cuts through the northern portion of the park. Non-native plant species are prominent along the road shoulder and in some areas of the Tropic Wash, especially yellow sweet clover (*Melilotus officinalis*) and cheat grass (*Bromus tectorum*). In some areas these non-native species are outcompeting native species for dominance.

Visitor Use and Experience

Utah Highway 12, a National Scenic Highway with preferred status, is located in the northern portion of the park parallel to Tropic Canyon and carries traffic such as passenger vehicles, construction equipment, semi-tractor trailers, vehicles towing trailers, and bicyclists. The highway is managed as a scenic transportation corridor and carries traffic in roughly a southeast-northwesterly direction providing access for local residents and visitors to local communities, businesses, and attractions such as Bryce Canyon National Park, Grand Staircase-Escalante National Monument, and Kodachrome Basin State Park. The section of Highway 12 and Tropic Wash where the stabilization repairs are proposed is mostly open and directly adjacent to the highway. Besides the Mossy Cave trail, this portion of the park receives little visitor use other than vehicles traversing the road. The site is visible from the road but is not visible from the Mossy Cave trail parking area.

The National Park Service provides visitors with numerous opportunities to explore the landscape and experience a relaxing, peaceful encounter in the outstanding natural setting of Bryce Canyon National Park. In 2005, park visitation was 1,505,640 (from Public Use Statistics Office accessed through <http://www.nps.gov>).

Water Resources

Tropic Canyon is an intermittent flowing wash with flows occurring during the winter/spring and during monsoon events in the summer. During periods of no moisture the wash is practically dry with only a slight flow occurring in random channels. Stabilization activities would occur in late spring, summer, fall, or anytime when flow would be low to non existent thus enabling equipment

to access the work site in the bottom of the wash and not impact water quality or result in machinery becoming mired in mud.

ENVIRONMENTAL CONSEQUENCES

Introduction

This section describes the environmental consequences associated with the alternatives. It is organized by Impact Topics, which distill the issues and concerns into distinct topics for discussion analysis. These topics focus on the presentation of environmental consequences, and allow a standardized comparison between alternatives based on the most relevant topics. Because definitions of intensity vary by impact topic, intensity definitions are provided separately for each impact topic.

Duration

For all impact topics, the duration of impacts in this document is defined as follows:

Short-term: impacts that last only during the proposed stabilization project period (May through early October), although actual project work will take approximately 1 month.

Long-term: impacts that last longer than the proposed stabilization project period.

Cumulative Impacts

The Council on Environmental Quality (CEQ) regulations, which implement the National Environmental Policy Act, requires 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). These impacts include the actions of neighboring agencies and private landowners such as road construction, visitor services, livestock grazing, and extractive industries (e.g., mining and logging). Cumulative impacts also incorporate activities within the park, including construction and maintenance of the park roads, visitor use, park operations, and maintenance and use of the Rim Trail and other park trails. Current projects include fire management, repair of the water collection system at Dr. Goode Spring, protection of cultural resources, building renovation, and Mossy Cave Trail Rehabilitation. Cumulative impacts are considered for all alternatives and are presented at the end of each Impact Topic discussion.

Impairment of Park Resources or Values

In addition to determining the environmental consequences of the preferred and other alternatives, NPS Management Policies and Director's Order 12, Conservation Planning, Environmental Impact Analysis and Decision-Making, require analysis of potential effects to determine if actions would impair park resources.

The fundamental purpose of the National Park System, established by the NPS Organic Act and reaffirmed by the General Authorities Act, begins with a mandate to conserve park resources and values. NPS managers must always seek ways to avoid or minimize, to the greatest degree practicable, adverse impacts on park resources and values. However, the laws do give managers discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as those impacts do not constitute impairment of the affected resource or values. The prohibited impairment is an impact that, in the professional judgment of the responsible manager, would harm the integrity of park resources or values, including opportunities that otherwise would be present for the enjoyment of those resources or values. An impact to any park resource or value could constitute impairment. However, an impact would more likely constitute impairment to the extent it affects a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park unit;
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- identified as a goal in the park's General Management Plan or other relevant NPS planning documents.

Potential impairment that may result from NPS management activities, visitor activities, or activities undertaken by contractors and others operating in the park is analyzed and a determination of impairment is made for each natural and cultural resource impact topic in this document.

Assessment of Anticipated Impacts

Soils

Methodology

Available information on soil resources was compiled from existing reports and studies. Predictions about short- and long-term site impacts were based on recent park data, previous studies of impacts from similar actions to natural resources, and from discussions with agency soil and hydrology specialists.

The thresholds of change for the intensity of an impact are defined as follows:

Negligible: No soils would be affected as a result of the action. The effects would be on a small scale. No cryptobiotic soils would be affected.

Minor: An action would affect a relatively minor portion of the soils. Mitigation to offset adverse effects, including special measures to avoid severe compaction of soils, could be required and would be effective.

Moderate: An action would affect a sizeable segment of the soils over a relatively large area. Mitigation to offset adverse effects could be extensive, but would likely be successful.

Major: An action would have a considerable effect on a relatively large area in and out of the park. Mitigation measures to offset the adverse effects would be required, extensive, and success of the mitigation measures would not be guaranteed.

Impacts of Alternative A (No Action)

Soils in the wash and road shoulder would continue to receive negligible-to-minor, long-term adverse impacts from existing natural conditions such as flows from monsoon and snowmelt activities as well as from vehicular access to Dr. Goode Spring through the wash bottom and vehicles driving on Utah Highway 12. Under this alternative, there is expected to be no increase in the area of soil disturbance or compaction currently observed in the project area; however there is a potential for major failure of the road which would result in longer, more intense disruption necessary to make repairs.

Cumulative Impacts

Soils in the region are being impacted by off-road vehicle activities, fire management activities, commercial and residential development, road construction and maintenance, livestock grazing, and agriculture. These actions cause long-term adverse impacts from disturbance, erosion, and compaction of soils in areas these activities occur. Soil disturbance often leads to the introduction of non-native plant species that can out-compete and replace native vegetation. Fire management activities cause long-term positive effects by controlling the encroachment of forest species into meadowland areas, promoting the growth of wildfire-dependent species, and recycling nutrients into the soil, thus benefiting native species. The loss of some soils has already occurred with the construction of the existing road and natural erosional activities resulting from flood events. This alternative would not contribute to other past, present, and reasonably foreseeable future actions, and would not appreciably contribute to cumulative impacts on soils in the region.

Conclusion
Under the no action alternative, there would be negligible, short-term adverse ground disturbance with the potential to impact soils due to the vehicles accessing Dr. Goode Springs and vehicles traveling on Highway 12. There would be no project-related impacts to soils as a result of this alternative. Soils in the area would continue to receive negligible-to-minor, long-term adverse impacts from existing natural erosional conditions. There would be no impairment of park resources or values under Alternative A.

Impacts of Alternative B (Preferred)
This alternative would result in local soils receiving minor impacts by construction vehicles accessing the site in the wash bottom and digging trenches for installation of stream barbs, and unloading approximately 1,800 cubic yards of fill material between the road shoulder and the wash. This would have the potential to adversely impact soils on portions of approximately 210 lineal feet of the wash bottom and bank. This impact would be short-term and adverse, but negligible because soils on the site have previously received negligible-to-minor impacts by vehicles accessing Dr. Goode Springs for maintenance and sampling via the wash bottom and as a result of natural flooding events. This alternative is expected to negligibly increase the disturbance or compaction of soils within the project area.

Cumulative Impacts
Cumulative impacts on soil resources in the region are identical to those described in Alternative A.This alternative would not contribute to other past, present, and reasonably foreseeable future actions, and would have negligible contribution to cumulative impacts on soils in the region, and would improve long term stability of soils in the construction zone. Negligible cumulative impacts would result from localized disturbance of the wash bottom and road shoulder for the installation of stream barbs, limited vehicular access to the wash bottom, and placement and manipulation of the fill material along the road shoulder. These activities will provide greater long term stability of soils in the project area than either alternative A or C.

Conclusion
Overall, soils in the park would receive minor, short-term adverse impacts as a result of the proposed repair activities. There would be minor project-related ground disturbance with the potential to impact soils due to equipment accessing the wash to install stream barbs, manipulate fill material and depositing of the fill material between the road shoulder and wash. Soils would continue to receive negligible-to-minor, long-term adverse impacts from existing Dr. Goode Spring access needs and natural erosional activities. No impairment of park resources or values would occur under Alternative B.

Impacts of Alternative C (Modified UDoT Proposal)
This alternative would result in local soils receiving minor impacts by construction vehicles accessing the site in the wash bottom and unloading approximately 1,800 cubic yards of soil between the road shoulder and the wash. This would have the potential to adversely impact soils on portions of approximately 210 lineal feet of the wash bottom and bank. This impact would be short-term and adverse, but negligible because soils on the site have previously received negligible-to-minor impacts by vehicles accessing Dr. Goode Springs for maintenance and sampling via the wash bottom and as a result of natural flooding events. This alternative is not expected to increase the disturbance or compaction of soils within the project area or improve long term stabilization of the highway; and would have a lesser impact than Alternative B, due to the lack of stream barb construction, and placement of large boulders along the road shoulder instead of the volume of fill material proposed in Alternative B.

Cumulative Impacts
Cumulative impacts on soil resources in the region are identical to those described in Alternative A.This alternative would not contribute to other past, present, and reasonably foreseeable future actions, and would negligibly contribute to cumulative impacts on soils in the region, and would improve stability of soils in the construction zone. Negligible cumulative impacts would result from localized disturbance of the wash bottom and road shoulder for the installation and manipulation of large boulders, limited vehicular access to the wash bottom, and placement and manipulation of the fill material along the road shoulder. These activities will provide greater long term stability of soils in the project area than Alternative A but not as much protection and long term stability as Alternative B.

Conclusion
Overall, soils in the park would receive minor, short-term adverse impacts as a result of the proposed repair activities. There would be minor project-related ground disturbance with the potential to impact soils due to equipment accessing the wash to manipulate fill material and depositing of the fill material between the road shoulder and wash. Soils would continue to receive negligible-to-minor, long-term adverse impacts from existing Dr. Goode Spring access needs and natural erosional activities. There would be no impairment of park resources or values under Alternative C.

Vegetation
Methodology
Available information on vegetative resources was compiled from existing reports and studies. Predictions about short- and long-term site impacts were based on recent park data and previous studies of impacts from similar actions to natural resources.

The thresholds of change for the intensity of an impact are defined as follows:

Negligible: No native vegetation would be affected, or some individual native plants could be affected as a result of the action, but there would be no effect on native species populations. The effects would be on a small scale, and no species of special concern or federally listed species would be affected.

Minor: An action would affect some individual native plants and would also affect a relatively minor portion of that species' population. Mitigation to offset adverse

effects, including special measures to avoid affecting species of special concern, could be required and would be effective.

Moderate: An action would affect some individual native plants and would also affect a sizeable segment of the species' population over a relatively large area. Mitigation to offset adverse effects could be extensive, but would likely be successful. Some species of special concern might also be affected.

Major: An action would have a considerable effect on native plant populations, including species of special concern, and affect a relatively large area in and out of the park. Mitigation measures to offset the adverse effects would be required, extensive, and success of the mitigation measures would not be guaranteed.

Impacts of Alternative A (No Action)

Vegetative communities would continue to receive negligible-to-minor, long-term adverse impacts from vehicles accessing Dr. Goode Springs by way of the wash, vehicles driving on Highway 12, and from the natural process of flood events scouring the wash bottom. Under this alternative, there is expected to be no increase in the number or density of non-native/invasive plants currently observed in the project area.

Cumulative Impacts

Vegetation in the region is being impacted by fire management activities, commercial and residential development, road construction and maintenance, livestock grazing, recreational activities, and agriculture. These actions, with the exception of fire management activities, may cause long-term adverse impacts from destruction of native vegetation and introduction of exotic species that replace natives. Fire management activities cause long-term positive effects by controlling the encroachment of forest species into meadowland areas, promoting the growth of wildfire-dependent species, and recycling nutrients into the soil, thus benefiting native species. This alternative would not contribute to other past, present, and reasonably foreseeable future actions, and would not appreciably contribute to cumulative impacts on vegetation in the region.

Conclusion

Under the no action alternative, there would be no project-related impacts to vegetation. Vegetative communities would continue to receive negligible-to-minor, long-term adverse impacts from vehicles accessing Dr. Goode Springs by way of the wash, vehicles driving on Highway 12, and from the natural process of flood events scouring the wash bottom. There would be no impairment of park resources or values under Alternative A.

Impacts of Alternative B (Preferred)

This alternative would result in native vegetation receiving negligible, short-term adverse impacts as a result of construction equipment accessing the wash bottom, digging trenches for stream barbs, and by approximately 1,800 cubic yards of fill material being placed between the road shoulder and wash. This would have the potential to adversely impact vegetation on approximately 210 lineal feet of the wash. This impact would be short-term and adverse, but negligible because vegetation on the site has previously received negligible-to-minor impacts by vehicles accessing Dr. Goode Springs and the area would be reseeded with native vegetation to reduce the potential for non-native species to be introduced as a result of the stabilization activities. This alternative is not expected to increase the occurrence or density of non-native/invasive species within the study area.

Cumulative Impacts
Cumulative impacts on vegetation resources in the region are identical to those described in Alternative A. This alternative would contribute a negligible, adverse impact and a minor beneficial impact to other past, present, and reasonably foreseeable future actions causing impacts to vegetation, resulting in a minor, long-term beneficial cumulative impact to vegetation in the region. Impacts will result from fill material covering a limited amount of existing vegetation along the wash bottom to widen the road shoulder and from limited vehicular access into the wash bottom to manipulate fill material and dig trenches for the stream barbs. These impacts will be lessened as a result of replanting the project area with native seed to stabilize the fill material and decrease the chance of introduction of non-native vegetation to the work zone.

Conclusion
Overall, vegetative communities in the park would receive negligible, short-term adverse impacts and a minor beneficial impact as a result of the proposed project. There would be negligible project-related ground disturbance with the potential to impact vegetation due to the digging and placement of stream barbs and placing of fill material between the road shoulder nad wash. Vegetative communities would continue to receive negligible-to-minor, long-term adverse impacts by vehicles accessing Dr. Goode Springs. The area would be reseeded with native vegetation to reduce the potential for non-native species to be introduced as a result of the stabilization activities. There would be no impairment of park resources or values under Alternative B.

Impacts of Alternative C (Modified UDoT Proposal)
This alternative would result in native vegetation receiving negligible, short-term adverse impacts as a result of construction equipment accessing the wash bottom and by approximately 1,800 cubic yards of fill material being placed between the road shoulder and wash. This would have the potential to adversely impact vegetation on approximately 210 lineal feet of the wash and road shoulder. This impact would be short-term and adverse, but negligible because vegetation on the site has previously received negligible-to-minor impacts by vehicles accessing Dr. Goode Springs and the area would be reseeded with native vegetation to reduce the potential for non-native species to be introduced as a result of the stabilization activities. This alternative is not expected to increase the occurrence or density of non-native/invasive species within the study area.

Cumulative Impacts
Cumulative impacts on vegetation resources in the region are identical to those described in Alternative A. This alternative would contribute a negligible, adverse impact and a minor beneficial impact to other past, present, and reasonably foreseeable future actions causing impacts to vegetation, resulting in a minor, long-term beneficial cumulative impact to vegetation in the region. Impacts will result from fill material and boulders covering a limited amount of existing vegetation along the wash bottom to widen the road shoulder and from limited vehicular access into the wash bottom to manipulate fill material and boulders. These impacts will be lessened as a result of replanting the project area with native seed, as in Alternative B, to stabilize the fill material.

Conclusion
Overall, vegetative communities in the park would receive negligible, short-term adverse impacts and a minor beneficial impact as a result of the proposed project. There would be negligible project-related ground disturbance with the potential to impact vegetation due to vehicular access in the wash and placing of fill material between the road shoulder and wash. Vegetative

communities would continue to receive negligible-to-minor, long-term adverse impacts by vehicles accessing Dr. Goode Springs. The area would be reseeded with native vegetation to reduce the potential for non-native species to be introduced as a result of the stabilization activities. There would be no impairment of park resources or values under Alternative C.

Visitor Experience

Methodology

Visitor information and personal observation of visitation patterns, combined with assessment of what is available to visitors under current management, were used to estimate the effects of the various alternatives.

The thresholds of change for the intensity of an impact are defined as follows:

Negligible: The impact is barely detectable, and/or will affect few visitors.

Minor: The impact is slight but detectable, and/or will affect some visitors.

Moderate: The impact is readily apparent and/or will affect many visitors.

Major: The impact is severely adverse or exceptionally beneficial and/or will affect the majority of visitors.

Impacts of Alternative A (No Action)

Under this alternative, the proposed stabilization repairs would not occur in Bryce Canyon National Park. Local residents and visitors would continue to utilize highway 12 to access points of interest in the area and the natural erosion process will be allowed to progress without any interference, eventually undercutting highway 12 thus making it impassable and requiring repairs that would more severely impact the resources in this specific area. There would be no change in the current status of visitor access under this alternative as long as the road remains passable. Visitors would still continue to visit the park and other local attractions at the current rate.

Cumulative Impacts

Other current and foreseeable projects in the area have the potential to affect park visitation. Tourism-related visits to the region occur on lands managed by the National Park Service, Bureau of Land Management, U.S. Forest Service, and private landowners. Designation of the adjacent Grand Staircase-Escalante National Monument in 1996 has led to an increase in visitation to the region. This alternative would not cause a change in visitation or visitor experience in the area from current and projected levels and, therefore, would not contribute to the cumulative impacts of other past, present, and reasonably foreseeable future actions, to the type or level of visitation in the region. Therefore, there would be no cumulative impacts to visitor experience under this alternative.

Conclusion

Under the no action alternative, there would be no impacts on visitors as long as the highway remains passable. No stabilization repair work would be conducted to alleviate the existing tenuous situation wherein the road shoulder is slowly eroding away due to flow in the wash and runoff from the roadway.

Impacts of Alternative B (Preferred)
Visitor experience could receive minor, short-term, adverse impacts as a result of traffic stoppage due to construction equipment delivering fill material to the site or other stabilization activities in the immediate area of the proposed project. Stabilization repair activities would cause a minor, short-term increase in the amount of project-vehicular traffic in the Tropic Canyon wash to install stream barbs and manipulate the fill material along the road shoulder. After the stabilization repairs are concluded, the wash will return to natural conditions as late-summer monsoon moisture provides adequate water flow to remove tire tracks resulting from the presence of construction equipment in the wash. The fill material will be reseeded utilizing native plant seed and the area will be monitored in subsequent years for the presence of non-native vegetation. Natural erosion processes will be altered to direct water flow away from road shoulder thus protecting the highway from becoming completely undercut and impassable as a result. This will allow visitors and local residents to continue to frequent local communities, businesses, and attractions. During stabilization activities along the highway, there will be negligible-to-minor impacts to visitor experience due to the visual impact of consruction equipment and traffic control measures while this equipment operates along the road shoulder. In order to diminish this impact, the repair activities will only be allowed to occur during daylight hours and any necessary traffic stoppage will be kept to a maximum of 10 minutes. A long term minor impact would exist from the permanent visual intrusion of the stream barbs in this natural setting along UT Highway 12.

Cumulative Impacts
Cumulative impacts on park visitation in the region are identical to those described in Alternative A. This alternative would not cause a change in visitation in the area from current and projected levels. Conducting stabilization and repair activities along highway 12 while providing continued visitor and local resident access on this major thorofare and providing continued services to park visitors when combined with other past, present and future actions would result in long-term beneficial impacts to visitor experience by increasing and ensuring access to the attractions that visitors and local residents have come to expect of this unique area of the state.

Conclusion
There would be a negligible to minor, short-term adverse impact on visitors during the time that stabilization and repair activities are occurring and a minor, long-term beneficial effect on visitor experience after the stabilization and repair activities are completed and continued, uninterrupted access to the natural wonders and local communities of the area are maintained.

Impacts of Alternative C (Modified UDoT Proposal)
Visitor experience could receive minor, short-term, adverse impacts as a result of traffic stoppage due to construction equipment delivering fill material to the site or other stabilization activities in the immediate area of the proposed stabilization project. Stabilization repair activities would cause a minor, short-term increase in the amount of project-vehicular traffic in the Tropic Canyon wash to manipulate the fill material along the road shoulder and adjacent to the wash. After the stabilization repairs are concluded, the wash will return to natural conditions as late-summer monsoon moisture provides adequate water flow to remove tire tracks resulting from the presence of construction equipment in the wash. The fill material will be reseeded utilizing native plant seed and the area will be monitored in subsequent years for the presence of non-native vegetation. Natural erosion processes will be slowed as a result of soil being placed between the wash and road shoulder thus protecting the highway from becoming completely undercut and impassable in the short term. This will allow visitors and local residents to continue to frequent local communities, businesses, and attractions. During stabilization activities along the highway, there will be negligible-to-minor impacts to visitor experience due to the visual impact of consruction

equipment and traffic control measures while this equipment operates along the road shoulder. In order to diminish this impact, the repair activities will only be allowed to occur during daylight hours and any necessary traffic stoppage will be kept to a maximum of 10 minutes. Impacts to the visual quality of the area would be less, because no stream barbs would protrude into the wash.

Cumulative Impacts
Cumulative impacts on park visitation in the region are identical to those described in Alternative A. This alternative would not cause a change in visitation in the area from current and projected levels. Conducting stabilization and repair activities along Highway 12, a National Scenic Byway, while providing continued visitor and local resident access on this major thorofare and providing continued services to park visitors when combined with other past, present and future actions would result in long-term beneficial impacts to visitor experience by increasing and ensuring access to the attractions that visitors and local residents have come to expect of this unique area of the state. Any traffic stoppages would be more than under Alternative A but fewer and of shorter duration then in Alternative B.

Conclusion
There would be a negligible to minor, short-term adverse impact on visitors during the time that stabilization and repair activities are occurring and a minor, long-term beneficial effect on visitor experience after the stabilization and repair activities are completed and continued, uninterrupted access to the natural wonders and local communities of the area are maintained.

Water Resources

Methodology
Available information on water resources was compiled from existing reports and studies. Predictions about short- and long-term site impacts were based on recent park data, previous studies of impacts from similar actions to natural resources, and from conversations and site visits with hydrologists, physical scientists, and NPS and Utah Department of Transportation personnel familiar with the project.

The thresholds of change for the intensity of an impact are defined as follows:

Negligible: Water quality and hydrology would not be affected, and changes would be either non-detectable or if detected, would have effects that would be considered slight, local and short-term.

Minor: Changes in water quality or hydrology would be measurable, although the changes would be small, would likely be short-term, and the effects would be localized. No mitigation measure associated with water quality or hydrology would be necessary.

Moderate: Changes in water quality or hydrology would be measurable and long-term but would be relatively local. Mitigation measures associated with water quality or hydrology would be necessary and the measures would likely succeed.

Major: Changes in water quality or hydrology would be readily measurable, would have substantial consequences, and would be noticed on a regional scale. Mitigation measures measures would be necessary and their success would not be guaranteed.

Impacts of Alternative A (No Action)

Under this alternative, the proposed stabilization repairs would not occur in the Tropic Canyon in Bryce Canyon National Park. This alternative would have no measurable impacts on water resources. The natural processes would be allowed to continue unabated and local residents and visitors would continue to utilize highway 12 to access points of interest in the area. There would be no change in the current management of water resources in the park or the project area under this alternative.

Cumulative Impacts
Other current and foreseeable projects in the area have the potential to affect the park's water resources. Water resources in the region occur on lands managed by the National Park Service, Bureau of Land Management, U.S. Forest Service, State of Utah, and private landowners. This alternative would not cause changes in water resources in the area from current and projected levels and, therefore, would not contribute to the cumulative impacts of other past, present, and reasonably foreseeable future actions, to the type or quantity of water resources in the region. Therefore, there would be no cumulative impacts to water resources under this alternative.

Conclusion
Under the no action alternative, there would be no impacts on water resources. No stabilization repair work would be conducted to alleviate the existing tenuous situation wherein the road shoulder is slowly eroding away due to flow in the wash and runoff from the roadway. There would be no impairment of park resources or values under Alternative A.

Impacts of Alternative B (Preferred)
Under this alternative, the proposed placement of 5 stream barbs and approximately 1,800 cubic yards of fill material between the road shoulder and wash for stabilization purposes would occur in the Tropic Canyon in Bryce Canyon National Park. This alternative would have negligible, short-term impacts on water resources during the time that stabilization work is being conducted as equipment accesses the wash to dig stream barbs, place diversion rocks, and move fill material. Work activities will be planned to occur between the winter/spring runoff and late summer monsoons. Any tracks or disturbance evident as a result of equipment in the wash will be removed as a result of monsoon moisture. Long term impacts of diverting the water away from the road shoulder may alter the flow of the wash during high runoff events. This diversion could result in minor changes to the wash downstream as a result of wash width potentially increasing.
Cumulative Impacts
Cumulative impacts on water resources in the region are identical to those described in Alternative A. This alternative would contribute negligible impacts to other past, present, and reasonably foreseeable future actions causing impacts to water resources in the immediate project area, resulting in negligible, short term cumulative impacts on water resources in the region. Impacts to water resources would result from placement of fill material between the road shoulder and wash, placement of stream barbs in the wash bottom to divert flow away from the roadbed, and construction equipment accessing the wash bottom to manipulate fill material and stream barbs. Once completed, these activities will provide a more stable surface on which Highway 12 is constructed.

Conclusion
Under this alternative, there would be negligible short-term adverse impacts to water resources in the immediate project area. There would be no impairment of park resources or values under Alternative B.

Impacts of Alternative C (Modified UDoT Proposal)

Under this alternative, the proposed placement of approximately 1,800 cubic yards of fill material between the road shoulder and wash for stabilization purposes would occur in the Tropic Canyon in Bryce Canyon National Park. Large boulders would be placed between the wash and new fill materials to protect the road shoulder from future erosion events. This alternative would have negligible, short-term impacts on water resources in the immediate project area during the time that stabilization work is being conducted. However, once work is completed, this alternative would result in long-term, beneficial effects to highway 12 since the fill material will protect the roadbed from normal erosion patterns as a result of intermittent flows in the Tropic Canyon wash.

Cumulative Impacts

Cumulative impacts on water resources in the region are identical to those described in Alternative A. This alternative would contribute negligible impacts to other past, present, and reasonably foreseeable future actions causing impacts to water resources in the immediate project area, resulting in negligible, short term cumulative impacts on water resources in the region. Impacts to water resources would result from placement of large boulders and fill material between the road shoulder and wash to divert flow away from the roadbed and construction equipment accessing the wash bottom to manipulate the fill material and boulders into position. Once completed, these activities will provide a more stable surface on which Highway 12 is constructed.

Conclusion

Under this alternative, there would be negligible short-term adverse impacts to water resources in the immediate project area and minor, long-term beneficial effect on highway stability once the project is completed. There would be no impairment of park resources or values under Alternative C.

CONSULTATION AND COORDINATION

Public Involvement

This Environmental Assessment will be made available for a 30-day public review period. The National Park Service will perform a content analysis on comments received from internal sources, other agencies, and the public.

Public participation is an important component of any planning process. For the proposed Tropic Canyon Highway Stabilization Project Environmental Assessment process, Bryce Canyon used several strategies to involve the public. External scoping was initiated in February 2006 and continued throughout the planning process. Scoping strategies included:

- Distributed over 170 scoping newsletters to individuals, organizations, and government agencies. The newsletter outlined the proposal and described the process for public involvement.
- Posted the newsletter notices on the Bryce Canyon internet homepage.
- Published notices of the planning/environmental assessment process in local newspapers.
- Posted the newsletter notices on the National Park Service Planning, Environment and Public Comment (PEPC) webpage.

The park did not receive any scoping comment letters from any of the groups, individuals, or agencies that received scoping letters.

National Historic Preservation Act

In accordance with the Act, letters requesting tribal consultation were mailed to the following tribes: Ute, Navajo, Goshute, Shoshoni, Hopi, Pueblo of Zuni, Chemehuevi, and Paiute. No responses were received during the scoping period.

State Historic Preservation Office

A scoping letter was sent to the State Historic Preservation Office in February 2006. No comments were received. A copy of this document will be sent to the SHPO for review and comment as part of the Section 106 process.

U.S. Fish and Wildlife Service

A scoping letter was sent to the U.S. Fish and Wildlife Service in February 2006. No comments were received. The NPS will consult with or send a copy of the EA to the USFWS for review under Section 7 of the Endangered Species Act. Determination of species listed as threatened or endangered in the State of Utah were made by visiting the following website: *http://mountain-prairie.fws.gov/ut.html*. There are no known occurrences of threatened or endangered species in the proposed project area. If threatened and endangered species are observed during construction activities, then work will be halted and Utah Department of Transportation personnel will contact NPS Resource Management personnel and consultation with USFWS will be initiated.

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Consultation

The park consulted with regional NPS hydrologists in making a determination on whether or not the project would have impacts to either wetlands or floodplains and whether or not a Statement of Impact was necessary for these impact topics. After reviewing the project proposal, site photographs, and drawings the regional personnel did not feel that the project would have adverse impacts on either wetlands or floodplains and that Statements of Impact were not necessary for this project.

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Appendix A. U.S. Fish and Wildlife Service Consultation

Threatened and Endangered Species

Plants

The following list was provided through consultation with the U.S. Fish and Wildlife Service (USFWS) website (*http://mountain-prairie.fws.gov/ut.html*). These species may occur within the two counties in which the park lies.

Federally Listed Plant Species			
Common Name	**Scientific Name**	**Federal Status**	**Found in Bryce Canyon***
Autumn Buttercup	*Ranunculus aestivalis*	Endangered	No
Kodachrome Bladderpod	*Lesquerella tumulosa*	Endangered	No
Navajo Sedge	*Carex specuicola*	Threatened	No
Siler Pincushion Cactus	*Pediocactus sileri*	Threatened	No
Welsh's Milkweed	*Asclepias welshii*	Threatened	No
Jones Cyclandenia	*Cyclandenia humilis var. jonesii*	Threatened	No
McGuire Daisy	*Erigeron maguirei*	Threatened	No
Ute's Ladies Tresses	*Spiranthes diluvialis*	Threatened	No
Aquarius Paintbrush	*Castilleja aquariensis*	Candidate	No

*Based on staff knowledge, various plant surveys documented by the Utah State Conservation Data Center, and/or lack of preferred habitat in the park.

As noted in the above table, none of the species listed above are known to occur in Bryce Canyon. Specific notes for each species are listed below.

Autumn buttercup (*Ranunculus agestivalis)* is a narrow endemic and occurs only in the Sevier River Valley, Garfield County, in wet meadows.

Kodachrome bladderpod (*Lesquerella tumulosa)* is a narrow endemic and occurs only in Kane County on shallow soils intermixed with shale fragments derived from the Windsor Member of the Carmel Formation.

Navajo sedge (*Carex specuicola)* occurs in canyons in Kane County but is restricted to seeps, springs, and hanging garden habitats in Navajo sandstone.

Siler pincushion cactus (*Pediocactus sileri)* occurs in Kane County on sandy or clay soils derived from the various members of the Moenkopi Formation.

Welsh's milkweed (*Asclepias welshii)* occurs in Kane County on dunes derived from Navajo sandstone.

Jones cyclandenia (*Cycladenia humilis var. jonesii)* is restricted to the canyonlands of the Colorado Plateau and grows in gypsum soils derived from the Summerville, Cutler, and Chinle Formations.

McGuire daisy (*Erigeron maguirei)* grows on the sand and detritus weathered from Navajo sandstone in crevices, on ledges, and bottoms of washes.

Ute's ladies tresses (*Spiranthes diluvialis)* occurs in several Utah counties, but is found only in moist to very wet meadows, along streams, and near seeps, springs, or lake shores.

Aquarius paintbrush (*Castilleja aquariensis)* occurs on the Aquarius Plateau and on the Boulder Top in Garfield and Wayne Counties, in clay loam or gravelly clay soils.

Bryce Canyon is also home to nine plant species considered sensitive or of special concern due to their limited distribution (endemism) or because they are disjunct from more abundant population centers. These species are recognized by park staff or past studies as being rare (Peabody 1995; 1997), and/or are listed by the State of Utah National Heritage Program and documented on the list of "Endemic and Rare Plants of Utah: An Overview of their Distribution and Status" (State of Utah 2004). In 1997, Dr. F. Peabody completed a field survey of eight of these species that were formerly "Candidate—Priority 2" (C2) federal species. Many of these species are found only on barren areas along the breaks and in open pine woodland habitats on bare, gravelly soils. Table 3 lists Bryce Canyon's sensitive plants according to habitat and their associated state status, if applicable. There are no known federally or state listed plant species that occur within the area of the proposed stabilization project. The area around Doctor Goode Springs, which is within ½ mile of the proposed Tropic Wash stabilization project, was surveyed for federally and state listed sensitive palnt species found within the park and none were observed (BRCA 2002).Therefore, no federally listed or state listed plant species will be considered in this assessment.

Sensitive Plant Species			
Common Name	**Scientific Name**	**State Status Category1**	**State Heritage Program Classification2**
Paria Breadroot	*Lomatium minimum*	Watch	G3/S3
Painted Desert Beard-Tongue	*Penstemon caespitosus*	Watch	G5T3/S2
Reveal Paintbrush	*Castilleja parvula var. revealii*	--	--
Yellow-White Cryptanth	*Cryptantha ochroleuca*	--	--
Jones Goldenaster	*Heterotheca jonesii*	--	--
Jones Oxytrope	*Oxytropis oreophila var. jonesii*	--	--
Platy Penstemon or Red Canyon Beardstongue	*Penstemon bracteatus*	--	--
Maguire Campion	*Silene petersonii*	Watch	G2G3/S2S3
Least Townsendia	*Townsendia montana var. minima*	Watch	G3/S3

[1] Watch – plants regionally endemic but without rangewide viability concern.
[2] G = Global /S = State. Numbers indicate rarity, with lower numbers (1, 2) indicating extreme rarity or vulnerability to extinction.

Wildlife

The animal species listed in the following table and described below either occur or have the potential to occur within Bryce Canyon. The list is based on consultation with the USFWS. If the species is also listed by the State of Utah, its state status is indicated.

Federally Listed and Candidate Animal Species					
Common Name	**Scientific Name**	**Federal Status**	**State Status**	**Found in Bryce Canyon?***	**Comments**
Mexican Spotted Owl	*Strix occidentalis lucida*	Threatened	S-ESA (sensitive)	No	None found during several park surveys
Bald Eagle	*Haliaeetus leucocephalus*	Threatened	S-ESA (sensitive)	Yes	Winter resident/migrant
California Condor	*Gymnogyps californianus*	Endangered	S-ESA (sensitive)	Yes	Intermittent visitor; experimental population
Western Yellow-Billed Cuckoo	*Coccyzus americanus occidentalis*	Candidate	S-ESA (sensitive)	Yes	One sighting in Sheep Creek; no known nesting
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	Endangered	S-ESA (sensitive)	Yes	A few sightings along Sheep and Yellow Creeks; no nesting
Utah Prairie Dog	*Cynomys parvidens*	Threatened	S-ESA (sensitive)	Yes	Breeds in park; several colonies
Kanab Ambersnail	*Oxyloma haydeni kanabensis*	Endangered	S-ESA (sensitive)	No	Limited habitat
Coral Pink Sand Dune Tiger Beetle	*Cincindela limbata albissima*	Candidate	S-ESA (sensitive)	No	No habitat
Colorado Pikeminnow	*Ptychocheilus lucius*	Endangered	S-ESA (sensitive)	No	Limited habitat
Razorback Sucker	*Xyrauchen texanus*	Endangered	S-ESA (sensitive)	No	Limited habitat
Humpback Chub	*Gila cypha*	Endangered	S-ESA (sensitive)	No	Limited habitat
Bonytail	*Gila elegans*	Endangered	S-ESA (sensitive)	No	Limited habitat

*Based on surveys, park staff knowledge, presence of preferred habitat, and known range.

The **Mexican spotted owl** (*Strix occidentalis lucida*), which is federally listed as a threatened species and a state-listed sensitive species, is not found within Bryce Canyon. Surveys were performed from 1993 to 1995 in several areas predicted to be suitable habitat for the owl in order to identify the extent of the Utah Range for this species. No Mexican spotted owls were seen or

heard along any of the surveyed transects in the park (Bryce Canyon National Park 2002a). Another survey was completed in 2003, and no owls were documented at that time (K. Legg, personal communication 2004). Bryce Canyon contains very limited preferred habitat for the owl, so these results are not unexpected.

The **bald eagle** (*Haliaeetus leucocephalus*), a federally threatened species and state-listed sensitive species, is a winter resident and migrant, and does not breed in the park. Bald eagles are more commonly seen along the cliffs and breaks of the park and along some streams and reservoirs outside of the park.

The federally endangered and state sensitive **California condor** *(Gymnogyps californianus)* is an intermittent visitor in the park and is part of an experimental population in Utah. They are not known to use the park consistently, and do not use the park as a breeding area.

The **western yellow-billed cuckoo** *(Coccyzus americanus occidentalis)* is a federal candidate species and state-listed sensitive species. It is considered a rare visitor in the park, and there has been only one sighting of this bird along Sheep Creek in 2002 (Bryce Canyon National Park 2002b). Their primary breeding habitat is an overstory of cottonwood canopy, which is rare in the park.

The **southwestern willow flycatcher** (*Empidonax traillii extimus*) is federally endangered and a statelisted sensitive species. It nests primarily in mid-to-low elevation riparian habitat along rivers, streams, or other wetlands where a dense growth of willows or other plants are present, and this habitat is very rare in Bryce Canyon. Several surveys for southwestern willow flycatcher were conducted along riparian areas in the park since 1995. A few sightings were recorded along the Yellow Creek and Sheep Creek/Swamp Canyon drainages, but no signs of nesting or nesting behavior have been observed (Bryce Canyon National Park 1996-2002).

The **Utah prairie dog** (*Cynomys parvidens*), a federally threatened species and state-listed sensitive species, occurs in several colonies in the central and northern portions of the park that contain open, grassy meadows. The Utah prairie dog, a burrowing rodent in the squirrel family (Sciuridae), occurs only in southwestern Utah. It is a member of the white-tailed prairie dog group that once inhabited vast areas of the western Great Plains. The Utah prairie dog is the most restricted of the three members of this group. Its total numbers declined drastically from the 1920s to 1976. This decline was caused by human-related habitat alteration and by intentional poisoning, which resulted from the belief that prairie dogs compete with domestic livestock for forage. At present, the Utah prairie dog is still threatened over much of its range by loss of habitat. Despite the problems listed above the Utah prairie dog saw an increase in overall population numbers between 1976 and 1991 (USFWS 1991). However, the population numbers have fluctuated overtime and have not continued on an upward trend (Utah Prairie Dog Recovery Implementation Team 1997). At Bryce Canyon National Park, Utah prairie dog reestablishment occurred between 1974 and 1988 after being eradicated from the park in the 1950s (Bryant 1995; Stebbins 1971). Since the reestablishment program, prairie dog population numbers at Bryce Canyon have fluctuated from under 50 animals to over 200 (Wallen 2000). Colonies are found in the meadows of the park. The Mixing Circle and Mixing Circle Junction areas are meadows and the Mixing Circle represents the largest viable colony of Utah prairie dogs in the park. There are no colonies located in the area of the proposed stabilization project so no impacts are expected as a result of initiating this project.

The **Kanab ambersnail** *(Oxyloma haydeni kanabensis)*, a federally endangered and state-listed sensitive species, is not known to occur in the park. Kanab ambersnails are found in three distinct

localities: Three Lakes and Kanab Creek in Utah, and another population in Arizona (UDWR 2001). All of these areas are disjunct from the park.

The **Coral Pink Sand Dunes tiger beetle** *(Cincindela limbata albissima)*, a federally endangered and state-listed sensitive species, is not found in Bryce Canyon. Its distribution is limited to the sand dunes within Coral Pink Sand Dunes State Park and also on adjacent lands managed by the Bureau of Land Management (USDI, USFWS 1997).

The remaining species listed as endangered by the USFWS for Garfield and Kane Counties are fish, including the **Colorado pikeminnow** (*Ptychocheilus lucius*), **razorback sucker** (*Xyrauchen texanus*), **humpback chub** (*Gila cypha*), and **bonytail** (*Gila elegans*). None of these is found within Bryce Canyon, primarily due to a lack of appropriate habitat (K. Legg, personal communication 2004).

State-Listed or Other Sensitive Species
Three other species that occur in Bryce Canyon are listed by the State of Utah or recognized by park staff as sensitive or rare as discussed below.

The **peregrine falcon** *(Falco peregrinus anatum)* was removed from the federal list of endangered and threatened species in 1999 and is not on the state list, but Bryce Canyon staff continue to keep data on nesting sites. Surveys for peregrines have been conducted at Bryce Canyon National Park since 1982. All nesting territories are located to the east of the rim and south of the main amphitheater, well away from the proposed action. There are seven known nesting sites/territories within the park, all located along the breaks or cliffs. Falcons nest on cliff ledges, but hunt in surrounding open woodlands and grasslands.

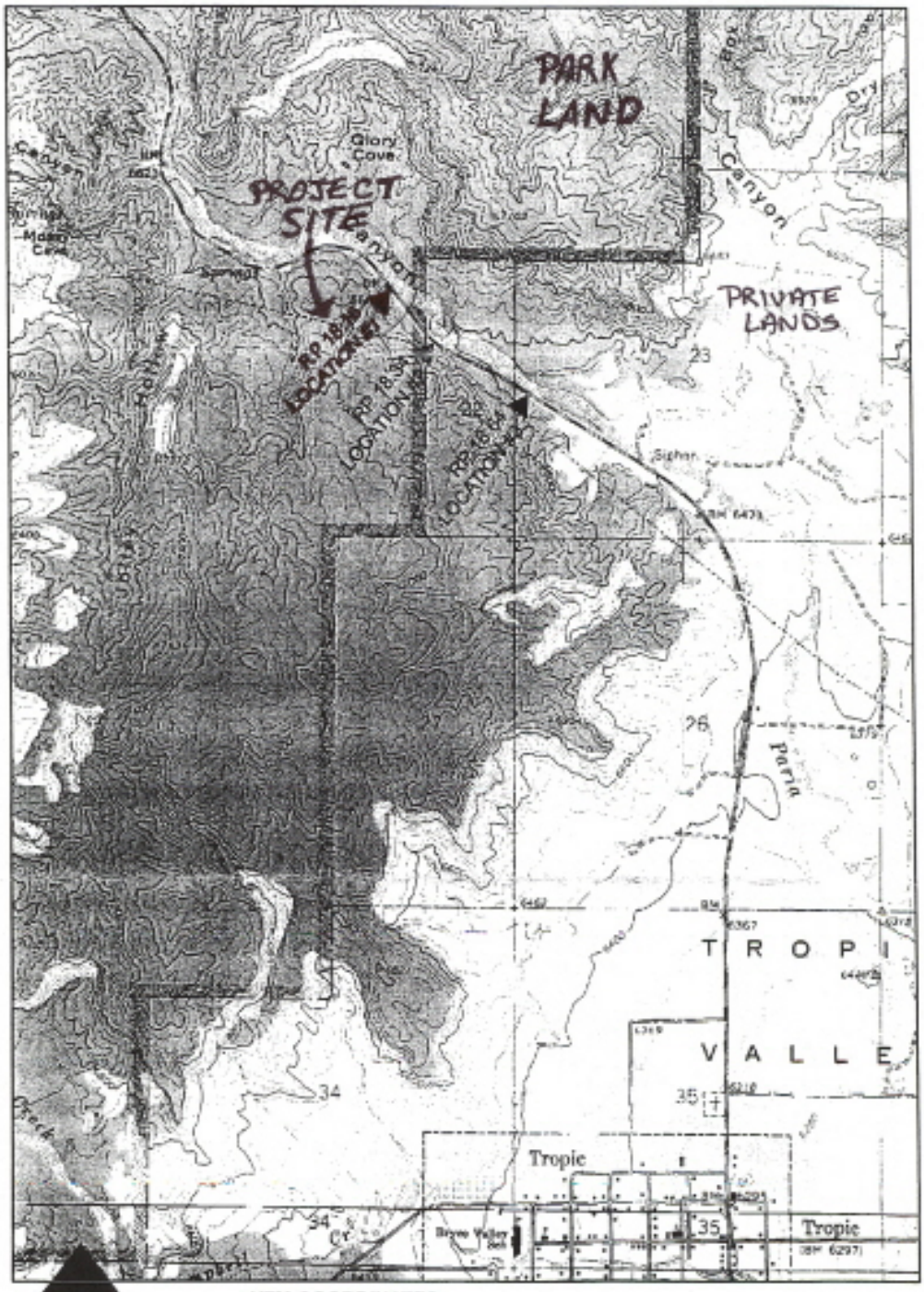
The **northern goshawk** *(Accipiter gentilis)*, a state-listed species that is under a Conservation Agreement, is known to nest in the park and hunt over open grasslands.

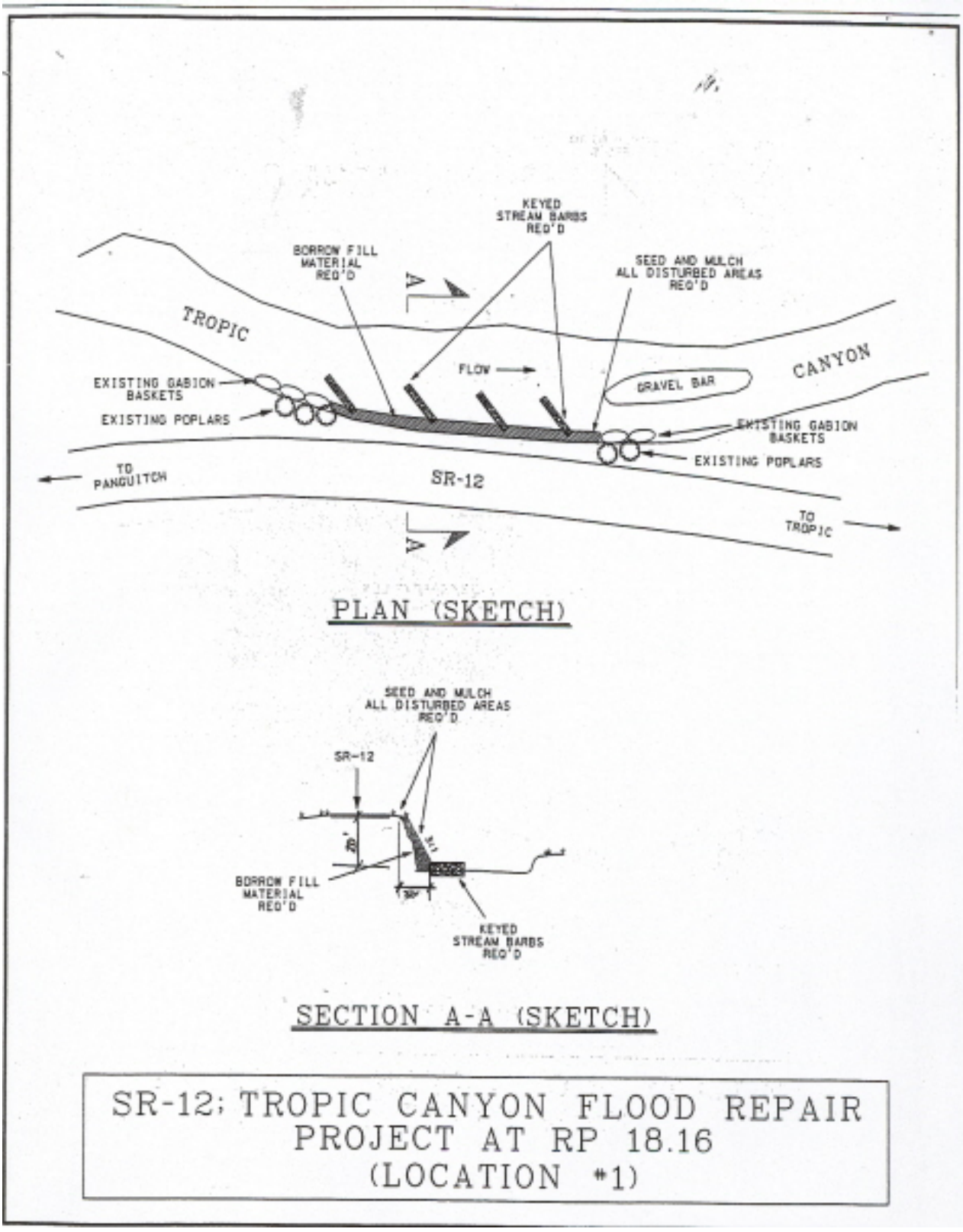
The **fringed myotis** *(Myotis thysandes)* is listed as a state wildlife species of concern and has been documented in and near the park. A bat survey performed in 1995 using mist nets caught fringed myotis at two of six locations in the park, along East Creek and Yovimpa Pass. Habitat along these drainages was characterized as montane grassland and montane forest/woodland (Foster et al. 1995).

All of these species are not in the area affected by the proposed stabilization project, and so are not considered in this assessment. There would be no depletion of water from any portion of the drainage basin occupied by listed fishes as a result of implementing any of the alternatives. If adverse impacts to a listed species are identified, consultation with the USFWS would be initiated.

Appendix B. Utah Department of Transportation Design Drawings

SR-12; Tropic Canyon Project Locations




KEYED
STREAM BARBS
REQ'D
BORROW FILL
MATERIAL
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SEED AND MULCH
ALL DISTURBED AREAS
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A
TROPIC
CANYON
FLOW
GRAVEL BAR
EXISTING GABION
BASKETS
EXISTING POPLARS
EXISTING GABION
BASKETS
EXISTING POPLARS
TO
PANGUITCH
SR-12
TO
TROPIC
A
PLAN (SKETCH)
SEED AND MULCH
ALL DISTURBED AREAS
REQ'D
SR-12
BORROW FILL
MATERIAL
REQ'D
KEYED
STREAM BARBS
REQ'D
SECTION A-A (SKETCH)
SR-12; TROPIC CANYON FLOOD REPAIR
PROJECT AT RP 18.16
(LOCATION #1)