National Park Service
U.S. Department of the Interior

Denali National Park and Preserve
Alaska

# Rehabilitate Mile 4.0 and 4.5 of Denali Park Road
# Environmental Assessment
# June 2007

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June 2007

The Federal Highway Administration
is a Cooperating Agency
on this Environmental Assessment

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## ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| § | Section |
| ADEC | Alaska Department of Environmental Conservation |
| ADFG | Alaska Department of Fish and Game |
| ANILCA | Alaska National Interest Lands Conservation Act of 1980 |
| BMPs | Best Management Practices |
| CAA | Clean Air Act of 1977 |
| CEQ | Council on Environmental Quality |
| CFR | Code of Federal Regulations |
| dBA | Decibels A-weighted |
| DCP | Development Concept Plan |
| DO | Director's Order |
| EA | Environmental Assessment |
| EIS | Environmental Impact Statement |
| E.O. | Executive Order |
| ESA | Endangered Species Act 1973 |
| FHWA | Federal Highway Administration |
| FLHP | Federal Lands Highway Program |
| FONSI | Finding of No Significant Impact |
| GMP | General Management Plan |
| MBTA | Migratory Bird Treaty Act 1918 |
| MP | Mile Post |
| NEPA | National Environmental Policy Act of 1969 |
| NOI | Notice of Intent |
| NPS | National Park Service |
| park road | Denali Park Road |
| SOF | Statement of Findings |
| the park | Denali National Park and Preserve |
| U.S. | United States |
| U.S.C. | United States Code |
| USACE | U.S. Army Corps of Engineers |
| USDOI | U.S. Department of Interior |
| USDOT | U.S. Department of Transportation |
| USEPA | U.S. Environmental Protection Agency |
| USFWS | U.S. Fish and Wildlife Service |
| USGS | U.S. Geological Survey |

## 1.0 INTRODUCTION

The National Park Service (NPS), in cooperation with the Federal Highway Administration (FHWA), is considering a project for road rehabilitation on two sections of the Denali Park Road (park road) in Denali National Park and Preserve (the park). The NPS is proposing to:

- Rehabilitate a problem slump area at mile post (MP) 4.0 by realigning approximately 1,600 feet of the road through an abandoned borrow pit to the north, or uphill side, and restore the bypassed section of road.
- Rehabilitate a problem sheet ice area at MP 4.5 by raising the road surface approximately 2 to 4 feet and shifting it approximately 2 to 8 feet along a stretch of road approximately 2,200 feet long; enlarging the uphill drainage ditch to retain greater winter ice volume; and adding and enlarging culverts.

At MP 4.0, deep permafrost thawing is causing this section of road to slump and slide downhill each spring. Approximately 1 to 2 feet of additional embankment is needed annually to maintain the grade. Despite the length of the slump, the area affected by the lateral movement appears to be limited to approximately 150 feet. The NPS has been unable to keep approximately 700 feet of asphalt from disintegrating and failing at this location.

At MP 4.5, freezing of water emanating from year-round springs upslope from the park road creates surface sheet icing (called aufeis) that, during most winters, covers the paved road with up to 6 feet or more of ice between MP 4.2 and MP 4.6. Aufeis is a German word meaning “ice on top” that is used to describe the formation of thick sheets of ice at locations of groundwater seepage in arctic climates. The ice accumulation is a maintenance challenge that can add considerable time, expense, and hazard to the spring road opening. The aufeis also presents hazards to winter recreational users. Figure 1 shows the proposed project area.

As compensation for wetlands damaged by proposed project activities, other wetlands would be rehabilitated at a site in the park near Glen Creek west of Kantishna.

Vegetation clearing would begin in autumn 2007, and road construction would begin in spring 2008. This road rehabilitation project would not be expected to extend beyond summer 2008. During project construction, alternate access would be available at MP 4.0 and traffic would be managed on a one-lane road in the vicinity of MP 4.5.

This Environmental Assessment (EA) analyzes the environmental impacts of the proposed action and the No Action alternatives. The EA has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 and regulations of the Council on Environmental Quality (CEQ) (40 Code of Federal Regulations [CFR] 1508.9).

### 1.1 Purpose and Need for Action

The purpose of the proposed road rehabilitation is to provide safe public travel ways that can be maintained safely, efficiently, and in a cost-effective manner. The road rehabilitation is needed because the current road conditions pose a safety hazard to park staff and visitors. Following winters of severe aufeis accumulation, maintenance crews remove 1,000 or more linear feet of ice, up to 6 feet deep, at MP 4.5 in order to open the park road for the summer season. This task presents a safety hazard to park maintenance crews, and serious safety incidents have occurred in past years. The aufeis presents a safety hazard to dog sled mushers, skiers and other park visitors who cross the ice at MP 4.5 to access the park interior for winter recreational activities.

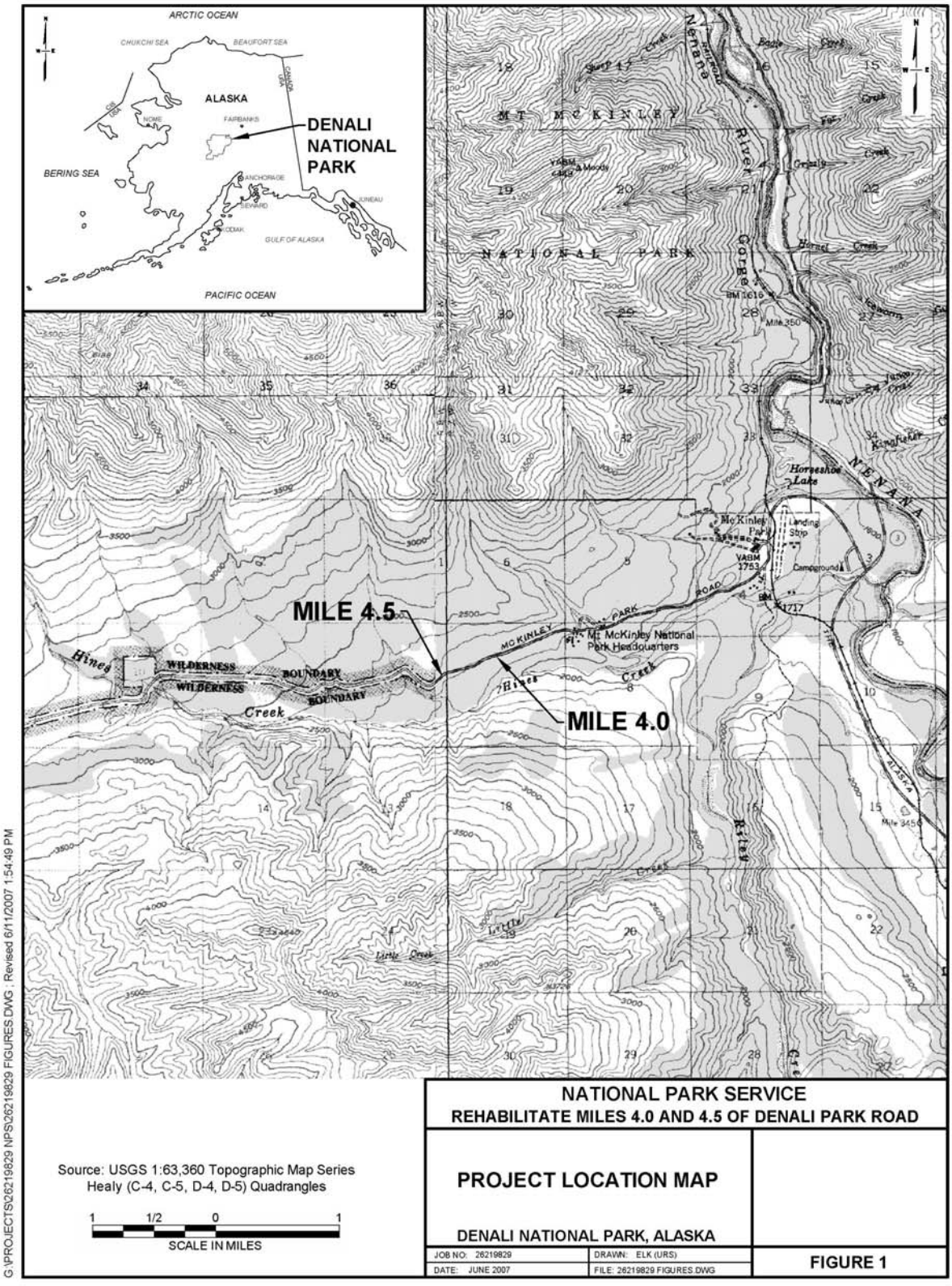


**Figure 1 Project Location Map**

While the spring road opening would occur at the same time annually with or without the project, the maintenance activities could start later and would be safer because there would be considerably less ice on the road surface. The road in winter would provide a safer and more reliable corridor for visitors to access the park backcountry by cross-country ski, dog sled, or snowshoe, because aufeis would not accumulate in large volumes on the road surface at MP 4.5. The road in summer would provide reliable visitor access into the park, because the unpaved and unstable MP 4.0 area would be bypassed with a paved road in a more stable location, and both MP 4.0 and MP 4.5 areas would have fewer maintenance delays.

The project is needed to reduce annual maintenance costs and to improve operational efficiency of park management. Park maintenance crews are provided hazard pay for road clearing in the vicinity of MP 4.5 when slippery aufeis is present. The current road design often requires increased wages and large amounts of time to clear the ice. The unstable roadbed at MP 4.0 requires high annual maintenance including 1 to 2 feet of additional gravel surfacing due to the slumping. The improved road conditions would help the park provide a more reliable spring road opening date to park concessions and other visitor service businesses.

## 1.2 Background

History of the Site

Park road construction began in 1921, and by 1925 the road was completed to the Savage River. The section of the park road in the project area was first paved in 1967 and repaved in 1990. Since the park road was initially accessible only by rail, transportation planners and engineers anticipated low volumes of traffic and the road alignment was dictated largely by topography. The road was constructed with methods and materials and for the vehicles common of that time period, primarily using native soils and forgoing the removal of organic layers. Consequently, common problems along the park road include poor subsurface drainage, saturable silts, and clays in the roadbed, and low density soils in the roadbed.

The former gravel pit above the road at MP 4.0 may have been used as early as 1924, and has not been used since at least 1967. The slumping at MP 4.0 has been a long-term problem with threats to visitor and park staff safety. In the past, a bus and other vehicles have slipped off the road at MP 4.0 due to soft shoulders created by the soil migration and slumping roadbed conditions. Additional layers of material are added to the road surface each year to maintain the road grade and a safe road edge.

Aufeis has been a long-term problem in the vicinity of MP 4.5. In the past, ice screens (Photo 1) have been used in an attempt to block the ice flow. However, previous attempts to manage the ice flow have not been effective. The ice has reached depths of over 6 feet, creating hazards for winter visitors, particularly dogsled mushers, to cross the area. Serious safety incidents have occurred during spring maintenance activities, including heavy equipment sliding off the road.


*Photo 1. Aufeis Control 1969.*

In a previous attempt to manage the aufeis problem, 1,500 feet of roadside ditch was made deeper and a perforated pipe was buried to collect the underground water. The perforated pipe connected into a pipe under the road. An insulating layer needed to be installed so the water would remain in a liquid state. A layer of blue foam insulation panels was placed over the pipe and then covered with gravel; the panels were approximately 3 inches thick, the size of a sheet of plywood and were used in approximately 1,500 feet of ditch length. To date, these panels have not been removed.

## 1.3 Park Purpose and Significance

In 1917, Congress established Mount McKinley National Park:

> …as a public park for the benefit and enjoyment of the people... for recreation purposes by the public and for the preservation of animals, birds, and fish and for the preservation of the natural curiosities and scenic beauties thereof... said park shall be, and is hereby established as a game refuge (39 Statute 938)

Additions to the park were made in 1922 and 1932 to provide increased protection for park values and, in particular, wildlife, and moved the eastern park boundary from just east of the Sanctuary River to the western bank of the Nenana River.

The Alaska National Interest Lands and Conservation Act of 1980 (ANILCA) added approximately 2,426,000 acres of pubic land to Mt. McKinley National Park and approximately 1,330,000 acres of public land as Denali National Preserve and re-designated the entirety Denali National Park and Preserve. ANILCA directs the NPS to preserve the natural and cultural resources in the park for the benefit, use, education, and inspiration of present and future generations.

## 1.4 Laws, Regulations, and Policies

Organic Act and General Authorities Act

The NPS Organic Act of 1916 and the General Authorities Act of 1970 prohibit impairment of park resources and values. The 2006 NPS Management Policies use the terms “resources and values” to mean the full spectrum of tangible and intangible attributes for which the park is established and managed, including the Organic Act’s fundamental purpose and any additional purposes as stated in the park’s establishing legislation. The impairment of park resources and values may not be allowed unless directly and specifically provided by statute. The primary responsibility of the NPS is to ensure that park resources and values will continue to exist in an unimpaired condition that will allow people to have present and future opportunities for enjoyment of them.

The evaluation of whether impacts of a proposed action would lead to an impairment of park resources and values is included in this EA. Impairment is more likely when there are potential impacts to a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- key to the natural or cultural integrity of the park or 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.

## 1.5 Relationship of Proposal to Other Planning Projects

Many plans have been developed for Denali, including the 1986 General Management Plan (GMP) and the Entrance Area and Road Corridor Development Concept Plan (DCP)/Environmental Impact Statement (EIS) (NPS 1997). The GMP is a broad planning document, setting general management direction for the park. The plan's focus is on managing ever-increasing visitor use to ensure access to a high quality wilderness experience for visitors of all ages and abilities while ensuring that the natural and cultural values are not degraded. The DCP/EIS amended the 1986 GMP. The DCP/EIS provides analysis and management direction for the frontcountry of Denali, including direction for road management and facility development for the entrance area and road corridor. Figure 2 illustrates the park zoning in the proposed project area. The park road, beyond park headquarters, changes from Motorized Sightseeing Zone in the summer, to Back-Country Day Use Zone in the winter when it is not cleared of snow and ice, and is used for non-motorized recreation by dog mushers and Nordic skiers.

The proposed project calls for a realignment, which appears (Figure 2) to encroach on the Back-Country Day Use Zone. The Motorized Sightseeing Zone is 150 feet from the centerline of the park road. If the road was to be realigned as proposed, this 300-foot-wide zone would shift along with the road. Therefore, there would be no gain or loss of either zone. This zone shifting would be so small that it would not represent a change or amendment to the park's 1986 GMP or the park's 1997 DCP/EIS.

This EA is consistent with the goals identified in the DCP/EIS for management of the park road. The project would address visitor safety as well as employee safety. This project is not directly related to other planning projects in the park.

## 1.6 Issues

To focus this EA, the NPS selected specific issues (also called "Impact Topics") for further analysis and eliminated others from evaluation. Issues selected for analysis in this EA were determined through internal scoping with the park and NPS Alaska Region staff.

### 1.6.1 Issues Selected for Detailed Analysis

<u>Vegetation</u>

Low and tall shrub vegetation, and mixed white spruce, white spruce-black spruce hybrids, and aspen vegetation would be removed or disturbed during road rehabilitation. Invasive plants could colonize soils that are disturbed during the construction process.

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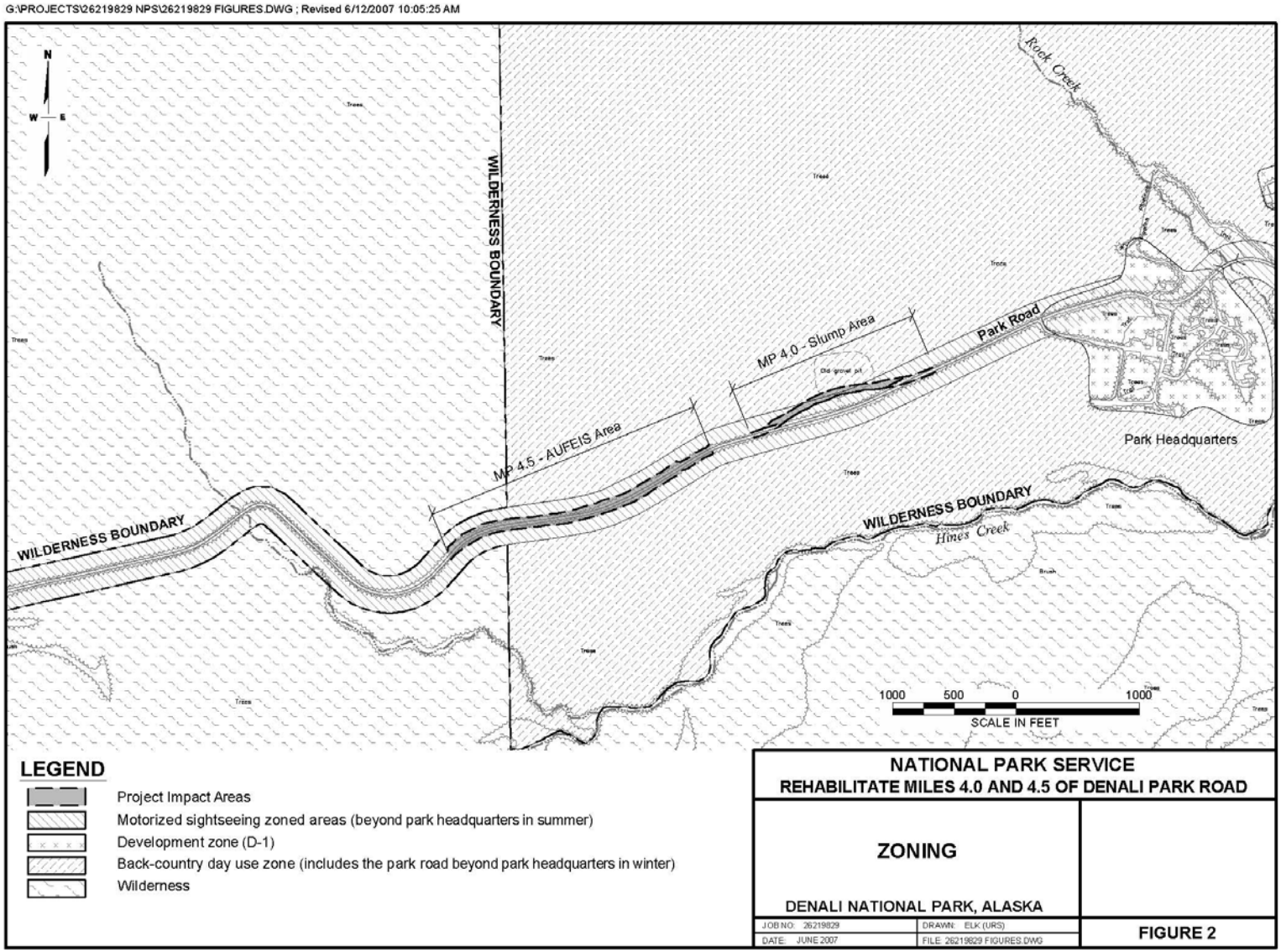


**Figure 2. Zoning**

Wetlands

Wetlands would be filled or disturbed by the proposed road rehabilitation. Compensation for impacts to wetlands would be carried out, with acreage depending upon wetland quality. A Wetlands Statement of Findings (SOF) is attached as Appendix A. Wetlands under the jurisdiction of the U.S. Army Corps of Engineers (USACE) would be filled and a 404 permit would be needed.

Wildlife Habitat

Rerouting the road at MP 4.0 could impact wildlife by removing habitat in the vicinity of the proposed roadbed and reclaiming the current roadbed for functional habitat. A variety of mammals and birds utilize the area along the road in the vicinity of the project area. Construction activities associated with the proposed development could disturb wildlife habitat and cause animals to disperse from nearby areas. Habitat would also be removed at MP 4.5 for construction of the ice basin.

Geological Processes

Existing soil strata would be altered or removed and land contours could be changed as a result of construction of the proposed road reroute at MP 4.0 and expanding the ditch at MP 4.5. The proposed project is located adjacent to Hines Creek and construction activities could impact this water body. The drainage of water and ice would be improved by constructing more and larger culverts in the aufeis section, and the water would not be removed from the hydrologic system.

Visitor Use

Recreation opportunities could be affected by the rehabilitation of the road, which would interrupt visitor traffic along the park road. In addition, the presence of construction equipment and the activity associated with construction could impact the visitor experience.

Visual Resources

Visual resources within the project area could be altered by the road relocation and reconstruction. The project area may be visible from trails and viewpoints such as the Mount Healy Overlook. There would be traffic and dust during the construction phase of the project, potentially impacting the visual resources in the vicinity of the site.

Soundscapes

Natural soundscapes in the area could be temporarily impacted by construction activities. Park visitors at the nearby scenic outlooks or at the sled dog kennels could be impacted by construction noise. There are also staff residences located at the park headquarters area; residents could also be impacted by construction noise.

### 1.6.2 Issues Dismissed from Detailed Analysis

The following issues have been considered but dismissed from detailed analysis. Issues dismissed from detailed analysis are not addressed further in this EA.

Threatened and Endangered Species

The Endangered Species Act of 1973 (ESA) requires an analysis of impacts on all federally listed threatened and endangered species. In compliance with ESA Section (§) 7, the U.S. Fish and Wildlife Service (USFWS) has been consulted. No federally designated threatened or endangered species are known to occur within the park (Swem 2000) and none are anticipated to be affected by this project. Species of special concern are addressed in the wildlife habitat sections of this EA.

Air Quality

Both the Clean Air Act of 1977 (CAA) and NPS 2006 Management Policies (NPS 2006b) require the NPS to consider air quality impacts from their projects. The park is a Federal Class 1 Air Quality Area under the CAA. Air quality is monitored near park headquarters and no exceedances of National Ambient Air Quality Standards have been documented within the park. Construction within the park associated with this project would result in short-term, minor, impacts on air quality. These impacts would be partially mitigated by use of a water truck during construction activities to keep the dust down.

Local Communities/Socioeconomic Resources

The proposed road rehabilitation project would help assure the spring opening date for the park road, which would assist businesses in marketing and planning. These include park concession operators of shuttle buses and tour buses, packaged tour operators, cruise ship businesses, local and regional lodging and visitor service industries, and in-park lodges near Kantishna.

Construction activities and costs associated with the proposed project would provide a temporary stimulus to the local or regional economy. Wages, overhead expenses, material costs, and profits would last only as long as the project, thus impacts to local communities and socioeconomic resources would be short-term.

Travel delays during construction would be minimized. Much of the work would be done during night hours. Delays would have a temporary impact on tourism services and businesses.

Environmental Justice

Executive Order (E.O.) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, requires all federal agencies to identify and address disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. The proposed project would not result in significant changes in the socioeconomic environment of the area, and is expected to have no direct or indirect impacts to minority or low-income populations or communities.

Floodplains

E.O. 11988, Floodplain Management, requires all federal agencies to take action to reduce the risk of flood loss, to restore and preserve the natural beneficial values served by floodplains, and to minimize the impact of floods on human safety, health, and welfare. The project sites at MP 4.0 and MP 4.5 are not located in floodplains, so this impact topic does not apply.

Subsistence

Subsistence activities are not allowed in the project area, so this impact topic does not apply. An ANILCA §810 evaluation is included in Appendix B.

Cultural Resources

Consideration of cultural resources is required under the National Historic Preservation Act of 1966 and NEPA. Pedestrian surveys of the park road alignment were conducted in the early 1980s. The proposed project area would be surveyed in the summer of 2007 after the snow melts and the surface thaws. There are no known historic or prehistoric cultural resources present in this area and the proposed construction sites have low probability for cultural artifacts.

Wilderness

Project activities would not occur in designated or eligible wilderness. Construction would not directly encroach upon the designated wilderness area. The project would not substantially change the visual impacts of the park road as seen from nearby wilderness. Figure 3 identifies the proposed project area in relationship to the wilderness boundary.

The west end of the MP 4.5 construction site is in the non-wilderness road corridor where the wilderness boundary is 150 feet from the road centerline. In this area, a wetland riparian-vegetation type occurs on both sides of the park road. The road could act as an impediment to natural riparian flows, thus degrading the riparian area below the road, which does enter the wilderness area. To prevent such damage, a culvert would be located in this area and riparian flows would be maintained. This is addressed further in the wetland sections of this EA.

An existing road materials stockpile area at MP 5.0 would be used for staging during project activities. See the photo insert in Figure 3. It has been used for road maintenance since before the 1980 ANILCA legislation that designated the park wilderness. The non-wilderness area of the park road corridor in this area extends 150 feet from the park road centerline. The road maintenance area at MP 5.0 extends beyond the 150 foot limit. In the wilderness boundary legal description, this MP 5.0 road maintenance area is not mentioned. However, the boundary description has a note that:

> *Along the existing (on December 2, 1980) highway through the park, the wilderness boundary begins 150 feet on either side of the center line of the road and 150 feet back from the edge of all existing (on December 2, 1980) turnouts and parking areas (Report of the Committee on Energy and Natural Resources, U.S. Senate, Report Number 96-413, page 216). This information supplements and amends, as necessary, the foregoing descriptions.*

This boundary description note clarifies that the existing MP 5.0 road maintenance area is non-wilderness and its use as a staging area is not a wilderness impact issue.

## 1.7 Permits and Approvals Needed to Implement Project

Wetlands Fill

Discharge of fill material into wetlands or waters of the United States (U.S.) requires a permit from USACE under the Clean Water Act §404. All of the mapped wetlands in the project area are "jurisdictional" according to the USACE (Skinner 2007).

Clean Water Act §401 (33 United States Code [U.S.C.] 1344; 18 Alaska Administrative Code 15) Water Quality Notification/Certification

The Alaska Department of Environmental Conservation (ADEC) has authority to certify Clean Water Act §404 permits. An ADEC-issued §401 Certificate of Reasonable Assurance would accompany the §404 permit.

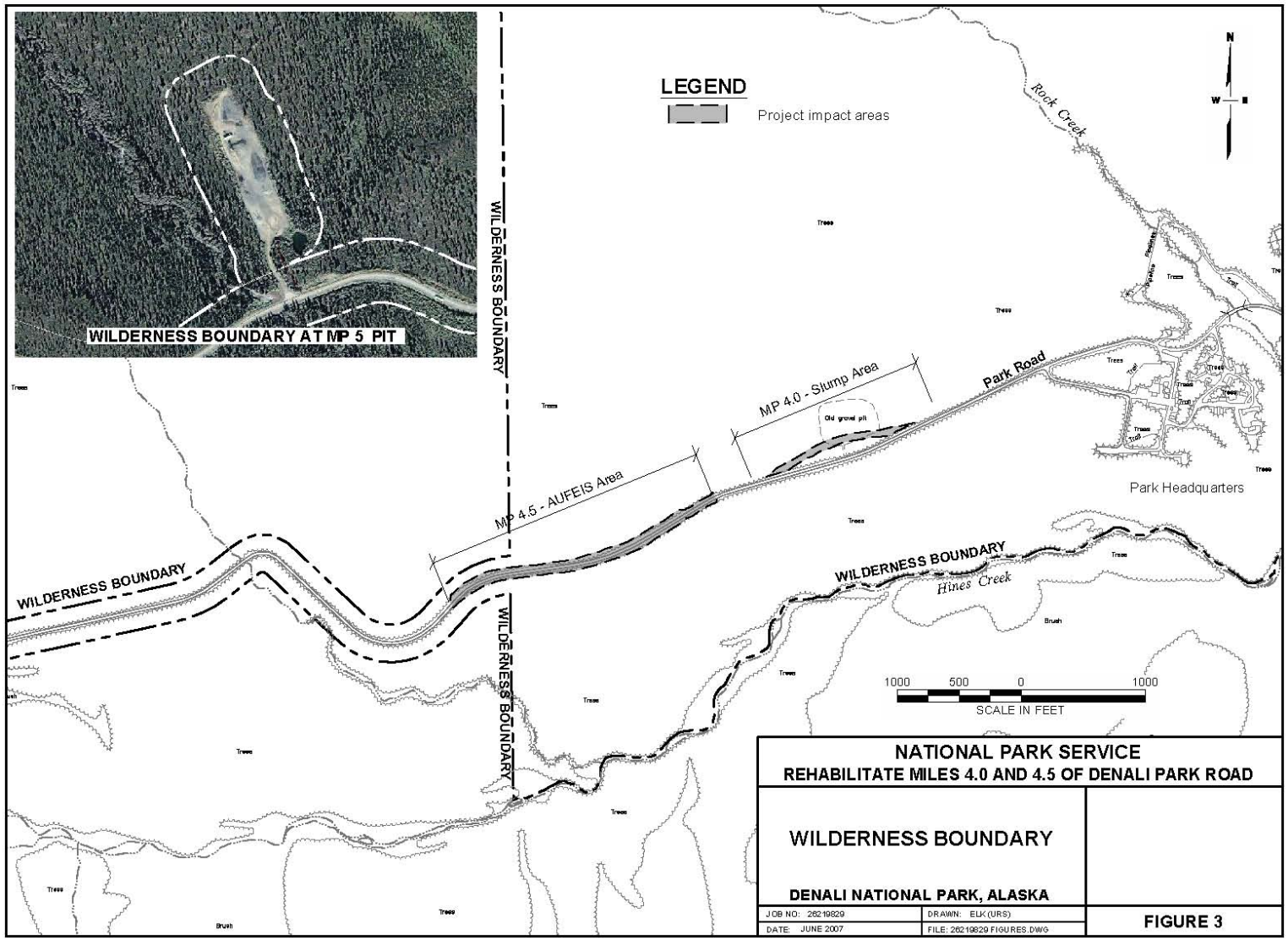


**Figure 3. Wilderness Boundary**

Clean Water Act §402(p) [33 U.S.C. 1342(p)]

Construction projects that expose more than 1 acre of cleared land to erosion and runoff require a National Pollution Discharge Elimination System permit from the U.S. Environmental Protection Agency (USEPA). A Notice of Intent (NOI) would be provided to USEPA to use the Construction General Permit. A copy of the NOI would be provided to the ADEC for comment. The construction contractor would be required to prepare a Storm Water Pollution Prevention Plan for submission to ADEC.

## 2.0 ALTERNATIVES

### 2.1 Introduction

This chapter includes a description of the alternatives and a table summarizing the impacts of the alternatives. The No Action Alternative and the proposed action are described here. Also discussed are any alternatives and actions that have been considered but dismissed from further analysis. Table 2-1 summarizes the components and attributes of each alternative. Table 2-2 summarizes the predicted impacts for each alternative on the issues of concern.

### 2.2 Alternative 1: No Action

Under the No Action Alternative, the NPS and FHWA would not complete the proposed road rehabilitation. Existing use and maintenance of the road at MP 4.0 and MP 4.5 would continue. Annual maintenance activities of adding 300 to 400 cubic yards of gravel to maintain a safe driving surface would continue at MP 4.0 due to slumps and slides. Removing large volumes of aufeis would continue to be required at MP 4.5 (see cover photo). Alternative 1 would continue to require large amounts of time for annual maintenance and ice removal. The equipment operation time demands a great amount of fuel. Federal Lands Highway Program (FLHP) funds are not available for annual maintenance because these funds are used exclusively for highway reconstruction and rehabilitation.

### 2.3 Alternative 2: Proposed Action (NPS Preferred Alternative)

The proposed action is a two-part road rehabilitation project, at MP 4.0 and MP 4.5 of the park road. The project areas are illustrated in Figures 4 and 5. The new road sections would continue to have two 11-foot paved travel lanes and 2-foot paved shoulders for a total pavement width of 26 feet. The roadbed would consist of roadway aggregate, compacted to about 8 inches deep. The finished road surface would be compacted asphalt approximately 3 inches deep. A typical cross-section is illustrated in Figure 6.

Approximately 2,500 truckloads of material would be transported into the park along the paved section of park road during the visitor season. Borrow material, free of weed seeds, would be obtained from nearby commercial sources outside of the park. Excess material would be hauled to the staging and stockpile site at MP 5.0 for later use in the project revegetation work. No new surface disturbance would occur for staging or stockpiling.

Unstable cut slopes would be treated with 12-inch think gabion mattresses. Sections would typically cover 9 to 20 feet. About 200 to 800 feet of gabion mattress would be needed. Topsoil to a depth of about 6 inches would be placed on the gabion mattress sections to facilitate native revegetation. Disturbed areas would be seeded by park staff with native legumes such as sweetvetch (*Hedysarum alpinum)*. All reseeding would be completed, after the construction period, in 2008 or 2009. Annual mowing (taking care not to damage the gabion mattress material) would keep tree species from becoming established.

Road construction would occur between mid-May and late September in two to three phases. The first phase would consist of tree clearing, which would be completed in autumn (September through October) of 2007. The second phase would occur in late spring and summer of 2008, and would consist of constructing the road at MP 4.0 and rehabilitating the road at MP 4.5. Depending on construction progress and weather delays, paving the new and rehabilitated sections of road may occur in late spring 2009. Traffic would continue to be routed along the existing road during construction. FHWA would hire a private construction contractor and would administer the construction contract with representation from NPS. The design life of this proposed project is 50 years.

***MP 4.0***

The NPS would reroute approximately 1,600 feet of road at MP 4.0 through an abandoned borrow pit (Figure 4) to the north, or uphill side. The new road section would have a maximum grade of 5.1 percent. Approximately 2,600 cubic yards would be excavated, roughly 5,100 cubic yards of fill would be used, and 1,400 cubic yards of base material would be laid down for this road section. The finished road surface would consist of approximately 430 cubic yards of asphalt concrete.

Enough borrow material would be removed from the old roadbed to approximate natural land contours. The uphill road cut slope would be 1:1.5 to 1:2 and reseeded by park staff. The existence of permafrost in some cut slopes is likely, but cannot be determined until the excavation phase. Subsurface conditions exposed may require cut slope stabilization (most likely in permafrost areas). Traffic would be directed along the old section of road until the rerouted portion is completed. About 2.6 acres of natural vegetation would be disturbed, thereby increasing the development footprint within the park.

***MP 4.5***

The NPS would widen and deepen the upslope ditch along approximately 2,600 feet of road, increase culvert size and number, raise and shift the roadbed to provide a larger ditch, and stabilize cut slope areas with a gabion mattress. The road surface would be raised about 2 to 4 feet. Approximately 12 large culverts would be placed in the road prism, about 6 to 7 feet in diameter each. The roadbed would be shifted about 2 to 8 feet. These changes would increase the flow of water under the road during the fall and early winter, increasing the amount of room available for winter ice accumulation, minimizing the amount of aufeis that would deposit on the road surface through the winter. The road section would have a maximum grade of 6.8 percent. Approximately 8,700 cubic yards of material would be excavated, roughly 22,000 cubic yards of fill would be used, and about 2,400 cubic yards of base material would be laid down for this road section. The finished road would require approximately 800 cubic yards of asphalt concrete. Approximately 5,000 to 7,500 square feet of gabion mattress would be constructed on the unstable cut slopes in the MP 4.5 project area. About 1.1 acres of natural vegetation would be disturbed, thereby increasing the development footprint within the park.

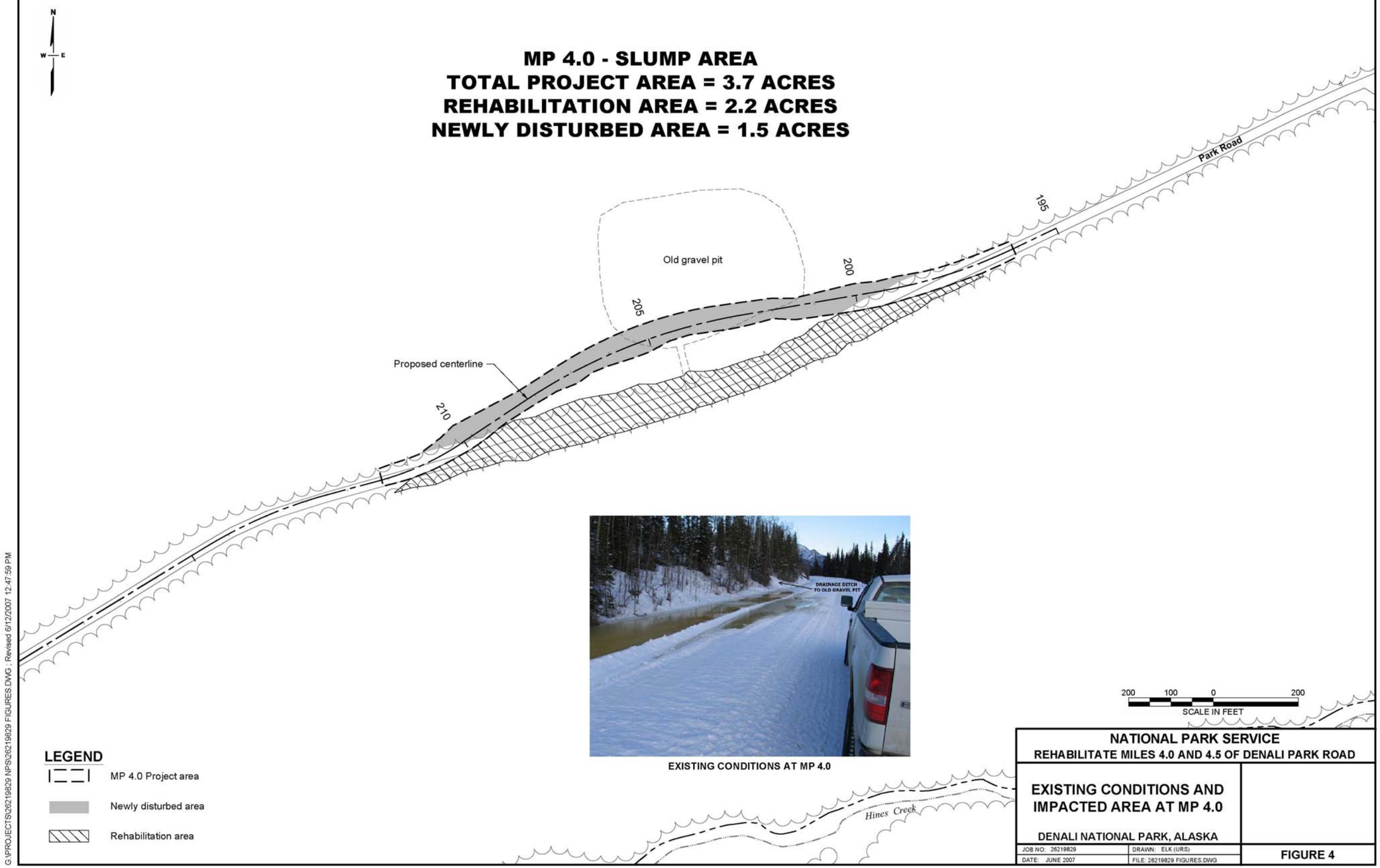


**Figure 4. Existing Conditions and Impacted Area at MP 4.0**

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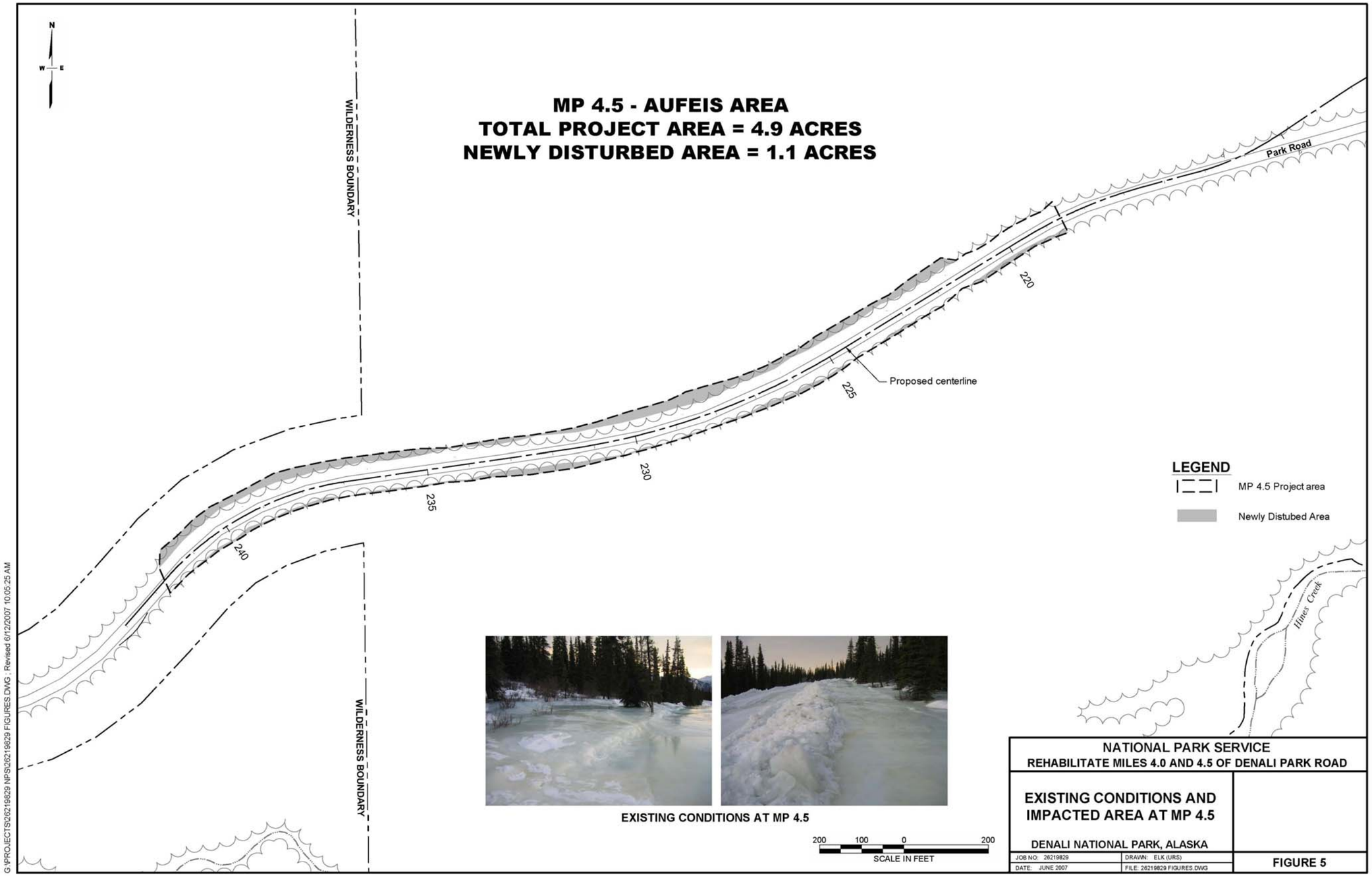


**Figure 5. Existing Conditions and Impacted Area at MP 4.5**

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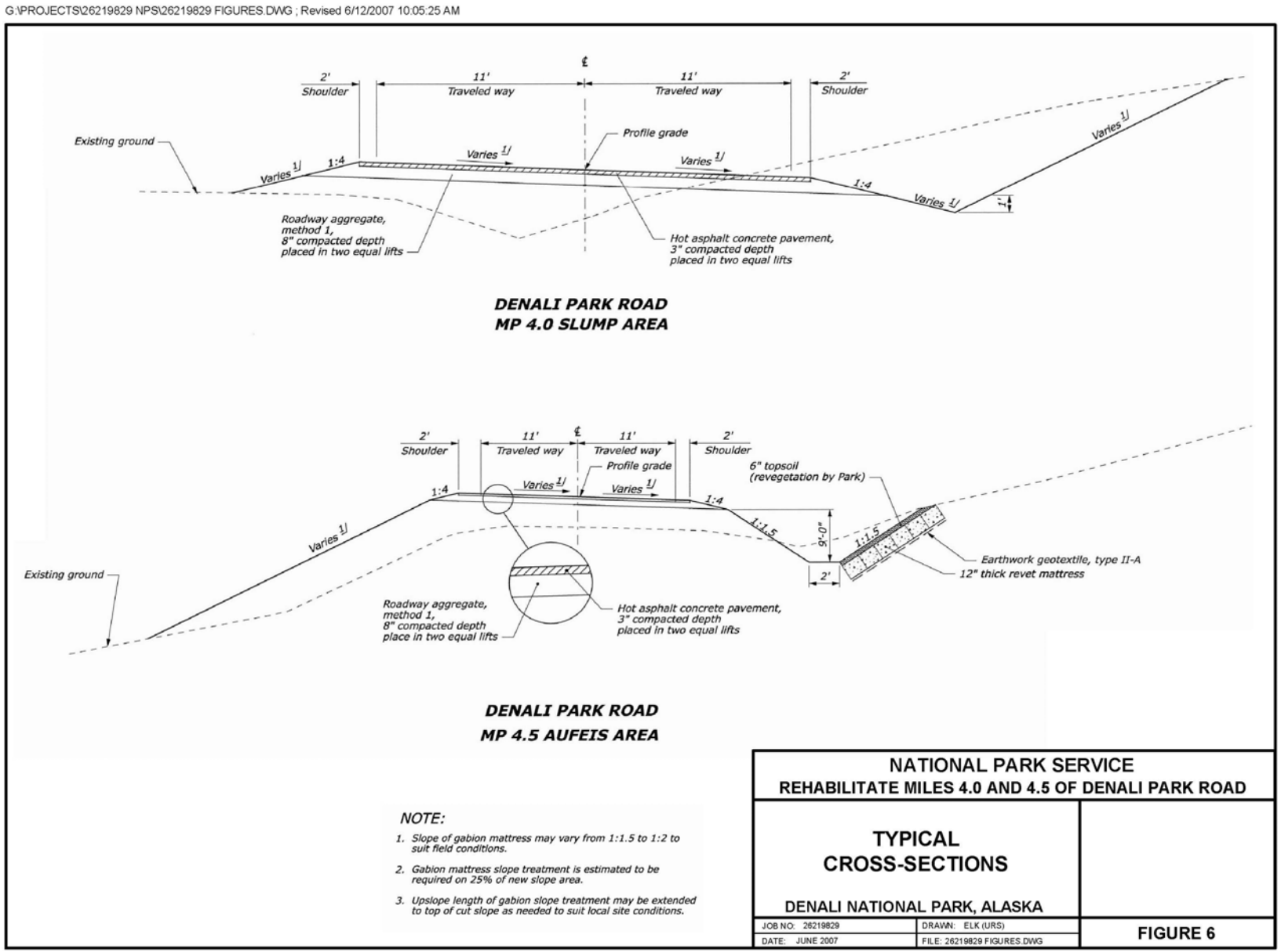


**Figure 6 Typical Cross-Sections**

## 2.4 Environmentally Preferred Alternative

As stated in Section 2.7 (D) of the NPS Director's Order (DO) 12 Handbook, "The environmentally preferred alternative is the alternative that will best promote the national environmental policy expressed in NEPA (§101(b))." The environmentally preferred alternative is the alternative that not only results in the least damage to the biological and physical environment, but that also best protects, preserves, and enhances historic, cultural, and natural resources.

*NEPA §101 Goal Statements:*

1. Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.
2. Assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings
3. Attain the widest range of beneficial uses of the environment without degradation, risk to health and 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 which supports diversity and variety of individual choice
5. Achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities
6. Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources (NEPA, 42 U.S.C. 4321-4347)

Alternative 1, the No Action Alternative, does not support the goals set forth in NEPA §101. This alternative represents worsening conditions of roadway slumping and aufeis can reach lengths of 1,000 feet and depths of 6 feet. Safety is a concern for winter visitors, as well as park maintenance crews who remove this large amount of ice in the spring in order to open the park road for safe travel.

Alternative 2, the proposed action, is the Environmentally Preferred Alternative. This alternative realizes the six goals expressed in NEPA §101 by addressing the worsening road issues at MP 4.0 and MP 4.5 and ultimately extending the life of the existing infrastructure, thus reducing the need for more extensive rehabilitation and reconstruction in the future. The redesigned road would stabilize a sliding slope and provide a safer road for park visitors and staff during the early spring when small amounts of ice would likely remain on the park road. A broader range of beneficial uses of the environment is promoted by addressing the aufeis area. Mushers and Nordic skiers have difficulty safely passing this area when the ice overtakes the road. To avoid the ice on the road at MP 4.5, the old Aufeis Trail above the road is used in the winter, but is sometimes itself covered with ice (as in early 2007). The Spring Trail was cleared below the road to provide safe winter access but it often has aufeis in late winter. In the winter of 2006/2007, the only safe access across this area was a groomed trail on the road over the MP 4.5 aufeis that the park road crew tried to maintain. The road rehabilitation would provide safer passage at MP 4.5 by reducing the amount of ice on the roadway. Vegetation is impacted by current maintenance practices when large blocks of ice are cleared and pushed over the side of the road.

## 2.5 Mitigation and Monitoring

Mitigation measures are specific actions that would reduce impacts, protect park resources, and protect visitors. The following mitigation measures would be implemented by the proposed action alternative and are assumed in the analysis of impacts.

### 2.5.1 Vegetation

Backslopes and fill slopes would be covered with conserved topsoil from earlier excavation. Disturbed sites within the project area would be replanted with native vegetation, following the Interior Alaska Revegetation Plan (U.S. Geological Survey [USGS] 1994). Measures to prevent invasive plant colonization would include: pressure washing construction equipment and vehicles prior to entering the park, any gravel or fill required would either come from a weed-free materials site (as verified by a park vegetation technician) or would be heated to kill any plant material or seeds, and continuation of the park's existing exotic plant eradication program.

### 2.5.2 Wetlands

Best Management Practices (BMPs), such as the use of silt fences, would be used to protect adjacent wetlands. The NPS would rehabilitate an off-site degraded wetland area near Kantishna as compensation for the wetland loss at the project site. The Wetlands SOF in the appendix of this EA describes this proposed compensation in detail.

### 2.5.3 Wildlife

Under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703), it is illegal to "take" migratory birds, their eggs, feathers, or nests. "Take" includes by any means or in any manner, any attempt at hunting, pursuing, wounding, killing, possessing, or transporting any migratory bird, nest, egg, or part thereof. The MBTA does not distinguish between intentional and unintentional take. Vegetation clearing, site preparation, or other construction activities that may result in the destruction of active bird nests or nestlings would violate the MBTA. In order to avoid violations of the MBTA, bird habitat (vegetation) would not be removed during the nesting season, April through July 15. After completing all the nesting vegetation removal required for the project, there would be no seasonal restriction for construction activities, even during subsequent nesting seasons. If an active nest were encountered at any time, it would be protected from destruction. "Active" is indicated by intact eggs, live chicks, or presence of an adult on the nest. Eggs, chicks, or adults of wild birds would not be destroyed (Zelenak 2005).

### 2.5.4 Geological Processes

Energy dissipaters would be placed at the outflow of each culvert to reduce water velocity and prevent erosion.

### 2.5.5 Cultural Resources

Project excavations would be monitored by cultural resource staff. If previously unknown cultural resources were located during construction, the project would be stopped in the discovery area until cultural resource staff could determine the significance of the finding and recommend appropriate courses of action.

### 2.5.6 Air Quality

Contractors would use BMPs to protect air quality, such as controlling vehicle and equipment pollution. Equipment not in use would be turned off. During construction, a water truck would apply water to the road and the excavation areas for dust abatement.

### 2.5.7 Visitor Use

Construction phasing and timing would be coordinated with the park bus systems and low visitor use times to minimize traffic delays on the park road.

### 2.5.8 Visual Resources

Approximately 5,000 to 7,500 square feet of 12-inch thick gabion mattress would be constructed on exposed unstable slopes and an erosion control mat would be placed on top of it. Topsoil to a depth of approximately 6 inches would cover the gabion mattress and park staff would complete revegetation.

### 2.5.9 Soundscapes

All noise-producing project equipment and vehicles using internal combustion engines would be equipped with mufflers, air-inlet silencers where appropriate, and any other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specification. Mobile or fixed "package" equipment (e.g., arc-welders, air compressors) would be equipped with shrouds and noise control features that are readily available for that type of equipment. The use of noise-producing signals, including horns, whistles, electronic alarms, and sirens and bells, would be for safety warning purposes only.

## 2.6 Description of Alternatives and Actions Considered but Eliminated from Detailed Study

Major Reroutes

A major reroute of the park road was considered. The new route could be about 300 yards below the existing road and follow the "Spring Trail" which is a dog sled trail most useful during late winter and spring when the depth of the snow is sufficient to make for a smooth surface. This alternative was eliminated during scoping because of the cost and environmental impacts. It would require a large quantity of gravel fill to build up the roadbed on the relatively flat route. Near the west end, the Spring Trail enters designated wilderness, where a road could not be built, so the park road would have to be routed up the steep slope to join the existing road alignment. This steep road design would not be practical.

The new route could also be about 200 yards above the existing road and follow an old road alignment above the abandoned borrow pit. This alternative was eliminated during scoping because of the cost and environmental impacts. It would require significant new route construction, slope cuts, and swale fills. Near the west end, the old road alignment enters designated wilderness, where the park road could not be built, so the road would have to be routed down the slope, through the wettest portion of the project area, to join the existing road alignment. This would impact more acres of wetlands than would the proposed project. The scale of this alternative would be inconsistent with the park's resource protection goals; it would impact more acres of wetlands, result in a greater footprint of development, and cause greater impacts to park resources.

New Secondary Ditch in the Aufeis Area

This alternative would have a secondary 15-foot deep ditch, parallel to the road, 110 feet upslope from the road in the MP 4.5 aufeis area. The new ditch would supplement the existing roadside ditch and culverts. This alternative was eliminated during scoping because of the cost and environmental impacts. While summer storm runoff would be captured by the secondary ditch and channeled to culverts, much of the spring water comes out of the ground closer than 110 feet to the road, so the secondary ditch would not substantially prevent winter spring-fed icing in the area.

Install Heated Culverts

Installation of electric heat tape-wrapped culverts beneath the roadway was considered as a means of preventing the culverts from freezing shut. This alternative was rejected because the heat from the culverts could thaw underlying permafrost, causing additional road integrity issues, and because extending electric service to this site, as well as facility operations, would not be cost effective.

**Table 2-1 Summary of Alternatives**

| | Alternative 1<br>No Action | Alternative 2<br>Proposed Action |
|---|---|---|
| **Description** | No new action. Existing use and maintenance of the road at MP 4.0 and MP 4.5 would continue. | Approximately 1,600 feet of road at MP 4.0 would be rehabilitated and rerouted through an abandoned borrow pit to the north.<br>Approximately 2,600 feet of road would be rehabilitated at MP 4.5, the road surface would be raised 2 to 4 feet and an estimated 12 large culverts, approximately 6 to 7 feet in diameter would be installed. The road would be shifted roughly 2 to 8 feet, and a deep roadside ditch would be constructed to serve as storage for ice. A gabion mattress and erosion mat would be installed on the back slope to prevent surficial erosion and improve slope stability. |
| **Attributes** | No new development or disturbed areas. | The portions of road would be more stable and aufeis flow would be diverted to a deep ditch and under the road through larger culverts. |
| **Newly Disturbed Area** | None | Approximately 1.5 acres at MP 4.0 and 1.1 acres at MP 4.5. |

## Table 2-2 Summary of Alternative Impacts

| Impact Issue | Alternative 1<br>No Action | Alternative 2<br>Proposed Action |
|---|---|---|
| **Vegetation** | Impacts on vegetation from this alternative would be **minor**. | The proposed action would result in **moderate** long-term impacts to approximately 2.6 acres of vegetation. The greatest amount of disturbance at MP 4.5 would be caused by the fill necessary to raise and shift the road and the clearing and grubbing to widen and deepen the roadside ditch. |
| **Wetlands** | Impacts on wetlands from the No Action Alternative would be **minor**. | The proposed action would result in **moderate** long-term impacts to about 1 acre of jurisdictional wetlands. The majority of wetland disturbance at MP 4.5 would be caused by the fill necessary to raise and shift the road and clearing and grubbing to widen and deepen the roadside ditch. Project activities would result in the direct loss of about 0.4 acre of wetlands at MP 4.0, and about 0.6 acre at MP 4.5. |
| **Wildlife and Habitat** | Impacts on wildlife and habitat from the No Action Alternative would be **minor**. | The proposed action would result in **minor** impacts to wildlife and habitat. About 2.6 acres of wildlife habitat would be lost long-term. Wildlife would be temporarily disturbed by construction activities. Positive impacts would occur from shorter-term spring road opening. |
| **Geological Processes** | The No Action Alternative would have **minor** but persistent impacts to geological processes. Ongoing geologic processes would continue to occur and could be impacted by a lack of action in the long-term. | The proposed action would result in **minor** impacts to geological processes at both locations. Hydrological connectivity would be restored. Damage to downslope vegetation and soils would be reduced. |
| **Visitor Use** | Impacts would be **minor**. Winter visitor use near MP 4.5 would continue to be impacted by slippery and dangerous aufeis. Summer visitor use near MP 4.0 would continue to be impacted by the slump area with slow, bumpy, and dusty driving conditions and potentially with soft shoulders. | The proposed action would result in **minor** impacts to visitor use. Impacts to visitor use would be temporary, from construction activities and traffic delays. The proposal would have positive impacts to winter visitor use at the aufeis area (MP 4.5) making it safer for dog sled mushers, skiers, and snowshoers. |
| **Visual Resources** | The No Action Alternative would continue to have **minor** impacts on visual resources. | The proposed action would result in **minor**, temporary impacts to visual resources, mainly resulting from rehabilitation activities. Disturbed areas would take years to fully revegetate. Visual character would be impacted locally. |
| **Soundscapes** | Impacts on natural soundscapes from the No Action Alternative would be **minor**. | The proposed action would result in **minor** impacts to soundscapes. Impacts would be temporary from construction activities. Noise from spring road opening maintenance equipment would decrease. |

## 3.0 AFFECTED ENVIRONMENT

### 3.1 Project Area

Denali National Park and Preserve encompasses 9,419 square miles in central Alaska. The main entrance to the park is at MP 238.0 of the George Parks Highway, approximately 240 miles north of Anchorage and 12 miles south of Healy. Mt. McKinley, at an elevation of 20,320 feet, is the focal point of the park. The project includes the area from MP 4.0 and MP 4.5 of the 92-mile long park road.

### 3.2 Vegetation

The park is comprised of a mosaic of tundra, forest, shrubland, and open meadow. The project area is located at an approximate elevation of 2,000 feet and lies within the Alaska Range Transition ecoregion, which is a more narrowly defined subset of the general Boreal ecoregion (Nowacki et al. 2001).

The proposed project is in an ecoregion consisting mostly of mixed needleleaf/deciduous forest of white spruce (*Picea glauca*), black spruce (*P. mariana*), and white spruce-black spruce hybrids (*P. glauca* X *mariana*) mixed with paper birch (*Betula papyrifera*) and small amounts of aspen (*Populus tremuloides*). White spruce, birch, and aspen typically occupy areas of well-drained soil on ridges, while black spruce is usually found in areas with poor drainage underlain by shallow permafrost. White spruce-black spruce hybrids are usually found in wetter, poorly drained areas. Common tall shrubs include high-bush cranberry (*Viburnum edule*) and Sitka alder (*Alnus viridis*) in dryer areas and diamondleaf willow (*Salix planifolia* spp. *pulchra*) in wetter areas along intermittent stream flows. Low shrub and herbaceous species include prickly rose (*Rosa acicularis*) in more well-drained areas and dwarf birch (*B. nana*), bog blueberry (*Vaccinium uliginosum*), bog cranberry (*Vaccinium oxycoccus*), Labrador tea (*Ledum palustre*), and various sedges (*Carex* spp.) in wetter locales. Ground cover typically consists of lichens and mosses, including true mosses (*Polytrichum* spp.) in dryer areas and peat mosses (*Sphagnum* spp.) in wetter areas (Nowacki et al. 2001;Viereck et al. 1992; NPS 1997; NPS 2004; NPS 2005a).

### 3.3 Wetlands

Wetlands are transitional areas between terrestrial and aquatic systems, where the water table is usually at or near the surface or the land is covered by shallow water. According to the USACE Wetland Delineation Manual (1987), wetlands are defined as:

> "*Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."*

A wetlands map of the project area was made from 2006 pedestrian surveys and air photo interpretation by park staff familiar with the local conditions (Carwile 2007). Wetlands cover a portion of the project area. All of the mapped wetlands in the project area are “jurisdictional” according to the USACE (Skinner 2007). Under the Cowardin Classification System outlined in “Classification of Wetlands and Deepwater Habitats of the United States” (Cowardin et al. 1979), the project area wetlands are classified as: palustrine forested, needle-leaved evergreen, saturated wetlands (PF04B); palustrine scrub-shrub, broad-leaved deciduous, saturated wetlands (PSS1B); and riverine intermittent, vegetated streambed wetlands (R4SB7). These wetlands are subject to NPS wetlands compliance procedures. Figure 7 illustrates wetland classifications in the project area.

Vegetation in the palustrine forested wetlands is typically dominated by white spruce-black spruce hybrids (Viereck et al. 1992). The understory shrub layer consists of both low and tall shrubs such as willow (*Salix* spp.), Labrador tea (*Ledum* spp.), lowbush cranberry (*Vaccinium vitis-idaea*), and bog blueberry. Common ground cover includes peat mosses (*Sphagnum* spp.), herbaceous species like field horsetail (*Equisetum arvense*), a few flowered sedges (*Carex pauciflora*), and a variety of forbs (Viereck at al. 1992; NPS 2005b; Reed 1996).

Vegetation in palustrine shrub-scrub wetlands is typically dominated by shrubs including those found in forested wetlands, as well as sweet gale (*Myrica gale*), leatherleaf *(Chamaedaphne calyculata*), and dwarf birch. The ground cover is similar to that of forested wetlands, with bluejoint reedgrass (*Calamagrostis canadensis*) also being typical (Viereck at al. 1992; Reed 1996). Palustrine forested and scrub-shrub wetlands can be present in varying degrees within the same classification area, resulting in forested/scrub-shrub wetlands or vice versa (i.e., PFO4B/PSS1B).

Wetlands of the riverine intermittent, vegetated streambed classifications are streambeds exposed long enough to be colonized by herbaceous plants. This vegetation, unlike that of emergent wetlands, is usually killed by rising water levels or sudden flooding. Typical vegetation found in these areas is swamp horsetail (*Equisetum fluviatile*) and sedges such as water sedge (*Carex aquatilis*) (Reed 1996; Cowardin et al. 1979).

Wetlands soils within the project area generally have an organic layer of peat materials in various stages of the decomposition process. This organic layer can vary in depth and is above a mineral layer.

These wetlands function to attenuate snow melt surface flow during break-up, when the ground is still frozen. These wetlands also provide habitat for small mammals, such as red squirrels, snowshoe hares, and porcupine; and bird species, including gray jays, robins, thrushes, sparrows, and warblers. Moose frequent the area for forage.

## 3.4 Wildlife Habitat

### 3.4.1 Mammals

The mosaic of tundra, forest, shrubland, wetland, and open meadow vegetation types found throughout the park and adjacent to the project area, provide optimal habitat for several large mammal species. These species include moose (*Alces alces*), caribou (*Rangifer tarandus granti*), brown bear (*Ursus arctos*), black bear (*Ursus americanus*), and gray wolf (*Canis lupus*). Some of these species can be observed in the landscape surrounding the project area, others may be observed crossing the park road where it bisects wildlife movement or migration corridors.

Smaller mammals potentially found near the project area include red fox (*Vulpes vulpes*), snowshoe hare (*Lepus americanus*), ermine (*Mustela erminea*), arctic ground squirrel (*Spermophilus parryii*), lynx (*Lynx canadensis*), coyote (*Canis latrans*), wolverine (*Gulo gulo*), and red squirrel (*Tamiasciurus hudsonicus*) (NPS 2005a). Red fox are common and very visible along the park road, whereas snowshoe hares and red squirrels are commonly found in forested areas. Other mammal species in the vicinity may include shrews (*Sorex* spp.), several species of voles and lemmings.

Currently there are no mammal species listed under the jurisdiction of the ESA or State of Alaska Species of Special Concern (Alaska Department of Fish and Game [ADFG] 2007b).

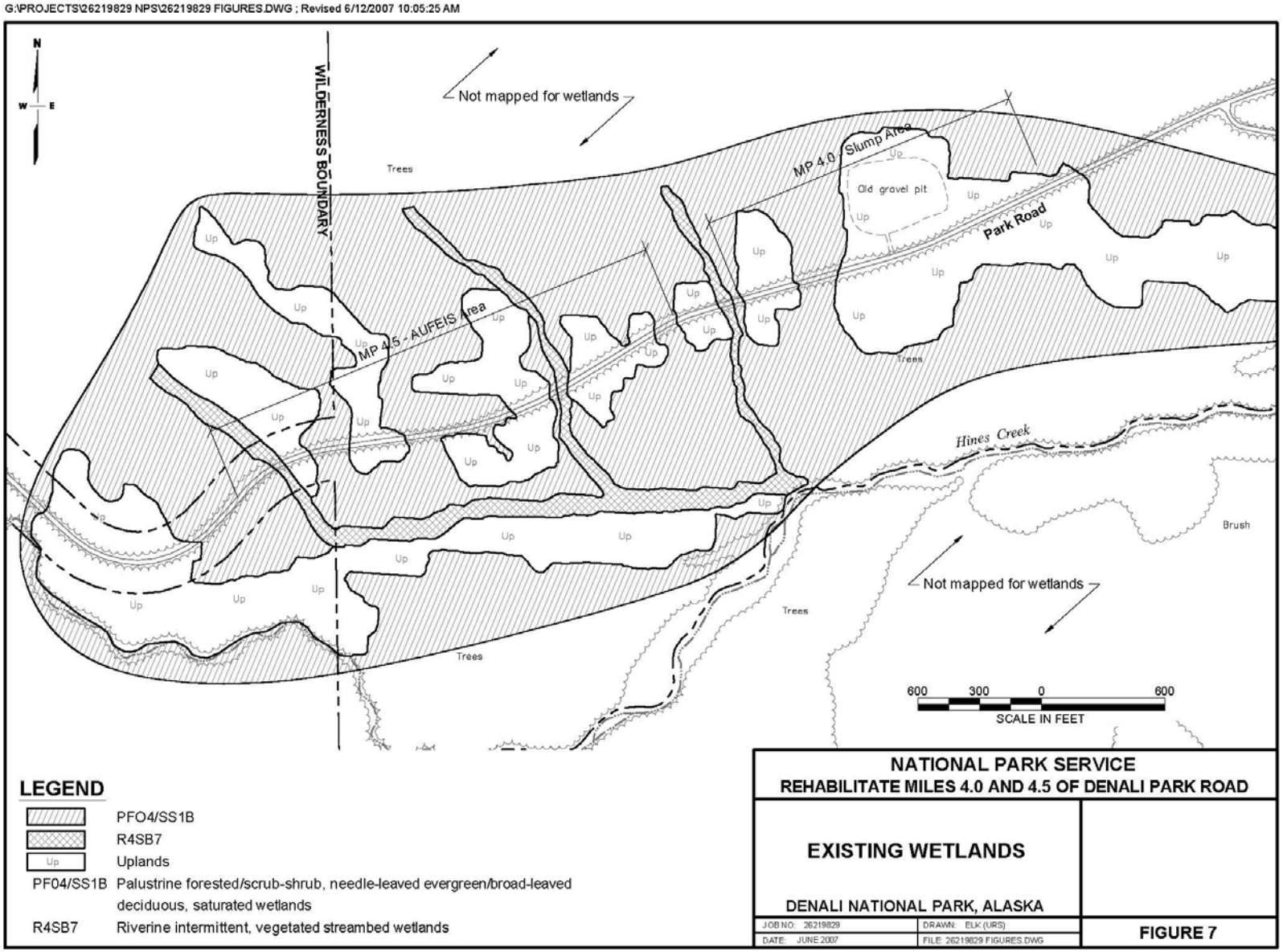


**Figure 7 Existing Wetlands**

### 3.4.2 Birds

The park hosts a wide variety of resident and migratory bird species that utilize a diversity of habitats. Formal bird surveys have not been conducted within the proposed project area; subsequently, the bird list for this section represents each species' likelihood of occurrence based on professional judgment (McIntyre 2007) and park information resources (NPS 2007). A primary wildlife concern regarding the proposed road improvement project is potential impacts to nesting birds. Therefore, birds have been organized by each species' likelihood to nest (rated as: likely, potentially, or not likely) in habitats found directly adjacent to the project area (refer to Appendix C).

Although currently no ESA-listed bird species occur in the park, several Alaska Species of Special Concern reside in or migrate through the park. Species listed as Alaska Species of Concern include the olive-sided flycatcher (*Contopus cooperi*), American peregrine falcon (*Falco peregrinus anatum*), northern goshawk (*Accipiter gentilis*), gray-cheeked thrush (*Catharus minimus*), and blackpoll warbler (*Dendroica striata*) (ADFG 2007a). These species can be found in their associated suitable habitats throughout the park, although few data exist on population abundance or distribution (NPS 2005a). The rusty blackbird (*Euphagus carolinus*) is also found in the park, and despite being identified as a species of conservation priority in Alaska by Boreal Partners in Flight, no management specific to this species has been initiated (Hannah 2004; ADFG 2007b).

## 3.5 Geological Processes

Topography in the Denali Park region of Alaska is characterized by the massive Alaska Range, including Mount McKinley at an elevation of 20,302 feet and several smaller mountain peaks reaching elevations of 10,000 feet or more. Several glacial periods have contributed to the topographic features of the area. Glacial events have provided the park with moraine and outwash sediment loads, some of which are currently used for park road maintenance activities.

The closest active fault to the project area is the Denali Fault System, a major continental translocation that can be traced across Alaska. Earthquakes originating along this fault could cause ground shaking and potential ground failures in the project area. The Hines Creek Fault, a secondary fault within the Denali Fault System, trends east-west less than 1 mile south of the project location. Bedrock north of the Hines Creek Fault, and beneath the project area, is characterized by schist and metamorphic rocks of the Yukon-Tanana Terrain.

Soils within the project area vary according to parent material, topography and vegetation coverage, and generally consist of three types. Sandy and silty soils underlay forested areas, and support moss and lichen groundcover. Wetland soils consist mostly of poorly-drained silts and glacial moraine materials, and typically possess a subsurface accumulation of organic matter and peat layers, with permafrost occasionally at depths less than 3 feet (NPS 1997). Geotechnical borings drilled in the MP 4.0 realignment project area encountered primarily silty gravelly sand to a maximum depth of 51 feet (U.S. Department of Transportation [USDOT] 2006). Sixteen geotechnical borings drilled at the MP 4.5 aufeis area in 2007 encountered mixtures of clay, silt, sand, gravel, and cobbles containing zones of free water, frozen soil, and ice.

Discontinuous permafrost occurs locally in this region, varying with elevation and soil types. Permafrost occurs intermittently in the park at varying depths below ground surface and can be continuous at higher elevations north of the Alaska Range (NPS 2003). Permafrost is defined as subsurface and surface soils that sustain a temperature regime below 32 degrees Fahrenheit for 2 years or more. Permafrost was

encountered in only one of 12 geotechnical borings and test pits completed in the MP 4.0 realignment project area (USDOT 2006).

Vegetative mats and shallow subsurface soils play a vital role in the formation and upkeep of permafrost layers in the region. Vegetation layers provide an insulation buffer from extreme seasonal temperature variations. Removal of vegetation and shallow soils can cause the permafrost layer to warm and recede. Thermokarst features develop when permafrost is repeatedly thawed and shrinks, causing uneven ground subsidence events. Groundwater and runoff water infiltration can increase during warmer periods concurrent with changes in depth of permanently frozen soils. This can result in slope instability and solifluction issues, such as heaving, slumping, lateral movement, and surficial erosion. Repeated freezing and thawing events can cause notable alterations to the landscape. A possible example is the slumping and roadbed shifting observed at MP 4.0.

At MP 4.5, freezing of surface and subsurface groundwater emanating from year-round springs upslope from the park road creates surface sheet icing called aufeis. Aufeis is a natural winter phenomena in arctic and sub-arctic environments and occurs during most winters at MP 4.5. The primary source of aufeis in the project area is attributed to year-round springs upslope from the park road. Hines Creek may also contribute to the aufeis water supply.

Information concerning subsurface hydrology is limited within the park boundaries. Groundwater, including artesian groundwater, was encountered in geotechnical borings drilled in the slope above the road at MP 4.5 in March 2007. Hines Creek flows along the park road on the south side, approximately 1/8 mile from the roadbed. Hines Creek has a dendritic drainage pattern, with tributaries occurring adjacent to the road in the project area, particularly near MP 4.5.

## 3.6 Visitor Use

The park road is the conduit for summer access that provides an opportunity to visitors of all abilities to experience the park's resources. The first 15 miles of the park road provides visitors opportunities to experience the park without the use of public transportation. Approximately 400,000 people visit the park annually, primarily during the months of June, July, and August (NPS 2005b). The primary visitor activity in the park is a shuttle or tour bus ride along the park road, which stretches from the Parks Highway for over 90 miles into the park, ending at Kantishna. Annually, about 280,000 visitors embark upon a shuttle bus trip or tour beyond the Savage River checkpoint for travel into the park interior (NPS 2004). Most of the remaining visitors stay in the frontcountry and explore this area of the park via the Savage River Shuttle bus, tour bus, private car, bicycle, or on foot. The nexus between the character of the park road and the surrounding landscape is essential to the visitor experience.

Within the project area, summer visitor use generally consists of shuttle bus tours, independent visitors in passenger vehicles, bicycling along the road, and foot traffic. Skiing, dog sled mushing, and snowshoeing are also common winter activities in this area of the park. Winter recreationists use the snow-covered road as a non-motorized recreational trail. Motor vehicles are not allowed beyond headquarters from about early October until the middle of April, but the dates are highly variable and depend on several factors (such as weather, snow depth, success in clearing aufeis, administrative needs, weight and destination of vehicles). The park road is always open for visitor use, either motorized (and pedestrian and bicycle) use during the summer, or non-motorized (over snow) use during the winter. When the aufeis develops in particular area, it is up to the individual to attempt to cross the ice safely.

## 3.7 Visual Resources

The visual landscape along the park road transitions with each mile. After leaving the main entrance area where bustling activity is centered around the railroad depot, Visitor Center Complex, and headquarters area, natural taiga and tundra vegetation as well as scenic vistas of the Alaskan Range begin to dominate the park road.

The park road bisects the natural landscape, but the linear form of the road is buffered by surrounding vegetation. Road signs and related items are kept to a minimum and natural features dominate the view. At MP 4.0, an existing gravel pit is visible on the north side of the road. At MP 4.5 the aufeis flow dominates the foreground view during the winter months.

## 3.8 Soundscapes

In accordance with NPS Management Policies 2006 (NPS 2006a) and DO 47-Sound Preservation and Noise Management (NPS 2000), an important part of the NPS mission is to preserve natural soundscapes associated with national park units. A soundscape refers to the total acoustic environment of an area. Both natural and human sounds may be desirable and appropriate in a soundscape, depending on the purposes and values of the park. Season, animals, vegetation, climatic conditions, topography, and proximity to water all influence the production and propagation of sounds. The NPS has developed an inventory and monitoring program that identifies "acoustic zones" within national parks. Acoustic zones are areas of similar vegetation, land cover, topography, elevation, and climate that typically contain similar animals, physical processes, and other sources of natural sounds.

The NPS has identified three acoustic zones within the park: alpine, sub-alpine, and scrub/forest zones (NPS 2006a). The proposed project site is located within the scrub/forest acoustical zone. The NPS describes this zone:

> *"This zone is consists of spruce on the north side of the Alaska Range and a mixture of deciduous and coniferous trees on the south side. Willow, birch, aspen, and alder also grow to heights that play a large role in attenuating sounds. The natural soundscape is less dominated by wind in this zone due to the presence of trees and tall shrubs that block and reduce wind speed. Compared to the other two zones, animal sounds are more frequently audible. A greater diversity of birds, insects, and mammals occupy this scrub/forest zone than the other two acoustical zones. With the exception of aircraft sounds, audible sounds are usually generated by nearby sources rather than carried from distances. Red squirrel chatter replaces the sub-alpine zone's arctic ground squirrel whistles, and woodland birds such as thrushes and warblers replace tundra bird species. Streams have turned into rivers in this zone, which then dominate the acoustics in the riparian and surrounding areas. Human-generated sounds originate from developed areas of the frontcountry and from travel corridors near roads and railways. Aircraft are often heard overhead throughout this zone. Again, the distinction between the natural soundscapes of the acoustical zones becomes blurred during the winter months when flowing water sounds have either stopped or are muffled by snowcover and animal sounds are reduced in diversity and number."*

Existing noise sources near the project site consist of vehicles on the park road; heavy equipment noise during road maintenance activities; dogs barking at the sled dog kennels; human-generated noise from utilization of the scenic overlooks, trails, park headquarters, and staff residences; aircraft overflights; water noise from Hines Creek; wildlife sounds; and wind.

# 4.0 ENVIRONMENTAL CONSEQUENCES

## 4.1 Introduction

This section provides an evaluation of the potential effects or impacts of each of the alternatives on the resources described in the issue statements presented in Section 1.6.1, Issues Selected for Detailed Analysis.

## 4.2 Methodology

### 4.2.1 Impact Criteria

The direct, indirect, and cumulative impacts are described for each issue (impact topic) that was selected for detailed analysis (see Section 1.6.1). The impacts for each issue are based on the intensity (magnitude), duration, and context (extent) of the impact. Summary impact levels (negligible, minor, moderate, or major) are given for each issue. Definitions are provided below.

Intensity

| | |
|---|---|
| Low: | A change in a resource condition is perceptible, but it does not noticeably alter the resource's function in the park's ecosystem, cultural context, or visitor experience. |
| Medium: | A change in a resource condition is measurable or observable, and an alteration to the resource's function in the park's ecosystem, cultural context, or visitor experience is detectable. |
| High: | A change in a resource condition is measurable or observable, and an alteration to the resource's function in the park's ecosystem, cultural context, or visitor experience is clearly and consistently observable. |

Duration

| | |
|---|---|
| Temporary: | Impacts would last only a single visitor season or for the duration of discreet activity, such as construction of a trail (generally less than 2 years). |
| Long-term: | Impacts would extend from several years up to the life of the plan. |
| Permanent: | Impacts are a permanent change in the resource that would last beyond the life of the plan even if the actions that caused the impacts were to cease. |

Context

| | |
|---|---|
| Common: | The affected resource is not identified in enabling legislation and is not rare either within or outside the park. The portion of the resource affected does not fill a unique role within the park or its region of the park. |
| Important: | The affected resource is identified by enabling legislation or is rare either within or outside the park. The portion of the resource affected does not fill a unique role within the park or its region of the park. |
| Unique: | The affected resource is identified by enabling legislation and the portion of the resource affected uniquely fills a role within the park or its region of the park. |

Overall Summary Impact Levels

Summaries about the overall impacts on the resource synthesize information about context, intensity, and duration, which are weighed against each other to produce a final assessment. While each summary reflects a judgment call about the relative importance of the various factors involved, the following descriptors provide a general guide for how summaries are reached.

| | |
|---|---|
| Negligible: | Impacts are generally extremely low in intensity (often they cannot be measured or observed), are temporary, and do not affect unique resources. |
| Minor: | Impacts tend to be low intensity or of short duration, although common resources may have more intense, longer-term impacts. |
| Moderate: | Impacts can be of any intensity or duration, although common resources are affected by higher intensity, longer impacts while unique resources are affected by medium or low intensity, shorter-duration impacts. |
| Major: | Impacts are generally medium or high intensity, long-term or permanent in duration, and affect important or unique resources. |

Impairment

Impairment of a park resource(s) occurs when a resource would no longer fulfill the specific purposes identified in the park's establishing legislation (or proclamation) or its role in maintaining the natural or cultural integrity of the park, as described in the park's GMP, foundation document, or other significant guiding plan.

### 4.2.2 Cumulative Impacts

Cumulative impacts are the additive or interactive effects that would result from the incremental impact of the proposed 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). Interactive impacts may be either *countervailing* – where the net cumulative impact is less than the sum of the individual impacts or *synergistic* – where the net cumulative impact is greater than the sum of the individual impacts. Cumulative impacts were assessed by combining the potential environmental impacts of the alternatives with the impacts of projects that have occurred in the past, are currently occurring, or are proposed in the future within the headquarters and entrance areas of the park. In the past, cumulative impacts on resources in the area have been dominated by the development of administrative facilities and visitor services along the park road. The entrance area is the area along the park road from the intersection with the George Parks Highway to the park headquarters situated at about MP 3.4.

There are several relevant past actions and projects that have been completed in the vicinity of the project as well as ongoing actions, facilities, and services in the project vicinity and park entrance area. The developed entrance area, the headquarters area, the paved road, and its associated developments through the Savage River Bridge near MP 14.0, make up the nearby area of development and disturbance examined in this cumulative impacts section. In this area, about 80 acres of park land has been developed. Ongoing actions in the area include upgrades and rehabilitation to existing facilities, trails, and campgrounds to support current visitor use.

Reasonably foreseeable future actions are those actions that are likely or reasonably certain to occur, and although they may be uncertain, they are not purely speculative. Typically, they are based on documents such as existing plans, permit applications, or announcements. Significant planned actions in this area that were either identified in the DCP/EIS or elsewhere include about 3 acres of additional clearing of natural habitat for development including: new administrative facilities and parking at C-Camp; rehabilitation of utility infrastructure with new buried utility lines; upgrading the sewage treatment system; replacement and realignment of the Rock Creek Bridge and other road improvements near MP 3.0; realignment of the dog kennel road and expansion of public parking; and road improvements. Several upgrades to existing facilities are also planned but would not increase the existing footprint of development in the area.

## 4.3 IMPACTS OF THE NO ACTION ALTERNATIVE

### 4.3.1 Vegetation

*MP 4.0 and MP 4.5*

Under the No Action Alternative, no new impacts to vegetation would occur, because no new excavation or ground disturbance is proposed at MP 4.0 or MP 4.5. Existing impacts to vegetation from past activities would continue long-term and current practices that impact vegetation would continue. The current practice of pushing large ice chunks off the road on the downhill side during spring road opening, often damaging vegetation, would continue. The current practice of roadside mowing to keep woody vegetation away from the roadway would continue. This mowing alters the natural vegetation mix. The roadside disturbance adds to conditions favorable for growth of some non-native species.

Cumulative Impacts

Past and present actions have contributed to cumulative impacts to vegetation in the project area. Development of the entrance area, headquarters area, park road, as well as facility upgrades has required clearing of vegetation in the vicinity of the proposed project area (see Section 4.2.2). The total acreage of existing disturbance to vegetation in the vicinity of the proposed project area is about 80 acres (NPS 2005b). Impacts related to these activities include creation of social trails and trampling of vegetation, placement of fill in vegetated areas, potential introduction of invasive species, channelization of runoff from impervious surfaces, and subsequent erosion of soils. The impacts of past and present actions on vegetation are long-term and would likely persist for more than 2 years.

Reasonably foreseeable future actions that could occur within the project area are described in Section 4.2.2. Of these, the actions that have the highest potential to impact vegetation include constructing additional parking and administrative space in the C-Camp and headquarters area and constructing a new rest stop near MP 12.3, east of Savage River Campground. These impacts would include the direct loss of vegetation and would be similar to those described under past actions. Impacts from these activities would be greatest during construction phases.

This alternative would not contribute to the cumulative impacts on vegetation. However, cumulative impacts on vegetation have occurred.

Conclusion

Impacts on vegetation from this alternative would be **minor**. New acreage of impacts to vegetation would not occur. Existing disturbance to vegetation in the larger park developed area, of about 80 acres, would persist for the long-term, but the overall integrity of vegetation in the park would remain.

The level of impact on vegetation from this alternative would not result in "impairment" of those park resources that fulfill the specific purposes identified in the enabling legislation or that are essential to the natural or cultural integrity of the park.

### 4.3.2 Wetlands

*MP 4.0 and MP 4.5*

Under Alternative 1, no new impacts to wetlands would occur because no new excavation or ground disturbance is proposed at MP 4.0 or MP 4.5. Existing impacts to wetlands from past activities would continue long-term.

Cumulative Impacts

Past and present actions have contributed to cumulative impacts to wetlands in the project area. Past and ongoing actions that have impacted wetlands are similar to those described in Section 4.3.1. As a result of these actions, about 10 acres of wetlands have been impacted in the project area (Carwile 2007). Some development has occurred in types of wetlands that are common throughout the eastern area of the park; no sensitive areas have been impacted. Impacts related to these activities have included draining, filling, or sedimentation of wetlands, which has produced results such as direct wetland losses and/or changes to functions and values (i.e., floodwater attenuation and contaminant filtration). Careful location to avoid uncommon or unique wetlands and adherence to BMPs to protect wetlands during construction has served to mitigate potential impacts. The impacts of past and ongoing actions on wetlands have lasted longer than 2 years.

Reasonably foreseeable future actions that could contribute to cumulative impacts to wetlands within the project area are described in Section 4.3.1. The reasonably foreseeable future actions that have the highest potential to impact wetlands include those mentioned in Section 4.3.1, as well as the replacement of Rock Creek Bridge that is located near MP 3.0 (see Section 4.2.2). Impacts would be similar to those described for past and present actions and would be greatest during the construction phases for these projects. However, carefully locating project actions to avoid uncommon or unique wetlands and adherence to BMPs to protect wetlands during construction would serve to mitigate potential impacts.

The No Action Alternative would contribute no direct or indirect impacts to the cumulative impacts on wetlands. There are cumulative impacts on wetlands resulting from the past, present, and reasonably foreseeable future actions described in Section 4.2.2.

Conclusion

Impacts on wetlands from the No Action Alternative would be **minor**. No new direct or indirect impacts to wetlands would occur, but long-term existing impacts would persist.

The level of impact on wetlands from this alternative would not result in "impairment" of those park resources that fulfill the specific purposes identified in the enabling legislation or that are essential to the natural or cultural integrity of the park.

### 4.3.3 Wildlife and Habitat

*MP 4.0 and MP 4.5*

Under Alternative 1, no new construction or significant road improvement activities would occur at the project sites, MP 4.0 or MP 4.5, therefore, no direct or indirect impacts to wildlife or to wildlife habitat would result.

Cumulative Impacts

Past construction actions that have impacted wildlife include the Visitor Center and the Murie Science and Learning Center. Various transportation projects, including road and trail construction and maintenance, have also been conducted throughout the park (Section 4.2.2). Wildlife impacts related to these activities have included harassment or displacement of individuals; the loss or degradation of habitat as a result of land use changes; introduction of invasive species; and higher levels of human presence and activity. Wildlife impacts have generally increased in intensity during the short-term construction period; however, the extent of impacts has typically been limited to the immediate vicinity due to human activities (e.g., habitat removal or alteration, species displacement or mortality, noise). Wildlife impacts resulting from past and present actions have persisted for greater than 2 years.

Reasonably foreseeable future actions that could contribute to cumulative impacts to wildlife and habitat include facility modification, removal, and construction, as well as road and trail construction and rehabilitation (Section 4.2.2). These activities would result in similar impacts to wildlife, as discussed for past and present actions.

The No Action Alternative would not contribute to cumulative effects on wildlife and habitat. There are no sensitive habitats within the immediate vicinity of the road corridor in the entrance area.

Conclusion

Impacts on wildlife and habitat from the No Action Alternative would be **minor**. No new direct or indirect impacts to wildlife or habitat would occur. Existing disturbance to habitat in the area would continue for the long-term, but the overall integrity of wildlife in the park would remain.

The level of impact on wildlife and habitat from this alternative would not result in "impairment" of those park resources that fulfill the specific purposes identified in the enabling legislation or that are essential to the natural or cultural integrity of the park.

### 4.3.4 Geological Processes

Under the No Action Alternative, no impacts to geological processes would occur because no direct ground disturbances or alterations are proposed. Existing impacts to geologic processes from past activities would continue.

*MP 4.0*

Under the No Action Alternative, continued road maintenance activities at MP 4.0 would be required, including transport of fill materials, from the stockpile borrow pit at MP 5.0, to raise the affected portion of the road to original grade. Approximately 300 to 400 cubic yards of crushed aggregate material must be added annually to maintain the grade and the driving surface. In addition to elevation changes in the roadway at MP 4.0, downslope soil migration has also been documented, affecting soils up to 150 feet laterally from the roadway, which also must be repaired on an annual basis. Slumping and roadbed shifting could continue throughout the life of the current road placement. With the exception of a large slope failure, impacts to downslope soils would last longer than 2 years.

*MP 4.5*

Under the No Action Alternative, up to 6 feet or more of aufeis at MP 4.2 through MP 4.6 would need to be removed during severe icing years. Currently, ice is removed from the roadbed using heavy equipment and disposed of over the downslope side of the road. This activity could damage the wooded and vegetative mat areas, which may alter any existing permafrost and downslope stability

characteristics, due to excessive moisture loads during spring thaws. The resulting transport of sediments and debris downslope and into current wetland areas is an impact and would last longer than 2 years.

Cumulative Impacts

Past and present construction activities that have impacted geologic processes include the initial park road construction and annual maintenance activities, development of the borrow pit and stockpile borrow pit, at MP 4.0 and MP 5.0 respectively, and general road traffic. Geologic impacts concerning these activities may have included alterations to permafrost-bearing soils as a result of vegetation and insulative mat removal; and natural spring water damming, resulting in aufeis accumulation and visitor and heavy equipment travel on and adjacent to the road corridor, which may have accelerated roadway degradation and compaction of shallow subsurface soils. Impacts of past and present actions on geologic processes would persist more than 2 years.

Reasonably foreseeable future actions that would contribute to cumulative impacts include continuing aufeis removal and road rehabilitation activities. These include ongoing road resurfacing and regrading of slumping road sections, replacement of failing pavement from MP 0.0 to MP 15.0, and the replacement of the Rock Creek Bridge at MP 3.0. Ongoing geological processes would continue to occur. Impacts from these activities would depend on seasonal variations, but would likely persistent for greater than 2 years. The No Action Alternative would have a persistent contribution to cumulative impacts.

Conclusion

Impacts on geological processes from the No Action Alternative would be **minor**. Persistent direct or indirect impacts on geological processes would continue. Ongoing geologic processes would continue to occur and would be impacted by a lack of action in the long-term.

The level of impact on geological processes from this alternative would not result in “impairment” of those park resources that fulfill the specific purposes identified in the enabling legislation or that are essential to the natural or cultural integrity of the park.

### 4.3.5 Visitor Use

*MP 4.0 and 4.5*

Under the No Action Alternative, impacts to visitor use would continue. The level of visitor use is expected to continue at the present rate or to increase. Winter visitor use activities would continue to have safety risks from the aufeis across the road at MP 4.5. The road surface at MP 4.0 would continue to slump and degrade which would lead impacts to summer visitor use with slow, bumpy, and dusty driving conditions, and possibly soft shoulders on the road. Impacts to visitor use would be long-term, persisting more than 2 years.

Cumulative Impacts

Past and present actions have contributed to cumulative impacts to visitor use, including: road resurfacing projects to improve transportation corridors for summer visitation, a railroad depot that provides access to the park from other areas of the State, several services geared towards park visitors to enhance their experience, and many recreation trails and facilities. Cumulative impacts to visitor use have included redistribution of accommodation services to surrounding communities and greater convenience and access to visitor information from new facilities in the park entrance area (e.g., Visitor Center, trails, and campgrounds). Recreation facilities that have contributed to cumulative impacts on

visitor use in the area include the sled dog kennels at park headquarters, expansion of Riley Creek Campground, and rerouting or rehabilitating area trails.

Reasonably foreseeable future actions that could contribute to long-term localized cumulative impacts to visitor use in the project vicinity include the proposed trail projects in the Nenana Corridor and the planned safety enhancements at MP 3.0 and MP 4.0. The trail projects would enhance future visitor use by providing more recreation trails in the vicinity of the project.

The No Action Alternative would have long-term contributions to cumulative impacts to visitor use. Existing visitor opportunities would continue in this area of the park, however, road conditions would continue to degrade or impede access to recreation opportunities. Perpetuation of the existing condition could potentially impact visitor experiences in the area. When combined with the scope of projects described in Section 4.2.2, this alternative would have a persistent contribution to cumulative impacts to visitor use in the project area.

Conclusion

Impacts on visitor use from the No Action Alternative would be **minor**. Winter visitor use near MP 4.5 would continue to be impacted by slippery and dangerous aufeis. Summer visitor use near MP 4.0 would continue to be impacted by the slump area with slow, bumpy, and dusty driving conditions and potentially with soft shoulders.

### 4.3.6 Visual Resources

*MP 4.0 and MP 4.5*

There would be no new impacts to visual resources resulting from the No Action Alternative. Existing landscapes and viewpoints would not be altered.

Cumulative Impacts

Cumulative impacts to visual resources have been dominated by past and present actions that have altered the natural environment, landscapes, and viewpoints in the area. As discussed in Section 4.2.2, several construction projects have shaped the landscape to serve visitors and staff, including the park road and associated gravel sources. With the exception of the railroad depot roof color, the park facilities and roads have typically been designed to mimic the features of the natural landscape, incorporating natural colors and textures, and landscaping with native materials. Past and present actions have contributed persistent impacts to visual resources of the park.

Reasonably foreseeable future actions in the vicinity that would have a persistent contribution to cumulative impacts on visual resources include removing the dorm at park headquarters, which would restore some of the natural visual character.

The No Action Alternative would not contribute to cumulative impacts on visual resources. When combined with past, present, and reasonably foreseeable future actions, the No Action Alternative would have a persistent contribution to cumulative impacts to visual resources.

Conclusion

Impacts on visual resources from the No Action Alternative would be **minor**. No new direct or indirect impacts to visual resources would occur. Existing landscapes and viewpoints would not be altered. Existing disturbance to visual resources due to development in the area would persist for the long-term, but the overall integrity of visual resources in the park would remain.

The level of impact on visual resources from this alternative would not result in "impairment" of those park resources that fulfill the specific purposes identified in the enabling legislation or that are essential to the natural or cultural integrity of the park.

### 4.3.7 Soundscapes

*MP 4.0 and MP 4.5*

Under the No Action Alternative, use and maintenance of the park road at MP 4.0 and MP 4.5 would continue under current conditions. Impacts to natural soundscapes would continue. Vehicle noise from summer visitors and administrative traffic would continue. Noise from road maintenance operations would continue, especially during spring road opening operations, removal of aufeis at MP 4.5, and building up of the slumping road surface at MP 4.0. The overall impacts to natural soundscapes would not change and this alternative would result in no new impacts.

Cumulative Impacts

Cumulative impacts to the natural soundscape from past, present, and reasonably foreseeable future actions primarily consist of increasing human use in the park. An increase in human use results in an increase in human-generated noise, thereby altering the natural soundscape. Because there would be no new noise sources associated with the No Action Alternative, there would be no additive cumulative impact to soundscapes in the park.

Past and present actions that temporarily impacted the natural soundscape of the area include: construction of the park road, park road resurfacing, expansion of the Auto Shop, improvement of C-Camp housing, upgrades to the visitor facilities at Savage River, annual road maintenance, and construction of buildings (Visitor Center Complex, Murie Science Center and Learning Complex, Wilderness Access Center, Railroad Depot, Post Office, Airstrip, bus barn). Past and present actions that contributed to a permanent impact in the soundscape due to increased human use in the area include: use of the park road, use of buildings, use of the Riley Creek campground, and use of other support facilities. The impacts of past and present actions on soundscapes are temporary during the construction period, but permanent for areas of increased human use.

Reasonably foreseeable future actions that could occur within the project area that would temporarily alter the soundscape include: removal of the dorm, employee housing upgrades, historic structure rehabilitation, construction of additional parking and administrative spaces in C-Camp area, repairing the utility infrastructure, repairing roads and trails, replacement of Rock Creek bridge, resurfacing of park road, replacing pavement on park road, realigning dog kennel's access road and expanding public parking, and correcting a sight distance problem at MP 3.0. Reasonably foreseeable future actions that would directly result in a permanent change in the soundscape by increasing human use would include additional parking at the C-Camp area and Visitor Center Complex. As trails and roads are improved, the park would continue to experience increased traffic and human noise into the soundscape. The impacts of past and present actions on soundscapes are temporary during the construction period, but permanent for areas of increased human use.

Conclusion

Impacts on natural soundscapes from the No Action Alternative would be **minor**. No new impacts to soundscapes would occur. Existing disturbance to soundscapes in the area would continue, especially temporary annual impacts from park road equipment during summer road opening, removing aufeis at MP 4.5 and building up the slumping road surface at MP 4.0.

The level of impact on natural soundscapes from this alternative would not result in "impairment" of those park resources that fulfill the specific purposes identified in the enabling legislation or that are essential to the natural or cultural integrity of the park.

## 4.4 IMPACTS OF THE PROPOSED ACTION (NPS Preferred Alternative)

### 4.4.1 Vegetation

*MP 4.0*

The proposed action would result in long-term direct and indirect impacts. About 1.5 acres of vegetation would be lost during construction of the new road segment. There are essentially three different sections occupying these 1.5 acres, which are about 1.1 acres of upland vegetation and 0.4 acre of wetland vegetation. The eastern section is an isolated dry area with white spruce, rose, mosses, and lichen. The middle section is the previously disturbed site of the former borrow pit, which has been populated with willow and sedges since being abandoned. The western section is composed of a spruce forest, some of which are wetlands (about 0.4 acre) (refer to Section 4.3.2 for wetlands impacts and Figure 8). The impacts of the development of a stretch of new road on terrestrial vegetation would include: direct loss of habitat, direct loss of native plant cover, and reduction in function such as biomass production or carbon dioxide sequestration. Impacts to surrounding vegetation would be minimized by plainly demarcating clearing limits. Fugitive dust from construction activities would indirectly affect nearby vegetation. These impacts would be temporary, localized, and minimized through the use of dust abatement practices (i.e., watering the exposed soil) and plainly demarcating clearing limits. Activities would be confined to the construction zone and surrounding habitats would not be disturbed. The impacts would persist for longer than 2 years.

Imported gravel could serve as a vehicle for the establishment and propagation of exotic species because the gravel source pit would be located outside the boundaries of the park. Park staff would both survey the gravel source pit for exotics prior to transportation into the park (see Section 2.5 for mitigation) and remove weeds annually after gravel has been placed.

The impacts to vegetation from excavating the old section of road would be minimized by the use of plainly marked clearing limits and active revegetation efforts. In order to minimize soil erosion, inhibit the establishment and propagation of invasive exotic plant species, and reestablish the natural vegetation community, the excavated area would be reseeded with locally-gathered seeds. Reseeding would take place at the end of the 2008 construction season or in 2009.

Direct loss of undisturbed vegetation would be limited to approximately 1.1 acres east and west of the abandoned 0.8-acre borrow pit. Impacts to vegetation would be long-term.

*MP 4.5*

Direct impacts to vegetation would long-term as a result of raising and shifting the road grade, installing additional culverts, excavating a deeper ditch, and installing a gabion mattress on the slope above the road. Raising the road grade would increase the size of the road footprint, which would result in the direct loss of vegetation. Deepening and widening the roadside ditch and installing the gabion mattress would necessitate additional vegetation clearing. The overall impact from these actions would be the loss of about 1.1 acres of vegetation. Of these 1.1 acres lost, about 0.5 acre would be upland vegetation, while about 0.6 acre would be wetland vegetation (refer to Section 4.3.2 for wetlands impacts and Figure 9). The impacts to vegetation would be similar to those previously described under the proposed road reroute at MP 4.0 and would be long-term, persisting more than 2 years.

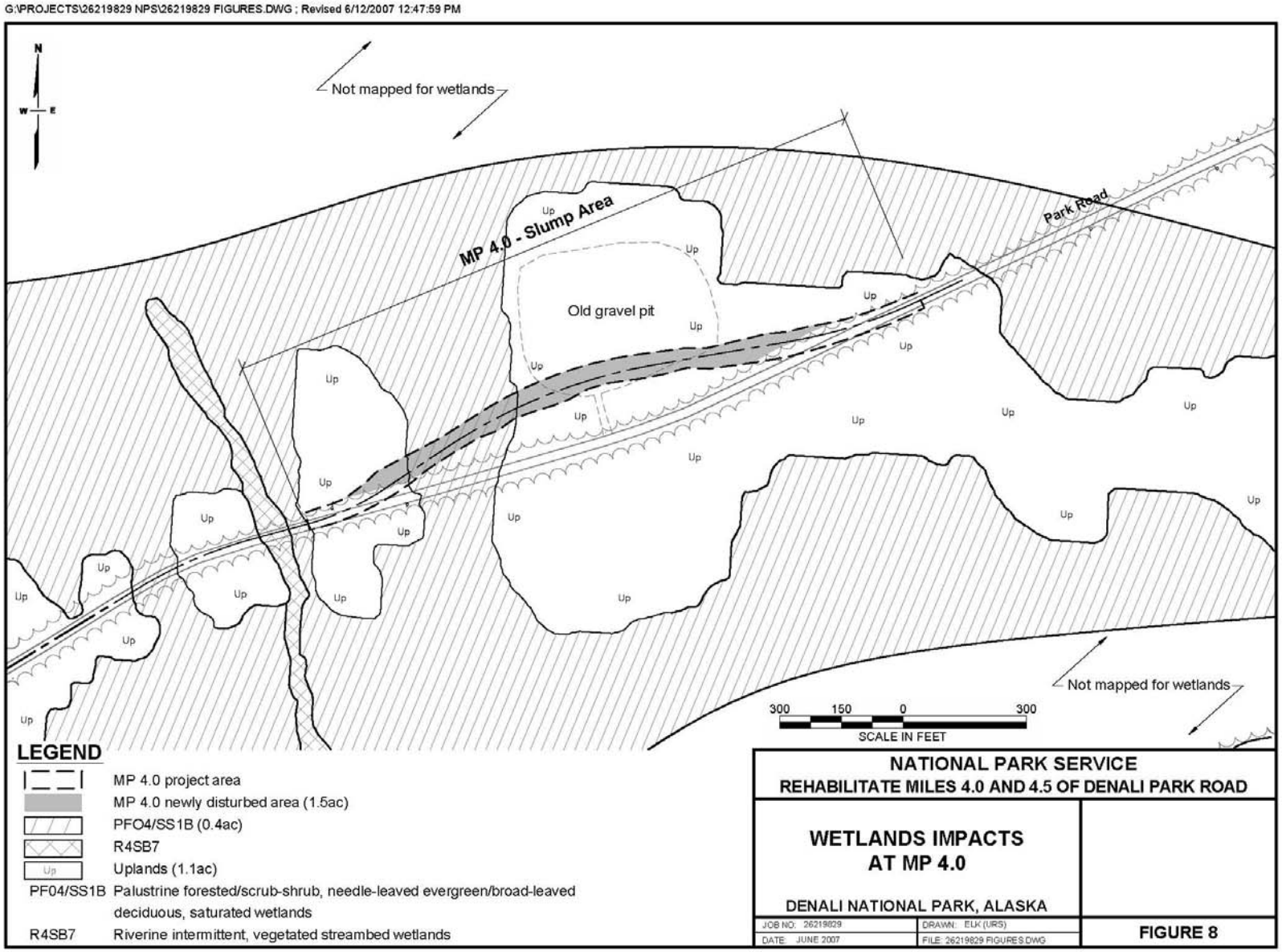


**Figure 8. Wetlands Impacts at MP 4.0**

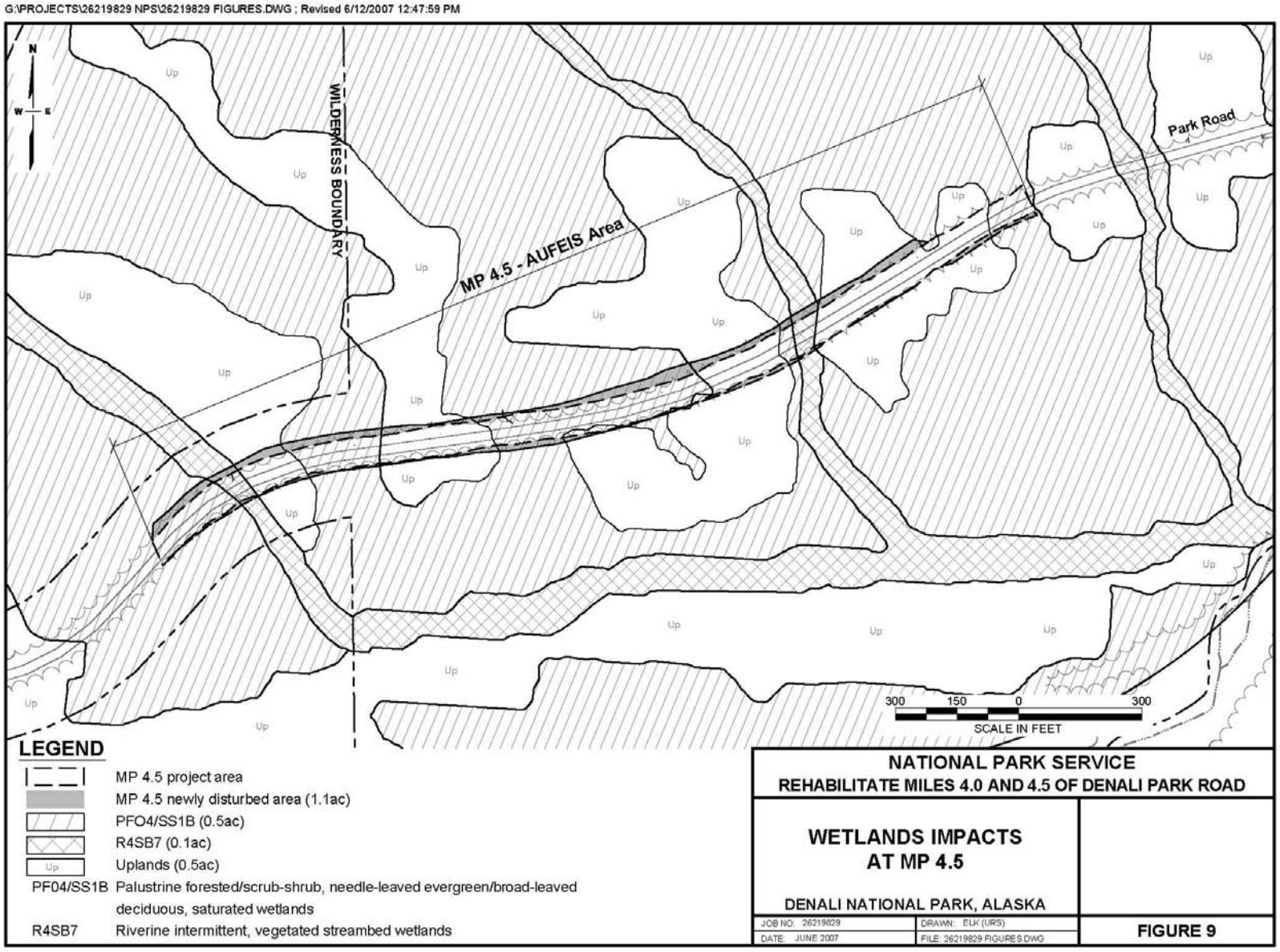


**Figure 9. Wetlands Impacts at MP 4.5**

Due to active revegetation, not all of the impact area associated with road moving and gabion mattress installation would be permanently lost. The portion of the slope that would be covered by the gabion mattress would be covered with a 6-inch layer of topsoil and reseeded with seeds gathered locally. The new slopes on either side of the raised park road would be reseeded with legumes such as sweet vetch. Annual mowing in the proposed project area, approximately 16 feet off the road, would keep tree species such as aspen or spruce from successfully propagating. If tree species become established, they could interfere with the objective of channeling water through the culverts, which could lead to the creation of a large amount of ice in the containment that might spread to the road. The excavated material would be temporarily stockpiled at the MP 5.0 pit for later use at other road projects.

The widening of the ditch and installation of larger culverts would result in increased hydrological connectivity between vegetation upslope and downslope from the road. These activities would be an improvement to the current design, in which the road operates as a barrier to hydrological connectivity. This increased hydrological connectivity, coupled with the retention of winter ice in a larger roadside ditch, would greatly decrease the volume of ice that currently reaches and covers the road. Since there would be minimal aufeis on the road, park maintenance staff would only have to remove enough ice to open the culverts. The installation of a gabion mattress covered with topsoil and vegetation would help stabilize the wet and saturated back slope as well as minimize soil erosion.

Overall, actions associated with MP 4.5 of the park road would result in the direct loss of about 1.1 acres of vegetation. Active revegetation would assure a native plant cover on the disturbed back slope. The proposed action would also increase hydrological connectivity between upgradient and downgradient vegetation. This project would result in a decrease of aufeis accumulation on the road and thus eliminate the need for park staff to dispose of removed ice on downgradient vegetation. Impacts to vegetation resulting from the proposed action would persist more than 2 years.

Cumulative Impacts

As described in Section 4.3.1, past, present, and reasonably foreseeable future actions have and would continue to have impacts to vegetation in the area. The proposed action would result in the total loss of less than 2.6 acres of regionally common vegetation and about 1.6 acres of this would be revegetated in addition to wetlands compensation for impacted wetlands. The vegetation that would be lost would contribute a small increase, about 3 percent, to vegetation already lost as a result of past, present, and reasonably foreseeable future actions, about 80 acres. These approximately 2.6 acres are a small fraction of the thousands of acres of similar vegetation in and adjacent to the project area. However, most of these thousands of acres of natural vegetation are not developable due to park zoning restrictions (Figure 2). The proposed action would have a long-term contribution to cumulative impacts on vegetation.

Conclusion

Impacts on vegetation from this alternative would be **moderate**. About 2.6 acres of vegetation would be removed, creating long-term impacts to vegetation in the project area. Existing disturbance to vegetation in the area, of about 80 acres, would persist for the long-term, but the overall integrity of vegetation in the park would remain.

The level of impact on vegetation from this alternative would not result in “impairment” of those park resources that fulfill the specific purposes identified in the enabling legislation or that are essential to the natural or cultural integrity of the park.

### 4.4.2 Wetlands

*MP 4.0*

As described in Section 4.4.1, the western portion of the reroute at MP 4.0 would result in the loss of about 0.4 acre of palustrine forested/scrub-shrub, needle-leaved evergreen/scrub-shrub, saturated wetlands (PFO4/SS1B) (Figure 8). All of the mapped wetlands in the project area are "jurisdictional" according to the USACE (Skinner 2007). The majority of wetland disturbance would come from the filling necessary to reroute the section of road to the north. Impacts related to the filling and/or clearing of these wetlands includes the loss of wetland vegetation and changes to functions and values (i.e., floodwater attenuation, wildlife habitat, and sediment retention). Impacts would be minimized to surrounding wetlands by plainly demarcating fill limits. Fugitive dust from construction activities would indirectly effect nearby wetlands. These impacts would be temporary, localized, and minimized using dust abatement practices (i.e., watering exposed soil). Activities would be confined to the construction zone and no surrounding wetlands would be directly disturbed. The impacts to wetlands would be long-term, persisting more than 2 years.

Some natural localized wetlands, and their accompanying processes, would be lost by the road rerouting project. For this loss of wetlands, off-site compensation (wetland restoration) has been proposed for this project. The loss of wetland acreage induced by the changes at MP 4.0 would be compensated for, on a minimum 2:1 acreage basis, by restoring riverine and palustrine wetland habitat (R3USJ/PUS1D) in the Kantishna Hills region of the park, specifically at the confluence of the West Fork Glen Creek and East Fork Glen Creek. Two-for-one compensation would be completed, rather than 1:1, because the work at the Kantishna Hills compensation site would restore some, but not all, of the natural functioning of the riparian wetlands previously lost (refer to Appendix A, Wetlands SOF for more details).

*MP 4.5*

Direct impacts to wetlands as a result of raising and shifting the road, installing culverts, deepening the ditch, and installing a gabion mattress would be long-term. Raising the road surface approximately 2 to 4 feet would increase the width of the road footprint. The increased road footprint, combined with moving the road approximately 2 to 8 feet, would result in the direct loss of mostly palustrine forested/scrub-shrub, needle-leaved evergreen/broad-leaved deciduous, saturated wetlands (PFO4/SS1B). Widening and expanding the ditch near the road would lead to the direct loss of the same type of palustrine forested and scrub-shrub (PFO4/SS1B) wetlands (refer to Appendix A, Wetlands SOF for more details). Also, two small reaches of riverine intermittent, vegetated streambed (R4SB7) would be disturbed. Overall, the impact from these actions would be the loss of about 0.6 acre of wetlands (this would consist of 0.1 acre of R4SB7 and 0.5 acre of PFO4/SS1B). The majority of the wetland disturbance would be caused by the fill necessary to raise and shift the road and clearing and grubbing to widen and deepen the roadside ditch. Impacts to wetlands would be similar to those previously described for the proposed road reroute at MP 4.0 and would be long-term and persist for longer than 2 years.

Installing more and larger culverts (estimated 6 to 7 feet in diameter) under the road would result in increased hydrological connectivity between wetlands upgradient and downgradient from the road. These activities would be an improvement to the current design, in which the road operates somewhat as a barrier to hydrological connectivity. And as described in the vegetation section, this increased hydrological connectivity, coupled with the retention of winter ice in a roadside ditch about 9 feet deep, would greatly decrease the volume of ice that currently reaches and covers the road. Since there would be minimal aufeis on and around the road, park personnel would not have to remove large quantities of

ice from the roadway and dispose of it on the downgradient side of the road, an activity that crushes wetland vegetation.

The NPS acknowledges that some natural localized wetlands, and their accompanying processes, would be lost. Therefore, compensation activities as described for the impacts associated with the road reroute at MP 4.0 would occur.

Overall, project activities at MP 4.5 would result in the direct loss of approximately 0.6 acre of wetlands. All of the mapped wetlands in the project area are "jurisdictional" according to the USACE (Skinner 2007). In compliance with NPS wetland protection policies, wetland losses would be compensated for, on a minimum 2:1 basis, in the Kantishna Hills region of the park. Although the impact site and the compensation site have some different functions and values, there would be net gain of wetland area a many of the lost functions would be replaced in the park (refer to Appendix A, Wetlands SOF for more details).

Cumulative Impacts

As described in Section 4.3.1, past, present, and reasonably foreseeable future actions have had and would continue to have impacts to wetlands in the area. As a result of these actions, about 10 acres of wetlands have been impacted in the project area (Carwile 2007). The proposed action would directly result in the loss of about 1 acre of regionally common palustrine forested/scrub-shrub and riverine (PFO4/SS1B and R4SB7) wetlands. This loss represents a relatively large portion (approximately 1 percent) of total wetlands lost to past and present actions in the area. However, these wetland losses would be compensated for with wetland mitigation at a site in Kantishna at the confluence of the East and West Forks of Glen Creek, resulting in no-net loss of wetland area or function.

The proposed action would result in greater hydrological connectivity between wetlands separated by the road, as well as eliminate most of the need for the removal of ice pieces that are subsequently thrown on, and crush, wetland vegetation downgradient from the road. The proposed action would have a long-term contribution to cumulative impacts on wetlands.

Conclusion

Impacts on wetlands from this alternative would be **moderate**. Impacts would be long-term. About 1 acre of jurisdictional wetlands would be disturbed (about 0.4 acre at MP 4.0, plus about 0.6 acre at MP 4.5). Compensation would occur at a 2:1 ratio in the Kantishna area of the park.

The level of impact on wetlands from this alternative would not result in "impairment" of those park resources that fulfill the specific purposes identified in the enabling legislation or that are essential to the natural or cultural integrity of the park.

### 4.4.3 Wildlife and Habitat

There would be temporary impacts to wildlife during construction and long-term impacts to habitat over the newly disturbed acreage. Similar wildlife and habitat impacts would occur at MP 4.0 and MP 4.5; therefore, impacts will be generally described first, followed by MP specific detail.

Increased traffic levels on the park road since the 1970s have not caused a significant change in abundance, distribution, or behavior of large mammals within the park (Burston et al. 2000). Further, a reduction in adverse wildlife response to traffic has been documented over time, potentially resulting from wildlife habituation to the road and consistent traffic levels (Burston et al. 2000). Wildlife habitat types found directly adjacent to the existing road are not considered crucial or sensitive due to widespread abundance and availability in the vicinity and throughout the park.

A primary wildlife concern includes potential construction impacts during the bird breeding season, which could result in nest destruction or abandonment, direct mortality, or bird displacement. However, mitigation measures for this project stipulate that bird habitat (vegetation) would not be removed during the nesting season, April through July 15, and active nests would be protected. Habitat degradation from exotic and invasive plant species is another wildlife concern. Mitigation measures would require park staff to survey the gravel source pit for exotic plant species prior to transportation to the project site and remove weeds annually at the proposed project area after gravel has been placed.

Direct wildlife and habitat impacts would occur as a result of habitat removal or alteration, potential mortality, and wildlife displacement from construction activities (increased human presence and noise impacts). Temporary construction noise, although perceptible by wildlife above the background noise, would likely cause only temporary displacement of small mammals and birds, which would return to the area after construction has ceased. Moose, which are common in the area, and occasional wolves and grizzly bears, would be temporarily displaced from adjacent habitats, and are likely to utilize similar abundant habitats in the vicinity. Small mammals would be displaced from the immediate area of vegetation clearing and disturbance during construction. Displaced animals would occupy adjacent areas of similar habitat, which is common throughout the vicinity. Resident and migrant bird species would also be displaced from the area of disturbance to some degree (see Appendix C) although many would likely utilize similar habitats in adjacent areas. Some small mammals, such as snowshoe hare and Arctic ground squirrels, could potentially experience direct mortality during construction activities. Given the amount of impacted habitat involved and low number of affected individuals, mortality impacts on wildlife would be few. No indirect effects are anticipated as a result of the proposed action. Activities would be confined to the construction zones and no surrounding wildlife habitats would be physically disturbed.

*MP 4.0*

Construction activities associated with rerouting approximately 1,600 feet of roadbed (about 2.2 acres) through an abandoned borrow pit to the north/upslope side of the current road footprint would result in temporary wildlife impacts due to construction activity and increased human presence. Habitat impacts would result from ground disturbance. The abandoned borrow pit is currently marginal wildlife habitat. The excavated and reclaimed area where the road currently exists may naturally recover to adequate wildlife habitat in the future.

*MP 4.5*

The roadbed at MP 4.5 would be elevated by approximately 2 to 4 feet under this alternative, resulting in temporary wildlife impacts related to construction activity and increased human presence during the construction period. Raising the road surface and ditch construction would increase the prism's footprint approximately 1.1 acres, impacting 0.5 acre of upland vegetation and approximately 0.6 acre of wetland habitat. However, wetland habitat lost due to this action would be adequately compensated for, resulting in no net loss of wetland habitat.

The proposed action also includes the stabilizing and re-vegetating of the uphill slope, modification of the up-slope ditches of the affected road section, and the addition of large culverts to allow spring water to flow under the road. Excavation the wide ditch would necessitate the clearing of small amounts of upland habitat.

Road rehabilitation actions under the proposed action would impact adjacent upland and wetland habitats (Section 4.3.1 and 4.3.2) by improving hydrological connectivity between vegetation upgradient

and downgradient from the road, and revegetating approximately 1.6 acres. Enhanced vegetative communities translate into wildlife and habitat benefits. Improved road design and drainage would decrease the volume of ice that currently accumulates on the road and in adjacent areas, increasing wildlife movement potential through the project area during winter months. Further, decreased aufeis on and around the road would minimize or eliminate the need for park maintenance personnel to remove ice, benefiting wildlife by minimizing human disturbance during winter months.

Cumulative Impacts

Past, present, and reasonably foreseeable future actions (Section 4.2.2) and associated impacts would be the same as previously described in Section 4.3.3. The stated actions do not take place in habitats that are considered crucial or sensitive due to widespread abundance and availability throughout the park. The large amount of habitat availability combined with appropriate conservation management of park resources effectively minimizes cumulative impacts. The proposed action would contribute to cumulative effects on wildlife and habitat.

Conclusion

Impacts on wildlife and habitat from the proposed action would be **minor**. Proposed road rehabilitation at MP 4.0 and MP 4.5 would impact approximately 2.6 acres of wildlife habitat. Temporary construction activities and increased human presence would result in wildlife impacts. Impacts to wildlife and habitat would occur at both project locations. Improved hydrologic connectivity, revegetation of approximately 1.6 acres, and minimized road maintenance activity would help mitigate wildlife habitat impact.

The level of impact on wildlife and habitat from this alternative would not result in "impairment" of those park resources that fulfill the specific purposes identified in the enabling legislation or that are essential to the natural or cultural integrity of the park.

### 4.4.4 Geological Processes

*MP 4.0*

Under the proposed action, roughly 1,600 feet of roadbed at MP 4.0 would be rerouted up to 120 feet north of the current roadbed through an abandoned borrow pit. Impacts that could occur along the approach from the current roadbed to the reroute location in the borrow pit include vegetation loss and resulting soil erosion and permafrost alterations. Geotechnical investigations conducted in the area (USDOT 2006) suggest that the borrow pit surface soils are comparable to those within the road corridor and could sustain anticipated uses; however, subgrade soil conditions are unfavorable and subgrade reinforcement (i.e., nonwoven separation geotextile or biaxial geogrid, and insulated roadway section in permafrost areas) would be recommended to provide a stable roadbed subgrade. Removing embankment materials and contouring to near its original topography and reseeding would reclaim the old roadbed at MP 4.0. Restoring this slope to its pre-road construction status is expected to result in improved stability, as the slope may have been stable prior to the original road construction (USDOT 2006). Impacts of the proposed action at MP 4.0 would last more than 2 years.

*MP 4.5*

Under the proposed action, the roadbed at MP 4.5 would be elevated by approximately 2 to 4 feet and shifted away from the hillside by roughly 2 to 8 feet. Impacts to geologic processes beneath the existing road would occur in locations where larger or additional culverts are constructed. Impacts would occur from the addition of downslope fill materials needed in order to maintain the road prism as the roadway

is raised and shifted. For every foot that the roadway is raised, the downslope prism would move out 4 feet, and for every foot the roadway is shifted, the downslope prism would move out a foot. The improved road design and the increase in number of culverts would reduce the magnitude of existing erosion.

Due to the relatively narrower and shallower existing ditch, the proposed ditch deepening and widening would result in an increase in ice storage capacity. The installation of a gabion mattress on some portions of the slope excavated for ditch widening would provide protection of the erosion-prone areas exposed to during ditch widening activities. The mat would protect the shallow subsurface soils and allow for more efficient revegetation of the affected areas.

The installation of additional culverts would reconnect some of the hydrological pathways that existed prior to the park road placement. The additional culverts would increase drainage of water available for the formation of aufeis and reduce ice removal from the road. With reduction of ice removal activities, roadbed maintenance would occur less frequently and heavy equipment traffic on the roadbed would be limited. Re-channelization of the spring flows could cause erosion within the new channel orientation.

Cumulative Impacts

Past and present construction activities that have impacted geologic processes in the project area include the initial park road construction and annual maintenance activities, the borrow pits at MP 4.0 and MP 5.0, and general road usage by maintenance crews and park visitors. Geologic impacts concerning these activities could include vegetation and insulative mat removal, causing alterations to permafrost-bearing soils and the formation of thermokarst features (most common impacts to thermokarst features are from insulative vegetation mat stripping and invasive construction activities leading to uneven ground thaw); natural spring water damming, resulting in aufeis accumulation; and heavy equipment travel on and adjacent to the road corridor, resulting in accelerated roadway degradation and uneven compaction of subsurface soils. Past and present actions have a contribution to cumulative impacts on geologic processes.

Reasonably foreseeable future actions that would contribute to cumulative impacts on geological processes include road rehabilitation activities, such as ongoing road resurfacing and regarding, the replacement of failing pavement from MP 0.0 to MP 15.0, and the replacement of the Rock Creek Bridge at MP 3.0. However, these road maintenance activities would be decreased in the project area with an effective reroute at MP 4.0 and aufeis control at MP 4.5.

Conclusion

Impacts on geological processes from the proposed action would be **minor**. Excavation and road rerouting would occur near MP 4.0 to avoid the persistent slumping section. Excavations for winter ice retention off the roadway would occur near MP 4.5. Hydrological connectivity would be restored and protected to the extent possible and damage to downslope soils would be reduced.

The level of impact on geological processes from this alternative would not result in “impairment” of those park resources that fulfill the specific purposes identified in the enabling legislation or that are essential to the natural or cultural integrity of the park.

### 4.4.5 Visitor Use

*MP 4.0*

The road rehabilitation at MP 4.0 primarily consists of 1,600 feet of road being rerouted north of the existing road, thereby leaving the existing road open for unimpeded travel. Park visitors would not be

delayed by rehabilitation activities except at late hours of the day when these activities are anticipated to occur. Most rehabilitation activities would occur at night; therefore, delays due to construction equipment hauling materials in or out across the old section of road would be minimal. Construction activities at MP 4.0 would result in temporary impacts on visitor use during the summer while road rehabilitation occurs.

In the future during the summer, park visitors would experience fewer maintenance delays that currently result from the need to annually add embankment to maintain the grade at this section of road. Park visitors would be safer traveling this section of road because traffic would no longer be routed through the unstable slump area, which has posed past safety risks to visitors in vehicles. These impacts are expected to be beneficial.

*MP 4.5*

Traffic would be limited to one-lane through this area, with some traffic delays, until the road rehabilitation was completed. Most construction activities would occur at late hours of the day to minimize impacts to park visitors and park shuttles. Most visitor traffic occurs during the day.

Aufeis would not likely form to the hazardous extent it currently does; therefore, winter visitor use would become safer and more reliable by allowing mushers, skiers, and snowshoers to access the back country along this corridor. Ice removal activities to open the park road for the summer season could start later, which would provide a longer season for winter visitors to use the park road as an access corridor without the added danger of ice removal equipment in the roadway. These impacts are expected to be beneficial and persistent for greater than 2 years.

Cumulative Impacts

As discussed in Section 4.3.5, cumulative impacts to visitor use in the vicinity of the proposed project have been influenced by past and present actions that have provided enhanced facilities and trails.

Reasonably foreseeable future actions such as the proposed trail projects in the Nenana Corridor and the planned safety enhancements at MP 3.0 and MP 4.0 could provide a localized but long-term contribution to cumulative impacts on visitor use in the vicinity of the project. The proposed action would improve visitor access to the backcountry; however, it is not expected that winter visitor use would increase in the park.

Conclusion

Impacts on visitor use from the proposed action would be **minor**. Impacts to visitor use at MP 4.0 would be temporary, primarily resulting from the initial construction activities associated with road rehabilitation. In the future, park visitors would experience fewer road work delays. At MP 4.5 winter visitor use would become safer.

### 4.4.6 Visual Resources

*MP 4.0*

Approximately 1,600 feet of the road at MP 4.0 would be rerouted to the north and the old roadbed revegetated. There would be impacts to visual resources during the rehabilitation phase from vegetation clearing, equipment, dust, and revegetation projects. The rerouted road would change the current landscape of the area. The reclaimed roadbed would eventually become revegetated; however, this area would appear uncharacteristically bare of the existing densely vegetated surrounding area for a period until the area could fill in. This condition would likely last more than 2 years.

*MP 4.5*

A ditch would be constructed approximately 2 feet wide and 9 feet below the road surface at MP 4.5, creating localized visual impacts. A 12-inch gabion mattress would mitigate impacts to visual resources in the area by providing a canvas for practical and stable revegetation. The visual impacts resulting from slope revegetation would be persistent but with a relatively small area of disturbance. Temporary impacts associated with rehabilitation, as discussed for MP 4.0 would occur.

Cumulative Impacts

Past, present, and reasonably foreseeable future actions that have contributed to cumulative impacts on visual resources in the area are consistent with the cumulative impacts discussion in Section 4.3.6, and include several construction projects that serve visitors and staff. The park facilities and roads are designed to mimic the features of the natural landscape, incorporating natural colors and textures, and landscaping with native materials. Past, present, and reasonably foreseeable future actions have contributed persistent impacts to visual resources of the park.

Because the proposed action would generate temporary, impacts to visual resources resulting from road rehabilitation activities, and impacts resulting from slope revegetation, this alternative would have a contribution to cumulative impacts on visual resources in the area.

Conclusion

Impacts on visual resources from the proposed action would be **minor**. The proposed action would create a larger footprint of development in the park, in the highly visible road corridor. At MP 4.0 road, grade and vegetation rehabilitation would occur.

The level of impact on visual resources from this alternative would not result in "impairment" of those park resources that fulfill the specific purposes identified in the enabling legislation or that are essential to the natural or cultural integrity of the park.

### 4.4.7 Soundscapes

*MP 4.0*

Construction activities at MP 4.0 would result in a temporary increase in the ambient noise level resulting from the operation of construction equipment. During these activities, varying numbers of construction equipment and personnel would be in the area of the project, resulting in varying levels of construction noise. The project would utilize conventional construction techniques and equipment including excavators, bulldozers, heavy trucks (water truck, dump truck) and similar heavy construction equipment.

The increase in noise level would be primarily experienced close to the noise source, but some noise may be audible at greater distances, depending on the propagation characteristics in the area. The magnitude of the noise effects would depend on the type of construction activity, noise level generated by various construction equipment, duration of the construction phase, and the distance between the noise source and receiver. Decibel A-weighted (dBA) is a measurement that indicates the sound level weighted for human hearing. Sound levels of typical construction equipment range from approximately 65 dBA to 95 dBA at 50 feet from the source (USEPA 1971).

Sensitive receptors that would potentially be impacted by the construction activities include visitors utilizing trails and scenic overlooks, visitors to the dog kennels and headquarters, staff at the headquarters and residences, and wildlife. In particular, the backup alarms would be disruptive to the

natural soundscape. However, the existing soundscape in the area is comprised of various natural and human-generated noises, such as heavy equipment during maintenance; therefore, these activities would not introduce a novel noise source to the existing natural soundscape. In addition, because the project would result in decreased annual maintenance, the overall net construction-related noise introduced to the soundscape in future years would decrease.

*MP 4.5*

Potential impacts to soundscapes associated with construction activities at MP 4.5 would be similar to those identified for MP 4.0. However, because the park headquarters and staff residences are farther away from MP 4.5 than MP 4.0, noise levels experienced at those receptors would be less at MP 4.5. Impacts to soundscapes under the proposed action at MP 4.5 would be temporary.

Cumulative Impacts

Cumulative impacts to the soundscape from past, present, and reasonably foreseeable future actions primarily consist of increasing human use in the park. An increase in human use results in an increase in human-generated noise, thereby altering the natural soundscape. Impacts from past, present, and reasonably foreseeable future actions are consistent with the cumulative impacts discussion in Section 4.3.7.

Under the proposed action, the soundscape would be altered temporarily during construction, but would return to existing levels once the project is completed. Therefore, there would no cumulative effect as a result of the project. Furthermore, because the project would result in decreased annual maintenance, the overall net construction-related noise introduced to the soundscape would decrease.

Conclusion

Impacts on natural soundscapes from the proposed action would be **minor**. Impacts would be temporary, primarily from construction activities. Construction-related noise introduced to the soundscape would decrease.

The level of impact on natural soundscapes from this alternative would not result in “impairment” of those park resources that fulfill the specific purposes identified in the enabling legislation or that are essential to the natural or cultural integrity of the park.

# 5.0 CONSULTATION AND COORDINATION

## 5.1 Agency Consultation and Coordination

The NPS is the lead agency in the development of this EA, and FHWA is a cooperating agency for this action.

There was no public scoping in the development of this document. NPS policies do not require public scoping during draft document preparation below the EIS level.

This EA will be available for public review and comment for a minimum of 30 days.

Following the public review period, all the public comments will be considered.

A final decision by the NPS Alaska Regional Director may come in the form of a Finding of No Significant Impact (FONSI), which would take into account any new information and public comment, and select an alternative to implement. If a FONSI is approved, it would be sent to those individuals and organizations that commented during the public review period, and it would be available on the park's web site (http://www.nps.gov/dena) and the NPS park planning web site (http://parkplanning.nps.gov/).

The NPS has determined that there are no Threatened and Endangered Species expected in the project area; therefore §7 consultation with the USFWS is not required.

The NPS has determined that the previously disturbed portion of the proposed road rehabilitation project would fall under a Programmatic Categorical Exclusion (No. 7: repaving of existing roads within previously disturbed areas) of the 1995 NPS Programmatic Agreement with the National Conference of State Historic Preservation Officers. For the new disturbance areas of the project, the NPS would consult as required under §106 of the National Historic Preservation Act and implementing regulations.

FHWA would consult, as required under the Clean Water Act, with USACE regarding wetland impacts and mitigations. USACE has regulatory authority over wetlands and a 404 permit would be needed if there are wetland impacts.

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This EA was developed under an NPS contract by URS Group, Inc. of Anchorage, Alaska. The NPS holds final responsibility for all content.

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# APPENDIX A
# WETLANDS STATEMENT OF FINDINGS

## PURPOSE AND NEED FOR ACTION

The National Park Service (NPS) has prepared and made available for public review an environmental assessment (EA) to evaluate the impacts of road rehabilitation and realignment around milepost (MP) 4.0 and MP 4.5 of the Denali National Park Road (park road) in Denali National Park and Preserve (the park).

The NPS is proposing to:

- Bypass a slump area at MP 4.0 by realigning the road through an abandoned borrow pit to the north, or uphill side.
- Raise the road surface at MP 4.5 approximately 2 to 4 feet, shift it 2 to 8 feet to the west, widen and deepen roadside ditches, and install equalization culverts.

The proposed project is consistent with similar projects and management plans outlined in both the 1986 General Management Plan and the 1997 Development Concept Plan/Environmental Impact Statement, which was an amendment to the 1986 plan.

Executive Order (E.O.) 11990, Protection of Wetlands, requires the NPS, and other federal agencies, to evaluate the likely impacts of actions in wetlands. The E.O. requires that short- and long-term adverse impacts associated with occupancy, modification or destruction of wetlands be avoided whenever possible. Indirect support of development and new construction in such areas should also be avoided wherever there is a practicable alternative.

To comply with these orders, the NPS has developed a set of agency policies and procedures which can be found in Director's Order (DO) 77-1, Wetland Protection, and Procedural Manual 77-1, Wetland Protection. The policies and procedures related to wetlands emphasize: exploring all practical alternatives to building on, or otherwise affecting, wetlands; reducing impacts to wetlands whenever possible; and providing direct compensation for any unavoidable wetland impact by restoring degraded or destroyed wetlands on other NPS properties.

The purpose of this Statement of Findings (SOF) is to present the NPS rationale for its proposed road rehabilitation at MP 4.0 and MP 4.5 in the wetland area. This SOF also documents the anticipated effects on these resources.

## WETLANDS WITHIN THE PROJECT AREA

Wetland boundaries were identified in the field by NPS personnel in August 2006, transcribed onto air photos, and converted to a geographic information system (GIS) layer to determine wetland acreage. Of the approximately 2.6 acres that would be newly disturbed by the proposed action, 1 acre is classified as wetlands under the "Classification of Wetlands and Deepwater Habitats of the United States," the Cowardin Classification System (Cowardin et al. 1979), and are therefore subject to NPS wetlands compliance procedures. Of the 2.6 acres that would be newly disturbed, 1.6 acres are upland, as evidenced by the white spruce associations, the lack of hydrologic indicators, and the presence of well-draining soils.

The 1 acre of wetlands located within the proposed project area is classified as palustrine forested/scrub-shrub, needle-leaved evergreen, saturated wetlands (PFO4/SS1B) and riverine intermittent, vegetated

streambed (R4SB7). Vegetation in palustrine forested/scrub-shrub wetlands is typically dominated by black spruce/white spruce hybrids (Viereck et al. 1992). The understory shrub layer can vary slightly, but typically consists of both low and tall shrubs of willow (including *Salix planifolia*), Labrador tea (*Ledum* spp.), lowbush cranberry (*Vaccinium vitis-idaea*), and bog blueberry (*Vaccinium uliginosum*). Common ground cover includes peat mosses (*Sphagnum* spp.) and herbaceous species like field horsetail (*Equisetum arvense*) and few flowered sedge (*Carex pauciflora*) and a variety of forbs (Viereck at al. 1992; Reed 1996). Local wetlands of the riverine intermittent classifications are small streambeds wet enough to be colonized by dense willow swarms (*S. planifolia*).

These affected wetlands function to attenuate snow melt surface flow during spring break-up, when the ground is still frozen. They also function to slow water movement during heavy rainfall events and limit erosion of soils during those events and help protect the park road from flood events. The wetlands involved here also include ground water discharge points (springs) that help keep the lower slopes saturated; however, they contribute to the aufeis situation on the road. These wetlands also provide habitat for wildlife, such as red squirrels, snowshoe hares, porcupine, and common bird species such as gray jays, thrushes, sparrows, and warblers. Less common raptors such as hawk-owls use wetland trees for nesting. Moose frequent the area for forage. No threatened or endangered animal or plant species are found in the area and no research or reference sites have been developed in the project area.

There are no water wells located near the project area. Flooding at this site has not been documented, as forests and open wetlands cover most of the adjacent land and gravelly subsurface soils absorb the rainfall.

**THE PROPOSAL IN RELATION TO WETLANDS**

The proposal and alternatives are described in detail in the project EA.

The road rehabilitation at MP 4.0 and MP 4.5 would impact a maximum of 0.9 acre of palustrine forested/scrub-shrub (PFO4/SS1B) and 0.1 acre of riverine (R4SB7) wetlands. The extent of disturbance is shown on Figures 4, 5, 8, and 9 of this EA. The majority of the wetland disturbance would be caused by the fill necessary to raise and shift the road at MP 4.5.

Palustrine forested/scrub-shrub, needle-leaved evergreen/broad-leaved deciduous, saturated wetlands (PFO4/SS1B) and riverine intermittent, vegetated streambed (R4SB7), as described above, are common throughout the eastern areas of the park. The wetlands located at the proposed project site are a relatively small part of the park's wetlands and are locally common: in the valley that surrounds about the first 10 miles of the park road alone, there are over 1,000 acres of palustrine forested/scrub-shrub wetlands. Therefore, the approximately 0.9 acre of palustrine forested/scrub-shrub wetlands that would be lost by the proposed action equates to less than 0.1 percent of the total palustrine forested/scrub shrub wetland acreage in just this area of the park. Removal of this amount of wetlands would have a moderate impact on overall wetland functions and values, such as surface water quality (including sediment control and water purification), floodwater attenuation, and animal habitat.

The primary purposes of this project are to reroute and solidify a section of slumping road and minimize aufeis impacts on another section of road. The road improvements would help to make the road passable and safe throughout the year. Also, activities associated with the proposed project (i.e., trenching, ditching, and installation of culverts) would result in the beneficial impact of increased hydrological connectivity between vegetation upgradient and downgradient from the road. This increased hydrological connectivity, coupled with the retention of winter ice in upgradient ditches, would greatly decrease the volume of ice that currently reaches and covers the road. Since there would be minimal

aufeis on and around the road, park personnel would not have to dig up the ice and dispose of it to the downgradient side of the road; an act which crushes vegetation. And, the upgradient retaining ditch would be placed in such a location (lower and closer to the road) so that vegetation upslope from it would not be affected by a lack of moisture during the growing season.

The proposed project area wetland soils include up to 60 inches of organic peat soils (such as Doroshin or Salamatof peat) over gravelly glacial till. The installation of culverts and ditch, and related road improvements would be accomplished by removing the organic soils and replacing it with clean fill on top of the glacial till to the depth necessary to support a paved road for vehicular traffic.

Discharge of dredged or fill material into jurisdictional wetlands is regulated by the U.S. Army Corps of Engineers (USACE) under section (§) 404 of the Clean Water Act. The project would need a §404 permit from USACE for the culvert work and the work around the intermittent streams that coalesce from uphill springs.

**MITIGATION PROPOSED**

Federal and NPS policy is to avoid locating projects in wetlands whenever possible. If circumstances make it impracticable to avoid wetlands, then mitigation of unavoidable impacts must be planned. An NPS wetlands no-net-loss policy requires that wetland losses be compensated for by restoration of wetlands, preferably of comparable wetland type and function and in the same watershed if possible.

Of the 2.6 acres potentially affected by the proposed action, 1 acre is classified as wetlands. This SOF commits to full 2:1 compensation for the 1 acre of disturbed wetlands.

On-Site Rehabilitation

As much as possible, disturbance of wetlands in and around the project area would be avoided. Silt fences would be set up to define construction impact limits. Any areas disturbed by construction activities would be restored to as near natural conditions as possible. Fugitive dust from construction activities would be mitigated through the use of dust abatement practices (i.e., watering). Prior to the start of construction activities, the NPS would salvage as much topsoil, organic matter, and vegetation as necessary for later use in site revegetation or for use in revegetating other local sites. Salvaged material would be stockpiled separately and would be placed in the disturbed areas following construction.

Off-Site Compensation (Wetland Restoration)

Compensation, by restoration of previously disturbed degraded wetlands, is required under the NPS no-net-loss policy for projects involving disturbance or loss of wetlands. Compensation would occur for the loss of 1 acre of palustrine forested/scrub-shrub and riverine intermittent wetland. Two-for-one compensation would be completed within the park, rather than 1:1, because the work at the compensation site would restore some, but not all of the natural functioning of the riparian wetlands previously lost at the site. Stabilizing the channel and floodplain would allow processes such as natural revegetation, soil deposition from spring breakup events, and pool and riffle initiation to begin with a much smaller chance of channel blowout during flooding and resultant loss of functioning.

The project site and the Kantishna compensation site (see Figure 10) are separated by about 65 miles but are both within Denali National Park. The affected area and the proposed compensation site have some different wetland functions and values. The wetlands impacted by the project are described above as a PFO4/SS1B and R4SB7 type and the wetlands to be restored at the Kantishna compensation site are described below as a R3USJ/PUS1D classification.

An NPS-funded project to restore landscapes within former placer mined areas in Kantishna is scheduled for 2008-2010. An estimated 2.7 acres (based on 2:1 compensation of wetlands lost to proposed project) within the park's Glen Creek floodplain (specifically at the confluence of the West and East Forks of Glen Creek) has been selected for restoration within the scope of this mitigation, for compensation related to this road rehabilitation project. These Kantishna area wetlands are classified as riverine upper perennial unconsolidated shore, intermittently flooded; palustrine unconsolidated shore, cobble gravel, seasonally flooded/well-drained (R3USJ/PUS1D). Restoration plans at the Glen Creek site include removing and disposing of debris; stabilizing the channel and floodplain; stabilizing the access road; and revegetating the stripped areas. Preliminary work would include water and soil sampling and an engineering survey of the existing stream channel, floodplain and upland topography. Discharge measurements would be collected to aid in stream channel design. Soil sampling would assess the geo-chemistry of the upper watershed, and determine the soil's potential for revegetation efforts. Surveys, both cross-sectional and topographical, would be conducted to supplement site data on the NPS topographic maps. This information would be used to locate and estimate material amounts for use in recontouring the site and reconstructing the stream channel and floodplain.

The cost estimate for this compensation project is approximately $20,000 per acre, based on an unpublished report, "Cost Estimation for Reclamation, National Park Service, Alaska Regional Office, January 1994." This report reviewed three separate mining reclamation projects that were conducted on abandoned claims in the park. The cost associated with compensation for the proposed road project would be about $40,000. The park cannot use funds specifically earmarked for natural resources management (e.g., Natural Resources Preservation Program funding, Water Resources Division-Competitive, etc.) to compensate for construction impacts. The NPS base funding for park operations would be used for this compensation.

Project design requirements would include a channel capacity for a 1.5-year (bank full) discharge and a floodplain capacity for up to a 100-year discharge. The project design would include the use of bio-revetment, located on meanders, to encourage channel stabilization using natural methods. Brush bars, located in areas of little or no fines, would be employed to dissipate floodwater energy and encourage sediment deposition. Riparian areas would be revegetated with willow cuttings and other appropriate vegetation. Depending on the results from the soils nutrient analysis, fertilizer would be used to ensure a quick start for new vegetation. Monitoring of the stream channel and riparian areas would occur to determine the success of the reclamation efforts. Vegetation plots and permanently mounted cross-sections would be surveyed and measured again after the first year. Additional seeding and revegetation would occur on areas not vegetated during the first year. It is anticipated that the site would be at least a partially functional wetland within 3 to 5 years after treatment, and would be fully-functioning within 15 years.

## ALTERNATIVES CONSIDERED

Alternative 1 describes the No Action Alternative; under this alternative, the NPS and Federal Highways Administration would not complete the proposed road rehabilitation. Existing use and maintenance of the road at MP 4.0 and MP 4.5 would continue. Refer to Section 2.2 of the EA for a more detailed explanation of Alternative 1.

Alternative 2 is the NPS Preferred Alternative to reroute the slumping park road at MP 4.0 and raise and shift it at MP 4.5. Alternative 2, the proposed action, is the Environmentally Preferred Alternative. This alternative addresses the worsening road issues at MP 4.0 and the icing problem at MP 4.5. It ultimately extends the life of the existing infrastructure and reducing the need for more extensive rehabilitation and

reconstruction in the future. The redesigned road would avoid or stabilize an unstable and sliding slope and provide a safer road for park visitors and staff during winter and spring road opening when aufeis threatens the park road. A broader range of beneficial uses of the environment would be accomplished in the aufeis area. Dog sled mushers and Nordic skiers have great difficulty safely passing this area when the ice overtakes the road. The road rehabilitation would provide safer passage by reducing the amount of ice that forms on the roadway. The amount of vegetation that is destroyed when large blocks of ice are cleared and thrown over the side of the road during spring road opening would be reduced.

Alternative 1, the No Action Alternative, would not accomplish the purpose or relieve the need for the project. This alternative allows the continuation and possible worsening of roadway slumping at MP 4.0 and the continued formation of aufeis at MP 4.5 that can cover 1,000 feet or more of roadway with ice up to 6 feet deep. Safety is a concern for winter visitors and for park maintenance crews who remove the large quantities of ice in the spring to open the park road for safe travel.

The reason for selecting Alternative 2, with a greater wetland impact, is that it better serves the purpose and need of the project. The purpose and need are described in detail in Section 1.1 of the project EA, which is incorporates this SOF through reference.

Several other alternatives were discussed during the project scoping process but were eliminated from further evaluations. These are briefly explained in the EA.

**SUMMARY OF ENVIRONMENTAL CONSEQUENCES ASSOCIATED WITH THE PROPOSED ACTION**

The potential environmental consequences of the proposed action and alternatives are fully described in the EA.

**CONCLUSION**

The NPS concludes that there are no practical alternatives to disturbing about 1 acre of wetlands for proposed project related activities including: raising and realigning the road grade, installing new and larger culverts, excavating a wider and deeper ditch, and related road improvements. Wetlands would be avoided to the maximum extent practicable. The wetland impacts that could not be avoided would be minimized. The NPS acknowledges that some natural localized wetlands, and their accompanying processes, would be lost by the road rehabilitation project. Impacts on the 1 acre of wetlands would be compensated for, on a minimum 2:1 acreage basis, by restoring riverine and palustrine wetland habitat in the Kantishna Hills region of the park (formerly a placer-mined stream and riparian habitat at the confluence of the East and West forks of the Glen Creek). The NPS finds that this project is consistent with the Procedural Manual #77-1, Wetland Protection and with NPS DO #77-1, Wetland Protection. The NPS finds that this project is in compliance with E.O. 11990, Wetland Management.

**REFERENCES:**

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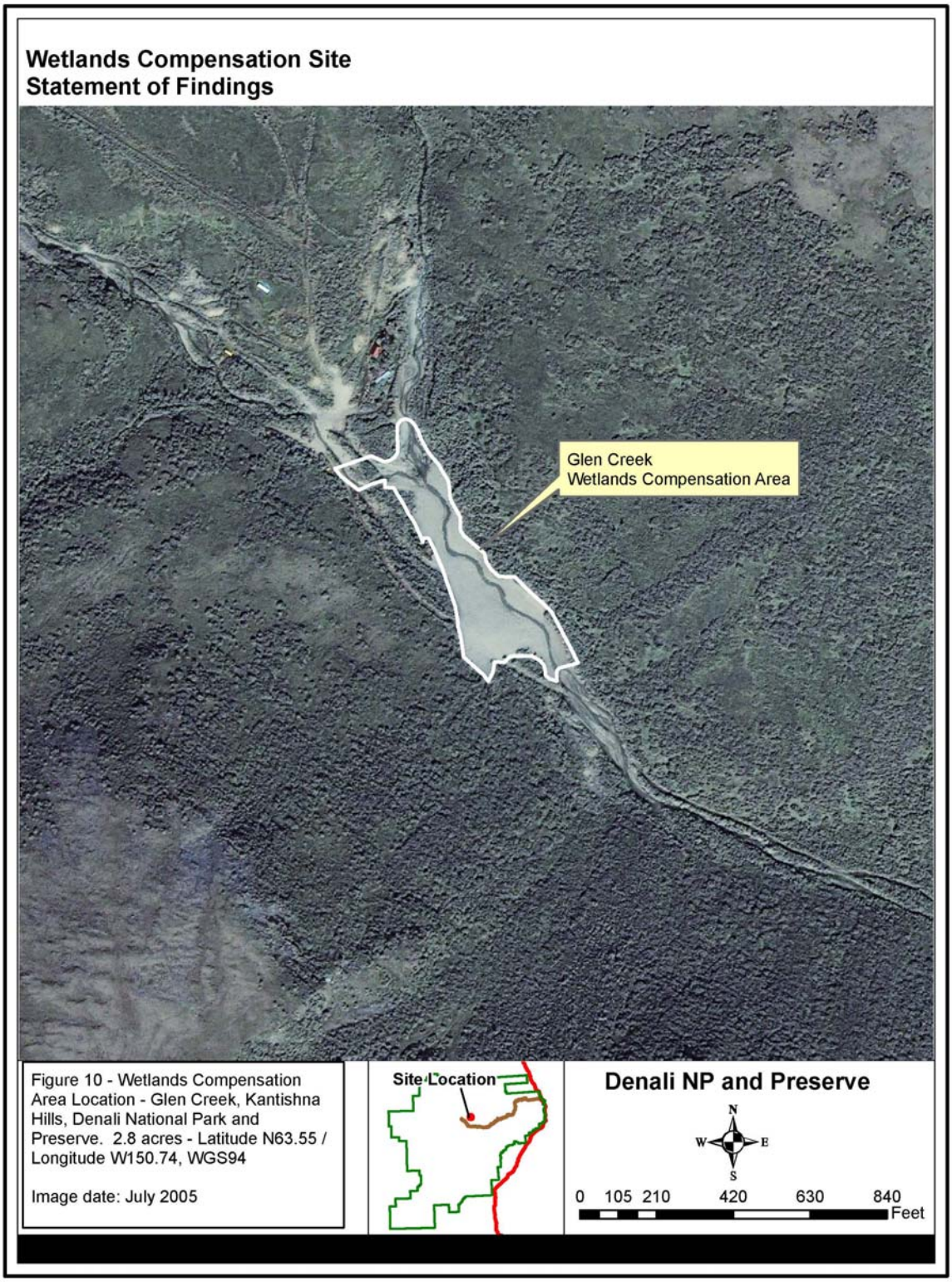
Reed, P.B., Jr. 1996. National List of Vascular Plant Species that Occur in Wetlands: 1996 National Summary. Available online.

Viereck, L.A., et al. (1992). The Alaska Vegetation Classification. General Technical Report PNW-GTR-286. USDA Forest Service, Pacific Northwest Research Station. Portland, OR.


Wetlands Compensation Site
Statement of Findings
Glen Creek
Wetlands Compensation Area
Figure 10 - Wetlands Compensation Area Location - Glen Creek, Kantishna Hills, Denali National Park and Preserve. 2.8 acres - Latitude N63.55 / Longitude W150.74, WGS94
Image date: July 2005
Site Location
Denali NP and Preserve
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# APPENDIX B
# ANILCA §810 SUBSISTENCE
# SUMMARY EVALUATION AND FINDINGS

## I. INTRODUCTION

This section was prepared to comply with Title VIII, §810 of the Alaska National Interest Lands Conservation Act (ANILCA) of 1980. It summarizes the evaluation of potential restrictions to subsistence activities that could result from the rehabilitation and realignment of the park road at milepost (MP) 4.0 and MP 4.5 just west of park headquarters in Denali National Park and Preserve.

## II. THE EVALUATION PROCESS

Section (§) 810(a) of ANILCA states:

> "In determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands . . . the head of the federal agency . . . over such lands . . . shall evaluate the effect of such use, occupancy, or disposition on subsistence uses and needs, the availability of other lands for the purposes sought to be achieved, and other alternatives which would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes. No such withdrawal, reservation, lease, permit, or other use, occupancy or disposition of such lands which would significantly restrict subsistence uses shall be effected until the head of such Federal agency -
>
> (1) gives notice to the appropriate State agency and the appropriate local committees and regional councils established pursuant to §805;
>
> (2) gives notice of, and holds, a hearing in the vicinity of the area involved; and
>
> (3) determines that (A) such a significant restriction of subsistence uses is necessary, consistent with sound management principles for the utilization of the public lands, (B) the proposed activity will involve the minimal amount of public lands necessary to accomplish the purposes of such use, occupancy, or other disposition, and (C) reasonable steps will be taken to minimize adverse impacts upon subsistence uses and resources resulting from such actions."

ANILCA created new units and additions to existing units of the National Park System in Alaska. Denali National Park and Preserve was created by ANILCA §202(3)(a):

> "The park additions and preserve shall be managed for the following purposes, among others: To protect and interpret the entire mountain massif, and additional scenic mountain peaks and formations; and to protect habitat for, and populations of, fish and wildlife, including, but not limited to, brown/grizzly bears, moose, caribou, Dall sheep, wolves, swans and other waterfowl; and to provide continued opportunities, including reasonable access, for mountain climbing, mountaineering, and other wilderness recreational activities."

Title I of ANILCA established national parks for the following purposes:

> ". . . to preserve unrivaled scenic and geological values associated with natural landscapes; to provide for the maintenance of sound populations of, and habitat for, wildlife species of inestimable value to the citizens of Alaska and the Nation, including those species dependent on vast relatively undeveloped areas; to preserve in their natural state extensive unaltered arctic tundra, boreal forest, and coastal rainforest ecosystems to protect the resources related to subsistence needs; to protect and preserve historic and archeological sites, rivers, and lands, and to preserve wilderness resource values and related recreational opportunities including but not limited to hiking, canoeing, fishing, and sport hunting, within large arctic and subarctic wildlands and on free-flowing rivers; and to maintain opportunities for scientific research and undisturbed ecosystems.
>
> ". . . consistent with management of fish and wildlife in accordance with recognized scientific principles and the purposes for which each conservation system unit is established, designated, or expanded by or pursuant to this Act, to provide the opportunity for rural residents engaged in a subsistence way of life to continue to do so."

The potential for significant restriction must be evaluated for the proposed action's effect upon ". . . subsistence uses and needs, the availability of other lands for the purposes sought to be achieved and other alternatives which would reduce or eliminate the use. . . ." (§810(a))

## III. PROPOSED ACTION ON FEDERAL LANDS

Alternatives 1 and 2 are described in detail in the environmental assessment. Customary and traditional subsistence use on NPS lands will continue as authorized by federal law under all alternatives. Federal regulations implement a subsistence priority for rural residents of Alaska under Title VIII of ANILCA.

The NPS proposes to rehabilitate two sections of the park road, and realign one of those sections, totaling about 4,200 feet in length between MP 4.0 and MP 5.0 west of park headquarters in Denali National Park and Preserve. The sites are in the former Mount McKinley National Park wherein subsistence activities are not allowed.

## IV. AFFECTED ENVIRONMENT

Subsistence uses within Denali National Park and Preserve are permitted in accordance with Titles II and VIII of ANILCA. Sec. 202(3)(a) of ANILCA authorizes subsistence uses, where traditional, in the northwestern and southwestern preserves of Denali National Preserve. Lands within former Mount McKinley National Park are closed to subsistence uses.

A regional population of approximately 300 eligible local rural residents qualifies for subsistence use of park resources. Resident zone communities for Denali National Park and Preserve are Cantwell, Minchumina, Nikolai, and Telida. By virtue of their residence, local rural residents of these communities are eligible to pursue subsistence activities in the new park additions. Local rural residents who do not live in the designated resident zone communities, but who have customarily and traditionally engaged in

subsistence activities within the park additions, may continue to do so pursuant to a subsistence permit issued by the Park Superintendent in accordance with state law and regulations.

The NPS realizes that Denali National Park and Preserve may be especially important to certain communities and households in the area for subsistence purposes. The resident zone communities of Minchumina (population 22) and Telida (population 11) use park and preserve lands for trapping and occasional moose hunting along area rivers. Nikolai (population 122) is a growing community and has used park resources in the past. Cantwell (population 147) is the largest resident zone community for Denali National Park and Preserve, and local residents hunt moose and caribou, trap, and harvest firewood and other subsistence resources in the new park area.

The main subsistence species, by edible weight, are moose, caribou, furbearers, and fish. Varieties of subsistence fish include coho, king, pink, and sockeye salmon. Burbot, dolly varden, grayling, lake trout, northern pike, rainbow trout, and whitefish are also among the variety of fish used by local people. Beaver, coyote, land otter, weasel, lynx, marten, mink, muskrat, red fox, wolf, and wolverine are important furbearer resources. Rock and willow ptarmigan, grouse, ducks, and geese complete the park/preserve subsistence small game list.

The NPS recognizes that patterns of subsistence use vary from time to time and from place to place depending on the availability of wildlife and other renewable natural resources. A subsistence harvest in any given year many vary considerably from previous years because of such factors as weather, migration patterns, and natural population cycles. However, the pattern is assumed to be generally applicable to harvests in recent years with variations of reasonable magnitude.

## V. SUBSISTENCE USES AND NEEDS EVALUATION

To determine the potential impact on existing subsistence activities, three evaluation criteria were analyzed relative to existing subsistence resources that could be impacted.

The evaluation criteria are:

- the potential to reduce important subsistence fish and wildlife populations by (a) reductions in numbers; (b) redistribution of subsistence resources; or (c) habitat losses;
- the affect the action might have on subsistence fishing or hunting access; and
- the potential to increase fishing or hunting competition for subsistence resources.

The potential to reduce populations:

Rehabilitation of the park road would have a long-term but minor impact on wildlife habitat and populations.

The alternatives would not adversely affect the distribution or migration patterns of subsistence resources. Therefore, no change in the availability of subsistence resources is anticipated as a result of the implementation of this proposed action.

Restriction of Access:

All rights of access for subsistence harvests on NPS lands are granted by §811 of ANILCA. Denali National Park and Preserve is managed according to legislative mandates, NPS management policies and the park's General Management Plan. No actions under the alternatives described in the environmental assessment should affect the access of subsistence users to natural resources in the park and preserve.

Increase in Competition:

The alternatives should not produce any increase in competition for resources to subsistence users.

If, and when, it is necessary to restrict taking, subsistence uses are the priority consumptive users on public lands of Alaska and will be given preference on such lands over other consumptive uses (ANILCA, §802(2)).

Continued implementation of provisions of ANILCA should mitigate any increased competition, however significant, from resource users other than subsistence users. Therefore, the proposed action would not adversely affect resource competition.

## VI. AVAILABILITY OF OTHER LANDS

Choosing a different alternative would not decrease the impacts to park resources for subsistence. The preferred alternative is consistent with the mandates of ANILCA, including Title VIII, and the NPS Organic Act.

## VII. ALTERNATIVES CONSIDERED

The alternatives considered for this project were limited to the lands along the park road just west of park headquarters. The alternatives are: 1) continue the existing conditions (No Action) which includes annual heavy maintenance of the section of the park road at MP 4.0 that is built on a small geologic slump, and a hazardous and expensive maintenance effort each year to clear ice off the park road in the MP 4.5 area; and 2) realigning 1,600 feet of the park road at MP 4.0 to place the road uphill of the small slump and, at MP 4.5, enlarging the existing uphill road ditch into an ice-collecting basin as well as raising the road prism and installing larger culverts to help pass through more of the water seeping out of the ground during the fall and winter and preventing large accumulations on top of the roadbed.

## VIII. FINDINGS

This analysis concludes that the preferred alternative would not result in a significant restriction of subsistence uses.

# APPENDIX C
# BIRDS FOUND IN THE GENERAL PROJECT AREA

## Table 1 Birds that are found in the general project area vicinity and are *likely* to nest near the project area.*

| Common Name | Scientific Name | Resident or Migrant Species† |
|---|---|---|
| Ruffed grouse | *Bonasa umbellus* | Resident |
| Willow ptarmigan | *Lagopus lagopus* | Resident |
| Great-horned owl | *Bubo virginianus* | Resident |
| Northern hawk owl | *Surnia ulula* | Resident |
| Boreal owl | *Aegolius funereus* | Resident |
| American three-toed woodpecker | *Picoides dorsalis* | Resident |
| Gray jay | *Perisoreus canadensis* | Resident |
| Black-capped chickadee | *Poecile atricapillus* | Resident |
| Boreal chickadee | *Poecile hudsonica* | Resident |
| Pine grosbeak | *Pinicola enucleator* | Resident |
| White-winged crossbill | *Loxia leucoptera* | Resident |
| Common redpoll | *Carduelis flammea* | Resident |
| Sharp-shinned Hawk | *Accipiter striatus* | Migrant |
| American Kestrel | *Falco sparverius* | Migrant |
| Merlin | *Falco columbarius* | Migrant |
| Northern flicker | *Colaptes auratus* | Migrant |
| **Olive-sided flycatcher** | ***Contopus cooperi*** | **Migrant** |
| Alder flycatcher | *Empidonax alnorum* | Migrant |
| Hammond's flycatcher | *Empidonax hammondii* | Migrant |
| **Gray-cheeked thrush** | ***Catharus minimus*** | **Migrant** |
| Swainson's thrush | *Catharus ustulatus* | Migrant |
| Hermit thrush | *Catharus guttatus* | Migrant |
| American robin | *Turdus migratorius* | Migrant |
| Varied thrush | *Ixoreus naevius* | Migrant |
| Ruby-crowned kinglet | *Regulus calendula* | Migrant |
| Orange-crowned warbler | *Vermivora celata* | Migrant |
| Yellow-rumped warbler | *Dendroica coronata* | Migrant |
| Wilson's warbler | *Wilsonia pusilla* | Migrant |
| American tree sparrow | *Spizella arborea* | Migrant |
| Savannah sparrow | *Passerculus sandwichensis* | Migrant |
| Fox sparrow | *Passerella iliaca* | Migrant |
| White-crowned sparrow | *Zonotrichia leucophrys* | Migrant |
| Dark-eyed junco | *Junco hyemalis* | Migrant |

Source: Modified version of list provided by Carol McIntyre, wildlife biologist, Denali National Park and Preserve (2007), and (NPS 2007). **Bold** text indicates a species of special concern

* Formal bird surveys have not been completed for the proposed project area; therefore, nesting potentials are based on professional experience and opinion (McIntyre 2007)

† Resident species over-winter regularly in the park; migrant species generally leave their breeding range during the non-breeding season.

**Table 2 Birds that are found in the general vicinity and *potentially* nest near the project area.***

| Common Name | Scientific Name | Resident or Migrant Species* |
|---|---|---|
| Spruce grouse | *Falcipennis canadensis* | Resident |
| **Northern goshawk** | ***Accipiter gentilis*** | **Resident** |
| Downy woodpecker | *Picoides pubescens* | Resident |
| Hairy woodpecker | *Picoides villosus* | Resident |
| Black-backed woodpecker | *Picoides arcticus* | Resident |
| Northern shrike | *Lanius excubitor* | Resident |
| Black-billed magpie | *Pica hudsonia* | Resident |
| American dipper | *Cinclus mexicanus* | Resident |
| Northern harrier | *Circus cyaneus* | Migrant |
| Red-tailed hawk | *Buteo jamaicensis* | Migrant |
| Solitary sandpiper | *Tringa solitaria* | Migrant |
| Lesser yellowlegs | *Tringa flavipes* | Migrant |
| Wilson's snipe | *Gallinago delicata* | Migrant |
| Short-eared owl | *Asio flammeus* | Migrant |
| Western wood-pewee | *Contopus sordidulus* | Migrant |
| Violet-green swallow | *Tachycineta thalassina* | Migrant |
| Arctic warbler | *Phylloscopus borealis* | Migrant |
| Bohemian waxwing | *Bombycilla garrulous* | Migrant |
| Yellow warbler | *Dendroica petechia* | Migrant |
| **Blackpoll warbler** | ***Dendroica striata*** | **Migrant** |
| Northern waterthrush | *Seiurus noveboracensis* | Migrant |
| Lincoln's sparrow | *Melospiza lincolnii* | Migrant |
| Golden-crowned sparrow | *Zonotrichia atricapilla* | Migrant |
| Pine siskin | *Carduelis pinus* | Migrant |

Source: Modified version of list provided by Carol McIntyre, wildlife biologist, Denali National Park and Preserve (2007), and (NPS 2007). **Bold** text indicates a species of special concern

* Formal bird surveys have not been completed for the proposed project area; therefore, nesting potentials are based on professional experience and opinion (McIntyre 2007). The project area nesting potential for many species in this table is unknown, so they were given a *potential* rating.

† Resident species over-winter regularly in the park; migrant species generally leave their breeding range during the non-breeding season.

**Table 3 Birds that are found in the general project area vicinity, but are not likely to nest near the project area.***

| Common Name | Scientific Name | Resident or Migrant Species* |
|---|---|---|
| Rock ptarmigan | *Lagopus muta* | Resident |
| White-tailed ptarmigan | *Lagopus leucura* | Resident |
| Gyrfalcon | *Falco rusticolus* | Resident |
| Great gray owl | *Strix nebulosa* | Resident |
| Common raven | *Corvus corax* | Resident |
| Rough-legged hawk | *Buteo lagopus* | Migrant |
| Golden eagle | *Aquila chrysaetos* | Migrant |
| **American peregrine falcon** | ***Falco peregrinus anatum*** | **Migrant** |
| Spotted sandpiper | *Actitis macularius* | Migrant |
| Wandering tattler | *Tringa incana* | Migrant |
| Least sandpiper | *Calidris minutilla* | Migrant |
| Mew gull | *Larus canus* | Migrant |
| Belted kingfisher | *Ceryle alcyon* | Migrant |
| Bank swallow | *Riparia riparia* | Migrant |
| Cliff swallow | *Petrochelidon pyrrhonota* | Migrant |
| **Rusty blackbird** | ***Euphagus carolinus*** | **Migrant** |

Source: Modified version of list provided by Carol McIntyre, wildlife biologist, Denali National Park and Preserve (2007), and (NPS 2007). **Bold** text indicates a species of special concern

* Formal bird surveys have not been completed for the proposed project area; therefore, nesting potentials are based on professional experience and opinion (McIntyre 2007)

† Resident species over-winter regularly in the park; migrant species generally leave their breeding range during the non-breeding season.

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## APPENDIX D
## COST ESTIMATES

| | Alternative 1<br>No Action | Alternative 2<br>Proposed Action |
|---|---|---|
| **Cost to Rehabilitate/Rebuild the Park Road at MP 4 and 4.5** | $0. | $2,000,000. |
| **Annual Cost for Spring Road Opening** | NPS currently spends $30,000 to $50,000 for spring road opening to remove and monitor aufeis at MP 4.5, depending on how the ice grows each winter. NPS can spend over $250,000 to open the entire road each spring. | $3,500 to $5,500 for spring road opening, once the project is completed. |
| **Life Cycle Costs** | $550,000 every 3 to 4 years to repave. As the road at MP 4.0 continues to slump, and as the ice removal operations at MP 4.5 continue to damage asphalt surfaces, the asphalt fails and needs to be replaced. | $550,000 to $850,000 every 20 years for pavement replacement. |