

Kenai Fjords National Park



Improvements to Trails and Overlooks in the Exit Glacier Area Environmental Assessment

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**Kenai Fjords National Park
Seward, Alaska**

United States Department of the Interior
National Park Service

TABLE OF CONTENTS

Purpose and Need.....	3
Background.....	4
Issues.....	8
Alternatives.....	11
Affected Environment.....	23
Environmental Consequences.....	29
Consultation and Coordination.....	46
References.....	47
Appendices.....	50

1.0 PURPOSE AND NEED FOR ACTION

1.1 Purpose and Need

The National Park Service (NPS) is considering implementing selected actions from the Exit Glacier Area Plan (NPS 2004) in order to improve the visitor experience, create wheelchair accessible glacier viewing opportunities, prevent adverse impacts to natural resources, and provide for safer access to Exit Glacier. Proposed improvements to the Nature Trail, Harding Icefield Trail and Overlook Loop Trail would include rerouting a portion of the Nature Trail that is threatened by bank erosion along Exit Creek, making the Nature Trail accessible to people in wheelchairs, rerouting a degraded section of the Harding Icefield Trail, extending the Overlook Loop Trail so visitors can approach the margin of Exit Glacier, and constructing overlooks to provide vistas of the outwash plain and glacier. The overall purpose of these proposed actions is to enhance the visitor experience at Exit Glacier while minimizing impacts to park natural resources.

Currently a 0.3 mile paved trail is the only trail in the Exit Glacier area that is wheelchair accessible. Starting at the Nature Center, the paved trail extends southwest in the direction of Exit Glacier terminating at the Interpretive Shelter. The paved trail meanders through a cottonwood forest and the peaks of surrounding mountains are visible; however, there is no good view of the glacier or outwash plain from the paved trail due to the dense forest. From the Interpretive Shelter, a packed gravel trail continues on for another 100 yards to the junction of the Overlook Loop, Nature, and Outwash Plain Trails. The 0.7 mile gravel Nature Trail winds through the floodplain forest along the banks of Exit Creek and back to the Nature Center with numerous views of the outwash plain and retreating glacier.

In addition to being inaccessible to wheelchairs, sections of the Nature Trail paralleling Exit Creek are threatened by bank erosion due to channel migration. A hydrological assessment of the stability of the Nature Trail recommended rerouting the western end of the trail by constructing a new trail segment (1,000 linear feet) from the Interpretive Shelter to the outwash plain, thus avoiding a particularly unstable section of stream bank (Martin 2006). The reroute would be made accessible to wheelchairs as would the remaining 2,252 linear feet of the existing Nature Trail leading back to the Nature Center. A primitive overlook would be constructed on the edge of the outwash plain within view of the glacier and a spotting scope installed to provide an opportunity for physically challenged visitors to view the glacier. The proposed improvements would result in a one mile long loop trail fully accessible to wheelchairs with an unobstructed vista of Exit Glacier.

Exit Glacier has retreated substantially in recent years and is now over 350 feet from the Overlook Loop Trail. The primary reason that more than three-quarters of visitors come to Exit Glacier is to closely approach and view a glacier (Vande Kamp et al. 2004). As the glacier retreats, visitors have created numerous social trails, or unofficial foot paths, which radiate from the designated trail in order to access the glacier. Social trails impact soils and vegetation and are visual intrusions on the landscape. Additionally, off-trail travel by visitors is a major concern given the possibility of falling ice when visitors climb on or get too close to the glacier. Constructing a spur trail and overlook would provide enhanced access to the face

of the glacier and reduce resource impacts and safety concerns associated with off-trail travel in this potentially hazardous area.

The Harding Icefield Trail is a 3.8 mile backcountry hiking trail that provides spectacular overviews of Exit Glacier, the Resurrection River valley, and the Harding Icefield. The lower end of the trail ascends quickly from the valley floor and winds its way through a steep bedrock cliff band before reaching a lateral moraine leading to the alpine zone and eventually a ridge overlooking the icefield. This lower section of trail through the steep cliff band is degraded and does not meet standards defined in the 1991 Park Trail Plan. Poor initial route selection and trail design combine to create serious visitor safety and erosion concerns over most of this section (NPS 1991). Rerouting the trail would involve removal of approximately 850 linear feet of existing trail and construction of a new trail segment (between 1,300 and 2,500 linear feet in length).

All of the proposed improvements to trails and overlooks in the Exit Glacier area are consistent with the management zone prescriptions and desired resource conditions and visitor experiences described in the 2004 Exit Glacier Area Plan. No increased visitation is expected in the Exit Glacier area as a result of the proposed actions.

The National Park Service has prepared this Environmental Assessment to evaluate the potential environmental impacts of the proposed actions and to inform and seek input from the public, regulatory agencies, and other interested parties. This Environmental Assessment has been prepared according to the National Environmental Policy Act of 1969 and regulations of the Council of Environmental Quality (40 CFR Part 1500).

1.2 Background

Established as a national monument in 1978, Kenai Fjords became a national park under the Alaska National Interest Lands Conservation Act (ANILCA) in 1980. Section 201 (5) of this act states that Kenai Fjords National Park shall be managed for the following purposes:

“To maintain unimpaired the scenic and environmental integrity of the Harding Icefield, its out-flowing glaciers, and coastal fjords and islands in their natural state; and to protect seals, sea lions, other marine mammals, marine and other birds and to maintain their hauling and breeding areas in their natural state, and free of human activity which is disruptive to their natural processes. In a manner consistent with the foregoing, the secretary is authorized to develop access to the Harding Icefield and to allow use of mechanized equipment on the icefield for recreation.”

Kenai Fjords National Park is located near the city of Seward in Southcentral Alaska, approximately 75 air miles (120 km) south of Anchorage (Figure 1). The park encompasses 607,805 acres of rugged coastal mountains, deep-water fjords, glaciers, and coastal temperate rainforest along the southeastern coast of the Kenai Peninsula. The 300 mi² Harding Icefield covers more than half of the park and overlies all but the tops of the central portion of the Kenai Mountains. The icefield lies almost a mile above the Gulf of Alaska and glaciers

radiate out in all directions. To the southeast, out-flowing glaciers descend to a coastal fjord system. In the northeast corner of Kenai Fjords National Park, Exit Glacier descends from the Harding Icefield, terminating in a wide outwash plain at the head of Exit Creek.

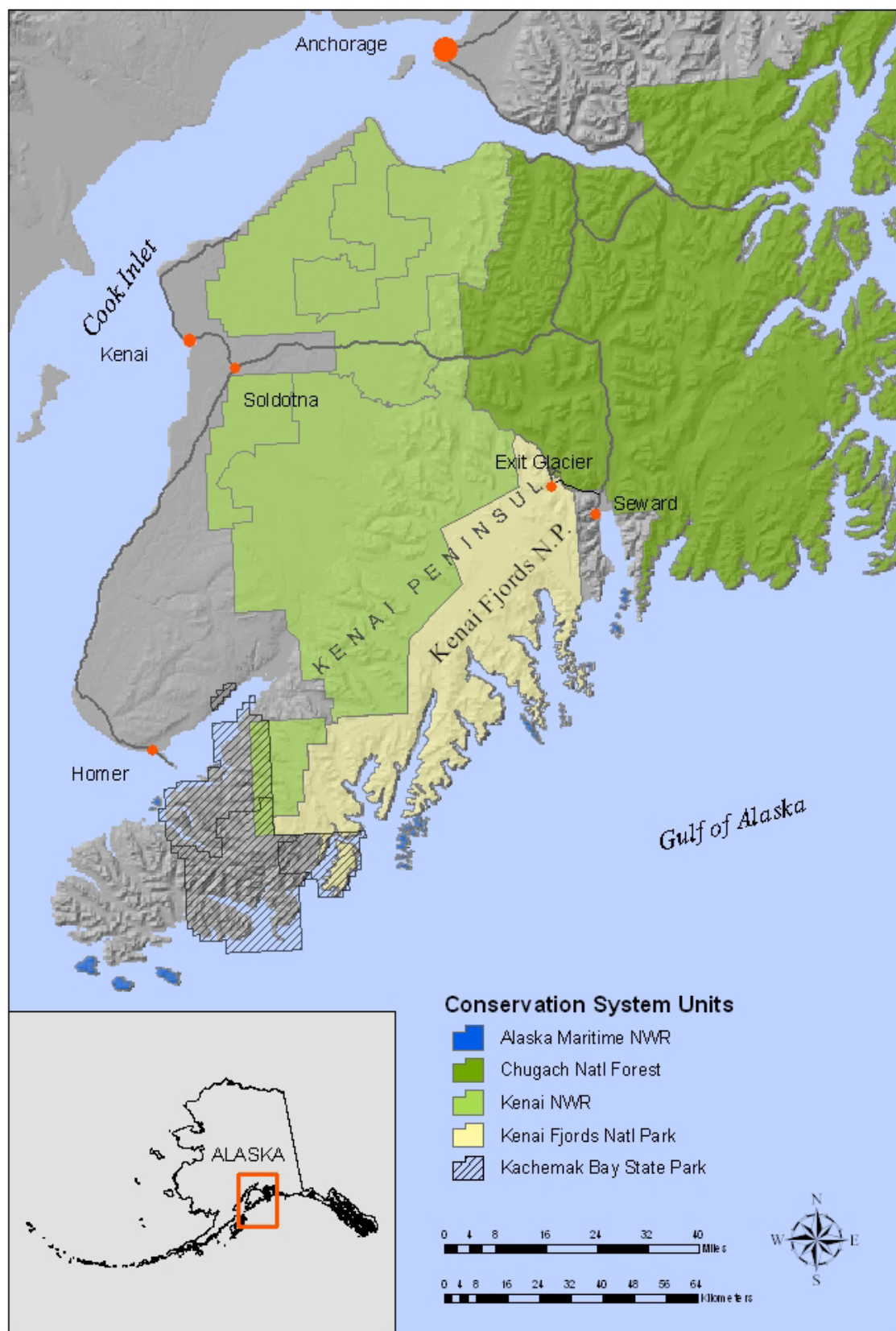
Easily accessible by paved road from mile 3.5 of the Seward Highway, Exit Glacier is the most visited area of the park receiving over 125,000 visitors a year. The 8.5 mile Herman Leirer Road (also known as Exit Glacier Road) is maintained between approximately May 1-November 1, and traverses State of Alaska and U.S. Forest Service land before entering the park at the Resurrection River bridge.

Authorities and Policies

The NPS Organic Act of 1916 states that the purpose of the national parks is to "conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." (16 U.S.C. 1). The NPS Organic Act and the General Authorities Act prohibit impairment of park resources and values. The NPS Management Policies and Director's Order #55 use the terms "resources and values" to mean the full spectrum and intangible attributes for which the park is established and are 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 National Park Service is to ensure that park resources and values will continue to exist in a condition that will allow the American people to have present and future opportunities for enjoyment of them.

NPS Management Policies (2001) Section 9.2.3 Trails and Walks states: *"Trails and walks provide the only means of access into many areas within parks. These facilities will be planned and developed as integral parts of each park's transportation system, and incorporate principles of universal design. Trails and walks will serve as management tools to help control the distribution and intensity of use. All trails and walks will be carefully situated, designed, and managed to*

- *reduce conflicts with automobiles and incompatible uses;*
- *allow for a satisfying park experience;*
- *allow accessibility by the greatest number of people; and*
- *protect park resources."*



Related Planning Documents:

This EA is an implementation plan tiering from the 2004 Exit Glacier Area Plan and the 1991 Kenai Fjords National Park Trail Plan.

The 2004 Exit Glacier Area Plan and associated Environmental Assessment amends the park's 1984 General Management Plan, and defines a direction for resource preservation and visitor use in the Exit Glacier area of Kenai Fjords National Park. The plan describes natural and cultural resource conditions and visitor experiences that are to be achieved and maintained in the Exit Glacier area for the next 15 to 20 years. Under the plan, the Exit Glacier area was zoned to ensure that resources are protected and that visitor opportunities are provided for a range of visitor experiences. The focus of the plan is to enhance the opportunities to view Exit Glacier, which is the main attraction of the area, and to provide for additional non-motorized recreational opportunities.

Both the Nature Trail and Overlook Loop Trail are within the Exit Glacier area *Pedestrian Zone*. As described in the Exit Glacier Area Plan, this zone “accommodates numerous visitors, many of who wish to experience the towering glacial ice of Exit Glacier up close. Social opportunities are plentiful, visitor comforts and structures are available but fewer and less concentrated than in the Visitor Facilities Zone, and the opportunity for visitor education through signs and personal contacts are abundant. Viewing of wildlife from this zone is an important activity.” Activities that may occur within the *Pedestrian Zone* “will be located in the outwash plain of the glacier terminus, encompassing the Nature Trail and the Overlook Loop Trail. This zone will be dynamic, as it will increase or decrease with glacial retreat or advancement, so as to always be located adjacent to the face of the glacier.” According to the Exit Glacier Area Plan, key actions in this zone include:

- The Overlook Loop Trail will be improved as needed, in accordance with a type A trail in the Trail Plan for Exit Glacier (NPS 1991), to accommodate increasing visitation. Improvements could include widening the trail up to 48”, providing steps in steep areas, and erecting barriers to prevent shortcuts and erosion between switchbacks.
- As the glacier retreats, the park will continue to provide safe, low impact access to the face of the glacier, for example, existing trails may be extended as needed.
- Additional educational signs and exhibits will be installed along the trail to the outwash plain, the Nature Trail, and the Overlook Trail explaining biological succession, wildlife in its natural setting, and a naturally-functioning ecosystem.
- A viewing platform (consisting of a hardened gravel pad) will be constructed on the edge of the outwash plain within view of the glacier and a spotting scope installed to provide an opportunity for physically challenged visitors to view the glacier. Some vegetation will be cleared to improve the vista.

The Harding Icefield Trail is within the Exit Glacier area *Hiker Zone* which is defined as a 0.25 mile wide (0.125 mile on each side of a trail) corridor along hiking trails. As described in the Exit Glacier Area Plan, this zone “allows visitors to access more remote locations...along

well maintained trails. This zone is meant to provide a mostly natural experience with moderate social possibilities, increasing opportunities for solitude, and fewer visitor comforts. Many visitors with varying outdoor skills would be able to hike into the Alaskan backcountry. While danger and hazards still exist, day hikers can access this zone with only a moderate amount of preparation and education about the area. Preservation of the natural system is a high priority, but impacts from trail development and associated use are common.” Trails types may include minor trails and wilderness-type trails, as specified in the 1991 Park Trail Plan. Management actions give a high priority for resource protection and a high priority for a positive visitor experience in a natural setting.

The 1991 Park Trail Plan defines the standards and provides direction for trail management at Kenai Fjords National Park. The majority of park trails are located in the Exit Glacier area. The trail types which currently exist at Exit Glacier are major trails, minor trails, walks, and other special use trails. The trails plan also outlines the level of maintenance for each trail, ranging from Level 1 trails that are maintained for high use with heavy traffic to Level 5 trails that are maintained for primitive use with low traffic. The Overlook Loop Trail is a Type A or “Major Trail” with a maintenance level 2. The Nature Trail is also a Type A trail with a maintenance level 3. Type A trails receive high levels of use and are maintained at relatively high standards. The Harding Icefield Trail is a Type B “Minor Trail” with a level 3 maintenance status (NPS 1991).

1.3 Issues

To focus the environmental assessment, the NPS selected specific issues for further analysis and eliminated others from evaluation. Issues and concerns with this project were grouped into distinct impact topics to aid in analyzing environmental consequences, which allows for a standardized comparison between alternatives based on the most relevant information. The impact topics were identified on the basis of federal laws, regulations and departmental orders, *NPS Management Policies 2001* (NPS 2001), and NPS knowledge of potentially affected resources. A brief rationale for selecting or dismissing each topic is provided below.

1.3.1 Issues Selected for Detailed Analysis

Soils: Foot traffic may compact newly exposed soil, which in turn could change its properties including its resistance to erosion and its ability to support plant and animal life. Soil structure can be damaged by compaction or churning; disturbed soils can be more easily eroded. The construction of new trails could have very localized effects on soils. Local impacts to soils could result from hikers cutting switchbacks and forming social trails or parallel trails. On steep slopes this can lead to erosion which results in damage to the trail bed and increased free sediment being carried downslope onto vegetation and into streams.

Water Quality: Construction of trails and overlooks adjacent to streams could result in increased sedimentation, adversely affecting water quality.

Floodplains: Proposed and existing trails are entirely located within a floodplain. Trail construction can alter the natural hydrology of the area, adversely affecting floodplain processes (e.g., flooding and silting).

Soundscape: The natural soundscape of the area could be affected temporarily by noise generated by the use power tools and other mechanized equipment during construction.

Vegetation: Vegetation in areas where visitors concentrate could continue to be impacted. New plants colonizing the terminal moraine in the outwash plain are susceptible to damage from trampling. Construction of new trails could require clearing of vegetation in lowland forest and early successional habitats. Long-term maintenance would require trimming of vegetation. Additionally, exotic plants may find avenues for invasion of new areas with the addition of new trails and overlooks.

Geologic Resources: Geologic resources including bedrock outcrops, rocks, and talus slopes could be affected by rock drilling and blasting.

Wildlife: Improvements to trails and construction of overlooks could decrease available wildlife habitat, displace wildlife, allow increased opportunities for wildlife to obtain human foods, and increase the possibility for defense of life and property (DLP) bear killings. Additionally, wildlife could be disturbed and displaced by the noise and activity surrounding construction sites. The addition of new trails could increase the disturbance and displacement of wildlife and impact wildlife travel corridors. New trails may also fragment habitat and facilitate the encroachment of “edge species”.

Visitor Experience: Improvements to trails and overlooks could allow more visitors in wheelchairs to access areas that are currently inaccessible, and provide these visitors with vistas of Exit Glacier that are not currently available. Extending the Overlook Loop Trail would provide visitors with the opportunity to approach the face of the glacier.

Safety: Improvements to trails and overlooks would affect the type of access visitors have to experience Exit Glacier which could have implications for visitor safety. NPS employees would follow all appropriate Occupational Health and Safety (OSHA) safety guidelines.

1.3.2 Issues Dismissed From Detailed Analysis

Several potential impact topics were dismissed because they would not be affected, or the potential for impacts under all the alternatives would be negligible. These topics are mentioned below, with an explanation of why they were not considered in detail.

Air Quality and Visibility: The alternatives described in this plan would not cause changes to air quality.

Socioeconomic Environment: All project labor would be provided by the NPS. The only materials that would be purchased from a commercial vendor are approximately 160 cubic yards of trail tread material. Trail maintenance would be conducted by park employees performing similar duties in the area. No net impact on the socioeconomic environment is expected.

Wetlands: Improvements to trails and overlooks in the Exit Glacier area would have no direct or indirect impacts to wetlands. The proposed trail reroute would not traverse any wetlands, nor would proposed improvements to the Nature Trail alter natural hydrological patterns that could adversely affect nearby wetlands and wetland ecology.

Cultural Resources: An archaeological survey of the Resurrection River Valley, including the Exit Glacier area, was conducted in 1983, and no cultural sites were identified within the proposed project area (Reynolds 1983). Section 106 National Historic Preservation Act archeological compliance surveys were completed for all trails in the Exit Glacier area (Kovac et al. 2005). Therefore, the effect of the proposed action on cultural resources was dismissed from further analysis. Construction or clearing of new trails, or other proposed actions causing ground disturbance may reveal currently unidentified cultural resources. Should historic properties be discovered during project implementation, work in the discovery area will be stopped and the KEFJ Superintendent notified. Procedures would be followed, as per "Director's Order #28A: Archeology", and found in the guiding regulations in 36 CFR 800.13.

Night Sky: Since no actions are proposed that would result in any measurable effects on night sky, this issue will not be considered further.

Park Operations: Improvements to trails and overlooks would not require additional park staff. Maintenance would be primarily preformed by existing staff and volunteers.

Subsistence Activities: The effects of the proposed action on subsistence uses and needs was dismissed from further analysis because (1) Kenai Fjords National Park (including the project area) is closed to subsistence uses, and (2) the proposed action would not affect regional subsistence resources or activities outside the park. There would be no potential for significant subsistence restrictions. An ANILCA Section 810(a) summary evaluation and analysis is contained in Appendix A.

Socially or Economically Disadvantaged Populations: Executive Order 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" requires federal agencies to incorporate environmental justice into their missions by identifying and addressing high and adverse human health or environmental effects in their programs and policies on minorities and low-income populations and communities. None of the actions in any of the alternatives would result in adverse impacts on any minority or low-income population or community.

Threatened and Endangered Species: None of the plant or animal species occurring in the Exit Glacier area are federally listed as endangered, threatened, special concern, or candidate species. Several state listed species that occur in the project area are discussed under the Vegetation and Wildlife sections of this document.

Designated Wilderness: None of the actions proposed in any of the management alternatives would impact areas suitable for wilderness designation in the Exit Glacier area. No lands were designated as wilderness in Kenai Fjords National Park under the enabling legislation (ANILCA, sec. 701). The 1984 GMP included a wilderness suitability study, which determined that nearly 97% of the park's lands were suitable for wilderness designation, excluding the developed area at Exit Glacier.

1.4 PERMITS AND APPROVALS NEEDED TO IMPLEMENT PROJECT

The Exit Glacier Area is within the Kenai Peninsula Borough District Coastal Zone because the project sites are below 1,000 elevation contour. Although Federal lands are excluded from Alaska's coastal zone boundaries, all uses or activities on excluded federal lands that directly affect the coastal area must be consistent to the maximum extent practicable with the Alaska Coastal Management Program under provisions of Section 307 of the Coastal Zone Management Act of 1972. As evident in the impacts analysis section, these projects are fully consistent with the Kenai Borough Coastal Management Plan Enforceable and Administrative Policies. Administrative policy A3 encourages development of improved trails within designated recreational areas, such as Kenai Fjords National Park.

2.0 ALTERNATIVES

2.1 Introduction

Alternatives were developed using an interdisciplinary team process that included NPS staff specialists. Two alternatives were developed and carried forward for detailed analysis in the EA. One alternative describes the continuation of current, existing management and serves as the No Action Alternative. The Proposed Action Alternative describes proposed changes to current management, as well as what aspects of current management would be carried forward.

2.2 No Action Alternative

Under this alternative, no improvements would be made to the existing trails and overlooks in the Exit Glacier area (Figure 2). Routine maintenance of existing trails and facilities would continue.

Currently, the nature trail experience is a loop walk consisting of the main paved and gravel trails, a portion of the outwash plain trail and the designated nature trail. The only portion of the Exit Glacier trail network that meets accessibility requirements is the main paved trail. The main paved trail is approximately 1/3 mile in length and does not provide a view of the glacier during the summer visitor season. Under the No Action Alternative, the Nature Trail

would not be rerouted and made accessible to persons with disabilities. The overlook and spotting scope would not be installed along the Nature Trail to provide an opportunity for physically challenged visitors to view the glacier.

The Overlook Loop Trail currently consists of a loop trail providing views of Exit Glacier from a distance of approximately 100 yards or more. Despite management efforts to delineate the trail and discourage off-trail travel, visitors desiring a closer view of the glacier often travel off-trail creating social trails which may pose safety issues for some users and which cause unacceptable impacts to visual and natural resources, as well as to the visitor experience. Under the No Action Alternative, the Overlook Loop Trail would not be extended to provide closer access to the face of Exit Glacier.

The Harding Icefield Trail currently provides a somewhat rugged hiking experience for those desiring a more strenuous and challenging trail experience. An 850 foot section approximately 0.4 miles up the trail is steep, following directly up the fall line, and has become degraded as a result. This degraded section creates a difficult section for most hikers and leads hikers near the edge of an overhanging drop off, where signs inform them to stay back from the edge. Under the No Action Alternative, this degraded segment of the Harding Icefield Trail would not be rerouted.

2.3 Proposed Action Alternative

The proposed trail improvements would occur in independent phases and over the course of three summer seasons. Work on the Nature Trail reroute and Overlook Loop Trail spur (Phase I) would be completed in 2006. Accessibility improvements to the Nature Trail would occur in 2007 (Phase II), and the Harding Icefield Trail (Phase III) would take place over the course of two summers, 2007 and 2008. All trail and overlook construction activities would occur from May through September and would be accomplished by the park maintenance staff and volunteers using hand tools as well as a motorized wheelbarrow, chainsaws, mechanical compactors, and gasoline powered rock drills. An electric rock drill run off a gasoline powered generator may also be used. Dump trucks would be used to deliver tread material to the Exit Glacier area, and a smaller Bobcat bucket loader would be used to transport tread material from the staging area to points along the Nature Trail. A small portion of the parking lot would be used as a temporary staging area for construction materials. Construction of the Harding Icefield Trail reroute could require the use of rock drills and explosives around unavoidable bedrock outcrops, talus slopes and other obstacles.

Exit Glacier Area Trails

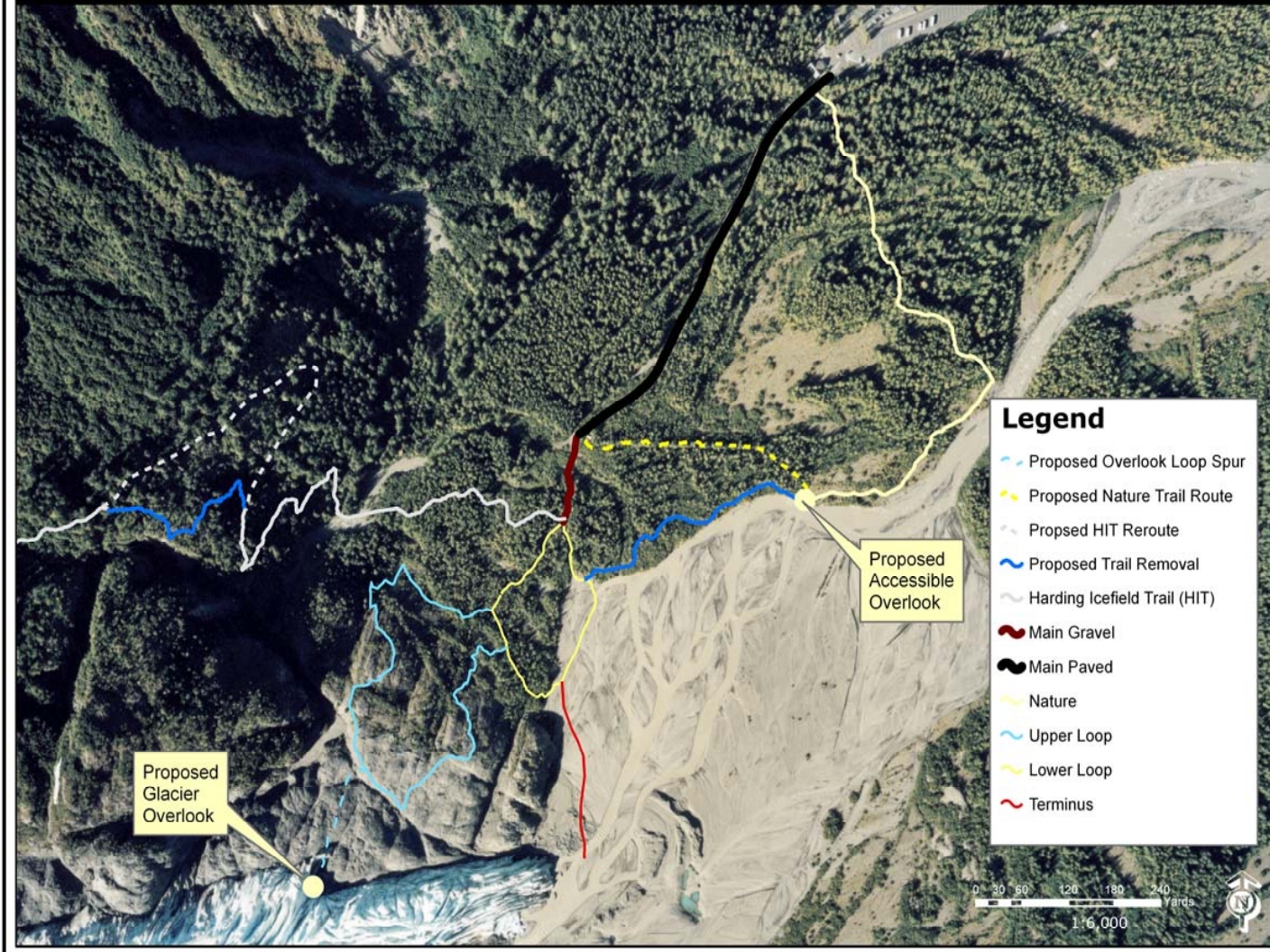


Figure 2. Map of No Action and Proposed Action Alternatives

Nature Trail

This alternative would reroute approximately 1,000 linear feet of the Nature Trail away from an eroding creek bank, and provide wheelchair accessibility along the entire length of the Nature Trail following U.S. Access Board Outdoor Recreation Guidelines (1999).

At the junction of the rerouted trail and the existing Nature Trail, a primitive overlook would be constructed on the edge of the outwash plain within view of the glacier and a spotting scope installed to provide an opportunity for physically challenged visitors to view the glacier. Interpretive panels and benches could also be installed. The Nature Trail would be upgraded from a Type A “Major Trail” to a Type D “Walk” and would receive the highest level maintenance priority. The section of the existing Nature Trail that is being rerouted away from the creek bank would be closed and disguised by placing brush cuttings from trail clearing along the trail corridor. Vegetation and soils removed while building the reroute of the trail would be used to revegetate the closed portion of the trail. Excess brush would be chipped on site and hauled out of the park for offsite disposal. Signs would encourage visitors to use designated trails to access the glacier and outwash plain.



Proposed location of accessible Nature Trail overlook.

All wheelchair accessible trails would be constructed to a tread width of five feet with grades of 5% or less to meet accessibility standards. Trail tread construction may require excavating 6 inches to 8 inches below the current trail surface in places. Instead of pavement, the trail tread would be surfaced with 3 inches of 3/8" minus crusher fines (pure crushed stone). This natural trail surface would be made firm and stable by vibratory compaction. As described in the 1991 Park Trail Plan, the tread would be free of obstacles and smooth enough to allow wheelchair access. Approximately 170 cubic yards of tread material would be purchased from a commercial rock vendor and transported to Exit Glacier by dump truck. Approximately 10-15 cottonwood trees (4-12 inches in diameter) would be removed to make the proposed trail improvements. Vegetation over 18 inches in height within three feet of the trail edge would be cleared for visibility. Vertical clearance would be a minimum of 10 feet to accommodate visitors with visual impairments.

Approximately 2,252 linear feet of the existing Nature Trail would be rehabilitated to a consistent 5-foot width to permit passing of wheelchair users. Sections of the trail that exceed 5% grade would be regraded to 5% or less so that they would be accessible to persons with mobility impairments. Approximately 250 linear feet of new trail would be added at points along the existing trail where the grade is excessively steep. Rerouting and lengthening the trail in these sections would achieve the required trail grade of less than 1:20 (5%). One 25

foot long wooden footbridge on the existing Nature Trail would be rebuilt in-kind and widened to 48 inches to accommodate wheelchairs.

Construction cost for the Nature Trail Reroute and Accessibility Improvements is estimated at \$84,000.

Overlook Loop Trail

Approximately 490 linear feet of new trail would be added to the Overlook Loop Trail. This proposed spur trail would depart from the western edge of the Overlook Loop Trail and traverse approximately 490 feet of moraines and bedrock to an overlook on a bedrock knoll near the present margin of the glacier. As defined in the 1991 Park Trail Plan, the foot trail would conform to the existing terrain constraints except for minor modifications (cut/fill depressions, pinned rock/log cribbing on bedrock) where necessary to ensure trail stability, visitor safety and a reasonable grade. The maximum general grade would be 10-15%, though grades up to 20% would be allowed for short sections where needed. The tread would be 48 inches wide.

In places where the proposed trail would cross areas of sloping, exposed bedrock, a rock or log crib would be constructed to support the trail tread. This would entail drilling small holes (3/8 to 1/2 inch diameter) into the bedrock in which small pieces of steel rod (rebar) would be placed to hold large rocks and/or logs in place creating the downhill edge of the trail (referred to as a crib). Smaller rocks would be used to fill in behind the crib of anchored rocks, and surfacing material would be placed on top (NPS 1991). All of the fill used to construct the trail tread and overlook (a maximum of 14 cubic yards) would be taken from nearby moraines and other deposits of glacial till. Any logs used would be obtained from NPS sources off-site. Upon completion, the trail would provide a relatively direct spur route from the Overlook Loop Trail to the face of Exit Glacier.

Construction cost for the Overlook Loop Spur, in addition to routine maintenance of current trails, is estimated to be between \$10,000 and \$20,000.



Existing Overlook Loop Trail glacier view point.

Harding Icefield Trail

This alternative would reroute a degraded portion of the Harding Icefield Trail that climbs a steep cliff band near the lower end of the trail. Approximately 850 linear feet of the existing trail would be removed and between 1,300 and 2,500 linear feet of new trail would be constructed in its place. The new trail segment would conform to the existing terrain constraints to the extent possible, with modifications (filling depressions, removing bedrock outcrops) where necessary to ensure trail stability, visitor safety and a reasonable grade. The exact placement and design of the proposed reroute has not been determined, but its general location would be to the north of the existing trail (Figure 2). Instead of climbing straight up the fall line of the slope as the existing trail does, the new trail would ascend more gradually with an average grade of 12 to 20% to meet standards defined in the 1991 Park Trail Plan. Grades on the existing trail segment exceed 25% in most places and approach 60% in several locations (NPS 1991).

The reroute that is currently envisioned would consist of one large switchback, with the lower leg traversing approximately 600 linear feet of steep slopes, cliffs and bedrock outcrops, and the upper leg following a large lateral moraine for about 1,000 linear feet. Construction of the lower leg would require steep cut and fill slopes with rock or log retaining walls, blasting of bedrock, and the construction of rock staircases. Few trees (primarily small cottonwoods less than 10 inches in diameter) and limited brush would need to be removed on the lower leg as the steep bedrock sloped is sparsely vegetated. The upper leg would be constructed primarily by cut and fill on moderate slopes along the flanks of the moraine with few structures required. Climbing turns would be used to follow the natural contours of the moraine.

Extensive brush removal would be required on the upper leg and tree removal would be minimized by routing the trail to avoid large cottonwoods. The trail would have a clearance of

4-6 lateral feet and 10 vertical feet. The proposed reroute may require one to two stream crossing structures over small intermittent stream channels. Rock drilling and blasting would be required to construct the trail reroute through the cliff band. Blasting and rock drilling would be limited to unavoidable bedrock outcrops and large rocks. The duration of blasting would be very brief, though the number of potential blast sites would be widespread along half the length of the proposed trail reroute given the steep, rocky terrain. The new trail tread would be constructed with native materials to a width of between 18 and 24 inches. Adequate sideslope on the tread and drainage channels would ensure proper drainage and prevent erosion. The exact placement and design of the reroute would be determined by an interdisciplinary team of NPS staff and consultants, and the final trail alignment would be made available to the public prior to construction.

Approximately 850 linear feet of the existing degraded trail would be removed. Cut slopes would be recontoured where possible, and all log steps, handrails, and fencing would be removed. Cut brush and from the new trail would be used to disguise the old trail, and individual shrubs, seedlings, and other plants cleared during construction of the trail reroute would be transplanted to aid in the revegetation of the old trail segment.

Construction cost, in addition to routine maintenance of current trails, for Harding Icefield Reroute is estimated to be approximately \$74,000.

2.4 Mitigation Measures

Mitigation measures are specific actions that when implemented, minimize, avoid, or eliminate impacts on resources that would be affected by the actions of any alternative. The following mitigating measures would be applied to avoid or minimize potential impacts from construction activities and visitor use. Except where specifically noted, these measures would apply to both alternatives. Resources that are not listed would not have any applicable mitigation measures.

Soils: Trail construction would be planned and designed to minimize erosion and sedimentation and the removal of soil-stabilizing vegetation. Alignment of trails would avoid disturbing fragile wetland soils or intercepting and diverting seeps and stream channels. Trails would be constructed in a manner to avoid or minimize steep treadways, reducing the potential for soil erosion due to formation of water rills, gullies, and outboard trail tread failure. The wheelchair accessible trail would be wide enough to allow two wheelchairs to pass each other safely without leaving the path tread, which would minimize localized impacts to soils along the margins of the path. Hiking trails would also be designed to prevent development of social trails or other off trail uses.

Impacts to soils including compaction from visitor use would be mitigated by installing barriers to minimize off trail use. Where appropriate, natural rock or log trail borders would be installed to delineate trails and encourage users to remain on the trail tread, thus reducing soil impacts to adjacent off path areas. At the proposed Overlook Loop Trail glacier overlook, signs as well as posts with rope barriers would be used to define the trail.

Soundscape: For trail construction as described in the proposed action alternative hand tools would be used in lieu of power tools as much as possible in order to lessen noise. Small diameter trees and shrubs would be cut or removed with handsaws or loppers. Power tools, including chainsaws and possibly a chipper, and vehicles would cause impacts to the soundscape.

Vegetation: Work on trails and overlooks would be planned so as to reduce impacts on vegetation. Proposed locations for infrastructure such as signs, trails and overlooks, would be surveyed for possible special status plant species. Trails would be designed and maintained to discourage social trail development. To mitigate the impacts of blasting, careful placement of charges would be used to minimize flying debris and damage to vegetation.

Efforts would be utilized to control exotic species in both alternatives. The park's exotic plants inventory and monitoring program currently surveys all trails and developed areas in the park for the purpose of early detection and rapid removal of non-native invasive plant species; this survey effort would continue under both alternatives.

Specifically, under the proposed action alternative, the following mitigation measures will be implemented to minimize or avoid infestation of exotics resulting from the projects:

- Vehicles and equipment (including hand tools and wheelbarrows) brought in from off-site will be cleaned at a commercial car wash in Seward and transported to the Exit Glacier area on a trailer prior to taking them off of the paved trail. If equipment leaves the pavement in the Exit Glacier developed area during the project, it will be recleaned prior to returning to the unpaved trail system.
- During the brush clearing portion of the Nature Trail Reroute, a pickup truck will be driven up the paved trail and parked at the end of the paved trail (still on pavement) while clean smaller equipment, such as a bobcat, transports brush cut from the trail corridor back to the pick-up for transport to an off-site disposal area. A chipper may be used to reduce the volume of brush to be handled. Park Resource Management staff will inspect the brush disposal location for presence of exotics to minimize the probability of transporting seeds into the park trail system.
- Some rock material used for these trail projects will come from on-site to avoid importing exotic plants to the area. Any purchased materials that could transport exotic vegetation will be purchased from sources as close to the Resurrection Valley as possible. If appropriate, park resource management personnel will inspect the material source prior to use.
- Area of disturbed soil will be minimized to the extent practicable, consistent with project objectives.
- Any stockpiled material will be stored for as short a time period as practical to maintain it in as weed-free condition as possible.
- At the start of the field season, and again whenever new trail crews arrive, trail workers will receive an orientation to exotic plants and standard or specific mitigation measures to reduce infestations. The park's resource management staff will be responsible for conducting the briefing. The park's maintenance staff is responsible

for notifying appropriate resource management when new crews are arriving to schedule the briefing.

- Park exotic plant personnel will pay particular attention to the project areas during routine survey efforts for at least three years following completion of the projects to ensure that any weeds inadvertently transported to the site are promptly detected and treated. Since trucks will be driven up the paved trail and to/from the off-site brush disposal site, intensive survey attention will be paid to areas along the paved trail.

Geologic Resources: To mitigate the impacts of blasting to geologic resources:

- Bedrock outcrops, talus slopes and other barriers would be avoided whenever possible by adjusting and lengthening the alignment of the trail; and
- Charges would be carefully placed in order to reduce the size of the impacted area.
- Blasting would be planned and conducted out by a trained, certified blaster.

Wildlife: New trails and overlooks would be sited to avoid the following sensitive wildlife habitats, including wildlife travel corridors, foraging areas, denning sites, and nesting or brood-rearing areas.

To mitigate the impacts of blasting on wildlife, the following mitigation measures would be employed:

- Blasting would be performed late in the summer season to minimize impacts on breeding wildlife;
- Blasting would occur between the hours of 9am to 6pm to avoid peak wildlife foraging times (early morning and evening).

Visitors, park staff, and contractors would be required to secure all food and garbage in cabins, vehicles, or bear-proof containers. Visitors would continue to be educated about the need to refrain from feeding wildlife through the use of signs attached to picnic tables and posted on kiosks in campgrounds and picnic areas. Park staff would be instructed in the use of pepper spray and required to carry it at all times while on duty.

Visitor Experience: To mitigate the impacts of blasting on park visitors, blasting would occur late in the summer season when visitation is lower. Power equipment (including chainsaws and chippers) and blasting would be restricted to the hours between 9am and 6pm to avoid disturbing overnight campers in the Exit Glacier area. Signs would be posted at trailheads to notify visitors of blasting on days when it would occur.

Maintenance staff will coordinate weekly with Interpretive staff regarding trail construction activities to mitigate impacts on park visitors and interpretive programs.

Safety: Overall safety in the Exit Glacier area may be improved for all alternatives via education, including brochures, interpretive talks and displays.

2.5 Description of Alternatives and Actions Considered but Eliminated from Detailed Study

An alternative to construct a wheelchair accessible trail in a new location not currently served by the established trail system was considered, but dismissed since it would not be consistent with actions approved in the 2004 Exit Glacier Area Plan. This alternative would also have the effect of separating disabled visitors from other visitors, and not integrating them into the mainstream of the visitor experience as required by NPS policy.

Extending the paved trail directly south to the outwash plain and constructing the overlook in this location was also considered, but dismissed because the face of the retreating glacier is no longer visible from this location. This alternative would not meet the need of providing a view of the glacier to mobility impaired visitors. It is possible that extensive vegetation clearing would have yielded a view of the glacier, but this level of vegetation manipulation was considered inconsistent with the NPS management objectives.

An alternative to extend the Overlook Loop Trail towards the glacier rather than construct a direct spur trail from the Loop Trail was also considered, but dismissed because the topography of area would have made construction of a loop very difficult. Uncertainty regarding the movements of the glacier was also a factor in the decision to dismiss this alternative. Although Exit Glacier is presently retreating, it may in the future advance if conditions permit. A simple spur trail instead of a longer loop trail would allow the park greater flexibility in responding to dynamic glacial activity while still providing for the desired visitor experience.

2.6 Environmentally Preferred Alternative

In accordance with Director's Order-12, *Conservation Planning, Environmental Impact Analysis, and Decision-making*, the NPS is required to identify the "environmentally preferred alternative" in all environmental documents, including EAs. The environmentally preferred alternative is determined by applying the criteria suggested in the National Environmental Policy Act (NEPA) of 1969, which is guided by the Council on Environmental Quality (CEQ). Generally, these criteria mean the environmentally preferable alternative is the alternative that causes the least damage to the biological and physical environment and that best protects, preserves, and enhances historic, cultural, and natural resources (Federal Register, 1981).

The "Proposed Action Alternative" is the environmentally preferred alternative, because it more fully meets the goals of "attain(ing) the widest range of beneficial uses of the environment without degradation, risk of health or safety or other....consequences." The project would include as many aspects of sustainability as are feasible and practicable. Natural resource conservation, planning and design principles, construction methodologies, and maintenance/operational practices that support sustainability would be utilized.

Table 1. Summary of Alternatives

	No Action Alternative	Proposed Action Alternative
Management Emphasis	This No Action Alternative provides a baseline for evaluating the changes and impacts of the proposed action alternative. Under this alternative, current conditions and features would be managed as-is.	Management would emphasize implementing selected actions from the Exit Glacier Area Plan (NPS 2004) in order to improve the visitor experience, create wheelchair accessible glacier viewing opportunities, prevent adverse impacts to natural resources, and provide for safer access to Exit Glacier.
Cost to Implement the Alternative	Cost will be only those routinely spent for maintenance of current trail system. No trail construction costs would be incurred.	Construction costs, in addition to routine maintenance of current trails, would be as follows: Nature Trail Reroute and Accessibility Improvements: \$84,000 Harding Icefield Reroute: \$74,000 Overlook Loop Spur: \$10,000 - \$20,000
Nature Trail Reroute and Glacier Overlook Construction	No trail relocation and overlook construction would occur.	The Proposed Action Alternative is to relocate approximately 1,000 linear feet of the Nature Trail away from an eroding creek bank, and construct a wheelchair accessible overlook of the glacier and outwash plain.
Accessibility Improvements to Existing Nature Trail	No improvements would be made to the Nature Trail to make it accessible to people in wheelchairs.	The Proposed Action Alternative is to make the existing Nature Trail (2,252 linear feet) wheelchair accessible.
Overlook Loop Spur Trail	No construction of a spur trail from the Overlook Loop Trail would occur to provide visitors enhanced access to Exit Glacier.	The Proposed Action Alternative is to construct a spur trail (490 linear feet) from the Overlook Loop Trail to the retreating face of Exit Glacier.
Harding Icefield Trail Reroute	A degraded section of the Harding Icefield Trail would not be rerouted.	The Proposed Action Alternative would reroute a portion of the Harding Icefield Trail. This section of trail is degraded and does not meet standards defined in the 1991 Park Trail Plan. Rerouting the trail would involve removal of approximately 850 linear feet of degraded trail and construction of a new trail segment (between 1,300 and 2,500 linear feet).

Table 2. Summary of Alternative Impacts (see page 29 for impact definitions).

	No Action Alternative	Proposed Action Alternative
Soils	* Negligible adverse long-term effects. Moderate adverse long-term cumulative effects.	* Negligible adverse long-term effects. Moderate adverse long-term cumulative effects.
Water Quality	* Minor adverse long-term effects. Minor adverse long-term cumulative effects.	* Minor adverse long-term effects. Minor adverse long-term cumulative effects.
Floodplains	* Moderate adverse long-term effects. Moderate adverse long-term cumulative effects.	* Moderate adverse long-term effects. Moderate adverse long-term cumulative effects.
Soundscape	* Minor adverse long-term effects. Minor adverse long-term cumulative effects.	* Moderate short-term impacts during construction. Minor adverse long-term effects. Minor adverse long-term cumulative effects.
Vegetation	* Moderate adverse long-term effects. Major adverse long-term cumulative effects.	* Minor adverse long-term effects. Major adverse long-term cumulative effects.
Geologic Resources	* No effects.	* Negligible adverse long-term effects. Negligible adverse long-term cumulative effects.
Wildlife	* Moderate adverse long-term effects. Major adverse long-term cumulative effects.	* Moderate short-term impacts during construction. Minor adverse long-term effects. Major adverse long-term cumulative effects.
Visitor Experience	* Moderate adverse long-term effects. Major long-term cumulative effects.	* Moderate short-term impacts during construction. Moderate beneficial long-term effects. Major long-term cumulative effects.
Safety	* Moderate adverse long-term increased safety risks. In combination with other past, present and reasonably foreseeable future actions in the study area, moderate adverse long-term cumulative increased safety risks would occur.	* Minor beneficial long-term effects. In combination with other past, present and reasonably foreseeable future actions in the study area, minor adverse long-term cumulative increased safety risks would continue.

3.0 AFFECTED ENVIRONMENT

3.1 Introduction

This chapter describes the existing environment and the current condition of important resources and values of the Exit Glacier project area of Kenai Fjords National Park. These resources have the potential to be affected by the alternatives should they be implemented.

3.2 Geologic Resources

The Kenai Mountain Range was formed primarily by the forces of uplift and erosion during the Jurassic to the late Cretaceous periods. The bedrock geology of the park is not well known as the Harding Icefield forms essentially a continuous cover over a large portion of the Kenai Mountains making investigations of the area's geology incomplete. The Exit Glacier area is a recently deglaciated valley characterized by floodplain and low lying areas of braided glacial rivers, fluvial valley bottoms, glacial moraines and outwash plains, depositional slopes and high relief terraces. Unconsolidated Holocene and Pleistocene surficial deposits of alluvium, alluvial fans, and glacial and landslide deposits near the mountains comprised mainly of silt, sand, gravel and reworked rock fragments overlie bedrock in most low-lying areas. The bedrock geology of the Exit Glacier area is primarily Cretaceous-aged undifferentiated sedimentary rocks that have been shaped by glacial action and erosion (Tande and Michaelson 2001).

3.3 Soils

There has not been any detailed study or description of the soils in the Exit Glacier area, except for some chemical analysis related to plant succession by Helm (1995) and Cusick (2001). In general, the soils in the Exit Glacier area are young and poorly developed. The valley floor is dominated by glacial moraines and alluvial gravels. The thickness of the organic layer on top of these gravelly soils is directly related to the amount of time since the last major disturbance – either from running water or from movement of the glacier. In general, the soils of the valley bottom are well-drained and not highly susceptible to compaction and erosion.

Along the margins of the glacier, especially around the terminus, are recently deposited soils in the form of moraines and other glacial deposits. These soils have a large proportion of fine-grained materials that make them susceptible to compaction. Although these areas may appear to be barren, they are the starting point for ecological succession as young plants colonize the area. Above the valley floor the soils generally fall into three categories: lateral moraines, slopes of talus and broken rock, and fine-grained silts and clays. The old lateral moraines typically are a mixture of all sediment classes from silt to boulders and are well-drained. The steep slopes below the crumbling ridges of the area are covered with unstable talus and broken rock. In between these areas of recent and on-going deposition are the older native soils which are mostly silts and clays. These fine-grained soils are easily compacted and eroded, and are especially susceptible to sloughing and erosion when they are saturated with water.

3.4 Water Quality

Water quality baseline testing at Exit Glacier was conducted during the summer season of 2001 by US Geological Survey hydrologists in area streams considered at risk for impacts from human use. These streams were considered at risk due to their close proximity to the road and to high visitor use areas. On one of the days tested, the stream reach crossed by the Harding Icefield Trail at mile 0.64 revealed small numbers (approximately 30) fecal coliforms per 100 ml of water. The presence of fecal coliform bacteria in streams indicates that the water may have been contaminated with human or animal fecal material. Although unacceptable for drinking, it was within normal limits for water contact recreational use such as swimming. All stream reaches were also tested for dissolved oxygen levels, pH, temperature and conductivity. All parameters were within normal limits and were consistent with healthy stream systems.

3.5 Floodplains

The entire lowlands of the Exit Glacier area are located within a floodplain. An Army Corps of Engineers flood boundary and floodway map for the area has not been completed, although prior flooding in the area is well-documented (NPS 2002b). All of the infrastructure at Exit Glacier including the Nature Center, paved trail, Nature Trail, parking lot and access road are located within this alluvial plain. There is currently no floodplain management plan in effect for the Exit Glacier area. The floodplain functions naturally with the following exceptions that have altered floodplain structure:

- The built up, or diked, area that supports the road to the glacier.
- A stream diversion and small dike located behind the new Nature Center. A minor flood event occurred in October 2002, threatening the foundation of the Nature Center during construction, necessitating diversion of the stream and placement of the dike.
- The paved trail to the glacier. Streams were diverted and channeled to construct the trail; culverts are utilized to prevent the trail from flooding.

Exit Creek transports large quantities of sediment downstream, ranging from glacial flour to cobbles, depositing these materials along the way. This activity forms braided channels and actively eroding banks. These meandering channels and banks are unstable and constantly shifting, making prediction of flood patterns and damages difficult. The floodplain is fed by Exit Creek and the associated high-gradient runoff streams from the Harding Icefield. Floods generated by any source are most likely to occur during periods of heavy fall rains and may result in the extensive deposition of materials within the alluvial plain (NPS 1986).

3.6 Soundscape

Soundscape refers to the ambient acoustic environment in a given area. The soundscape in the Exit Glacier area is composed of both natural sounds and a variety of human-made sounds. The character of the soundscape may vary from day to night and from season to season. The overall soundscape during summer in the Exit Glacier area is predominated by the natural

sounds of wind and water. Human generated noise intrusions such as voices, whistling, and foot stomping are more common in summer than birdsongs and other natural sounds (Wright and Hetrick 2002).

3.7 Vegetation

Vegetation Communities

Situated on the south-central coast of Alaska, the Kenai sub-region of the Coniferous Forest Biome is on the boundary of the southern boreal forests and coastal biogeoclimatic regions. The rugged relief of this area and its geographic position combine to produce a relatively unique mosaic of vegetated communities ranging from alpine meadows to coastal rainforests. The distribution of these vegetation communities across the landscape is determined primarily by elevation and glacial disturbance. Vegetation communities (adapted from Vierek et al. 1992) present in the Exit Glacier project area include:

Open Tall Scrub: Found on terraces adjacent to Exit Creek, these communities are dominated by Sitka alder, black cottonwood, or Sitka willow. This community represents an early post-glacial successional stage and is also subject to occasional flood disturbance by Exit Creek. This community is found along the Nature Trail.

Closed Deciduous Forest: This community is dominated by black cottonwood and is found on upland terraces and moraine deposits in the Exit Glacier Valley. This is the most extensive vegetation community on the valley floor and represents an older successional stage than the open tall scrub community. Young Sitka spruce seedlings occurring in the understory indicate that, in time, this community will become a closed mixed forest dominated by Sitka spruce and black cottonwood. This community is found along both the Nature Trail and Harding Icefield Trail.

No known federally listed plant species occur in Kenai Fjords National Park. However, three plant species listed as rare within the state of Alaska by the Alaska Natural Heritage Program (AKNHP) have been documented in the Exit Glacier area. These are pale poppy (*Papaver alboroseum*), bog bluegrass (*Poa leptocoma*), and Bebb's sedge (*Carex bebbii*) (Bryden 2002a).

Eleven species of exotic plants, plant species not native to this area, have been identified within Kenai Fjords National Park along the Exit Glacier Road, campground, parking area and trails including common dandelion (*Taraxacum officinale*), oxeye daisy (*Leucanthemum vulgare*), common plantain (*Plantago major*), white clover (*Trifolium repens*) and butter and eggs or toadflax (*Linaria vulgaris*) (Kriedeman, 2005). Densmore et al. (2001) found eight additional species of exotic plants growing along the Exit Glacier road outside the park boundary. These included alfalfa (*Medicago sativa*), yellow sweetclover (*Melilotus officinalis*), red clover (*Trifolium pratense*), oxeye daisy (*Leucanthemum vulgare*), and annual hawksbeard (*Crepis tectorum*). These plants were apparently introduced in a reseeding mix after that section of road was paved in 1999 (Bryden 2002 b). If left uncontrolled, it is likely that all of these species would eventually spread into the park.

3.8 Wildlife

Terrestrial Mammals

Twenty nine species of terrestrial mammals occur or are expected to occur within Kenai Fjords National Park (AKNHP 2000a). Habitats suitable for all or most of these species is present within the Exit Glacier area and presumably these species occur there with varying frequency. Among these, mountain goat (*Oreamus americanus*), moose (*Alces alces*), black bear (*Ursus americanus*), brown bear (*Ursus arctos*), hoary marmot (*Marmota caligata*), snowshoe hare (*Lepus americanus*), porcupine (*Erithizon dorsatum*), ermine (*Mustela erminea*), red squirrel (*Tamiasciurus hudsonicus*), and red-backed vole (*Clethrionomys rutilus*) are the species most frequently encountered (AKNHP 2000a, NPS 2001b). Also present, but less frequently observed, are wolves (*Canis lupus*), coyotes (*Canis latrans*), lynx (*Felis lynx*), wolverine (*Gulo gulo*), marten (*Martes americana*), flying squirrel (*Glaucomys sabrinus*), beaver (*Castor canadensis*), river otter (*Lutra canadensis*), little brown myotis bat (*Myotis lucifugus*), and mink (*Mustela vison*) (AKNHP 2000a, NPS 2001b). Moose and black bears are the most common large mammals observed in the Exit Glacier area.

Birds

Two hundred eighteen species of birds occur or are expected to occur within Kenai Fjords National Park (AKNHP 2000b). Of these, 143 species are expected to occur within the Exit Glacier Exit Glacier area, although a smaller number likely nest there due to limited available nesting habitat. Sixty-two species have been identified in the Exit Glacier area to date (NPS 2002b). The species most commonly observed are Wilson's warbler (*Wilsonia pusilla*), varied thrush (*Ixoreus naevius*), hermit thrush (*Catharus guttatus*), fox sparrow (*Passerella iliaca*), ruby-crowned kinglet (*Regulus calendula*) and orange-crowned warbler (*Vermivora celata*). Other passerine (songbird) species commonly encountered include Steller's jay (*Cyanocitta stelleri*), black-billed magpie (*Pica hudsonia*), northwestern crow (*Corvus caurinus*), common raven (*Corvus corax*), chestnut-backed (*Poecile rufescens*) and black-capped chickadee (*Poecile atricapillus*), common redpoll (*Carduelis flammea*), snow bunting (*Plectrophenax nivalis*), white-winged cross bill (*Loxia leucoptera*), and dark-eyed junco (*Junco hyemalis*). Raptor species include bald eagle (*Haliaeetus leucocephalus*), golden eagle (*Aquila chrysaetos*), northern goshawk (*Accipiter gentilis*), sharp-shinned hawk (*Accipiter striatus*), great horned owl (*Bubo virginianus*) and northern saw-whet owl (*Aegolius acadicus*). Additionally, willow ptarmigan (*Lagopus lagopus*), rock ptarmigan (*Lagopus mutus*), white-tailed ptarmigan (*Lagopus leucurus*), and spruce grouse (*Falcapennis canadensis*) inhabit the Exit Glacier area.

Amphibians

Wood frog (*Rana sylvatica*) and boreal toad (*Bufo boreas*) are both reported as occurring on the Kenai Peninsula; however, neither species has been observed in Kenai Fjords National Park despite intensive surveys in the Exit Glacier area (Wright 2002).

Fish

A freshwater fish inventory of Kenai Fjords National Park including the Exit Creek system was conducted in 2004. Dolly Varden char were the only fish species detected in Exit Creek.

No anadromous salmonids were observed in Exit Creek or its tributaries, but they were documented within the Resurrection River system (Jones and Hamon 2005).

Threatened and Endangered Species

No federally listed species are known to occur in the Exit Glacier area. Several State of Alaska Species of Special Concern and Alaska Audubon Society watch list species are present in the Exit Glacier area. Townsend's warblers, a State Species of Special Concern, have been sighted in the Exit Glacier area during the breeding season (NPS 2002b) and conifer habitat suitable for nesting is available. Gray-cheeked thrush, also a State Species of Special Concern, have rarely been reported in the Exit Glacier area during the breeding season (NPS 2002b) and suitable woodland nesting habitat is available. Golden eagles, on the Audubon Watch List, are observed infrequently in the Exit Glacier area, primarily in the early spring. No known golden eagle nesting sites have been identified in Kenai Fjords National Park.

3.9 Visitor Experience

Kenai Fjords National Park is one of the more popular road-accessible visitor attractions in Alaska. In 2001 Kenai Fjords ranked fourth in total visitation out of the fifteen park units in Alaska, reporting a total of 257,852 recreational visits (NPS 2005). Visitation to the Exit Glacier area represents about one half of the park's total annual visitation (NPS 2005).

The overall visitor environment at Exit Glacier is dominated by the natural environment and the spectacle of the glacier and icefield. The primary reason that more than three-quarters of visitors come to Exit Glacier is to closely approach and view a glacier. Visitor amenities and services are limited, and more than 90% of visitors take self-guided hikes to the glacier and Harding Icefield trail having only occasional or no contact with the roving park rangers (Vande Kamp et al. 2004). Visitors are asked to stay on the trails, especially near the glacier due to management concerns regarding safety and impacts to soils and vegetation. Other than the requirement to stay on the trails, the visitor experience is largely unstructured and visitors are able to create their own experience.

Total annual visitation to the Exit Glacier area has increased dramatically since the park was established in 1980. Large increases in visitation occurred in 1982 when a footbridge was installed across the Resurrection River at the park boundary, and again in 1986 when the footbridge was replaced with a vehicle bridge. The main visitor use season is from spring to fall. In winter visitation is considerably lower and the road to Exit Glacier is unmaintained and closed to vehicles. Winter visitors to Exit Glacier cross-country ski, dogsled, snowshoe, winter camp, and snowmachine.

The Exit Glacier area contains a variety of trails (Table 3) that visitors use to access the glacier and the Harding Icefield. This trail system represents the only developed trails within Kenai Fjords National Park. Vehicle access in the Exit Glacier area is restricted to the road and parking lot, except for limited use of maintenance and emergency vehicles on the paved trail (snowmobile access in the winter is addressed under the winter access section below). The parking lot, plaza, restroom facilities, and Nature Center are accessible to all visitors. The trail to the glacier meets accessibility standards up to the junction of the Outwash Plain Trail and

Overlook Loop trail. The trails beyond this point are more primitive and not completely accessible to visitors of all ability levels.

Table 3. Existing trails in the Exit Glacier area.

Trail	Length	Width	Surface
Harding Icefield Trail	3.8 miles	18 to 24 inches	Native materials, may have rocks or low obstacles
Overlook Loop Trail	0.7 miles	36 to 48 inches	Native materials, tread is smooth and free of obstacles
Nature Trail	0.7 miles	36 to 48 inches	Native materials, tread is smooth and free of obstacles
Main Trail to Glacier	0.6 miles	10 feet	Paved for 0.3 miles, native materials for 0.3 miles

3.10 Safety

Visitors to the Exit Glacier area have the potential to encounter a variety of safety hazards:

- Injuries related to the wide mix of activities, both motorized and non-motorized, that occur in both winter and summer.
- Encounters with wildlife such as bears, mountain goats, and moose.
- The possibility of falling ice with visitors climbing on or getting too close to the glacier.
- The possibility of hypothermia and being swept away when crossing streams.
- Possible fecal coliform contamination of surface water resulting from improper disposal of human and/or animal waste.

Overall the accident rate at Exit Glacier is fairly low. Accidents within the Exit Glacier area that have taken place in the past resulted mainly in small injuries. Almost every year injuries such as sprained ankles, scrapped knees/palms, and broken bones occur. The majority of these accidents occur along the Harding Icefield Trail where the topography can be very steep and slippery. Such injuries also occur along the Overlook Loop Trail and in the outwash plain, although they are infrequent, when visitors lose their footing on loose rocks. Wildlife encounters can be dangerous interactions especially when food is involved.

Although only one fatal incident in the past 20 years has occurred involving ice falling from the glacier, the risk of injury is considered high due to the number of people who venture too close to the glacier. Each year, visitors are warned by rangers that they are too near the glacier. Warning signs about falling ice and indicating area closures are placed around the glacier to help prevent future injuries.

Regulations are in place and visitors are educated to help prevent or minimize the safety hazards discussed above. Visitor information regarding regulations and general safety in the Exit Glacier area are provided at numerous locations and in various forms. Three bulletin boards are located within the Exit Glacier area at the campground, the Nature Center and the Harding Icefield trailhead. Park staff and trail patrols are available for visitor information or help at the Visitor Center and at Exit Glacier during the summer.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Methodology

The methodology of the impact analysis follows the guidance provided in NPS DO-12 and CEQ's NEPA implementation guidelines at 40 CFR Parts 1500 through 1508. The environmental consequences associated with the proposed alternatives are considered in terms of direct, indirect, and cumulative impacts. A direct impact is one that is caused by an action and occurs at the same time and place. An indirect impact is one that is caused by an action that is later in time or further removed in distance, but still reasonably foreseeable.

Each impact is further described in terms of type (beneficial or adverse); context (site-specific, local, or regional); intensity (negligible, minor, moderate, or major); duration (short- or long-term); and impairment (would or would not impair park resources and values). A definition of impacts is located below.

1. Temporary Impacts: Impacts anticipated during construction only. Upon completion of construction activities, conditions are likely to return to those that existed prior to construction.
2. Short-term impacts: Impacts that may extend past the construction period, but are not anticipated lasting more than a couple years.
3. Long-term impacts: Impacts that may extend well past the construction period, and are anticipated to last more than a couple of years.
4. Negligible: Little or no impacts (not measurable).
5. Minor: Changes or disruptions may occur, but do not result in a substantial resource impact.
6. Moderate: Easily defined and measurable, but does not result in a substantial resource impact.
7. Major: Easily defined and measurable. Results in a substantial resource impact.
8. Impairment: An impact that would harm the integrity of Park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values.

Cumulative Impacts

Cumulative effects are defined by CEQ as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7).

Impairment

NPS Director's Order 12 requires an impairment finding for actions that impact NPS resources. The 'fundamental purpose' of the National Park System, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. National Park Service managers must always seek ways to avoid or minimize to the greatest degree practicable adverse impacts on park and monument resources and values. However, the laws do give NPS management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given NPS management discretion to allow certain impacts within parks, that discretion is limited by statutory requirement that the NPS must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise.

The prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including opportunities that otherwise would be present for the enjoyment of those resources or values. An impact to any park resource or value may constitute impairment. However, an impact would more likely constitute impairment to the extent it affects a resource or value whose conservation is:

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

4.2 Impacts of the No Action Alternative

4.2.1 Soils

Under the No Action Alternative, the cutting and filling required to maintain existing trails, roads and campgrounds would not result in measurable impacts on soils over that which is currently occurring. Small natural watercourses and groundwater seeps along trails would continue to be intercepted by trail maintenance. Trail maintenance may inadvertently cause small amounts of erosion by diversion of such water courses. Water could collect on the surface of the trail tread and flow down trail causing erosion and rilling, leading to damage to the trail bed and removal of fine particles. Trail users stepping off of the path as necessary for passing, taking pictures, resting, etc. would continue to cause localized compaction and churning beyond the actual trail tread. These actions would impact less than five acres with no impacts to biological productivity. The rate and extent of soil impacts would be expected to correspond with visitation levels.

Cumulative Impacts

Currently there are approximately 30 acres of impacted soils within the project area. Soils in and near the project area have been altered in the past due to construction of buildings, roads, trails and other facilities. Besides the actual footprint of the facilities, the immediate surrounding areas are impacted primarily by compaction from pedestrian and vehicle traffic, and occasionally by isolated areas of erosion where fill slopes exist. In addition to the soil impacts adjacent to facilities, there have been dispersed impacts caused by off-trail pedestrian traffic that has resulted in compaction over broad areas as well as limited erosion on steeper slopes. Concentrated areas of compaction and erosion often take the form of unofficial social trails. The NPS plans no additional reasonably foreseeable actions that would adversely affect soils in the Exit Glacier area other than those described in the 2004 Exit Glacier Area Plan. Cumulatively, these other past, present, and reasonably foreseeable future actions would have moderate impacts on soils. The additional contribution of negligible impacts from this alternative results in a continued moderate rating for overall cumulative impacts to soils.

Conclusion

The overall impact on soils as a result of implementing this alternative would be negligible. The total estimated area of impacted soils remains close to what is currently impacted and would not measurably change the impacted area's overall biological productivity. These impacts would primarily be associated with the normal impact from trampling that typically occurs along margins of trails. The level of impacts to soils anticipated from this alternative would not result in an impairment of KEFJ resources that fulfill specific purposes identified in the establishing legislation or are key to the natural integrity of this park.

4.2.2 Water Quality

No actions would occur that would result in changes to water quality. Under the No Action Alternative, water quality is expected to remain within DEC water quality acceptable limits. Increased visitation and associated vehicle traffic could cause seasonal changes in water quality, such as increased fecal coliform and hydrocarbon pollutant levels. These changes, though measurable, would be seasonal and below DEC water quality acceptable limits as visitation is not expected to increase markedly over the next 10 to 15 years.

Cumulative Impacts

Past actions in the Exit Glacier area that may have affected water quality include installing a large septic system, paving the road, and expanding the parking area to accommodate more vehicles. Current conditions affecting water quality include high visitor use of existing trails, combined with the absence of toilet facilities outside of the developed area. Impacts from all these actions, if any, are unknown, as historical data is unavailable. However, water quality baseline testing was conducted just prior to implementing the paving project (Wright 2001b). Testing revealed water quality was well within state and national standards, implying past actions had no or negligible effects on water quality. Regularly scheduled testing of wells used for drinking water has revealed no contamination (Cook 2006). The NPS plans no additional reasonably foreseeable actions that would adversely affect water quality in the Exit Glacier area other than those described in the 2004 Exit Glacier Area Plan. Cumulatively, these other past, present, and reasonably foreseeable future actions would have minor impacts on water

quality. The additional contribution of minor impacts from this alternative results in a continued minor rating for overall cumulative impacts to water quality.

Conclusion

Under the No Action Alternative, minor impacts to water quality would be expected, primarily from possible increases in visitation without additional sanitary facilities. Although visitation could increase, access to the area would be limited by the parking capacity. The level of impacts to water quality anticipated from this alternative would not result in an impairment of KEFJ resources that fulfill specific purposes identified in the establishing legislation or are key to the natural integrity of this park.

4.2.3 Floodplains

Under the No Action Alternative, actions to prevent flooding of infrastructure, such as diverting stream channels, placing culverts or building berms would continue. These actions would alter floodplain structure and function to varying degrees, depending on the action. Due to the dynamic quality of the Exit Glacier area, major flood events can be expected, necessitating alterations of the floodplain, and further altering the natural hydrology in order to protect infrastructure. Although future actions may not be accurately predicted as they are dependant on flood events, they are expected to be similar to past actions, which have had long-term to permanent effects in areas totaling up to 5 acres.

Cumulative Impacts

Past actions affecting floodplains have included diverting stream channels away from infrastructure, building a levee to support the road to Exit Glacier, installing gabions to divert flood waters away from state-maintained portions of Exit Glacier road, and installing various culverts, all altering floodplain function and structure. Current actions include a temporary ditch to divert runoff away from the Nature Center's foundation, altering the natural course of the stream. The NPS plans no additional reasonably foreseeable actions that could adversely affect floodplains in the Exit Glacier area other than those described in the 2004 Exit Glacier Area Plan. Cumulatively, these other past, present, and reasonably foreseeable future actions would have moderate impacts on floodplains. The additional contribution of moderate impacts from this alternative results in a continued moderate rating for overall cumulative impacts to floodplains.

Conclusion

Under the No Action Alternative, there would be moderate impacts on floodplain resources or function, as alterations to floodplains would continue in order to prevent damage to infrastructure. The level of impacts to floodplains anticipated from this alternative would not result in an impairment of KEFJ resources that fulfill specific purposes identified in the establishing legislation or are key to the natural integrity of this park.

4.2.4 Soundscape

The natural soundscape would be expected to remain similar to the current soundscape. Noise intrusions such as voices, cars, diesel-powered generator and other noises currently occurring in the study area would continue. Such noise intrusions would be primarily apparent during

the middle of the day during the summer season, not likely audible over ¼ mi away, and concentrated around these high use areas. Most routine trail maintenance activities would be performed with hand tools, and noise intrusions associated with power-tools such as chainsaws would be brief and intermittent and limited to the summer season. Dense vegetation adjacent to trails would also help to muffle occasional power tool noises, which would not likely be audible at distances over one mile.

Cumulative Impacts

Past actions affecting soundscape in the study area include road construction and paving, and the construction of a new restroom facility and Nature Center. These new or improved facilities resulted in transient and permanent impacts on the natural soundscape. The transient impacts included the operation of power tools and heavy equipment during the construction phases of these projects, while permanent impacts include noise from increased vehicle traffic to and from the study area and increased human presence as amenities and access have improved over time. Current noise sources include intrusions produced by general use of the area such as voices, vehicles, maintenance activities, and the generator. Intrusions from outside the study area, such as aircraft noise, also occur.

The NPS plans no additional reasonably foreseeable actions that would affect the soundscape in the Exit Glacier area other than those described in the 2004 Exit Glacier Area Plan. However, the possibility exists for future noise-producing activities to occur outside of park boundaries such as helicopter-assisted skiing. Cumulatively, these other past, present, and reasonably foreseeable future actions would have minor impacts on soundscape. The additional contribution of minor impacts from this alternative results in a continued minor rating for overall cumulative impacts to soundscape.

Conclusion

Implementation of the No Action Alternative would result in minor impacts to the soundscape of the Exit Glacier area. Many of the impacts to the soundscape would be transient (seasonal) or limited to construction of discrete projects. The level of impacts to the soundscape from this alternative would not result in an impairment of KEFJ resources that fulfill specific purposes identified in the establishing legislation or are key to the natural integrity of this park.

4.2.5 Vegetation

Use of existing trails would continue to impact vegetation in several ways. Social or informal trails that establish would become devoid of vegetation and may gully and collect water in low areas. Trails may eventually widen and trail braiding could develop with increased traffic on wet or steep slopes. Trail widening would lead to increased trampling of vegetation and bare ground. Increased trampling of soils and vegetation on the outwash plain, as well as increased off-trail use on all existing trails, may occur. Under current conditions, these types of impacts occur in localized areas along existing trails with a total area of impact of less than five acres. Because there would be a net loss of native vegetation and natural succession processes would be disrupted in these areas, these impacts would be considered to be outside of the natural variability for more than one growing season. However, the continued existence of herb-

dominated vegetation would not be threatened because trampling of soils and vegetation occur only a small proportion of these habitats.

Continued high visitation during summer would have the potential to impact vegetation indirectly through the introduction and spread of exotic plant species in the study area, particularly along the road and adjacent to visitor services. Exotic plant control efforts would continue in these areas. Likewise, trail maintenance would continue at current levels, primarily in response to damage in the most heavily used areas.

Cumulative Impacts

Past actions in the study area have resulted in numerous permanent and temporary measurable impacts to vegetation. Impacts include the removal of trees for construction of the parking area, destruction of mosses and lichens on bedrock along the Overlook Loop Trail from foot traffic, development of switchbacks and social trails, and introduction of exotic species. These actions have resulted in measurable, long-term impacts in limited areas which affect more than one generation, although no known species have been extirpated. Lesser impacts include picking of wildflowers and brushing of trail corridors. These actions have not had effects lasting longer than one growing season.

Current actions include an exotic species control project initiated by the Seward Ranger District of the Chugach National Forest and the NPS. This effort is expected to have positive long-term impacts by reducing the overall numbers of invasive species.

The NPS plans no additional reasonably foreseeable actions that could adversely affect vegetation in the Exit Glacier area other than those described in the 2004 Exit Glacier Area Plan. Cumulatively, these other past, present, and reasonably foreseeable future actions would have major impacts on vegetation. The additional contribution of moderate impacts from this alternative results in a continued major rating for overall cumulative impacts to vegetation.

Conclusion

The combined impacts of the proposed actions in the no-action would be moderate as vegetation would continue to be impacted by foot traffic and motorized use in winter; however, trail maintenance would continue, and exotic species would not be allowed to spread unchecked. The level of impacts to vegetation from this alternative would not result in an impairment of KEFJ resources that fulfill specific purposes identified in the establishing legislation or are key to the natural integrity of this park.

4.2.6 Geologic Resources

Under the No Action Alternative, the maintenance of existing trails, roads and campgrounds would not result in impacts on geologic resources.

Cumulative Impacts

Currently there are no impacted geologic resources in the Exit Glacier area including natural processes such as the advance and retreat of Exit Glacier and shifting stream channels.

Geologic resources in and near the Exit Glacier area have not been altered in the past due to construction of buildings, roads, trails and other park facilities. Cumulatively, other past, present, and reasonably foreseeable future actions would have no impacts on geologic resources. The additional contribution of no impacts from this alternative results in a continued “no effect” rating for overall cumulative impacts to geologic resources.

Conclusion

Overall, implementing this alternative would have no effect on geologic resources in the Exit Glacier area. Therefore, this alternative would not result in an impairment of KEFJ resources that fulfill specific purposes identified in the establishing legislation or are key to the natural integrity of this park.

4.2.7 Wildlife

Wildlife species in the Exit Glacier area would continue to be subject to periodic disturbance, displacement, or mortality due to the activities of visitors and park staff, though most species would remain relatively abundant in the area.

Cumulative Impacts

Park management has, for more than twenty years, worked to facilitate an increase in visitation to the Exit Glacier area. Impacts resulting from past park development of this area have undoubtedly had undocumented and possibly profound effects on species which have large home range requirements and a low tolerance for human disturbance such as brown bears, wolves, wolverine, and lynx (Zielinski 1995). A lack of predevelopment data, however, makes it difficult to assess whether the current scarcity of these species in the Exit Glacier area, relative to surrounding areas, is a direct result of park development and increases in visitation (Martin 2002). Under this alternative, development outside of the NPS boundary but still in the general area and unrestricted winter motorized use are likely to increase, making it conceivable that these species could be permanently excluded from the area. Additionally, the Resurrection River Valley is an important travel corridor for these species. Present and future development of the Exit Glacier area may effectively block the movement of wildlife species along the valley. The extent to which this could occur is difficult to assess with current information, though it is unlikely that current plans for this area would result in the long term absence of these species.

The NPS plans no additional reasonably foreseeable actions that could adversely affect wildlife in the Exit Glacier area other than those described in the 2004 Exit Glacier Area Plan. Cumulatively, these other past, present, and reasonably foreseeable future actions would have major impacts on wildlife. The additional contribution of moderate impacts from this alternative results in a continued major rating for overall cumulative impacts to wildlife.

Conclusion

Overall, the No Action Alternative continuing current management practices could have a moderate impact on wildlife in the Exit Glacier area. The level of impacts to wildlife from this alternative would not result in an impairment of KEFJ resources that fulfill specific purposes identified in the establishing legislation or are key to the natural integrity of this park.

4.2.8 Visitor Experience

The implementation of this alternative would result in negligible impacts to the visitor experience as a portion of the Nature Trail would likely be destroyed by Exit Creek channel migration and bank erosion. Loss of sections of the trail would result in minor relocations or complete trail closure depending on the extent of the damage caused by the eroding bank. However, this section of trail is short in length and alternative glacier routes and viewpoints exist in the immediate area. Under this alternative, only 0.3 miles of trail would be wheelchair accessible and no glacier viewpoint for visitors in wheelchairs would be provided in the Exit Glacier area. There would be no designated route and viewpoint near the face of Exit Glacier and visitors would be unable to achieve the primary desired experience of “getting close to a glacier” without ignoring park recommendations and traveling off-trail. The No Action Alternative would have moderate, long-term adverse effects on the visitor experience at Exit Glacier.

Cumulative Impacts

The visitor experience at Exit Glacier has changed from a primitive backcountry experience to a rustic frontcountry experience since the park was created in 1980. A footbridge was installed across the Resurrection River in 1982 and a hiking trail to the glacier was constructed. The two-mile trail to the glacier was primitive with few signs or other amenities. The most noteworthy changes to the visitor experience occurred in 1986 and 1987 when the vehicle bridge was constructed and many of the current amenities were added. In 1987 the first 0.25 miles of the trail to the glacier were paved. In addition, vault toilets, an interpretive shelter, wayside exhibits and a picnic shelter were constructed. Since then, there have been incremental changes that have made the experience less rustic such as the installation of additional signing, construction of new flush toilet facilities, paving of the road and parking lot, and improvement of the main hiking trails to the glacier.

Outside the park, the growing tourism industry has had an impact on the visitor experience at Exit Glacier. Over the last 20 years the economy of Seward has steadily shifted toward a seasonal tourism market, which has resulted in more summer visitors to the Seward area. Visitation at Exit Glacier apparently responded dramatically to an intensive state-wide tourism marketing campaign undertaken by the State of Alaska in the early 1990's, nearly tripling between 1992 and 1995. In general, since the first bridge over the Resurrection River was installed in the early 1980's, the Exit Glacier area has changed from a place where local and other Alaskan residents took their families and friends for a quiet walk, to an international tourist destination dominated in the summer by non-Alaskan visitors.

The NPS plans no additional reasonably foreseeable actions that could adversely affect the visitor experience in the Exit Glacier area other than those described in the 2004 Exit Glacier Area Plan. Cumulatively, these other past, present, and reasonably foreseeable future actions would have major impacts on the visitor experience. The additional contribution of moderate impacts from this alternative results in a continued major rating for overall cumulative impacts to the visitor experience.

Conclusion

Overall, the impact of this alternative on the visitor experience is anticipated to be moderate and adverse because some park visitors would continue to have limited opportunity to view and experience the glacier.

4.2.9 Safety

Under the No Action Alternative no new trails are proposed. Visitor safety on trails would be similar to current levels. Vegetation and topography generally restrict all users to the narrow path along the glacier margin; however, off-trail travel in this area would be expected to increase as the glacier retreats further from the existing trail network. Visitor safety on the Overlook Loop Trail could be adversely impacted by increasing numbers of visitors traveling off-trail to closely approach the face of the glacier using undesignated social trails. Exposure to potential hazards including falling ice, steep terrain, and sub-glacial rivers would increase creating moderate, adverse impacts to visitor safety in the Exit Glacier area. Visitor safety would continue to be a concern along the lower portion of the Harding Icefield Trail.

The potential for wildlife encounters would remain low under this alternative. No injuries in the past have been documented from wildlife encounters. However, as visitation increases, so does the potential for encounters as more people could come into contact with wildlife. Fecal coliform contamination in the water would likely remain at current levels. Visitors consuming water without using a filter would be at risk from *E.coli* and *Giardia*. No records document any visitors acquiring *E.coli* or *Giardia* from drinking water in the Exit Glacier area. This impact would remain low to nonexistent.

Cumulative Impact

In the past brochures and interpretive bulletin boards have been made available to visitors to the Exit Glacier study area illustrating proper hiking gear and what to do in case of wildlife encounters. A park website has also been created with visitor safety topics. In the future there is more work planned on trails to improve visitor safety. The NPS plans no additional reasonably foreseeable actions that could adversely affect safety in the Exit Glacier area other than those described in the 2004 Exit Glacier Area Plan. Cumulatively, these other past, present, and reasonably foreseeable future actions would have minor impacts on safety. The additional contribution of moderate impacts from this alternative results in a continued moderate rating for overall cumulative impacts to safety.

Conclusion

Implementing the No Action Alternative would have moderate, adverse impacts on visitor safety. Injury rates could change from previous years. The main issue that could constitute a threat to visitor safety is the increase in off-trail pedestrian travel by visitors desiring to “get close to” the retreating glacier.

4.3 Impacts of the Proposed Action Alternative

4.3.1 Soils

Improvements to trails and overlooks in the Exit Glacier area would result in negligible impacts to less than one acre of soils. Although ground disturbance would occur under this alternative, adverse impacts to soils in the project area would be negligible over both the short-term and long-term for several reasons. Significant erosion is unlikely given the gently sloping terrain traversed by the Nature Trail. The Overlook Loop spur trail and overlook would be constructed on exposed bedrock and glacial till. This area was only recently exposed by the retreating glacier and soils are poorly developed or absent along most of the proposed trail route. This alternative would result in a negligible increase in disturbed lands (i.e., compacted or unstable soils) over existing levels in the Exit Glacier area because the rerouted portion of the Nature Trail would be closed and allowed to recover, and the Overlook Loop Trail would replace numerous social trails that have developed in this area. Rerouting the Harding Icefield Trail would result in reduced soil erosion through appropriate sidesloping of the trail tread, reduced gradient, and construction of water diversion structures. The current portion of the Harding Icefield Trail in the vicinity of the reroute would be closed and allowed to recover. Under this alternative, the developed area footprint would remain essentially the same; so overall, no new impacts would occur. The extraction of fill material from borrow pits for the Overlook Loop spur trail would result in minor, adverse, localized effects due to the limited area affected.

Cumulative Impacts

Past, current and future impacts to soils are discussed in the *No Action Alternative*. The actions associated with the implementation of this alternative would add less than one acre of impacted soils to the existing 30 acres that are already impacted. Cumulatively, these other actions would have moderate impacts on soils. The additional contribution of negligible impacts from this alternative results in a moderate rating for overall cumulative impacts to soils.

Conclusion

The overall impact on soils as a result of implementing the Proposed Action Alternative would be negligible. The total estimated area of soils that would likely be measurably impacted is less than one acre and on most of this area there would not likely be impact that would measurably change the impacted area's overall biological productivity. The majority of this impact is associated with the construction of new trail segments and overlooks and the normal impact from trampling that typically occurs along margins of trails. The level of impacts to soils anticipated from this alternative would not result in an impairment of KEFJ resources that fulfill specific purposes identified in the establishing legislation or are key to the natural integrity of this park.

4.3.2 Water Quality

Under the Proposed Action Alternative, improvements to trails and overlooks would occur in areas adjacent to surface water resources. As under the No Action Alternative, temporary, primarily summer seasonal changes in water quality may result from unconfined human waste entering streams that may be used for drinking water or recreation. However, due to the high use levels and proximity to public restrooms of the Nature Trail and Overlook Loop Trail low incidents of improper waste disposal along the trails would be expected. Hikers embarking on the Harding Icefield Trail would continue to receive information regarding Leave-No-Trace practices in backcountry areas of the park. Water quality would be expected to remain within DEC standards, as visitation is not expected to increase markedly and current visitor use levels have not resulted in any detectable changes in water quality.

Cumulative Impacts

Past, current and future impacts to water quality are discussed in the *No Action Alternative*. Cumulatively, these other actions would have minor impacts on water quality. The additional contribution of minor impacts from this alternative results in a continued minor rating for overall cumulative impacts to water quality.

Conclusion

Under the Proposed Action Alternative, minor impacts to water quality would be expected. The level of impacts to water quality anticipated from this alternative would not result in an impairment of KEFJ resources that fulfill specific purposes identified in the establishing legislation or are key to the natural integrity of this park.

4.3.3 Floodplains

Floodplains would continue to be impacted under this alternative as infrastructure in the Exit Glacier area would continue to occupy sites in a floodplain; however, this type of development represents a minimal amount of intrusion on floodplains and floodplain processes in the Exit Glacier area. Under the Proposed Action Alternative, improvements to hiking trails and construction of a primitive overlook in a floodplain are proposed. The hiking trail would be rustic (not paved) and follow natural geographical contours. No berming, ditching, diverting stream channels, or otherwise altering the natural floodplain hydrology would be conducted. Because of all these considerations, no changes to the floodplain are expected from improvements to the Nature Trail.

NPS activities that have the potential to have adverse impacts on floodplains are subject to the provisions of Executive Order 11988 (Floodplain Management) as implemented through NPS Director's Order 77-2. The DO requires a "Statement of Findings" (SOF) to be written justifying any unavoidable impacts to floodplains resulting from a preferred alternative. Bike and hiking trail construction are considered "excepted" from SOF requirements because the actions fall under the description of "...foot trails in non-high hazard areas provided that the impacts of these facilities on flood plain values are minimized" and "Isolated backcountry sites,sites along trails or roads."

Cumulative Impacts

Past, current and future impacts to floodplains are discussed in the *No Action Alternative*. Cumulatively, these other actions would have moderate impacts on floodplains. The additional contribution of moderate impacts from this alternative results in a continued moderate rating for overall cumulative impacts to floodplains.

Conclusion

Under the Proposed Action Alternative there could be moderate impacts on floodplain resources or function as changes to protect infrastructure would continue and are expected to be long-term. The level of impacts to floodplains anticipated from this alternative would not result in an impairment of KEFJ resources that fulfill specific purposes identified in the establishing legislation or are key to the natural integrity of this park.

4.3.4 Soundscape

Power tools and other mechanized equipment with accompanying noise intrusions would be used to construct hiking trails and overlooks. However, because power tools would not be used continuously throughout the day, noise is expected to total less than six hours per day during trail construction, which is anticipated to last three summer seasons or up to five months each summer. Since the proposed trails would be rustic, large amounts of clearing and tree-felling utilizing noise-generating power tools would not be required, thus reducing the incidence of intrusive noises.

Construction of the Overlook Loop Trail would involve use of gasoline or generator powered rock drills in a very exposed area. Sound from this activity is expected to be audible throughout the Exit Glacier area.

Power tools, including vehicles and a chipper, would be used during construction. Dense vegetation along the Nature Trail would help to muffle noises in this area, decreasing the intensity and limiting the distance the noise would travel to less than one mile.

Rerouting the Harding Icefield Trail would require rock drilling and blasting which would impact the natural soundscape throughout the entire Exit Glacier Area. However, blasting would be restricted to one short period towards the end of the summer visitor use season, and the duration of the impact would be very brief.

Cumulative Impacts

Past, current and future impacts to the soundscape are discussed in the *No Action Alternative*. Cumulatively, these other actions would have minor impacts on soundscape. The additional contribution of minor impacts from this alternative results in a continued minor rating for overall cumulative impacts to soundscape.

Conclusion

Implementation of the Proposed Action Alternative would result in moderate short-term impacts to the soundscape during construction, with minor long-term impacts to the soundscape of the Exit Glacier area. Many of the impacts to the soundscape are transient

(seasonal) or limited to construction of discrete projects. As such, the combined impacts to the soundscape of the Exit Glacier area would be minor. The level of impacts to the soundscape from this alternative would not result in an impairment of KEFJ resources that fulfill specific purposes identified in the establishing legislation or are key to the natural integrity of this park.

4.3.5 Vegetation

Under the Proposed Action Alternative, several actions that may impact vegetation are planned. These actions include construction of the Nature Trail reroute, the Overlook Loop spur trail, primitive overlooks along both of these trails, and the Harding Icefield Trail reroute. Less than one acre of previously undisturbed lands would be altered in order to accommodate these actions. The actual use of the trails and the potential for introduction of exotic plant species could also impact vegetation. Due to the nature of the proposed hiking trails, construction activities would primarily involve brush removal and pruning of woody shrubs. Trees (between 10-15 mature cottonwoods) could be removed when necessary for trail access or for safety reasons, especially on the new portion of the Nature Trail. However, a portion of the current nature trail would be allowed to revegetate. The impact of drilling and blasting for the Harding Icefield Trail reroute would include permanent destruction of vegetation (trees and shrubs) in the immediate area and damage to nearby vegetation from flying debris. Very few trees (primarily small cottonwoods less than 10 inches in diameter) would be removed during the lower portion of the proposed Harding Icefield Trail reroute and no trees would be removed from the upper half of the reroute.

The viewing area with the spotting scope would be situated on a mostly unvegetated disturbed area, although a substantial amount of brushing of approximately 100 square feet of woody vegetation would be necessary to provide 360 degree views. Although vegetation removed would be capable of regrowth, continuous pruning would be necessary to maintain unobscured access to views.

Use of the proposed new hiking trails could impact vegetation in several ways. Social or informal trails could establish, shortcuts may develop, trails can eventually widen, and trail braiding could develop with increased traffic. Trail widening could lead to increased trampling of vegetation and bare ground. Shrub-dominated communities, through which these trails travel, are slower to recover than grass-dominated communities. Lichens are particularly sensitive to trampling and may not recover for several years in high-use trail areas in alpine habitat. Areas dominated by late-successional plant communities would be avoided and thus would not be altered by this project.

The proposed Outlook Loop Trail would traverse recently exposed bedrock and glacial moraines containing virtually no vegetation as yet.

The actions discussed above, trail construction, and trail use have the potential to impact vegetation indirectly through the introduction and spread of exotic plant species, particularly along trails and roads and in areas adjacent to other visitor services. If unchecked, exotic species introduced via the above actions may have long term adverse impacts on native

vegetation, lasting many years and affecting plant populations by competing with or displacing native species. However, previously described mitigation measures would be implemented to avoid or minimize potential impacts due to introduction of exotic species.

Cumulative Impacts

Past, current and future impacts to vegetation are discussed in the *No Action Alternative*. Cumulatively, these other actions would have major impacts on vegetation. The additional contribution of minor impacts from this alternative results in a continued major rating for overall cumulative impacts to vegetation.

Conclusion

The combined impacts of the proposed actions in the Proposed Action Alternative would be minor as large amounts of visitors are not anticipated on proposed new trails and exotic species would not be allowed to spread unchecked. The level of impacts to vegetation from this alternative would not result in an impairment of KEFJ resources that fulfill specific purposes identified in the establishing legislation or are key to the natural integrity of this park.

4.3.6 Geologic Resources

Under the Proposed Action Alternative, the only action that would impact geologic resources in the Exit Glacier area would be the use of explosives around unavoidable bedrock outcrops, talus slopes and other obstacles in the construction of the Harding Icefield Trail reroute. The impact of drilling and blasting would include permanent destruction of up to 0.15 acres of rock outcrops. The types of geologic features affected by the proposed reroute are not unique to the Exit Glacier area but are common throughout the park and the Kenai Mountain range. A trained, certified blaster would supervise the drilling, placement of charges and blasting operations. Bedrock outcrops, talus slopes and other barriers would be avoided whenever possible by adjusting and lengthening the alignment of the trail before removal of the obstruction is undertaken.

Cumulative Impacts

Past, current and future impacts to geologic resources are discussed in the *No Action Alternative*. Cumulatively, these other actions would have no impacts on geologic resources. The additional contribution of negligible impacts from this alternative results in a continued negligible rating for overall cumulative impacts to geologic resources.

Conclusion

The combined impacts of the proposed actions in the Proposed Action Alternative would be negligible as impacts to geologic resources would be limited to a very small area and would have no effect on geologic processes. The level of impacts to geologic resources from this alternative would not result in an impairment of KEFJ resources that fulfill specific purposes identified in the establishing legislation or are key to the natural integrity of this park.

4.3.7 Wildlife

Improvements to the Nature Trail and Overlook Loop Trail could impact wildlife in the area. Impacts to wildlife from visitor use in the Exit Glacier area include primarily behavioral responses to approaching hikers and from habitat alterations, habitat fragmentation, and habitat loss due to trail construction. Wildlife occurring in the area such as marten, red squirrel, black bear, brown bear, wolverine, mountain goat, varied thrush, common raven, chestnut-backed chickadee, northern goshawk, weasel, sapsucker, and rodents would be disturbed by the use of chainsaws and other hand tools to construct trails and overlooks. Wildlife could be temporarily displaced from the project area while construction is occurring (4 months each summer over two years). Normal habitat use and movement patterns would likely continue at times of day when construction activities are not occurring (evenings, night, early morning). Floodplain habitats (i.e. deciduous riparian woodlands) currently occupied by the existing development are of higher value to wildlife than the less-productive upland sites. Floodplains and valley bottoms are important travel corridors for many species of wildlife including bears and wolves.

Blasting could injure or kill wildlife near blast zones. Wildlife most sensitive to blasting would be those species that inhabit talus slopes and rocky areas, such as small mammals. Mitigation measures described in this document would reduce the impacts of blasting on wildlife; however, individual species of wildlife could still be harmed or killed, but the impact to populations would be negligible to minor. Blasting would occur during prime foraging season for bears. The extent of impacts to bears (e.g. disturbance) would be difficult to determine; however, the duration of the impact would be very brief.

The sites proposed for the trail reroute, spur trail and overlooks are immediately adjacent to existing development. Disturbance and displacement of wildlife currently occurs in the project area due to the noise associated with hikers, park operations, and facility maintenance; therefore, wildlife in the area have either been displaced from the site or have habituated to current levels of human activity. This adverse effect would be of minor intensity, however, because the noise potentially causing displacement would continue to occur predictably and mainly during the summer and would only affect wildlife within areas near the trail and campground. In total, the proposed improvements would only negligibly increase the total miles of trails in the Exit Glacier area (5.8 miles) by less than 2,500 linear feet.

Cumulative Impacts

Past, current and future impacts to wildlife are discussed in the *No Action Alternative*. Cumulatively, these other actions would have major impacts on wildlife. The additional contribution of minor impacts from this alternative results in a continued major rating for overall cumulative impacts to wildlife.

Conclusion

Overall, the proposed actions in the Proposed Action Alternative could have a moderate impact on wildlife during the actual construction, with minor long-term impacts on wildlife in the Exit Glacier area. Proposed improvements to trails and overlooks are those most likely to impact wildlife in the short-term by spatially and temporally altering human intrusions on

wildlife. The level of impacts to wildlife from this alternative would not result in an impairment of KEFJ resources that fulfill specific purposes identified in the establishing legislation or are key to the natural integrity of this park.

4.3.8 Visitor Experience

Implementation of the Proposed Action Alternative would provide greater wheelchair accessibility in the Exit Glacier area than currently exists. Of the existing 5.8 miles of trails in the Exit Glacier area, 0.30 miles are currently wheelchair accessible. Widening and regrading the existing 0.70 mile Nature Trail would increase pedestrian accessibility and safety. The new and rehabilitated trail sections would provide an improved trail surface and with grades equal to or less than 5%. This would allow for greater use by persons with mobility disabilities and would be safer for all visitors. The proposed improvements would result in a one mile long loop trail fully accessible to wheelchairs with unobstructed vistas of Exit Glacier. This increases the length of accessible trails in this area by 0.70 miles.

Rerouting a portion of the Harding Icefield Trail would improve the experience of visitors hiking this trail by providing a better designed and less hazardous trail to access the spectacular views of the Harding Icefield, Exit Glacier and the Resurrection Valley. Many visitors have complained about the condition of the lower portion of this trail and have asked the NPS to improve the trail.

The 490 linear feet of new trail extending from the Overlook Loop Trail would allow visitors closer access to Exit Glacier. With the construction of the proposed spur trail, the NPS anticipates a reduction in off trail use by visitors that currently go off trail to get close to the glacier. This would help protect the fragile landscape and provide a safer visitor experience. Construction of a primitive overlook at the end of the spur trail near the face of the glacier would provide visitors with the primary experience they are seeking in the Exit Glacier area—the opportunity “to closely approach and view a glacier.” This, along with the proposed improvements to the Nature Trail, would allow all visitors greater access to the Exit Glacier resource. The experience for pedestrians including accessibility, safety, and resource access would be improved. Park staff do not expect an increase in visitor use at Exit Glacier as a result of these actions.

Temporary adverse impacts to the visitor experience would be expected due to temporary closures of the Nature Trail and Harding Icefield Trail during construction, presence of vehicles driving on the paved trail, and noise from construction equipment. These impacts would only occur sporadically during work hours and be of short duration, but may moderately impact visitor experience in the short-term during construction.

Cumulative Impacts

Past, current and future impacts to visitor experience are discussed in the *No Action Alternative*. Cumulatively, these other actions would have major impacts on visitor experience. The additional contribution of moderate beneficial impacts from this alternative results in a continued major rating for overall cumulative impacts to visitor experience.

Conclusion

Overall, the long-term impact of this alternative on the visitor experience is anticipated to be moderate and beneficial because opportunities for park visitors to view and experience the glacier would be enhanced. However, in the short-term, moderate impacts may be experienced by visitors during the construction period over three summers.

4.3.9 Safety

Under the Proposed Action Alternative proposed improvements to the Nature Trail, Harding Icefield Trail and Overlook Loop Trail would result in minor beneficial impacts to visitor safety. Visitor safety on the Nature Trail would be improved for mobility challenged visitors. Construction of a spur trail would provide visitors with a designed route to approach the face of the glacier and would reduce the use and establishment of social trails for this purpose. Exposure to potential hazards including falling ice, steep terrain, and sub-glacial rivers would be reduced if visitors stayed on designated trails while experiencing the sites and sounds of Exit Glacier.

The potential for wildlife encounters would be similar to current levels. No injuries in the past have been documented from wildlife encounters. However, as visitation increases, so does the potential for encounters as more people could come into contact with wildlife. Fecal coliform contamination in the water would likely remain at current levels. Visitors consuming water without using a filter would be at risk from *E.coli* and *Giardia*. Since there are no documented incidents of visitors acquiring *E. coli* or *Giardia* from water sources in the Exit Glacier area, chances of acquiring an infection are expected to remain low.

Cumulative Impacts

Past, current and future impacts to safety are discussed in the *No Action Alternative*. Cumulatively, these other actions would have minor impacts on safety. The additional contribution of minor impacts from this alternative results in a continued minor rating for overall cumulative impacts to safety.

Conclusion

Implementing the Preferred Action Alternative would have minor, beneficial impacts on visitor safety. Most of the safety issues would stay the same, but visitor safety along the Overlook Loop Trail would improve as a result of the expected decrease in off-trail pedestrian travel by visitors desiring to “get close to” the retreating glacier.

5.0 CONSULTATION AND COORDINATION

The following individuals, agencies and organizations were consulted in preparation of this document.

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Appendix A: Summary, Evaluation and Findings ANILCA Section 810(a)

I. Introduction

This evaluation and finding was prepared to comply with Title VIII, Section 810 of the Alaska National Interest Lands Conservation Act (ANILCA). It evaluates the potential restrictions to subsistence uses, which could possibly result from the proposal to implement the proposed action alternative in the Exit Glacier area of Kenai Fjords National Park near Seward, Alaska. The *Improvements to Trails and Overlooks in the Exit Glacier Area Environmental Assessment (EA)* describes a range of alternatives for consideration.

II. Evaluation

Section 810(a) of ANILCA states:

“In determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands under any provision of law authorizing such actions, the head of the Federal agency having primary jurisdiction over such lands or his designee 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 affected 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 section 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. Kenai Fjords National Park, containing approximately five hundred and sixty-seven thousand acres of public lands, was created by ANILCA, section 201(5) for the following purposes:

"The park shall be managed for the following purposes, among others: To maintain unimpaired the scenic and environmental integrity of the Harding Icefield, its outflowing glaciers, and coastal fjords and islands in their natural state; and to protect seals, sea lions, other marine mammals, and marine and other birds and to maintain their hauling and breeding areas in their natural state, free of human activity which is disruptive to their natural processes.

Section 201 (5) of ANILCA does not authorize subsistence use within Kenai Fjords National Park.

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." (Section 810(a), ANILCA).

III. Proposed Action on Federal Lands

The Alternative section of the *Improvements to Trails and Overlooks in the Exit Glacier Area EA* describes in detail the alternatives for consideration. Following is a brief summary of each.

No Action Alternative: No improvements to trail and overlooks in the Exit Glacier area would be implemented.

Proposed Action Alternative: The National Park Service (NPS) is considering implementing selected actions from the Exit Glacier Area Plan (NPS 2004) in order to improve the visitor experience, create wheelchair accessible glacier viewing opportunities, prevent adverse impacts to natural resources, and provide for safer access to Exit Glacier. Proposed improvements to the Nature Trail and Overlook Loop Trail would include rerouting 1,000 linear feet of the Nature Trail that is currently threatened by bank erosion along Exit Creek, making the entire 0.7 mile Nature Trail accessible to people in wheelchairs, extending the Overlook Loop Trail by approximately 490 linear feet so visitors can safely view Exit Glacier, and constructing overlooks along both trails to provide vistas of the outwash plain and glacier. The NPS also proposes to reroute a portion of the Harding Icefield Trail. This section of trail is degraded and does not meet standards defined in the 1991 Park Trail Plan. Rerouting the trail would involve removal of approximately 850 linear feet of degraded trail and construction of a new trail segment (between 1,300 and 2,500 linear feet). The overall purpose of these proposed actions is to enhance the visitor experience at Exit Glacier while minimizing impacts to park natural resources.

IV. Affected Environment

Kenai Fjords National Park was established by ANILCA in 1980. Located on the Kenai Peninsula in Game Management Unit 7, Kenai Fjords National Park contains impressive geologic features, scenery, wildlife and human history.

A summary of the affected environment pertinent to subsistence uses is presented here and in the Affected Environment section of the *Improvements to Trails and Overlooks in the Exit Glacier Area Draft EA*. The following documents contain additional descriptions of the affected subsistence environment of the region:

- Kenai Fjords National Park Final General Management Plan, Alaska Regional Office, National Park Service, 1984
- Kenai Fjords National Park Final Environmental Impact Statement, Wilderness Recommendation, National Park Service, 1988.

- Kenai Fjords National Park Final Exit Glacier Area Plan, National Park Service, 2004.

Section 803 of ANILCA defines subsistence uses as "the customary and traditional uses by rural Alaska residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of non-edible by-products of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade."

ANILCA and National Park Service regulations authorize subsistence use of resources in all Alaska national parks, monuments and preserves with the exception of Kenai Fjords National Park, Glacier Bay National Park, Katmai National Park, Klondike Gold Rush National Historical Park, "old" Mount McKinley National Park, and Sitka National Historical Park (Codified in 36 CFR part 13, Subparts A, B, and C). Consequently there are no Federal subsistence open seasons for wildlife harvest within Kenai Fjords National Park.

In accordance with Title VIII of ANILCA, subsistence uses are allowed on adjacent federal public lands within Kenai National Wildlife Refuge and Chugach National Forest. Federal regulations allow qualified rural residents to use fish and wildlife population for subsistence purposes on USDA National Forest and U.S. Fish and Wildlife Service lands.

Regional subsistence activities that occur outside the park include hunting, fishing, trapping, berry picking and plant gathering. Black bear, moose, fish, furbearers, small mammals, waterfowl, berries, edible plants and wood constitute the major subsistence resources used by qualified rural residents.

V. Subsistence Uses and Needs Evaluation

Potential Impacts to Subsistence Users

To determine the potential impacts on existing subsistence activities for each alternative, three evaluation criteria were analyzed relative to existing subsistence resources which could be impacted.

1. the potential to reduce important subsistence fish and wildlife populations by (a) reductions in number, (b) redistribution of subsistence resources, or (c) habitat losses;
 2. what affect the action might have on subsistence fisherman or hunter access;
 3. the potential for the action to increase fisherman or hunter competition for subsistence resources.
1. *The potential to reduce populations:*
 - (a) Reduction in Numbers: None of the alternatives described would reduce populations.

(b) Redistribution of Resources: The alternatives are not expected to cause a disturbance to habitat thereby reducing certain subsistence wildlife resources.

(c) Habitat Loss: The alternatives are not expected to impact critical habitat for moose, furbearers, waterfowl and other subsistence resources.

These alternatives are not expected to manipulate subsistence habitats or result in any measurable reduction in or redistribution of wildlife or other subsistence resources. Provisions of ANILCA, Federal Subsistence Board, USDA Forest Service, Fish and Wildlife Service and NPS regulations provide the tools for adequate protection of fish and wildlife populations within region while ensuring a subsistence priority for local rural residents. In addition, the Federal managers may enact closures and/or restrictions if necessary to assure the continued viability of a particular fish or wildlife population.

2. Restriction of Access:

The alternatives are not expected to significantly change regional subsistence use patterns. Access for subsistence uses within National Forest Service and US Fish and Wildlife Service areas are granted pursuant to ANILCA, sections 811(a)(b) and 1110(a). ANILCA allows access within Kenai Fjords National Park by certain specified means for traditional activities.

3. Increase in Competition:

The alternatives are not expected to result in an increase in competition for subsistence resource on federal public lands, which are open to eligible subsistence users. Federal regulations and provisions of ANILCA mandate that if and when it is necessary to restrict taking of fish or wildlife subsistence users are given a priority over other user groups. Continued implementation of the ANILCA provisions should mitigate any increased competition from resource users other than subsistence users. Federal managers may enact restrictions if necessary to protect the continued viability of a particular fish or wildlife population.

VI. Availability of Other Lands

The availability of other lands outside or within the park has not been considered in the proposed actions. The alternatives are consistent with NPS mandates, the Kenai Fjords General Management Plan, and the Kenai Fjords Exit Glacier Area Plan. Because the proposed actions occur on federal lands that are not available for subsistence use, they do not affect the availability of federal land for subsistence use. No major impact on subsistence use is expected under the proposed actions.

VII. Alternatives Considered

This evaluation has described and analyzed the alternatives of this EA with emphasis on the Proposed Action Alternative.

VIII. Findings

This analysis concludes that the proposed actions would not result in restriction of subsistence uses.