Denali National Park and Preserve
Final Backcountry Management Plan

General Management Plan Amendment and Environmental Impact Statement
January 2006

Produced by Denali National Park and Preserve
National Park Service

U.S. Department of the Interior
Denali Park, Alaska

Abstract: This *Final Backcountry Management Plan, General Management Plan Amendment, and Environmental Impact Statement (Final EIS)* provides specific direction for backcountry management for Denali National Park and Preserve for the next 20 years. This plan will update and expand the 1976 *Backcountry Management Plan* and will amend the 1986 *General Management Plan* for Denali National Park and Preserve. The plan addresses management of all park and preserve areas not included in the 1997 *Entrance Area and Road Corridor* and the 1997 *South Side Denali Development Concept Plans*, including the designated wilderness in the former Mount McKinley National Park, the national park additions, the northwest and southwest national preserve areas, and the park road corridor west of park headquarters during the winter season. The *Final EIS* follows a *Draft EIS* published in February 2003, and a *Revised Draft EIS* published in April 2005. It presents a modified version of the preferred alternative from the *Revised Draft EIS* and an analysis of its environmental consequences. It also provides a summary of the other alternatives considered and their environmental consequences. The complete text of those alternatives can be found in the *Revised Draft EIS*.

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Executive Summary

This document is a *Final Backcountry Management Plan, General Management Plan Amendment, and Environmental Impact Statement (Final EIS)*. It follows an original *Draft Backcountry Management Plan and EIS (Draft EIS)* published in February 2003 and a *Revised Draft Backcountry Management Plan and EIS (Revised Draft EIS)* published in April 2005. The *Final EIS* makes several adjustments to the preferred alternative of the *Revised Draft EIS*, but retains that alternative's essential elements and strategies.

This document does not reprint all of the information from the *Revised Draft EIS*. It contains the entirety of the Purpose and Need (chapter 1), the modified preferred alternative (chapter 2), and an analysis of impacts of that alternative (chapter 4). It also contains a summary comparison of the modified preferred alternative with the alternatives previously presented. Factual corrections to the Affected Environment (chapter 3) and the Appendices are presented as Errata sheets following the Final Action. The entirety of the chapter on Consultation and Coordination (chapter 5) and the Section 810 evaluation and findings of potential restrictions to subsistence activities (appendix C) are also reprinted with modifications. Unmodified portions of the *Revised Draft EIS* are incorporated into the *Final EIS* by reference.

Purpose and Need

The goal of the backcountry management plan is to describe how the National Park Service will act to provide future generations with a variety of opportunities to experience the Denali backcountry while protecting park wildlife and other natural resources, wilderness resource values, and subsistence resources. This plan will update and expand the 1976 *Backcountry Management Plan* and, once approved by a Record of Decision, will amend the 1986 *General Management Plan* for Denali National Park and Preserve. This plan will also serve as a *Soundscape Preservation and Noise Management Plan* as required by NPS Director's Order 47, a *Wilderness Management Plan* as required by NPS Director's Order 41, and a *Commercial Services Plan* for the backcountry.

This new plan addresses management of all park and preserve lands, except the park road corridor and adjacent development zones and backcountry day use areas, which were addressed in the 1997 *Entrance Area and Road Corridor Development Concept Plans (DCP)*. The study area also includes the park road corridor west of park headquarters during the winter season. Some actions do affect the development and backcountry day use areas delineated in the 1997 *Entrance Area and Road Corridor Development Concept Plans;* the new actions proposed in this plan, however, are consistent with the *Entrance Area and Road Corridor DCP* and the 1997 *South Side Denali DCP*. The plan is intended to guide decision-making for the backcountry areas of Denali for 20 years.

There are four reasons why a new backcountry management plan is needed at this time, identified as planning issues during project scoping.

- The 1976 backcountry planning document predated the 1980 Alaska National Interest Lands Conservation Act, and the park's 1986 General Management Plan did not provide detailed guidance about managing backcountry uses in the park additions.
- Visitation has grown dramatically for some backcountry activities, requiring new methods of management.
- Anticipated increases in additional activities are expected in the next 20 years.
- Changes in backcountry use require National Park Service action to protect park resources and wilderness character.

Specifically, actions described by this plan should

- protect and preserve the park's natural and cultural resources, including natural soundscapes and subsistence opportunities;
- protect and preserve the park's wilderness resource values, including its wilderness character and outstanding opportunities for solitude;
- provide for the public's freedom of use and enjoyment of the park's backcountry and wilderness in a manner that is consistent with park purposes and the protection of park resources and values;
- protect and provide opportunities for wilderness recreational activities in the backcountry, including reasonable access; these recreational opportunities should be defined within the context of a spectrum of recreational opportunities available on lands managed by public agencies in the Denali region (primarily state parks, other state lands, and federal Bureau of Land Management lands);
- ensure all National Park Service management practices and research activities in the backcountry are consistent with park purposes; and
- provide for the means to achieve public understanding and support of backcountry and wilderness values.

The purpose and need for the plan are explained fully in chapter 1.

Alternatives

The *Revised Draft EIS* included a no-action alternative and four action alternatives. This document describes the modified preferred alternative and summarizes the other four alternatives. A summary of all the alternatives appears in Table 2-14. The following topics are addressed.

1) Management Areas: This topic includes descriptions of visitor experience and resource protection goals for various parts of the backcountry. These goals are presented through the articulation and allocation of "management areas" that are defined by indicators and quantitative standards.
2) Access Management: This topic addresses strategy, tools, and specific prescriptions for managing motorized and non-motorized recreational access to the park and preserve.
3) Wilderness Management: This topic addresses a guiding philosophy for wilderness management at Denali consistent with law, policy, and the park's specific history. It includes several specific measures to protect wilderness

resources and wilderness recreational opportunities, including guidance on group size, human waste disposal, and climbing tools.

4) Commercial Services Planning: This topic includes descriptions of the appropriate type, locations, and scale of commercial services in the backcountry including both transportation and guide services. Guided hiking, air taxi, scenic air tour, and guided sport hunting services are specifically addressed.
5) Backcountry Facilities: This topic identifies appropriate types of and locations for backcountry facilities – including trails, designated campsites, sanitation facilities, cabins and shelters, and information facilities – as well as proposing specific new facilities. This topic also includes winter management of the park road corridor west of Park Headquarters.
6) Administrative and Scientific Activities: This topic addresses the management of administrative and scientific activities to protect resource values of the backcountry. It covers administrative camps, information and education, aviation, research, and resource management.
7) Easements and Boundary Changes: This topic includes a proposed land exchange in the Tokositna and Coffee Rivers area and a strategy for addressing a stranded public access easement in the Cantwell/Windy Creek area that is intended to provide access to the park boundary.

Each alternative of the *Revised Draft EIS* represented a distinct vision for the Denali backcountry and proposed a set of actions under the seven topic categories which would result in achievement of the vision. Based on public comment, the *Final EIS* presents the following vision as the preferred alternative:

> This backcountry management plan would guide the National Park Service in providing opportunities for a variety of wilderness recreational activities and experiences while recognizing and protecting the premier wilderness resource values of the entire backcountry. Areas in the Dunkle Hills and around the Ruth and Tokositna Glaciers on the south side of the Alaska Range would be managed for those visitors who want to experience the wilderness resource values or other resource values of the Denali backcountry but require services or assistance, or who are unable to make a lengthy time commitment. Areas along the park road in the Old Park and the Kantishna Hills would provide accessible opportunities for short- or long-duration wilderness recreational activities with only limited options for guidance or assistance the farther one gets from the park road. The remainder of the backcountry would be managed for dispersed, self-reliant travel, and would include opportunities for extended expeditions in very remote locations.

Environmental Consequences

Following the modified preferred alternative is an analysis of environmental consequences of that action. This analysis evaluates the magnitude of impacts and how these impacts compare to current conditions. The cumulative impact assessment outlines overall impacts resulting from past, current, proposed, and reasonably foreseeable management and other actions. Table 2-15 compares the conclusions of the analysis for the Final Action to the conclusions of the action alternatives presented in the *Revised Draft EIS*.

The National Park Service considered in detail 10 categories for analysis, including park resources, recreational opportunities, and park operations. These were:

- Soils (particularly ice-rich permafrost soils)
- Vegetation
- Fish and wildlife
- Natural soundscapes
- Wilderness
- Subsistence
- Cultural resources
- Socioeconomics
- Recreational opportunity and visitor safety
- Park management and operations

By providing for growth in recreational activities that require services or assistance, the preferred alternative would constrain some opportunities for wilderness-dependent activities in accessible areas and produce minor benefits to recreational opportunities overall. There would be a negligible change in impacts to wilderness and natural soundscape resources, although locations of impacts in the park would shift. Minor adverse impacts would occur to ice-rich permafrost soils, minor to moderate adverse impacts to wildlife and subsistence resources and opportunities, and moderate adverse impacts to vegetation. This alternative would provide little overall mitigation for past actions, so there would still be cumulative major adverse impacts to such resources as wilderness and natural soundscapes.

The impacts of the modified preferred alternative are compared to the impacts of the other four alternatives of the *Revised Draft EIS* in Table 2-15.

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CHAPTER 1: PURPOSE AND NEED

SUMMARY

This *Final Backcountry Management Plan, General Management Plan Amendment, and Environmental Impact Statement* provides specific direction for backcountry management and guides backcountry management decisions for Denali National Park and Preserve for the next 20 years. Existing management plans do not adequately cover the extensive areas added to the park by the Alaska National Interest Lands Conservation Act of 1980 (ANILCA), nor do they address many of the current visitor experience, resource protection, and user conflict issues. The goal of the backcountry management plan is to describe how the National Park Service will act to provide future generations with a variety of opportunities to experience the park backcountry while protecting park wildlife and other natural resources, wilderness resource values, and subsistence resources. Proposed National Park Service actions are guided by established laws and policies, such as the National Park Service Organic Act, Mount McKinley National Park enabling legislation, the Wilderness Act, ANILCA, and National Park Service Management Policies. The plan also responds to public concerns identified during project scoping, public comments made during the National Environmental Policy Act (NEPA) review process, and the social and environmental impacts identified as part of NEPA review.

FINAL BACKCOUNTRY MANAGEMENT PLAN

This document is a *Final Backcountry Management Plan, General Management Plan Amendment, and Environmental Impact Statement* (*Final EIS*). This document follows an original *Draft Backcountry Management Plan and Environmental Impact Statement* (*Draft EIS*) published in February 2003 and a *Revised Draft Backcountry Management Plan and Environmental Impact Statement* (*Revised Draft EIS*) published in April 2005. The *Revised Draft EIS* substantially changed the actions in the plan alternatives in response to public comment on the original draft. These changes were significant enough to merit a new round of public review before publication of the *Final EIS*. This *Final EIS* makes several adjustments to the preferred alternative of the *Revised Draft EIS*, but retains the essential elements and strategies of that alternative.

To enhance public understanding of the changes to the *Revised Draft EIS*, this *Final EIS* does not reprint all of the information from the draft. This document highlights those areas of importance for understanding the new preferred alternative and its impacts, and contains all of the changes made throughout the plan. Unmodified portions of the *Revised Draft EIS* are considered to be an integral part of this *Final EIS*, and readers should refer to that draft as appropriate. An itemization of the important components of the *Final EIS* is as follows:

Chapter 1, Purpose and Need	Entire chapter is in this document.
Chapter 2, Alternatives	Modified preferred alternative is in this document along with a summary table comparison to other alternatives (Table 2-14). Refer to *Revised Draft EIS* for full description of other alternatives.
Chapter 3, Affected Environment	Errata sheet with changes from *Revised Draft EIS* is in this document; otherwise refer to *Revised Draft EIS*.
Chapter 4, Environmental Consequences	Marked-up version of the impact analysis for the modified preferred alternative is in this document along with a summary table comparison to consequences of other alternatives (Table 2-15). For the full analysis for other alternatives refer to the *Revised Draft EIS*.
Chapter 5, Consultation and Coordination	Entire chapter is in this document.
Chapter 6, Comments and Responses	Comments and responses on the *Revised Draft EIS* are in this document. For comments and responses on the original *Draft EIS*, refer to appendix A of the *Revised Draft EIS*.
Appendices	Bibliography mark-ups and the entirety of Appendix C, ANILCA Section 810(a) Summary of Analysis and Findings are in this document. Other appendices are found in the *Revised Draft EIS*.

SUMMARY OF CHANGES BETWEEN THE REVISED DRAFT EIS AND THE FINAL EIS

The National Park Service received 15,198 comments on the *Revised Draft EIS* of the Denali Backcountry Management Plan, compared to 9,370 comments received on the original draft. Chapter 6 contains a characterization of comments received, copies of representative substantive comments, and the NPS responses to those comments. In some cases, the National Park Service made changes to the preferred alternative in order to respond to public interest and new information. The major differences between the modified preferred alternative of the *Final EIS* and the preferred alternative of the *Revised Draft EIS* are as follows:

Management Areas

- Indicators and standards were added for the populations, demographics, and distributions of major wildlife species.
- The southern Kantishna Hills and the southern park additions between Cantwell Creek and Bull River were changed from Management Area A to Management Area B.
- A portion of the northern park additions east of the McKinley River was changed from Management Area D to Management Area B.

- The Buckskin and Coffee Glacier valleys were changed from Management Area A to a combination of Management Area C in the glaciated portions and Management Area B in the lowland areas.
- The suggested third Major Landing Area on the southwest fork of the Kahiltna Glacier was removed.
- The Muddy and Kantishna River Corridor was designated for summer season only. The Corridors on the Yentna River were removed, as was the summer season Corridor on Eldorado Creek in Kantishna.
- The winter season Corridors in the southern park additions were authorized but would not be implemented until there is sufficient demand. These Corridors were shortened in the Tokositna River area.
- The "Low" standard for Encounters with People was changed from "3 or fewer parties per week" to "visitors are unlikely to encounter other parties in these areas."

Wilderness Management

- A clarification was made that maximum group size in Management Areas OP2 and D would be six.

Commercial Services

- The hierarchy for guided services and educational programs was removed and replaced with a statement indicating that National Park Service and Murie Science and Learning Center activities would have a priority for available backcountry capacity where such capacity is limited.
- Definitions of scenic air tours and air taxis were clarified.
- The restriction that would prohibit scenic air tours from landing on the Pika or Eldridge Glaciers when climbers or mountaineers are present was modified. Scenic air tour landings may take place when climbers are present, but those landings are subject to management area standards, cannot occur when other landing locations are available, and are discouraged when climbers are present.
- Guided day-hiking in the Old Park would be restricted to areas west of Toklat River with access from Kantishna, plus the guided hiking in the Wonder Lake area authorized by the *Entrance Area and Road Corridor DCP*.

Backcountry Facilities

- The trail suggested in Alternative 5 from Eielson Bluffs to Thorofare River was added to the *Final EIS*. The Wildhorse Creek trail was removed.
- The language from Alternative 3 regarding plowing the park road in winter was adopted in the *Final EIS*, so snow would not be removed from the road until necessary to prepare for summer use.

Administrative and Scientific Activities

- The requirement to develop management area-specific criteria for research and resource management activities was removed in favor of a requirement to obtain research permits. The process for Alaska Department of Fish and Game management activities was also clarified.

PURPOSE OF PLAN

The goal of the backcountry management plan is to describe how the National Park Service will act to provide future generations with a variety of opportunities to experience the Denali backcountry while protecting park wildlife and other natural resources, wilderness resource values, and subsistence resources. This plan will update and expand the 1976 *Backcountry Management Plan* and, once approved by a Record of Decision, will amend the 1986 *General Management Plan* for Denali National Park and Preserve. The 1997 *Entrance Area and Road Corridor Development Concept Plan* (DCP) and the 1997 *South Side Denali Development Concept Plan* also amended the 1986 *General Management Plan*. This plan will also serve as a *Soundscape Preservation and Noise Management Plan* as required by NPS Director's Order 47, as a *Wilderness Management Plan* as required by NPS Director's Order 41 (see appendix B), and as a *Commercial Services Plan* for the backcountry.

This new plan addresses management of all park and preserve lands, except the park road corridor and adjacent development zones and backcountry day use areas, which were addressed in the 1997 *Entrance Area and Road Corridor Development Concept Plan*. The study area also includes the park road corridor west of park headquarters during the winter season. Some actions do affect the development and backcountry day use areas delineated in the 1997 *Entrance Area and Road Corridor Development Concept Plan;* the new actions proposed in this plan, however, are consistent with the *Entrance Area and Road Corridor* DCP and the *South Side Denali* DCP. The study area for this plan is shown in Map 1. The study area includes congressionally designated wilderness and lands determined suitable for wilderness designation.

The National Park Service has prepared this environmental impact statement to evaluate the potential environmental impacts of the proposed backcountry management plan alternatives and to inform and seek input from the public, regulatory agencies, and other interested parties. The environmental impact statement findings and public comment will form the basis for a decision by the NPS Regional Director for Alaska on the final *Backcountry Management Plan and General Management Plan Amendment*. Implementing the plan may require promulgation of special regulations and public advisories in consultation with other federal and state agencies and the public. This environmental impact statement has been prepared according to the National Environmental Policy Act of 1969 and regulations of the Council on Environmental Quality (40 CFR Part 1500).

This amendment to the *General Management Plan* does not change the fundamental purposes of the park as established in law and policy. Throughout the history of the park, management decisions have been oriented to the preservation of wilderness character and other wilderness resource values. There has also been an emphasis on protecting the park's intact natural ecosystem. This plan will retain that consistency in management but will introduce new ideas for addressing the issues of today and those anticipated in the next 20 years.

NEED FOR PLAN

There are four reasons why a new backcountry management plan is needed at this time, identified as planning issues during project scoping.

1) **The 1976 backcountry planning document predated ANILCA, and the 1986 GMP did not provide detailed guidance about managing backcountry uses in the park additions.**

   As a result, there is a well-defined system for managing backcountry use in the former Mount McKinley National Park (the Old Park), but only a small portion of the ANILCA park additions have been incorporated into that management framework. In addition, ANILCA designated most of the Old Park as wilderness under the Wilderness Act and included provisions for special access that have never been addressed in backcountry planning.

2) **Visitation has grown dramatically for some backcountry activities, requiring new methods of management.**

   Since 1986, general growth in the tourism industry statewide has brought more pressure for comfortable, convenient, and predictable access to Alaska's wild lands. The resident population of Alaska has grown more than 50 percent since 1980, providing a much larger year-round demand for recreational opportunities on the public lands. Twenty years ago the relatively few recreational users of the public lands were sparsely spread over a vast area, but today – particularly in areas that are accessible from the state road system – the use is much more dense, creating concerns about damage to resources and generating conflicts among different user groups. For many locations and activities, the National Park Service has little information about the extent and character of use. Laws, regulations, and agency management policies require the National Park Service to manage recreational and other uses to protect resources and to minimize conflicts among park users.

   Specific issues identified during scoping include the following:

   <u>Aircraft Overflights and Airplane Landings</u>: Scenic air tours and concession-permitted airplane landings have increased dramatically since the 1986 GMP was completed. Helicopter and fixed-wing aircraft encounters are a common occurrence in all of the popular hiking areas, particularly south of the park road along the flank of the Alaska Range and in glaciated areas around Mount McKinley. Airplanes making landings on Alaska Range glaciers – once primarily a way to transport mountaineers – now account for almost 3,000 landings a year; and more than two-thirds of those landings are brief stops with scenic tour passengers.

   Aircraft are an important means of visitor access to remote areas of the Denali backcountry, but overflights and landings, generally unrestricted by management plans in effect, have resulted in substantial changes in the natural sound environment

and generated new conflicts with park users on the ground beneath flight corridors. Commercial jets traveling across the park, military flights in a Military Operations Area south of the Alaska Range, and NPS administrative use of aircraft also contribute to these issues.

Snowmachine (Snowmobile) Use: Recreational snowmachine use was very limited at the time of the 1986 GMP. Since then improved technology has extended the range of the machines and the terrain they are capable of traversing, so that snowmachine use is now widespread in the southern park additions and growing rapidly. Snowmachines can be an important means to access remote backcountry areas, but conflicts with other users, especially non-motorized winter recreationists and subsistence users, are increasing, and concerns have been raised about the effects of snowmachine use on wildlife, vegetation, water quality, air quality, natural soundscapes, and other park resources. There are currently few guidelines for managing use.

Hiking and Backpacking: The numbers of participants in backcountry park activities such as hiking are growing because of larger numbers of visitors. There are many more seasonal workers in the area who often use the park backcountry during their leisure time. Lodges in the Kantishna Hills are providing a much broader range of options for their guests than those available 15 years ago.

Climbing and Mountaineering: The number of climbers on Mount McKinley has doubled in the last 20 years. As climber numbers continue to rise, crowding on technical sections of popular routes, such as the fixed lines section of the West Buttress, could jeopardize visitor safety. Congestion at campsites also raises questions about the quality of the experience within this part of the Denali Wilderness, and the level of use has created a substantial human waste management concern. Several climbing areas in the park additions, such as Little Switzerland and the Eldridge Glacier, are becoming new popular destinations for climbers and mountaineers, leading to concerns about human waste and eventual crowding in those locations.

Guided and Commercial Uses: Increasing visitation has led to significant increases in demand by businesses and non-profit organizations to offer guided activities. The new Murie Science and Learning Center is bringing additional groups of visitors into the park for research and educational activities. The National Park Service has no management plan that describes the kind and level of guided and commercial uses appropriate in the Denali backcountry.

3) Anticipated increases in additional activities are expected in the next 20 years.

The National Park Service needs to act to anticipate changes in use. Off-road bicycle use, motorboat access, and pack animal use are activities that presently occur at minimal levels, but for which interest could increase at any time just as interest in snowmachine use increased during the 1990s. Non-motorized winter recreational use (skiing, skijoring, snowshoeing, and dog mushing) has been modest, but also has potential for growth. This plan needs to provide guidance for managing these uses.

4) **Changes in backcountry use require National Park Service action to protect park resources and wilderness character.**

Underlying the need to manage visitor activities in the backcountry is the NPS responsibility to protect park resources and values. These include wildlife, vegetation, natural ecological relationships, natural sounds, and wilderness resource values. The changes in both visitor activities and administrative activities in the backcountry need to be managed to ensure these values are not compromised. Present plans do not adequately address these topics, particularly in the 1980 park additions and preserve, nor do they address resources that have only recently been identified as threatened, such as the park's natural soundscape.

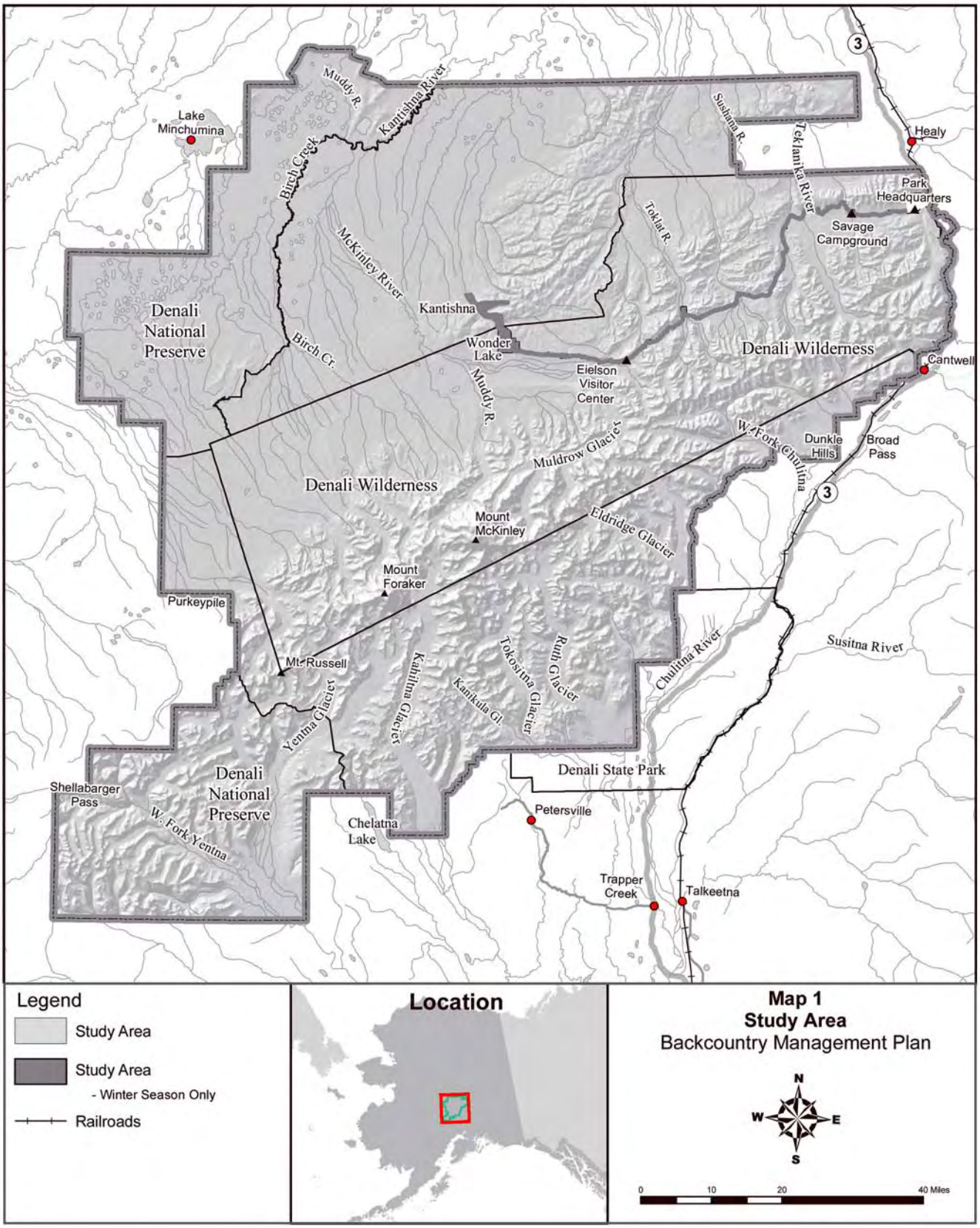
BACKGROUND

Congress designated the original Mount McKinley National Park and the larger Denali National Park and Preserve for specific purposes as described in law. The park was created by Congress because it had particular significance – qualities that make it a superlative example of the natural, cultural, and wilderness landscapes of the United States.

Park Purpose

The purpose of Denali National Park and Preserve has evolved from the time Congress established the original Mount McKinley National Park to the present and has increased in complexity because of the different mandates that apply to the Old Park (the original Mount McKinley National Park), the national park additions (added by ANILCA), the national preserve (also added by ANILCA), and the designated wilderness (covering most of the Old Park).

<u>Mount McKinley National Park (Old Park)</u>
In 1917 Congress established Mount McKinley National Park as a "game refuge" to "set apart as a public park for the benefit and enjoyment of the people ... for recreation purposes by the public and for the preservation of animals, birds, and fish and for the preservation of the natural curiosities and scenic beauties thereof ..." (39 Stat. 938).


Lake Minchumina
Muddy R.
Kantishna River
Birch Creek
McKinley River
Sushana R.
Teklanika River
Healy
Park Headquarters
Savage Campground
Toklat R.
Kantishna
Wonder Lake
Eielson Visitor Center
Denali National Preserve
Denali Wilderness
Cantwell
Birch Cr.
Muddy R.
Muldrow Glacier
W. Fork Chulitna
Dunkle Hills
Broad Pass
Denali Wilderness
Mount McKinley
Eldridge Glacier
Mount Foraker
Purkeypile
Mt. Russell
Kahiltna Glacier
Tokositna Glacier
Ruth Glacier
Kanikula Gl.
Chulitna River
Susitna River
Yentna Glacier
Denali State Park
Shellabarger Pass
Denali National Preserve
W. Fork Yentna
Chelatna Lake
Petersville
Trapper Creek
Talkeetna
Legend
Study Area
Study Area
- Winter Season Only
Railroads
Location
Map 1
Study Area
Backcountry Management Plan
N
W
E
S
0
10
20
40 Miles

Denali National Park and Preserve

In 1980 Congress passed the Alaska National Interest Lands Conservation Act (ANILCA, 16 USC §§ 3101-3233, Pub. L. 96-487), which enlarged and renamed the park Denali National Park and Preserve. Section 101 of ANILCA describes the broad purposes of the new conservation system units throughout Alaska, including enlarged national parks and preserves such as Denali. These are the following:

- Preserve lands and waters for the benefit, use, education, and inspiration of present and future generations.
- Preserve unrivaled scenic and geological values associated with natural landscapes.
- Maintain sound populations of, and habitat for, wildlife species.
- Preserve extensive, unaltered ecosystems in their natural state.
- Protect resources related to subsistence needs.
- Protect historic and archeological sites.
- Preserve wilderness resource values and related recreational opportunities such as hiking, canoeing, fishing, and sport hunting.
- Maintain opportunities for scientific research in undisturbed ecosystems.
- Provide the opportunity for rural residents engaged in a subsistence way of life to continue to do so.

Section 202 stated that the Denali National Park and Preserve additions are to be managed for the following additional specific purposes:

- To protect and interpret the entire mountain massif and the additional scenic mountain peaks and formations.
- To protect habitat for, and populations of fish and wildlife, including, but not limited to, brown/grizzly bears, moose, caribou, Dall sheep, wolves, swans, and other waterfowl.
- To provide continued opportunities, including reasonable access, for mountain climbing, mountaineering, and other wilderness recreational activities.

Denali Wilderness

Section 701 of ANILCA designated the “Denali Wilderness of approximately one million nine hundred thousand acres” under the Wilderness Act as depicted on a map referenced in Section 202 of ANILCA and including 99% of the former Mt. McKinley National Park. According to the Wilderness Act, these lands are to be “administered for the use

and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness."

Denali National Preserve
Section 1313 of ANILCA addresses the purpose of national preserves created by the act.

> A National Preserve in Alaska shall be administered and managed as a unit of the National Park System in the same manner as a national park except as otherwise provided in this Act and except that the taking of fish and wildlife for sport purposes and subsistence uses, and trapping shall be allowed in a national preserve under applicable State and Federal law and regulation.

Park Significance

Large Protected Area. Denali National Park and Preserve encompasses a vast six million acre area, about the size of the state of New Hampshire. Most of the two million acres of the original park has been in protected status since 1917. This large size enables a spectacular array of flora and fauna to live together in a healthy natural ecosystem and provides excellent opportunities to study subarctic ecosystems in settings largely undisturbed by humans. Because of these values, the United Nations Man and the Biosphere Program designated the park and preserve to be an International Biosphere Reserve.

Mountains and Glaciers. The park contains a major portion of the Alaska Range, one of the great mountain uplifts in North America. The Alaska Range is dominated by North America's highest peak, Mount McKinley, with its summit at 20,320 feet above sea level. Towering 18,000 feet above the adjacent lowlands, the mountain's dramatic vertical relief rivals any other mountain in the world, exceeding the vertical relief of Mount Everest measured from base to summit. A number of large glaciers originate in the park's high mountains, including some of the largest in North America.

Wildlife and Habitat. The park was originally established in 1917 as a refuge for large mammals. Backcountry visitors and visitors traveling along the park road often observe Dall sheep, caribou, wolf, grizzly bear, moose, and fox. While populations fluctuate, nowhere else in America can such concentrations of these large species of wildlife be observed in as accessible a natural setting. The park is also significant for its diverse avian habitat that attracts birds from all over the world. The park's rich and varied vegetation includes alpine tundra, shrub-scrub tundra, mixed spruce-birch and spruce-tamarack woodlands, taiga, wetlands, and extensive riparian and lowland forest areas. Denali has more than 10,000 mapped lakes. More than 753 species of flowering plants inhabit the slopes and valleys of the park.

Scenic Resources and Air Quality. Outstanding views of natural features, including mountains, glaciers, faults, and rivers dominate the park landscape. On a clear day, Mount McKinley can be seen from Anchorage, more than 130 air miles to the south. The

exceptional air quality in Alaska and the lack of city lights near the park provide the conditions for outstanding daytime views year-round and excellent night sky visibility in fall, winter, and spring. Denali National Park and Preserve is a designated Class I airshed under the Clean Air Act Amendments.

Cultural Resources. There are 257 known cultural resource sites within Denali's boundaries, including both prehistoric and historic sites. Because cultural resource inventories have been limited to date, this number likely represents a small fraction of the park's total sites. Known resources include archeological and historic sites associated with Athabascan Indian groups, early explorers, mining history, and the early days of the park. Major prehistoric sites in the park include the Teklanika Archeological District, a property listed on the National Register of Historic Places. Many historic structures are in the park headquarters area, which is listed on the National Register of Historic Places as a district, and on the boundaries of the Denali Wilderness (along the original park boundary). These are mainly patrol cabins and other structures dating back to early years of park management. Historic mining activity dates back to the early 1900s in the Kantishna Hills (which includes the national register-eligible Kantishna Historic District), the Stampede area, and the Dunkle Hills near Cantwell.

Mountaineering. Because it is the highest peak in North America, has a high northern latitude location, and is relatively accessible, Mount McKinley is considered one of the world's premier mountaineering destinations, drawing climbers from many countries. It is touted as one of the "seven summits of the world." Many other peaks in the park, including Mount Foraker, also offer outstanding expeditionary climbing opportunities.

Wilderness Recreation. Denali offers superlative opportunities for primitive wilderness recreation. Outstanding cross-country hiking, backcountry camping, and winter touring possibilities are available for those willing to approach the area in its natural condition. This huge park contains large areas with almost no trails and where evidence of human use is minimal to nonexistent. These conditions are in contrast to most wilderness areas in the contiguous 48 states where maintained trails, designated campsites, footbridges, and signs are standard. These conditions also contrast with much of Alaska, where similar opportunities abound, but are very difficult to reach. A large portion of Denali's backcountry is readily accessible to visitors who can reach the park by either highway or railroad from either Anchorage or Fairbanks – Alaska's two largest cities and major connection points for out-of-state visitors.

MANAGEMENT GOALS

General Vision

The National Park Service will preserve outstanding opportunities to view wildlife and mountain scenery, to experience wilderness, and to study wildlife, habitat, and ecosystem patterns and processes in the backcountry of Denali National Park and Preserve. Denali will retain its unique status as a park that offers an undeveloped Alaskan wilderness park experience distinct from the wilderness and park experience in the other states, while being more accessible than most national parks in Alaska because of the adjacent highway system and interior park road. In order to preserve the park's character and unique recreational opportunities, the National Park Service will seek to provide recreational opportunities in the Denali backcountry that are compatible with the unique resources and values for which the park was established. Other recreational activities can occur on adjacent lands that possess excellent wildland qualities but also have broader management mandates that are more appropriate for some uses.

Objectives

Specifically, actions described by this plan should

- protect and preserve the park's natural and cultural resources, including natural soundscapes and subsistence opportunities;
- protect and preserve the park's wilderness resource values, including its wilderness character and outstanding opportunities for solitude;
- provide for the public's freedom of use and enjoyment of the park's backcountry and wilderness in a manner that is consistent with park purposes and the protection of park resources and values;
- protect and provide opportunities for wilderness recreational activities in the backcountry, including reasonable access; these recreational opportunities should be defined within the context of a spectrum of recreational opportunities available on lands managed by public agencies in the Denali region (primarily state parks, other state lands, and federal Bureau of Land Management lands);
- ensure all National Park Service management practices and research activities in the backcountry are consistent with park purposes; and
- provide for the means to achieve public understanding and support of backcountry and wilderness values.

APPLICABLE LAWS, REGULATIONS, AND POLICIES

Management of Denali National Park and Preserve's backcountry must be consistent with the laws, regulations, policies, and plans of the federal government. The legal and policy framework that governs management of Denali is extensive; the following information summarizes the most important directives organized around categories of major actions. The directives are categorized as follows:

- Statute (law, legislation): These are the laws passed by Congress that provide the overriding direction for the management of national parklands and give the National Park Service its authority for management action. Citations may be found at http://www4.law.cornell.edu/uscode/ or http://uscode.house.gov/.
- Regulation: Compiled in the Code of Federal Regulations (CFR), regulations are promulgated by the executive branch to interpret statutes. Citations may be found at http://www.gpoaccess.gov/cfr/index.html.
- Case Law: Disputes over the interpretation of law are resolved by administrative bodies, such as the Department of Interior's Office of Hearing and Appeals, and by the federal court system. Such interpretations then govern within the area of the court or administrative body's jurisdiction.
- Executive Orders: Executive Orders are instructions by the president to the federal agencies for carrying out their work. Citations may be found at http://data2.itc.nps.gov/npspolicy/getEOs.cfm.
- NPS Management Policies: Management Policies translate directives and guidance, including the Constitution, public laws, executive proclamations and orders, and regulations, into cohesive directions. They are published approximately every 10 years and apply servicewide. An electronic file of the current Management Policies is found at http://data2.itc.nps.gov/npspolicy/index.cfm.
- NPS Director's Orders: If and when it is necessary, Management Policies may be modified or supplemented by Director's Orders. These orders articulate new or revised policy on an interim basis between publication dates of NPS Management Policies. They also provide more detailed interpretation of Management Policies and outline requirements applicable to NPS functions and responsibilities. Full text files of the Director's Orders are found at http://data2.itc.nps.gov/npspolicy/DOrders.cfm.
- Park-specific Directives: Park-specific instructions, procedures, directives and other guidance supplemental to and in conformance with applicable NPS policies and regulations (such as hours of operation, the dates of seasonal openings, or procedures for implementing servicewide policies) may be set by superintendents within formal delegations of authority from regional directors. Denali's directives related to backcountry management are found primarily within park planning documents, particularly the 1986 *General Management Plan* and the 1976 *Backcountry Management Plan*, and within the annual *Superintendent's Compendium*. These documents can be found at http://www.nps.gov/dena/pphtml/documents.html

Authority for the General Management Plan Amendment and EIS Process

National Parks and Recreation Act of 1978 (NPRA, 16 USC § 1 note, 92 Stat. 3467)
NPRA requires the National Park Service to prepare and revise general management plans in a timely manner for each unit. A general management plan or amendments must include resource protection measures; general development locations, timing, and costs; carrying capacity analyses; and boundary modifications.

National Environmental Policy Act of 1969 (NEPA, 42 USC §§ 4321-4370d)
NEPA mandates that any federal project or any project that requires federal involvement be scrutinized for its impact on the natural and human environment and that reasonable alternatives for accomplishing the project purpose be considered. The purpose of NEPA is to help public officials make well-informed decisions that are based on an objective understanding of environmental consequences for any federal action with potentially major impacts. To ensure compliance with NEPA, a specified process for proposed projects must be followed. The steps in this process are:

1. Scoping
2. Draft Environmental Impact Statement (EIS)
3. Public Review of the Draft EIS
4. Final Environmental Impact Statement and Record of Decision

This document is a Final Environmental Impact Statement.

NPS Management Policies Chapter 2. This chapter specifies that the National Park Service will maintain an updated General Management Plan for each unit of the national park system and review, amend, or revise the plans every 10-15 years or sooner if conditions change rapidly. Important guidance for this plan includes mandates for management zoning, public involvement, cooperative regional planning, and the examination of alternative futures.

General Direction for Public Enjoyment and Resource Protection

The National Park Service Organic Act of 1916 (16 USC §§ 1-4, 39 Stat. 535)
The Organic Act establishes the National Park Service and directs the agency to

> … promote and regulate the use of the Federal areas known as national parks, monuments, and reservations… by such means and measures as conform to the fundamental purpose of the said parks, monuments and reservations, which purpose 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.

Importantly for all planning processes in the park system, the Organic Act provides a fundamental standard for management – that park resources should remain “unimpaired” for the enjoyment of future generations.

Redwood National Park Expansion Act of 1978 (16 USC §§ 1-1a, 92 Statute 166)
The Redwoods Act amends the Organic Act and clarifies the importance Congress placed on protecting park resources such that:

> The authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress.

NPS Management Policies Section 1.4. The NPS Management Policies use the terms "resources" and "values" to mean the full spectrum of attributes for which a park unit is established and managed, including the Organic Act's fundamental purpose and any additional purposes as stated in a park unit'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 to enjoy them.

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

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

NPS Management Policies Chapter 8. The NPS management policies address recreational activities in general and backcountry uses in particular in sections 8.1 and 8.2. To provide for enjoyment of the parks, the National Park Service will encourage visitor activities that

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

Unless mandated by statute, the service will not allow visitors to conduct activities that

- would impair park resources or values;
- create an unsafe or unhealthful environment for other visitors or employees;
- are contrary to the purposes for which the park was established; or

- unreasonably interfere with
  - the atmosphere of peace and tranquility, or the natural soundscape maintained in wilderness and natural, historic, or commemorative locations in the park;
  - NPS interpretive, visitor service, administrative, or other activities;
  - NPS concessioner or contractor operations or services; or
  - other existing, appropriate park uses.

Case Law. *Wilkins v Department of the Interior, 995 F.2d 850, 853 (8th Cir. 1993)*
New Mexico State Game Commission v Udall, 410 F.2d 1197 (10th Cir. 1969)
These two cases demonstrate that the NPS need not wait for actual damage to occur before taking protective action to prevent degradation to wildlife and other natural resources. They were fundamental in the environmental assessment evaluating closure of the Old Park to snowmachine use (NPS 2000).

Mount McKinley National Park Backcountry Management Plan (NPS 1976). Increased visitation from increased access due to the opening of the George Parks Highway during the 1970s prompted Mount McKinley National Park to introduce use limits in 1974 and establish a quota system with the park's 1976 *Backcountry Management Plan*. The plan outlined use limits for designated units in the backcountry and institutionalized the concepts of dispersed use and self-reliance. Implicit to the visitor experience in the backcountry of Mount McKinley National Park was the "overpowering feeling of wilderness" as articulated in later plans.

Management Areas

NPS Management Policies Section 2.3.1.3. Management policies specify that GMPs provide for management zoning to illustrate where there are differences in intended resource conditions, visitor experience, and management activity.

NPS Management Policies Section 8.2.1. Management policies also specify that to determine carrying capacity (as required by NPRA), "the decision-making process should be based on desired resource conditions and visitor experiences for the area; quality indicators and standards that define the desired resource conditions and visitor experiences; and other factors that will lead to logical conclusions and the protection of park resources and values." Appendix H of the original *Draft EIS* provided detailed information about NPS visitor carrying capacity decision making, including the use of the Visitor Experience and Resource Protection process (NPS 2003d).

NPS Management Policies Section 4.9. The policy requires that the National Park Service will preserve, to the greatest extent possible, the natural soundscapes of parks. It requires the NPS to restore degraded soundscapes to the natural condition wherever possible, and to protect natural soundscapes from degradation due to noise (undesirable human-caused sound). The service is mandated to take action to prevent or minimize all noise that, through frequency, magnitude, or duration, adversely affects the natural soundscape or

other park resources or values, or that exceeds levels that have been identified as being acceptable to, or appropriate for, visitor uses at the sites being monitored.

Director's Order 47, Soundscape Preservation and Noise Management. This directive establishes that natural sounds are intrinsic elements of the environment, and states that the National Park Service considers natural sounds an inherent component of "the scenery and the natural and historic objects and the wild life …" protected by the Organic Act. Park managers are directed to preserve natural soundscapes and to eliminate, mitigate, or minimize inappropriate noise sources through the NPS planning processes, such as general management plans and amendments. Park plans will address 1) the baseline natural ambient sound environment in qualitative and quantitative terms; 2) identify sound sources and sound levels consistent with park legislation and purposes; 3) identify the level, nature, and origin of internal and external noise sources; 4) articulate desired future soundscape conditions; and 5) recommend approaches or actions to achieve those conditions or otherwise mitigate noise impacts.

1986 General Management Plan. The General Management Plan for Denali National Park and Preserve zoned all of the park and preserve into one of four designations: Natural Zone, Historic Zone, Park Development Zone, and Special Use Zone. The 1997 *Entrance Area and Road Corridor Development Concept Plan (DCP)* further classified the Park Development Zone into several subzones. The Special Use Zone applied only to private inholdings within park boundaries, and has diminished in size as the NPS has purchased mining properties in the Kantishna Hills. This classification still applies to the remaining privately held properties throughout the park and preserve. The Historic Zone remains as specified in the GMP. The action alternatives of this backcountry management plan propose subdividing the Natural Zone into more specific classifications much as the *Entrance Area and Road Corridor DCP* subdivided the Park Development Zone.

Access

ANILCA Section 811 [16 USC § 3121(b)]. This section provides for continued access to public lands for subsistence use. Specifically, it states that ". . . rural residents engaged in subsistence uses shall have reasonable access to subsistence resources on public lands" and ". . . the Secretary shall permit on the public lands appropriate use for subsistence purposes of snowmachines, motorboats and other means of surface transportation traditionally employed for such purposes by local residents, subject to reasonable regulations."

ANILCA Section 1110 [16 USC § 3170(a)]. This section provides for special access and access to inholdings. Of particular interest to this plan are the provisions for special access – including motorized access – across public lands that are not generally allowed in national parks or wilderness areas outside of Alaska. Subsection (a) reads in part:

> Notwithstanding any other provision of this Act or other law, the Secretary shall permit … the use of snowmachines (during periods of adequate snow cover, or frozen river conditions in the case of wild and scenic rivers), motorboats, airplanes, and non-motorized surface transportation methods for traditional activities (where such activities are permitted by this Act or other law) and for travel to and from villages and homesites. Such use shall be subject to reasonable regulations by the Secretary to protect the natural and other values of the conservation system units … and shall not be prohibited unless, after notice and hearing in the vicinity of the affected unit or area, the Secretary finds such uses would be detrimental to the resource values of the unit or area.

Airplane Access

National Parks Overflights Act (16 USC § 1a-1 note, 100 Stat. 91). In 1987 the U.S. Congress enacted the National Parks Overflights Act, which called for the National Park Service to recommend to the Federal Aviation Administration (FAA) actions for the substantial restoration of natural sounds to Grand Canyon National Park. It also required the National Park Service to report to Congress on the nature of the overflight problem and its effects on park units. In 1995 the National Park Service presented the *Report on Effects of Aircraft Overflights on the National Park System* (NPS 1995b), which recommended that the National Park Service use the following methods when resolving airspace issues over national parks:

1. Work with the FAA and with air tour operators to develop voluntary agreements to reduce noise over parks.
2. Develop incentives to encourage air tour operators to replace equipment with quieter aircraft.
3. Develop flight-free zones and flight corridors over parks.
4. Create minimum altitude restrictions.
5. Encourage the FAA to require operators to conform to certain operational requirements such as using quieter aircraft.
6. Treat all commercial services provided to visitors in parks as concessions, which ensures services will conform to minimum standards, are not priced unreasonably, and are consistent with park values.
7. Develop noise budgets at landing areas, landing strips, and airports to allot responsibility for and control of noise among operators.
8. Limit times of operations and notify visitors of the best times to experience natural sounds.

43 CFR § 36.11. This regulation implements the “special access” provisions of ANILCA 1110(a) and provides that “Fixed-wing aircraft may be landed and operated on lands and waters within areas, except where such use is prohibited or otherwise restricted by the appropriate Federal agency, including closures or restrictions pursuant to the closures of paragraph (h) of this section.” This direction is an exception to the regulations at 36 CFR § 2.17 that generally prohibit aircraft landings in national parks except by special regulation. However, helicopter landings are prohibited unless a special use permit is issued for that purpose.

FAA Advisory Circular 91-36C, Visual Flight Rules, Flight Near Noise-Sensitive Areas. In addition to the 500-foot above-ground-level (AGL) guideline for surfaces around non-congested areas (FAA 2000a), this circular identifies 2,000 feet AGL as the minimum recommended altitude for overflights of noise sensitive areas, including units of the national park system. The suggested altitude minimums have been printed on the sectional aeronautical charts (scale 1:500,000) since the mid-1970s. The National Park Service recognizes that lower altitudes may be required at times because of weather conditions and emergencies (NPS 1986 GMP).

NPS Management Policies Section 8.4. The National Park Service will monitor the effects of aircraft overflights on park resources and values and visitor enjoyment. Because the National Park Service has no direct authority or jurisdiction over airspace above parks, it will actively seek the assistance of the Federal Aviation Administration and Department of Defense to resolve overflight concerns.

Snowmachine Access

36 CFR § 2.18. This regulation generally prohibits snowmachine use in national parks , except on routes and water surfaces designated by special regulations. In Alaska, however, two snowmachine access regulations provide for exceptions: 36 CFR 13.46(a) and 43 CFR 36.11(c). The rules in 36 CFR 2.18 continue to regulate snowmachine speed limits, noise, headlights and taillights, brakes, and minimum age necessary for operating a snowmachine. This section also adopts state regulations for snowmachines.

36 CFR § 13.46(a). This regulation states that snowmachines and other means of surface transportation traditionally employed by local rural residents engaged in subsistence uses are permitted in park areas, except at those times and in those areas restricted or closed by the superintendent.

43 CFR § 36.11(c). This regulation allows the use of snowmachines (during periods of adequate snow cover and frozen river conditions) for traditional activities (where such activities are permitted by ANILCA or other law) and for travel to and from villages and homesites and other valid occupancies, except where such use is prohibited or otherwise restricted.

36 CFR § 13.63(h). This special regulation addresses snowmachine operations specifically in Denali National Park and Preserve. It (a) defines a “traditional activity” in the former Mount McKinley National Park (Old Park) and (b) prohibits the use of snowmachines in the Old Park. Part (1) of subsection 13.63(h) defines the term “traditional activity” for the Old Park pursuant to ANILCA Section 1110(a) as follows:

> A *traditional activity* is an activity that generally and lawfully occurred in the Old Park contemporaneously with the enactment of ANILCA, and was associated with the Old Park, or a discrete portion thereof, involving the consumptive use of one or more natural resources of the Old Park, such as hunting, trapping, fishing, berry picking or similar activities. Recreational use of snowmachines was not a traditional activity. If a traditional activity generally occurred only in a particular area of the Old Park, it would be

considered a traditional activity only in the area where it had previously occurred. In addition, a traditional activity must be a legally permissible activity in the Old Park. (36 CFR § 13.63 (h)(l))

State of Alaska Snowmachine Laws
The National Park Service enforces State of Alaska snowmachine laws on lands under NPS jurisdiction, including requirements for safety equipment, licensing, and registration.

Off-road Vehicle Access

Executive Order 11644, Use of Off-Road Vehicles on Public Lands. Section 3 of this Executive Order directed federal land management agencies to promulgate regulations on the designation of routes and areas for ORV use. This section requires that designation take place as a special park regulation and establishes criteria that the agency must consider when designating routes and areas. These considerations include soil, watershed, vegetation damage; wildlife harassment or wildlife habitat disturbance; and potential user conflicts. The Executive Order also states that ORV use in national park system areas is permitted only upon a determination that such use would not adversely affect the natural, aesthetic, or scenic values of the area. Both this order and the Wilderness Act prohibit the use of ORVs in designated wilderness. The National Park Service implemented this Executive Order's directive in 36 CFR § 4.10.

43 CFR § 36.11(g). In addition to the process outlined by Executive Order 11644, this regulation provides that permits could be issued for ORV access on existing ORV trails if not in designated wilderness and if a finding shows that such access would be compatible with purposes and values for which the area was established.

Boating and Water Use Activities

43 CFR § 36.11(d). This regulation allows motorboat use on all area waters , except where such uses are prohibited or otherwise restricted in accordance with the procedures of 43 CFR 36.11(h). However, the use of personal watercraft (PWC) is prohibited, except where such use is designated by regulations at 36 CFR § 3.24. No NPS areas in Alaska are designated for such use.

Non-Motorized Surface Transportation

43 CFR § 36.11(e). The regulation at 43 CFR § 36.11(e) allows non-motorized surface transportation, such as dog teams, horses, and other pack or saddle animals on federal lands in Alaska, except where such use is prohibited or otherwise restricted in accordance with the procedures of 43 CFR § 36.11(h). Pack animals that have traditionally been used for transportation in support of subsistence activities would be allowed under 36 CFR § 13.46(a).

Closures and Public Use Limits

36 CFR § 1.5. This regulation provides authority for the park superintendent to close or restrict all or some public use or activities in an area. The use of permit, registration, or reservation systems can be employed as a tool for accomplishing the public use limits. The superintendent must make a determination that such action is necessary "for the maintenance of public health and safety, protection of environmental or scenic values, protection of natural or cultural resources, aid to scientific research, implementation of management responsibilities, equitable allocation and use of facilities, or the avoidance of conflict among visitor use activities" and must explain why less restrictive measures would not suffice. The regulation at 36 CFR §13.30 provides guidance for restrictions and closures for specific activities identified in Part 13 for national park units in Alaska, and 43 CFR §36.11(h) provides guidance for restrictions and closures to special access under ANILCA 1110(a).

43 CFR § 36.11(h). This paragraph provides procedures for temporary or permanent closures to special access authorized under ANILCA 1110(a). The NPS "may close an area on a temporary or permanent basis to the use of aircraft, snowmachines, motorboats or non-motorized surface transportation only upon a finding by the agency that such use would be detrimental to the resource values of the area." This paragraph also allows the agency to restrict or limit uses of an area under other statutory authority.

Wilderness Management

The Wilderness Act of 1964 (16 USC §§ 1131-1136, 78 Stat. 890).
The 1964 Wilderness Act established the National Wilderness Preservation System and identified the National Park Service as one of the four federal agencies responsible for protecting and preserving the nation's wilderness resource. The Wilderness Act defines wilderness as follows:

> A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this chapter an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which
>
> (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable;
> (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation;
> (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and
> (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

The Wilderness Act prohibits construction of roads or structures and the use of motorized equipment and mechanical transport in designated wilderness areas, but provides for exceptions for certain administrative activities through a "minimum requirement" process.

Alaska National Interest Lands Conservation Act of 1980 (ANILCA, 16 USC §§ 3101-3233). ANILCA provides guidance about wilderness management at Denali.

- ANILCA Section 101 lists "preserve wilderness resource values" as a fundamental purpose of ANILCA.
- ANILCA Section 102(13), states that the term "wilderness" as used in ANILCA has the same definition as in the Wilderness Act.
- ANILCA Section 203(a) states that a fundamental purpose of the Denali park and preserve additions is to provide continued opportunities, including reasonable access, for wilderness recreational activities.
- ANILCA Section 1317 requires a wilderness suitability review and wilderness recommendations regarding the park additions and preserve lands added to Denali by ANILCA.

In addition, ANILCA provides some exceptions to national park and wilderness management practice that are detailed under the sections "Access," described above, and "Facilities," described below.

NPS Management Policies, Chapter 6. Section 6.3.1 establishes that suitable and proposed wilderness on NPS lands should be managed under wilderness policy.

> For the purposes of applying NPS wilderness policies, the term 'wilderness' includes the categories of suitable, study, proposed, recommended and designated wilderness. NPS wilderness policies apply regardless of category. . . In addition to managing these classified areas for the preservation of their wilderness values, planning for these areas must ensure that the wilderness character is likewise preserved…The National Park Service will take no action that would diminish the wilderness suitability of an area possessing wilderness characteristics until the legislative process of wilderness designation has been completed. Until that time, management decisions pertaining to lands qualifying as wilderness will be made in expectation of eventual wilderness designation.

1986 *General Management Plan.* The 1986 GMP partially implemented the mandate of ANILCA Section 1317 by completing a wilderness suitability review of the Denali park additions and preserve. The review concluded that about 3.73 million acres of the park additions and preserve were suitable for wilderness designation, meaning that 99% of the entire park and preserve is either designated or suitable for designation as wilderness. The GMP concluded that "All lands determined suitable for wilderness designation will be managed under the terms of ANILCA to maintain the wilderness character and values of the lands until designation recommendations have been proposed and Congress has acted on these proposals."

Denali National Park and Preserve Wilderness EIS (NPS 1988b). The park's wilderness EIS described the status of designated, suitable, NPS proposed and recommended wilderness. The National Park Service proposed recommending to Congress all of the park additions, except former mining districts in the Kantishna Hills and Dunkle Hills, and a few other areas along the south boundary and north of the Wolf Townships along the northeast boundary. None of the preserve areas was proposed for wilderness designation. This proposal was not forwarded by the secretary of interior to the president for a recommendation to Congress.

Map 3-1 in the *Revised Draft EIS* shows designated wilderness and areas determined suitable for wilderness designation at Denali.

Commercial Services

National Park Service Concessions Management Improvement Act of 1998 (Pub. L. 105-391, codified at scattered sections in the U.S. Code).
This act provides the requirements under which commercial visitor services are authorized in units of the national park system. Section 402(b) provides:

> It is the policy of the Congress that development of public accommodations, facilities and services in units of the National Park System shall be limited to those accommodations, facilities and services that
> 1) are necessary and appropriate for public use and enjoyment of the unit of the national park system in which they are located; and
> 2) are consistent to the highest practicable degree with the preservation and conservation of the resources and values of the unit.

Wilderness Act (16 USC §§ 1131-1136, 78 Stat. 890). The Wilderness Act provides two pieces of guidance related to commercial activities in wilderness.

- Section 4(c): "Except as specifically provided for in this Act, and subject to existing private rights, there shall be no commercial enterprise . . . within any wilderness area . . .."
- Section 6: "Commercial services may be performed within the wilderness areas designated by this Act to the extent necessary for activities which are proper for realizing the recreational or other wilderness purposes of the area."

NPS Management Policies, Chapter 6. Management policies on wilderness clarify the Wilderness Act for management of commercial services on wilderness lands managed by the National Park Service. Section 6.4.4 directs the following:

> Wilderness-oriented commercial services that contribute to public education and visitor enjoyment of wilderness values or provide opportunities for primitive and unconfined types of recreation may be authorized if they meet the "necessary and appropriate" tests of the National Park Service Concessions Management Improvement Act of 1998 and section 4(d)(6) of the Wilderness Act (16 U.S.C §§ 1133(d)(5)), and if they are consistent with the wilderness management objectives contained in the park's wilderness management plan, including the application of the minimum requirement concept.

NPS Management Policies, Chapter 10. These policies address commercial visitor services authorized either through concession contracts or commercial use authorizations. Section 10.2.2 specifies that commercial services planning will identify the appropriate role of commercial operations in helping parks to achieve desired visitor experiences. A decision to authorize a concession must be based on a determination that the facility or service

- is necessary and appropriate for public use and enjoyment and cannot be met outside of park boundaries;
- will be provided in a manner that furthers protection, conservation, and preservation of the environment; and
- will enhance visitor use and enjoyment of the park without causing unacceptable impacts to park resources or values.

Alaska National Interest Lands Conservation Act (ANILCA, 16 USC §§ 3101-3233). Section 1307(a) provides for persons who were adequately providing visitor services in areas incorporated into conservation system units as of January 1, 1979 to continue doing so, assuming such services are compatible with the purposes of the area and the service is adequately provided. Section 1307(b) provides preference for visitor service contracts to most affected Native Corporations and to local residents, except for sport fishing and hunting guiding activities.

Facilities

NPS Management Policies Chapter 9. The National Park Service will provide visitor and administrative facilities that are necessary, appropriate, and consistent with the conservation of park resources and values and will avoid the construction of buildings, roads, and other development that will cause unacceptable impacts on park resources and values. The policy provides parameters for constructing trails and backcountry campsites.

Wilderness Act (16 USC §§ 1131-1136, 78 Stat. 890). Structures and installations are generally not permitted in designated wilderness, although there are exceptions for cultural and historic resources and certain administrative purposes.

Alaska National Interest Lands Conservation Act (ANILCA, 16 USC §§ 3101-3233)

- Section 1306 provides for the establishment of visitor facilities and administrative sites within conservation system units if compatible with the purposes for which the unit is established, expanded or designated, or other provisions of the act. It also allows for construction of such facilities outside the boundaries of the unit, with a preference for locating such sites and facilities on Native lands in the vicinity.
- Section 1310 allows for the establishment of navigation facilities or facilities for weather, climate, and fisheries research and monitoring.
- Section 1315(d) authorizes the construction of new public use cabins in designated wilderness “if such cabins and shelters are necessary for the protection of public health and safety.”
- Section 1316 authorizes the continuation and new establishment of temporary campsites, tent platforms, shelters, and other temporary facilities and equipment that

> are directly and necessarily related to the taking of fish and wildlife where those activities are allowed. The secretary may deny such use if it is determined that the use would be detrimental to the purposes for which the conservation system unit was established, including the wilderness character of any wilderness area within a unit.

Denali South Side Development Concept Plan/EIS (NPS 1997a). This EIS evaluated the impacts of a proposed action and range of alternatives to phase in the development of visitor facilities and services on the south side of the Alaska Range. The final plan was a result of cooperative regional planning by the NPS, State of Alaska, Denali Borough, Matanuska-Susitna Borough, and two Native regional corporations (Ahtna, Inc., and Cook Inlet Region, Inc.). The plan included several backcountry facilities including:

- Five primitive fly-in campsites and up to two public-use cabins at Chelatna Lake.
- Four public-use cabins to be built on state land in the Tokositna area.
- Public access from the Dunkle Hills Road.
- A trail from a new visitor center on the Petersville Road to the park boundary.

The National Park Service is presently developing an implementation plan for portions of the *South Side Denali DCP* in conjunction with its partners, the State of Alaska and the Matanuska-Susitna Borough, but only the last of the items listed above will be addressed in this phase of implementation.

Denali Entrance Area and Road Corridor Development Concept Plan/EIS (NPS 1997b) This plan addressed visitor use, resource protection, and related facility development in the "frontcountry" of Denali National Park and Preserve. The frontcountry includes all non-wilderness areas along the George Parks Highway, the Alaska Railroad, the entrance and headquarters areas, and the Denali Park Road corridor to the Kantishna airstrip. This plan included several backcountry facilities, including:

- Up to 10 walk-in campsites in the vicinity of Kantishna.
- Several hiking trails from the park road and the Parks Highway, including an upgraded Triple Lakes Trail and new trails on Thorofare Ridge from Eielson, Savage River, and between the Savage River Bridge and Savage Campground.

Americans with Disabilities Act (Pub. L. 101-336, 104 Stat. 327, codified at scattered sections in the U.S. Code).

The following language describes the relationship between ADA and the Wilderness Act:

> Congress reaffirms that nothing in the Wilderness Act is to be construed as prohibiting the use of a wheelchair, and consistent with the Wilderness Act no agency is required to provide any form of special treatment or accommodation, or to construct any facilities or modify conditions of lands within a wilderness area to facilitate such use. The term wheelchair means a device designed solely for the use by a mobility-impaired person for locomotion that is suitable for use in an indoor pedestrian area. (Section 507c).

Wheelchairs that meet this definition are allowed in the backcountry of Denali National Park and Preserve.

Administrative and Scientific Activities

Wilderness Act (16 USC §§ 1131-1136, 78 Stat. 890). The Wilderness Act provided that administrative activities in wilderness must meet a "minimum requirement" test in order to be excepted from general prohibitions on temporary roads, use of motorized equipment and motorized or mechanized transportation, landing of aircraft, and structures or installations.

NPS Management Policies 8.4. Official NPS use of aircraft in and over parks will be limited to flights needed to support or carry out emergency operations or essential management activities where no practical alternative methods of access exist. National Park Service uses of aircraft will be planned and scheduled to minimize adverse impacts on park resources and values and visitor enjoyment.

Easements and Boundary Changes

National Parks and Recreation Act of 1978 (NPRA) (NPRA, 16 USC § 1 note, 92 Stat. 3467). The NPRA requires that general management plans for national parks consider boundary changes.

Alaska Native Claims Settlement Act, Section 17(b) [43 USC § 1616(b)].
Section 17(b) provides for the reservation of public access easements across Native corporation lands within or adjoining park and preserve lands. The purpose of these easements is to provide access from public lands and waters across the private lands to other public lands and waters. The National Park Service is responsible for managing these public access easements inside the park unit and for those assigned to the National Park Service outside of the park.

Alaska National Interest Lands Conservation Act (ANILCA, 16 USC §§ 3101-3233)
Section 103(b) provides the Secretary of Interior the authority to make minor adjustments in the boundaries of areas added to or established by ANILCA with written notification to Congress. Section 1302(i)(1) authorizes the Secretary to acquire by donation or exchange lands contiguous to a conservation system unit.

PLANNING ISSUES CONSIDERED BUT NOT ADDRESSED

The following planning issues were identified during scoping, but are not addressed in this document. Many issues are not addressed because this plan is only a limited amendment of the 1986 *General Management Plan* and focuses on issues for which the guidance in the GMP is either lacking in detail or out of date.

Major Facility Development. The *Denali Entrance Area and Road Corridor (Front Country) Development Concept Plan* and the *Denali South Side Development Concept Plan* amended the park *General Management Plan* and provided for anticipated visitor facility needs on both the north and south sides of the park.

Denali North Access. Language contained in Senate Amendment 39, page CR H14289 for Fiscal Year 1996 directed the National Park Service to conduct a North Access Feasibility Study in cooperation with the State of Alaska and the tourism industry. This study was completed in April 1997. In transmitting this study to the Senate Committee on Energy and Natural Resources, the Department of Interior memorandum stated that:

> The projected costs of either new road access or rail access into Denali would exceed the projected costs for the National Park Service's 10-year, visitor access development program for the entire State of Alaska. Thus, we believe this study must be considered in conjunction with the other National Park Service proposals for visitor facilities and access in Alaska—proposals developed with input from the State of Alaska, the visitor industry and the public.
>
> This study is not to be interpreted in any way as implying that the National Park Service supports a northern route. Again, a new north access is contrary to the existing management plan for Denali National Park and Preserve (US Department of the Interior, 1997).

Congress has funded additional studies since the completion of the 1997 report. Funding was provided in fiscal year 2000 for a cooperative study with the State of Alaska to explore options for the location of campgrounds, trails, and other visitor facilities along the Stampede Road alignment, and that study was completed in August 2004. In 2002, the Denali Borough and the State of Alaska Department of Transportation and Public Facilities began a planning and reconnaissance study for a north Denali access route as directed by federal and state authorizations. Pending further decisions and actions on north access, the backcountry areas that might be affected by north access proposals will be managed as the rest of the park additions.

Wilderness Suitability and Wilderness Recommendations. ANILCA section 1317(a) required the National Park Service to conduct a wilderness suitability review, which was included in the 1986 *General Management Plan* for Denali National Park and Preserve. The review concluded that about 3.73 million additional acres of the non-designated lands in the park and preserve were suitable for wilderness designation. An area within the Kantishna Hills was determined to be unsuitable for wilderness because of persistent disturbance caused by past mining and the road system; however, most of these lands are now suitable because of changing conditions. For example, most mining properties have been purchased and many of these areas are being restored. A new suitability study would likely result in additional acreage identified as suitable in the Kantishna Hills, but that study is not included with this plan.

In 1988, the National Park Service forwarded an environmental impact statement for wilderness recommendations to the secretary of the interior. The preferred alternative identified 2.25 million acres of the 3.73 million suitable acres to be proposed for wilderness designation. The secretary of the interior did not forward the proposal to the president to send to Congress for approval. Because of the complexity of the process and the fact that wilderness designation requires congressional action, wilderness

recommendations are not addressed in this plan. However, as discussed in the plan the wilderness values of the suitable lands will continue to be protected.

Subsistence Management. Subsistence management for Denali National Park and Preserve is addressed in the 2000 *Subsistence Management Plan* (NPS 2000i) that was prepared in cooperation with the Denali Subsistence Resource Commission. The backcountry management plan, therefore, does not include recommendations for managing subsistence uses. Because of the importance of these uses and because of potential conflicts from other uses, however, subsistence is included as an impact topic.

Snowmachine Access in Old Park by Individuals with Disabilities. The National Park Service has determined that any snowmachine use would be detrimental to the resource values of the Old Park. As a result, areas of the park that are closed to snowmachine use (such as the Old Park) would not be open to snowmachine use by persons with disabilities. This decision treats all potential users equally in that snowmachine use is prohibited for everyone in the old park. The commercial dog sled companies that operate in the old park have expressed a willingness to take any interested individuals, including those with disabilities, into the Old Park.

Off-Road Vehicle (ORV) Use. The use of ORVs, except on established roads is generally prohibited in Denali (36 CFR § 4.10, 43 CFR § 36.11). ORV use can occur on state right-of-ways. ORVs have been authorized in the past and may be authorized in the future to access inholdings in the Kantishna Hills pursuant to a right-of-way permit. ORVs traditionally employed for subsistence purposes are regulated under 13 CFR § 13.46, and a separate plan and NEPA compliance will address resource protection alternatives pursuant to the July 2005 Cantwell Subsistence Traditionally Employed ORV Determination.

Natural and Cultural Resource Management**.** Priorities for studies and procedures for managing natural and cultural resources are not addressed in the backcountry management plan since they are included in the 1998 *Resource Management Plan*. That plan outlines management and study of air resources, aquatic resources, geological resources, terrestrial biota, wildland fire, cultural resources, and subsistence resources.

Minerals Management**.** This topic is included in the 1991 *Record of Decision on the Cumulative Impacts of Mining in Denali* and the 1998 *Resource Management Plan* so is not addressed in the backcountry management plan.

IMPACT TOPICS

Impact Topics Considered In This Document

Potential Effects on Soils and Water Resources. Methods and routes of access and the intensity and levels of use in various backcountry management areas could lead to impacts on soil and water. Of particular concern are potential damage to ice-rich permafrost soils from surface travel and potential localized degradation of water quality where visitors are concentrated on glaciers.

Potential Effects on Vegetation. The levels and intensity of backcountry uses (aircraft access, snowmachining, mountaineering, hiking, camping) could have adverse effects on vegetation and wetlands. Design of management areas, access corridors, group sizes, and means of transportation could all be factors in the extent of these impacts.

Potential Effects on Fish and Wildlife. Various backcountry uses and means of access could affect fish and wildlife habitat, wildlife behavior, and wildlife distribution. The design of management areas and the levels of use within them must consider the potential effects on wildlife behavior and the possible effects to wildlife populations and their habitat.

Potential Effects on Natural Soundscapes. Quiet and solitude were identified as key values of the park and preserve. Various uses of motorized equipment or changes in the level of any human activity may adversely affect natural soundscapes.

Potential Effects on Wilderness. The various forms of access and uses in the park and preserve could affect wilderness resource values. ANILCA designated 99% of the Old Park as the Denali Wilderness and almost all of the park additions and preserve have been determined suitable for wilderness designation.

Potential Effects on Subsistence. Changes in backcountry use have the potential to affect wildlife numbers and distribution for subsistence species. Increased access to preserve areas could create more competition for harvest from sport hunters. ANILCA and NPS policy require proposed actions within Alaska national parks to address potential effects on the area's legally permitted subsistence uses. A section 810 subsistence evaluation and finding is included as appendix C in the environmental impact statement.

Potential Effects on Cultural Resources. Increased access into backcountry management areas of the park by various user groups could disturb historical resources, such as historic backcountry patrol cabins. The design of management areas and use levels within them should consider the potential impacts on cultural resources.

Potential Effects on Recreational Opportunity and Visitor Safety. Prescriptions for access, management tools, guided activities and commercial services, and other plan components could affect visitor numbers, how visitors access the park, what kind of activities visitors participate in, the type of experience available, and visitor safety.

Potential Effects on Local and Regional Economy. The allocation of uses in and over management areas in the park and preserve could affect the regional and local economies of Southcentral and Interior Alaska, particularly the recreational and tourism sectors.

Potential Effects on Park Management and Operations. The actions described in most alternatives could affect park management and operations, requiring staff, equipment, and facilities to fulfill the responsibilities necessary for successful implementation.

Impact Topics Considered But Not Addressed

Effects on Air Quality. Exhaust emissions from internal combustion engines associated with motorboats, snowmachines, and airplanes could have adverse impacts on air quality. Denali is designated a Class I airshed under the Clean Air Act amendments and has exceptionally clean air. However, at projected levels of dispersed use, resource experts believed there would be no more than minor impacts to air quality under any alternative.

Effects on Soils from Hiking and Camping. Excessive concentration of hiking and camping on trails and campsites can lead to deterioration of surface soils, compaction of mineral soils, and severe erosion on slopes. Impacts to soils in Denali National Park and Preserve from hiking and camping would be detectable along established trails; however, in all management scenarios, trails constitute a small part of the park (< 1%) and are generally constructed by NPS to prevent worse erosion from social trail formation; therefore, overall impacts to soils from these activities would be negligible to minor.

Effects on Slope Stability, Hydrologic Regimes, and Drainage Patterns. Trail construction could affect slope stability, but there are not enough proposed trails to assume an impact of any significance. Bank erosion could occur from motorboat use but use is not expected to increase to a level that would cause anything more than a minor impact to bank stability on rivers in the park. Changes in hydrologic regime and drainage patterns would be negligible to minor for all alternatives. Trail construction in the Kantishna Hills would alter surface hydrology, including sheet flow of water; however, impacts would be minimal given the low level of expected trail development and the tendency for trails to develop on ridge-tops and areas of mineral soil.

Effects on Water Quality: The impact to water quality from motorized vehicle access and human waste was investigated as a separate topic. The impact to overall water quality was considered to be minor or negligible in all alternatives and was eliminated from general consideration. However, there were site specific concerns for fish habitat and drinking water quality that are addressed under the Wildlife section and Recreational Opportunity and Visitor Safety sections respectively.

Effects on Threatened and Endangered Species**.** The American peregrine falcon was the only threatened and endangered species in the park area, but this species was removed from the threatened and endangered species list on August 25, 1999 (64 FR 46542).

Effects on Cultural Landscapes. Of the four cultural landscapes identified at Denali, only two are within the scope of the plan: Kantishna and part of the Teklanika Archaeological District. Neither has been described so impacts are difficult to determine. While there are potential future impacts, the actions described in the plan are unlikely to have more than minor impacts on these two cultural landscapes.

Effects on Ethnographic Resources. There are known ethnographic resources in the park. However, there are not yet any traditional cultural properties identified. While there could be impacts identified in the future (e.g. high visitor use near burial sites, disruption of traditional fish camp sites, etc.), no more than minor impacts could be determined at this time.

Effects on Minority Populations and Low-Income Populations**.** Executive Order 12898 requires federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. The backcountry management plan would not result in significant direct or indirect adverse effects on any minority or low-income population or community.

Chapter 2: Alternatives

INTRODUCTION

This chapter contains a modified version of the preferred alternative from the *Revised Draft EIS*. This alternative incorporates the proposals from Actions Common to All Action Alternatives, some of which have also been modified. Table 2-14 at the end of the chapter provides a comparative summary of this alternative with the other alternatives presented in the *Revised Draft EIS*. The complete versions of the original preferred alternative (Alternative 4) and the other alternatives are found in the *Revised Draft EIS*.

The modified preferred alternative is described below using the same topic areas as the alternatives in the *Revised Draft EIS*.

- Management Areas
- Access
- Wilderness Management
- Commercial Services
- Backcountry Facilities
- Administrative and Scientific Activities
- Easements and Boundary Changes

Existing backcountry units and requirements for overnight camping permits, use limits, and food storage have been developed through previous planning efforts, including the 1976 *Backcountry Management Plan* and its subsequent modifications. These provisions would apply as described in appendix D of the *Revised Draft EIS*.

OVERVIEW OF THE PREFERRED ALTERNATIVE

This backcountry management plan would guide the National Park Service in providing opportunities for a variety of wilderness recreational activities and experiences while recognizing and protecting the premier wilderness resource values of the entire backcountry. Areas in the Dunkle Hills and around the Ruth and Tokositna Glaciers on the south side of the Alaska Range would be managed for those visitors who want to experience the wilderness resource values or other resource values of the Denali backcountry but require services or assistance, or who are unable to make a lengthy time commitment. Areas along the park road in the Old Park and the Kantishna Hills would provide accessible opportunities for short- or long-duration wilderness recreational activities with only limited options for guidance or assistance the farther one gets from the park road. The remainder of the backcountry would be managed for dispersed, self-reliant travel, and would include opportunities for extended expeditions in very remote locations.

MANAGEMENT AREAS

This alternative would subdivide the Natural zone identified in the 1986 *General Management Plan* into a variety of more specific management areas. Each of these new management areas reflects an overall management concept or vision and provides for a related set of opportunities in the backcountry. Each area is defined by a set of desired future resource and social conditions. Allocation of management areas is a prescriptive process that describes the desired condition rather than the existing condition.

For all areas, common management policies would apply to subsistence activities, fire management, cultural resources management, natural resources management, and reclamation as expressed in other plans. These plans include:

- *Subsistence Management Plan* (NPS 2000i, annual updates)
- *Fire Management Plan* (NPS 2004a)
- *Resource Management Plan* (NPS 1998)
- *Reclamation Plan* (NPS 2001c)

Map 2 shows how management areas would be applied under this alternative.

The backcountry includes privately-owned lands, some unpatented mining claims in the Kantishna Hills, lands conveyed to the State of Alaska, and certain segments of the State road and railroad right-of-way easements. The National Park Service recognizes these inholdings and respects the rights of the landowners. Inholdings are located primarily in the Kantishna area and the northwest part of the preserve, with a few on the south side of the Alaska Range such as the Mountain House in the Ruth Amphitheater and the Tokosha Mountain Lodge along the Tokositna River. These inholdings remain in the Special Use zone as described in the 1986 *General Management Plan*. The name for that management zone would be modified to Inholdings Special Use Area to distinguish it from the Ruth Glacier and West Buttress Special Use Areas described below. Those private lands designated Special Use in the 1986 *General Management Plan,* but which 1) have been acquired by the National Park Service, and 2) are within the geographic scope of the backcountry management plan, would be included within the new management areas described by this plan.

Management Area Descriptions

The management areas are defined to provide specific recreational opportunities and resource conditions that are appropriate given the purposes for which the national park unit was established. Most of the areas are designed to cover substantial areas of the park and preserve, but some – including the Backcountry Hiker, Corridor, Portal, and West Buttress Special Use areas – are intended to provide high use routes, trails, or landing areas to accommodate backcountry transportation and concentrated use directed at particular destinations. The former Mount McKinley National Park (the Old Park) has separately defined management areas to reflect its unique history, resource values, and legal status.

The management areas are defined in the following table. Each area has an indicated purpose, followed by descriptive terms for several qualities that define minimally acceptable conditions

for that management area. These qualities are indicators of the visitor experience and resource conditions in each management area. Although they do not capture the entire range of qualities that comprise the experience and resources of the area, they are intended to provide both a reasonable indication to visitors of what they should expect and guidance to managers about appropriate management actions and levels of use. The indicators chosen for the Denali backcountry include the following:

Resource Conditions

- Trail and campsite disturbance
- Evidence of modern human use
- Landscape modifications
- Litter and human waste
- Natural sound disturbance
- Wildlife population, demographics, and distribution

Social Conditions

- Encounters with other people
- Encounters with large groups
- Camping density
- Accessibility
- Management presence

Following the definitions in table 2-1 is a set of tables (tables 2-2 through 2-9) that provide a key for the indicators, defining them and their condition levels. These tables provide a narrative description for desired conditions, specific standards that provide a quantitative interpretation of those conditions, and both a monitoring strategy and a review process for each indicator.

Indicators are generally selected to represent those resources and conditions that are allowed to change until they approach the quantitative thresholds. However, the National Park Service would take action to manage visitor use under many other circumstances if that use would be detrimental to resource values of the park. For example, the National Park Service would act to avoid the introduction of exotic plant species to the park backcountry; to protect wildlife habitat particularly during critical times such as breeding, nesting, and denning; to protect subsistence resources and opportunities; and to avoid bear-human conflict.

Table 2-1: Management Area Descriptions

Management Area	Purpose	Resource Condition		Social Condition	
A	Provide a diversity of opportunities for wilderness recreational activities that are relatively accessible to day-users and to those who have limited wilderness travel skills or equipment.	Trail & campsite disturbance:	Medium	Encounters with people:	High
		Evidence of modern human use:	Medium	*Encounters w/large groups:*	*Yes*
		Landscape modifications:	*No*	Camping density:	Low
		Litter & human waste:	Low	Accessibility:	Medium
		Natural sound disturbance:	High	Administrative presence:	Medium
B	Provide opportunities for wilderness recreational activities suitable for day-users and overnight users that are remote and require self-reliance.	Trail & campsite disturbance:	Low	Encounters with people:	Medium
		Evidence of modern human use:	Low	*Encounters w/large groups:*	*Yes*
		Landscape modifications:	*No*	Camping density:	Low
		Litter & human waste:	Low	Accessibility:	Low - Medium
		Natural sound disturbance:	Medium	Administrative presence:	Low
C	Provide opportunities for climbing and mountaineering experiences in a wilderness setting.	Trail & campsite disturbance:	Medium	Encounters with people:	High
		Evidence of modern human use:	Medium	*Encounters w/large groups:*	*Yes*
		Landscape modifications:	*No*	Camping density:	Low
		Litter & human waste:	Low	Accessibility:	Low – Very Low
		Natural sound disturbance:	Medium	Administrative presence:	Low
D	Provide opportunities for extended expeditions that are remote and require self-reliance, significant time commitment, and thorough advance planning.	Trail & campsite disturbance:	Low	Encounters with people:	Low
		Evidence of modern human use:	Low	*Encounters w/large groups:*	*No*
		Landscape modifications:	*No*	Camping density:	Low
		Litter & human waste:	Low	Accessibility:	Low
		Natural sound disturbance:	Low	Administrative presence:	Low
Portal	Provide high-use airplane landing areas that provide access to remote parts of the park and preserve. Year-round or seasonal. **Natural sound disturbance standard is same as for surrounding area, but no lower than Medium.*	Trail & campsite disturbance:	N/A	Encounters with people:	N/A
		Evidence of modern human use:	Medium	*Encounters w/large groups:*	*Yes*
		Landscape modifications:	*No*	Camping density:	Medium
		Litter & human waste:	Low	Accessibility:	Medium
		Natural sound disturbance:	Medium-High*	Administrative presence	Medium

Portal - Major Landing Area	Provide high-use airplane landing areas that are suitable for both day use and expedition drop-off and pick-up. Seasonal, May-September.	Trail & campsite disturbance: N/A Evidence of modern human use: High *Landscape modifications: Yes* Litter & human waste: Low Natural sound disturbance: Very High	Encounters with people: N/A *Encounters w/large groups: Yes* Camping density: High Accessibility: High Administrative presence: Medium-High
Corridor	Provide high-use travel routes via ground or water that provide access to remote parts of the park and preserve. Year-round or seasonal.	Trail & campsite disturbance: Medium Evidence of modern human use: High *Landscape modifications: Yes* Litter & human waste: Low Natural sound disturbance: High	Encounters with people: Very High *Encounters w/large groups: Yes* Camping density: Medium Accessibility: Low-High Administrative presence: Medium
Backcountry Hiker	Provide day use trails into the backcountry in areas that are accessible to many visitors. Year-round or seasonal. ** No camping would be allowed on the trails.*	Trail & campsite disturbance: N/A Evidence of modern human use: High *Landscape modifications: Yes* Litter & human waste: Low Natural sound disturbance: Medium	Encounters with people: Very High *Encounters w/large groups: Yes* Camping density: N/A* Accessibility: High Administrative presence: High
Ruth Glacier Special Use	Provide for high use of transportation services during the season when large numbers of day users are accessing the Ruth Amphitheater. Seasonal, May-September.	Trail & campsite disturbance: Medium Evidence of modern human use: Medium *Landscape modifications: No* Litter & human waste: Low Natural sound disturbance: Very High	Encounters with people: High *Encounters w/large groups: Yes* Camping density: Low Accessibility: Low – Very Low Administrative presence: Medium
Old Park			
OP1	Provide opportunities for day use and overnight wilderness recreational activities that are remote and require self-reliance in an area that has limited opportunities for motorized access.	Trail & campsite disturbance: Medium Evidence of modern human use: Low *Landscape modifications: No* Litter & human waste: Low Natural sound disturbance: Low	Encounters with people: Medium *Encounters w/large groups: Yes* Camping density: Low Accessibility: Medium - High Administrative presence: Medium

Table 2-1: Management Area Descriptions, continued

Management Area	Purpose	Resource Condition		Social Condition	
OP2	Provide opportunities for extended expeditions that are remote and require a high degree of self-reliance, significant time commitment, and thorough advance planning in an area that has limited opportunities for motorized access.	Trail & campsite disturbance:	Low	Encounters with people:	Low
		Evidence of modern human use:	Low	*Encounters w/large groups:*	*No*
		Landscape modifications:	*No*	Camping density:	Low
		Litter & human waste:	Low	Accessibility:	Low
		Natural sound disturbance:	Low	Administrative presence:	Low
West Buttress Special Use	Provide a seasonal route to the summit of Mount McKinley that can accommodate large numbers of climbers during the primary climbing season. Seasonal, late April to mid-July.	Trail & campsite disturbance:	N/A	Encounters with people:	N/A
		Evidence of modern human use:	High	*Encounters w/large groups:*	*Yes*
		Landscape modifications:	*Yes*	Camping density:	High
		Litter & human waste:	Low	Accessibility:	Low – Very Low
		Natural sound disturbance:	Low	Administrative presence:	High

Key to the Management Area Descriptors

The following tables present qualitative and, where possible, quantitative standards for each descriptor used in Table 2-1; a monitoring strategy; and a review process for each indicator to allow for changes if the indicators or standards are not functioning as intended or new information requires a reappraisal. Generally, if conditions approach the minimally acceptable standards, the National Park Service would take actions described in this plan to prevent the standard from being exceeded.

Where specific standards are provided, the National Park Service would expect those standards to be achieved for 95% of all measurements or samples obtained through monitoring over the course of a visitor season (e.g., May to September for summer activities, February to April for late winter activities).

Table 2-2: Trail and Campsite Disturbance

Descriptor	Description & Standard	Monitoring	Process for Evaluation
Medium	Visitors notice occasional social trails, campsites, or cut or broken vegetation.	Monitoring would occur at three levels. These include: 1) the use of an existing grid system of plots for monitoring changes in vegetation cover that are randomly distributed through the park and preserve, 2) a set of index sites where known social trail or campsite formation can be monitored, and 3) a random sample of additional locations selected each year. Variables to monitor would include bare ground, vegetation cover, soil compaction, physical damage to plants, and site characteristics, such as soil moisture and soil temperature.	The "Medium" descriptor is intended to match current conditions in the Old Park in areas accessible from the park road corridor. The first phase of the monitoring program would utilize existing data and new field observations to describe those conditions in more detail.
Low	Visitors notice few if any signs of social trails, campsites, or cut or broken vegetation.		
N/A	Identifies an alpine area that has very scarce or no vegetation or soil. Trails and campsites on snow are not monitored.		

Table 2-3: Evidence of Modern Human Use

Descriptor	Description & Standard	Monitoring	Process for Evaluation
High	Visitors have at most 5 encounters with modern equipment or landscape modifications each day of their trip.	Monitoring would be conducted at least once every five years by visitor survey, and would be supplemented by continuous observation of ranger patrols.	The first visitor survey after plan approval would contain questions to evaluate the usefulness of this indicator and investigate other alternatives for indicating the impact of modern civilization on the wilderness experience. Survey results could be used to modify this indicator, but the relative differences between categories (High, Medium, Low) would be retained.
Medium	Visitors have at most 3 encounters with modern equipment or landscape modifications each day of their trip.		
Low	Visitors have at most 1 encounter per trip with modern equipment or a landscape modification.		
Landscape Modifications			
Yes	There may be visible mitigations for visitor use such as constructed trail segments, route markers, signs, bridges, designated campsites, food storage facilities, sanitation facilities, fixed climbing lines, or others as described or proposed by this plan.		
No	There are no visible landscape mitigations for visitor use.		
Notes: "Modern equipment" includes communication facilities, research equipment, chain saws, motorized or mechanized vehicles on the ground, and other similar devices. This definition does not include portable devices that a person could reasonably carry without assistance (e.g., cell phones, GPS units, fuel-burning stoves), subsistence equipment such as traps or firearms, or aircraft in flight. "Landscape modifications" specifically do not include historic or cultural resources such as historic cabins, gravesites, or other structures or artifacts. They also do not include permitted modifications for subsistence use such as cabins or trapline trails. An "encounter" refers to visual recognition. A single trail or route markers associated with a single route would count as only one encounter. Audio recognition of noise is covered under the Natural Sound Disturbance standards.			

Table 2-4: Litter and Human Waste

Descriptor	Description & Standard	Monitoring	Process for Evaluation
Low	No more than 5% of visitors encounter human waste, toilet paper, or litter in the backcountry.	Monitoring would be conducted at least once every five years by survey of backcountry visitors. This information would be supplemented by the observations of park staff during backcountry patrols.	

Table 2-5: Natural Sound Disturbance

Descriptor	Description & Standard	Monitoring	Process for Evaluation
Very High	Natural sounds are often interrupted by motorized noise including loud noise. Motorized noise may be audible up to 50% of any hour, and there may be up to 50 motorized noise intrusions per day that exceed natural ambient sound. Motorized noise does not exceed 60dBA.	Sound monitoring would be conducted on a continuous basis using remote monitors. Long-term monitoring and attended monitoring would take place at locations of particular concern or where it has been determined that management action is necessary to meet standards. Other locations would be randomly sampled.	Indicators and standards would be used as benchmarks for five years while additional information is gathered through the initial stages of the monitoring program. After five years, the NPS would propose changes to either the indicators or standards through a public process. Relative differences between categories (Low, Medium, High, Very High) would be retained during the revision process.
High	Natural sounds are frequently interrupted by motorized noise, including some loud noise. Motorized noise may be audible up to 25% of any hour, and there may be as many as 25 motorized noise intrusions per day that exceed natural ambient sound. Motorized noise does not exceed 60dBA.		
Medium	Natural sounds predominate in this area, but there are infrequent motorized intrusions, a few of which may be loud. Motorized noise may be audible up to 15% of any hour, and there may be as many as 10 motorized noise intrusions per day that exceed natural ambient sound. Motorized noise does not exceed 40dBA.		
Low	Natural sounds predominate in this area and motorized noise intrusions are very rare and usually faint. Motorized noise may be audible up to 5% of any hour, and there is no more than 1 motorized intrusion each day that exceeds natural ambient sound. Motorized noise does not exceed 40dBA.		
Notes: "Audible" means audibility to a person of normal hearing. Maximum sound levels assume the measurement device is more than 50 feet from the noise source. For comparison, 40dBA is the overall sound level inside a typical residential home. 70dBA is the sound level of a vacuum cleaner as perceived by the user.			

Table 2-6: Encounters with People

Descriptor	Description & Standard	Monitoring	Process for Evaluation
Very High	Visitors commonly encounter other parties in these areas. They generally encounter 10 or fewer parties per day.	Monitoring would be conducted at least once every five years by survey of backcountry visitors and "displaced" (see below) backcountry visitors. This information would be supplemented by the observations of park staff during backcountry patrols.	The NPS would review encounter rate standards after each five-year survey to evaluate visitor satisfaction and the success of the standards in achieving management area goals. If professional judgment suggests that changes are necessary, the NPS would propose new indicators and/or standards through a public process. The relative differences between management areas would be retained.
High	Visitors commonly encounter other parties in these areas, although they still have many opportunities to be alone. They generally encounter 5 or fewer parties per day.		
Medium	Visitors occasionally encounter other parties in these areas, but are almost always alone. They generally encounter 2 or fewer parties per day.		
Low	Visitors are unlikely to encounter other parties in these areas during the course of their backcountry trip.		
N/A	There is no standard for encounter rate in this area. Visitors may always be within sight or sound of other visitors.		
Encounters with Large Groups			
Yes	1 or 2 of the parties encountered may have more than 6 people.		
No	No parties are encountered that are larger than 6 people.		

Notes: An *encounter* is the unaided recognition by sight or sound of another park user, including other recreationalists or subsistence users. An encounter does not include aircraft in flight which are addressed under Natural Sound Disturbance. "Displaced" backcountry visitors are those who would visit the park backcountry, but do not because management limitations, crowding, or other factors make it an undesirable destination.

Table 2-7: Camping Density

Descriptor	Description & Standard	Monitoring	Process for Evaluation
High	During the season of peak visitation, there is little or no opportunity for visitors to camp out of sight and sound of others. At other times of year visitors may be able to camp out of sight and sound of others.	Monitoring would be conducted at least once every five years by survey of backcountry visitors. This information would be supplemented by observations of park staff during backcountry patrols.	As part of the monitoring process, NPS would evaluate the importance placed by park users on this indicator. The distinctions between categories could be adjusted through a public process within the context of all the indicators related to "social conditions" in the park backcountry.
Medium	During the season of peak visitation, visitors may have to camp within sight or sound of others, but often are able to avoid doing so. At other times of year visitors generally are able to camp out of sight and sound of others.		
Low	Visitors are always able to camp out of sight and sound of others.		
Notes: This category refers only to the opportunity to camp outside of sight or sound of other park visitors; however, visitors may still choose to camp where they can see or hear others. "Sight or sound" refers to unaided recognition of another campsite from the site where the visitor camps for the night.			

Table 2-8: Accessibility

Descriptor	Description	Monitoring & Evaluation
High	These areas are suitable for casual use and do not require extensive time commitments, specialized backcountry travel skills, advance planning, or self-reliance.	This category is descriptive only. The actions that determine the rating are listed elsewhere in this plan. Since the status would not change without additional action, monitoring is unnecessary.
Medium	Visits to these areas require self-reliance, but may not require extensive time commitments, specialized backcountry travel skills, or extensive advance planning.	
Low	Visits to these areas require significant time commitment, some specialized backcountry travel skills, advance planning, and a high-degree of self-reliance.	
Very Low	Visits to these areas require significant time commitment, specialized backcountry travel skills, thorough advance planning, and a high degree of self-reliance.	
Notes: NPS management largely determines the degree of accessibility by providing facilities (such as trails) or services (transportation, guide services) that determine how easy or difficult it is to travel in an area of the park. Terrain also plays a role, primarily in the alpine mountaineering areas that require specialized equipment and knowledge. These are the only areas that achieve a "very low" rating, although the availability of guide services that can provide equipment and instruction can boost the rating to a "low." Areas accessible to day visitors who decide to visit spontaneously without planning or preparation achieve a "high" rating.		

Table 2-9: Administrative Presence

Descriptor	Description	Monitoring	Process for Evaluation
High	Rangers are frequently present, so visitors generally have some contact with them. Visitors may occasionally encounter staff or permitted researchers involved in inventory and monitoring projects and research in some areas.	Ranger patrols would record and report visitor contacts. Visitor surveys would assess the amount and quality of interactions between visitors and NPS rangers and researchers at least once every five years.	There are no specific quantitative indicators or standards proposed for this category.
Medium	Rangers may make routine visitor contacts, so visitors may be aware of administrative presence. Visitors may occasionally encounter staff or permitted researchers involved in inventory and monitoring projects and research in some areas.		
Low	Administrative presence is generally limited to emergency activities and occasional patrols, with research and resource monitoring projects in some areas.		
Notes: This category only includes interactions with administrative and research personnel, which are not included with the encounter rate standards given above. Interactions with park aircraft, research equipment, snowmachines, or other equipment are included in the standards for Evidence of Modern Human Use and Natural Sound Disturbance.			

Wildlife

Wildlife is one of Denali's most important resources. Active monitoring of the populations, distributions, and demographics (e.g., age structure, gender ratios) of major wildlife species would occur throughout the duration of plan implementation. If statistically significant changes occur in any of the variables listed, and these changes could be correlated with changes in visitor use, the National Park Service would take actions described in this plan to manage the level and/or type of visitor use. Additional development of wildlife indicators and standards would occur during plan implementation. The National Park Service would consult with the Alaska Department of Fish and Game during the development of specific indicators, standards, and protocols for monitoring.

Management Area Designations

Management areas would be applied as depicted in Map 2. The percentage of the park and preserve allocated to each management area is as follows:

Table 2-10: Area of Park and Preserve by Management Area

Management Area	Acres	% Backcountry
A	358,256	6%
B	962,244	16%
C	312,469	5%
D	2,242,454	38%
OP1	1,408,886	24%
OP2	737,409	11%
TOTAL	**6,028,202**	100%
Special Use Areas	150,269	2.5%

Summer season Corridors would be designated as follows:

- Kantishna and Muddy Rivers (56 miles)
- the lower Tokositna River (4 miles)
- Skyline and Moose Creek former mining access routes in Kantishna (10 miles).

If demand is sufficient, the National Park Service could also designate the following winter season Corridor management areas:

- three Corridors from the southern park boundary to the Old Park boundary near West Fork Chulitna River, Bull River, and Cantwell Creek (12.5 miles)
- the lower Tokositna River (4 miles)
- the upper Tokositna River to the mouth of Wildhorse Creek (3 miles).

All Corridors are depicted on Map 3.

The Ruth Glacier Special Use Area would be designated to include areas of the Ruth and Tokositna Glaciers as shown on Map 2. Backcountry Hiker designations are described below under Backcountry Facilities.

Major Landing Areas and Portals would be designated as follows (see Map 4):

- Major Landing Areas – Kahiltna Base Camp and Ruth Amphitheater
- Portals – Pika Glacier, Coffee Glacier, Buckskin Glacier, Eldridge Glacier, and upper Tokositna Glacier.

The locations of Major Landing Areas and Portals could be adjusted to respond to changes in the glaciers; however, the number and approximate size of the Major Landing Areas and Portals would remain the same as these adjustments occur.

The West Buttress Special Use Area would be designated to include the entire West Buttress route on Mount McKinley, from the Old Park boundary at the Kahiltna Base Camp portal to the summit of the mountain. Existing backcountry trails (those that extend beyond the development zones and Backcountry Day Use Areas described in the 1997 *Entrance Area and Road Corridor DCP*) would be designated as Backcountry Hiker areas. These trails are described in the Visitor Use and Experience section of Chapter 3, Affected Environment.

ACCESS

General Guidance

Access to all parts of the Old Park, park additions and preserve would be managed to achieve management area standards using the tools identified below. Recreational access to the Old Park would continue to be managed to emphasize non-motorized access, but this area would be accessible by airplane and motorboat. The National Park Service would actively identify locations in the Old Park that have ecological, wildlife, or other resource values that are at substantial risk of harm from airplane landings or motorboat use, and locations where these modes of access would cause unacceptable impacts to visitor safety. The National Park Service would close or otherwise manage motorized access to these areas as appropriate to alleviate the resource and safety concerns. In the park additions and preserve, airplane and motorboat access, and snowmachine access for traditional activities, would continue. If Congress considers additional wilderness designations for Denali, the National Park Service would propose that accommodation be made as necessary for recreational snowmachine access along the winter season Corridor management areas.

The National Park Service is committed to providing visitors to the national park and preserve with reasonable access for wilderness recreational activities, traditional activities, and for other purposes as described in ANILCA and other laws summarized in chapter 1. The National Park Service would generally allow independent, cross-country travel by any legal means, and would encourage access to the park and preserve by means of facilities (e.g., trails and marked routes) and services (e.g., commercial air taxi and guide services) as described in the Backcountry Facilities and Commercial Services portions of this plan. If it becomes necessary to manage travel in any area to achieve desired future resource and social conditions for an area, to reduce visitor conflict, or to protect visitor safety, the National Park Service would use the least restrictive mechanism or "tool" necessary to accomplish the goal. The National Park Service need not wait for conditions to match or exceed standards before taking management action; an expectation that conditions would exceed standards is sufficient to mandate a response. Restrictions and closures would be accomplished consistent with the process outlined in 43 CFR 36.11 and/or other relevant regulations.

Table 2-11 lists the tools that may be used to manage access when necessary, arranged in rough order from the least restrictive to the most restrictive. The park superintendent is free to pick whichever tool is required as long as the "least restrictive" criterion is heeded. There is no implication that the tools must be tried in the listed order and a failure elicited before trying the next one.

Table 2-11: Access Management Tools

1) Education	The National Park Service would provide printed material, public presentations, targeted presentations to user groups, and Internet-based programs, with the goal of actively involving visitors in helping the park achieve the standards for all management areas.
2) Increased enforcement of existing regulations	The National Park Service would prioritize enforcement of existing regulations to assist in achieving standards for management areas. For example, enforcement of the snowmachine speed limit or the sound level limits on motorized equipment could assist in achieving standards for sound quality.
3) Voluntary restrictions	The National Park Service would ask visitors to restrict their use voluntarily. Examples of such measures could include: voluntary registration; use of low-impact equipment; avoidance of certain areas of the park or preserve; or avoidance of areas during particular seasons or times of day. Voluntary registration would not require a permit and could be accomplished by trailhead register, phone or radio call-in, or the Internet.
4) Required registration	The National Park Service would require visitors to register. Visitors would be issued a permit that provides information about park rules and conditions for use necessary to protect park resources. Permit conditions could include minimum impact travel and camping requirements and resource protection requirements; however, a registration process would not limit the number of visitors or the type or amount of access. Registration is a means to gather information about visitor use levels and to ensure visitors receive necessary resource protection and safety information.
5) Technology requirements or other requirements governing means of access	To achieve management area standards, the National Park Service would place requirements on the means of access. For example, the NPS could require individuals to use technology that meets specific noise specifications if those individuals are accessing the park by snowmachine, motorboat, or airplane.
6) Management of commercial activity	The National Park Service would adjust concession contracts and other commercial use permits to govern use levels or direct authorized commercial activity to locations, seasons, or times of day as necessary to achieve management area standards.
7) Regulate numbers of visitors	The National Park Service would establish quotas for visitor numbers in areas of the park additions and preserve when the volume of use is high enough that other mechanisms are unlikely to achieve standards. Visitors would be required to register and carry a permit, and the number of available permits would be limited. This is the mechanism presently used to manage overnight backcountry use in the Old Park and parts of the Kantishna Hills.
8) Temporal restrictions	The National Park Service would restrict access to particular times of day, days of the week, or other unit of time, or the duration of access could be limited.
9) Temporary and permanent closures	Using the appropriate authorities, the National Park Service would temporarily or permanently close areas of the park and preserve to all types of visitor use or to specific modes of access.
10) Management authorities of other agencies	The National Park Service would seek assistance from cooperating entities, such as the Federal Aviation Administration or State of Alaska, to apply regulatory or other measures to protect park resource values and achieve management area standards.

Registration and Permit Systems
The National Park Service would study and deploy the most efficient, cost-effective, and user-friendly system for park visitors to register or obtain permits to access the park backcountry where required. The goals would be to: 1) provide safety and resource protection information to visitors before they enter the backcountry; 2) track the amount and type of visitor use; 3) improve the existing system; and 4) if necessary, expand the system to serve new activities and/or areas. Some options that would be considered include:

- Same-day and advance permits or registration
- One-time, seasonal, and annual registration
- Staffed desks or automated kiosks in Anchorage, Fairbanks, Trapper Creek, Talkeetna, Cantwell, Healy, or other locations
- Permits and registration by phone, Internet, or mail, or through transportation services (e.g., air taxis, Visitor Transportation System (VTS) bus system).

The National Park Service would impose new registration requirements only in areas where use levels are sufficient enough that user conflicts and/or resource damage are occurring or would occur and when other methods for obtaining accurate information on visitor use and conveying essential visitor safety and resource protection information are unlikely to be successful. It is likely that overnight use and winter day use from the Kahiltna Glacier east would meet these criteria in the near future. The National Park Service would begin a system of voluntary registration for airplanes landing in the Old Park. To test the feasibility of advance backcountry registration, an experimental system for advance registration would be employed for dispersed camping and camping at designated campsites in the Kantishna Hills.

The number of available permits for climbers attempting to climb Mount McKinley would be restricted to 1,500 during the main mountaineering season (April 1- August 1). The limit of 1,500 would be reevaluated 10 years after approval of the backcountry management plan.

Aircraft Overflights Working Group
The National Park Service would establish an aircraft overflights working group, which would include scenic air tour operators, commercial airlines, general aviation organizations, and other concerned parties. This group would develop voluntary measures for assuring the safety of passengers, pilots, and mountaineers and for achieving desired future resource conditions at Denali.

Cross-Country Travel
Except as otherwise specified in the management area descriptions and the Backcountry Facilities section, backcountry access and travel in Denali would continue without designated routes or constructed trails to allow for freedom to explore and to minimize signs of human presence. To prevent vegetation damage and social trail formation, the National Park Service would take the following actions:

1) Apply the Access Management tools specified for the situations described in Table 2-12.

2) Establish a social trails working group consisting of NPS staff, guided hiking concessioners, Murie Science and Learning Center staff and associated non-profit partners, and commercial services that provide access to the backcountry (by shuttle bus and air taxi). This group would address specific problem areas through coordinated action.

3) Develop Leave-No-Trace guidelines that are specific for Denali National Park and Preserve in consultation with the internal working group, NPS resource managers, and the Murie Science and Learning Center.

Table 2-12: Decision Guide for Addressing Social Trail Formation

Situation	Strategy	Application of Access Management Tools
No social trail formation; terrain allows dispersal or travel on durable surfaces (e.g., gravel river beds).	Keep use dispersed.	Provide Leave-No-Trace education for backcountry users to encourage continued dispersal and travel on durable surfaces.
No social trail formation at existing use levels, but terrain does not allow for dispersal or travel on durable surfaces.	Maintain use at level such that social trail formation does not begin.	Provide Leave-No-Trace education for backcountry users; manage guided groups to limit use; monitor level of use to detect increases; and limit number of visitors if necessary.
Social trails are present and are either stable or deteriorating, but additional dispersal is possible.	Encourage additional dispersal to lower levels of use on the social trail.	Provide Leave-No-Trace education for backcountry users and encourage voluntary dispersal coordinated through a social trails working group (see #2 below).
Social trails are present but stable at existing levels of use; little opportunity for dispersal.	Concentrate use on social trail and limit use sufficiently to prevent deterioration.	Educate visitors or restrict them to social trail, and limit numbers of visitors if necessary.
Social trails are present and are deteriorating; additional dispersal is not possible because of terrain.	Lower use levels until condition stabilizes.	Limit numbers of visitors or use temporary closures to restrict use.
In addition, the National Park Service may temporarily close some areas around social trails to allow rehabilitation even if conditions are stable.		

WILDERNESS MANAGEMENT

General Guidance

The National Park Service would manage all backcountry areas of the national park to protect wilderness resource values and provide opportunities for wilderness recreational activities, consistent with the direction of law and policy, with particular attention to the following:

- ANILCA Section 101 lists "preserve wilderness resource values" as a fundamental purpose of ANILCA.
- ANILCA Section 102(13) states that the term "wilderness" as used in ANILCA has the same definition as in the Wilderness Act.
- ANILCA Section 202(3)(a) states that a fundamental purpose of the Denali park and preserve additions is to provide continued opportunities, including reasonable access, for wilderness recreational activities.

As described in chapter 1, the Wilderness Act identifies two key components of wilderness character as

1) generally appearing to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; and
2) having outstanding opportunities for solitude or a primitive and unconfined type of recreation.

The qualities of "affected primarily by the forces of nature" and the "imprint of man's work substantially unnoticeable" would be interpreted for Denali by the following characteristics:

- Absence of permanent human structures, including buildings, roads, trails, dams, and communications facilities
- Perpetuation of natural ecological relationships and processes and the continued existence of native wildlife populations in largely natural condition

Providing "opportunities for solitude" would include managing for visitor experiences with the following characteristics:

- Freedom from the reminders of society
- Privacy and isolation
- Absence of distractions, such as large groups, mechanization, unnatural noise, signs, and other modern artifacts

Providing a "primitive and unconfined type of recreation" would include recreation with these characteristics:

- Self-sufficiency, absence of support facilities or motorized transportation
- Direct experience of weather, terrain, and wildlife with minimal shelter or assistance from devices of modern civilization
- Lack of restriction on movement; freedom to explore in the way that is desirable given conditions of weather, terrain, and personal ability; ability to be spontaneous; minimal formal regulatory requirements

The above are the wilderness resource values that the National Park Service would seek to preserve at Denali. The NPS recognizes that ANILCA and other laws provide for exceptions in national park and wilderness management for particular uses or activities. Primary examples include:

- ANILCA 811 allows the use for subsistence purposes of snowmachines, motorboats, and other means of surface transportation traditionally employed for such purposes.
- ANILCA 1110(a) allows use of snowmachines, motorboats, and airplanes for traditional activities.
- ANILCA 1315(d) allows for the construction of a limited number of public use cabins or shelters in designated wilderness if necessary for the protection of public health and safety.
- ANILCA 1316(a) allows the establishment and use of temporary campsites, tent platforms, shelters, and other temporary facilities and equipment directly and necessarily related to the activities of taking fish and wildlife where such activities are allowed.
- Section 4(a-b) of the Wilderness Act establishes that the act does not change the statutory authority for which a park was created, nor does it lower the standards of any other act of Congress which might pertain to or affect such area, including the Antiquities Act or Historical Sites Act allowing for the preservation of historic structures.
- Section 4(c) of the Wilderness Act allows land managers the discretion to use motorized vehicles, use motorized equipment or motorboats, land aircraft, use other forms of mechanical transport, or construct structures or installations as necessary to meet the minimum requirements for the administration of the area for the purpose of this Act (including measures required in emergencies involving the health and safety of persons within the area).

In implementing this plan, and with future management actions, the National Park Service would, with every decision, forego actions that might have no seeming physical impact, but which would detract from the idea of wilderness as a place set apart, a place where human uses, convenience, and expediency do not dominate.

Group Size

The National Park Service would establish a maximum group size of 12 for backcountry areas of Denali for both private and guided groups, including guides. In Management Areas OP2 and D, the maximum group size would be six for both private and guided groups, including guides. The park superintendent could make an exception to the group size limit if that would benefit visitor safety or park resources. This limit does not apply in designated Hiker areas (trails) identified in the 1997 *Entrance Area and Road Corridor DCP*, but does apply on any trail that crosses into a backcountry area within the scope of this plan. Commercial and non-commercial groups would be required to have a group leader who is trained in Leave-No-Trace principles for tundra environments generally and Denali National Park and Preserve in particular. In all cases, larger groups (more than four) would be encouraged to disperse or stay on durable surfaces such as gravel river beds.

Human Waste

Removal of human waste from the park would be required in the following areas:

- The West Buttress Route on Mount McKinley above the 14,000 foot camp
- Campsites within one-half mile of air taxi landing locations on glaciers unless pit latrines or other waste disposal facilities are provided.

In other glaciated locations, including the West Buttress of Mount McKinley below the 14,000-foot camp, climbers would be encouraged, but not required, to remove their waste. Additional requirements for removing waste from glaciated areas could be imposed in high use areas if waste handling technology and techniques improve to make more widespread removal practical. The

National Park Service would emphasize education about human waste removal during climber orientation, during patrols, in working with mountaineering organizations such as the American Alpine Club, and in distributed publications.

The current rules on human waste in the Denali backcountry would remain in force. As described in the 2005 Superintendent's Compendium, these rules are as follows:

- *Human body waste will be deposited in cat-holes when the ground is not frozen, dug at least 100 feet from any surface freshwater source.*
- *Toilet paper will be burned or removed as trash.*
- *Persons engaged in any travel (such as skiing, snowshoeing, aircraft landings) or activities (such as mountaineering, climbing, flightseeing, camping) in a glacier environment, such as Mount McKinley and other peaks and glaciers within the park and preserve, must dispose of all human wastes according to the following guidelines:*
    - *Use pit latrines where they are provided by the National Park Service, such as those typically located at the 7,000-foot and 14,000-foot base camps along the West Buttress route, the Ruth Glacier in the vicinity of the Mountain House landing area, and elsewhere as provided.*
    - *At locations without pit latrines, bag all human waste (feces) and carry it out or place it in a deep crevasse. On steeper technical routes outside of the West Buttress, the bag can be tossed away from the climbing route or shovel feces off and away from the route.*

Climbing Tools

Power drills for climbing activities would be prohibited throughout the park additions and preserve.

The following guidance for fixed and removable anchors would be implemented:

> Removable and fixed anchors, as well as other climbing equipment, must be used wisely and be closely managed in order to prevent the degradation of wilderness resources and character. When anchors are necessary for climber safety, removable anchors are desired and highly recommended. Fixed anchors should not be placed merely for convenience.
>
> Fixed anchors (such as webbing, bolts, pitons, chains) currently in place may remain. They may be replaced or removed by individual climbers during a climb or by the National Park Service during park operations. Safety remains a responsibility of the climber. The National Park Service would not, as a policy or practice, monitor fixed anchors to evaluate their condition. When a climber determines the need for anchor placement or replacement, this must be accomplished in compliance with regulated and permitted standards (for example, power drills may not be used). If unable to do so, the route should remain unclimbed. New, bolt-intensive climbing routes, such as sport climbs and "bolt ladders," are not appropriate and would not be allowed.
>
> Placement of new anchors may be allowed when necessary to enable a safe rappel when no other means of descent is possible; to enable emergency retreat; during self-rescue situations; and on new routes when ascending a route to connect terrain that is otherwise protected by removable anchors (for example, one crack system or other natural feature to another). Permanent bottom to top fixed anchor routes would not be allowed throughout the Denali backcountry, with the exception of the headwall (15,300-16,200 feet) on the West Buttress route of Mount McKinley.

COMMERCIAL SERVICES

The NPS Management Policies 10.2.2 mandates commercial visitor services planning for national parks and preserves. Commercial services may be authorized as concession contracts or commercial use authorizations. A decision to authorize a concession is to be based on a determination that the service:

- is necessary and appropriate for public use and enjoyment of the park in which it is located and identified needs are not, nor can they be, met outside park boundaries,
- will be provided in a manner that furthers the protection, conservation, and preservation of the environment and park resources and values, and
- will enhance visitor use and enjoyment without causing unacceptable impacts to park resources or values.

For the purposes of commercial visitor services planning in the Denali backcountry, these criteria would apply to all commercial visitor service authorizations. To be consistent with the purposes of the park and preserve and the objectives of this plan, the criteria would be interpreted for Denali as follows:

- Commercial services are necessary and/or appropriate in the Denali backcountry if they meet the following criteria:
  - They depend on the unique character and environment of the Denali backcountry, and the same experience cannot be found on nearby public lands.
  - They are consistent with the purposes of the park and preserve as described in chapter 1.
  - They do one of the following:
    - They provide access to remote areas of the park and preserve where the time or equipment necessary for the independent traveler to reach those locations would otherwise be prohibitively lengthy or expensive.
    - They provide education and inspiration related to wilderness resources and values.
    - They assist visitors in exploring the backcountry in areas or by means that require specialized knowledge (e.g., mountaineering, dog mushing).

- Commercial services are provided in a manner that furthers protection, conservation, and preservation when they do all of the following:
  - They teach and follow Leave-No-Trace principles for the sub-arctic wilderness environment.
  - They provide education relevant to preservation of wilderness resources and values.
  - They offer substantial benefits to the protection of the wilderness resources and values of the area.

- Commercial services do not cause unacceptable impacts to park resources or values when they do all of the following:
  - Group size, number of groups, and travel modes are consistent with management area designations and avoid impacts on vegetation, wildlife usage, and cultural resources of the area.
  - Groups follow Leave-No-Trace principles for the sub-arctic wilderness environment.
  - The activities are consistent with management area standards for solitude, natural sounds, and other wilderness characteristics for each management area.

In the park additions and preserve, if a guided commercial activity or non-commercial educational program takes place in an area where the numbers of visitors are limited, the allowable number of parties or visitors participating in the guided activity would be no more than 50% of the total potential use of the area during any visitor season (summer/winter) in order to allow for non-guided uses. In the Old Park, the number of parties or visitors participating in the guided activity would be no more than 25% of the total potential use of the area during any visitor season (summer/winter) where such use is allowed. Among commercial and educational programs, the programs provided directly by the National Park Service and the Murie Science and Learning Center would have priority for available capacity.

To avoid adverse affects to resources, the National Park Service would be conservative in making available guided activities and similar educational programs. When establishing new programs, the NPS would evaluate the impact of the new use before offering the program in additional locations or adding more programs to the same area.

All new commercial services, and both new and existing operators, would be required to meet the criteria listed above. Activities or services not described in this section could be considered only in the southern additions designated as Management Area A.

Commercial Airplane Landings

- Air taxi landings could occur throughout the park additions and preserve. To be considered an "air taxi" landing, the majority of passengers on the flight must either be dropped off or picked up from a day trip or overnight stay and passengers do not remain with their airplane while on the ground.
- "Scenic air tour landings" are distinguished by passengers remaining with their airplane while on the ground. Scenic air tour landings would be allowed on glaciers in all areas designated as Management Area A. Scenic air tour landings could also occur at the designated Portals on the Eldridge and Pika Glaciers; however, these areas would remain secondary and less used in accordance with their management area designation. Scenic air tour landings in these two areas would not occur when other landing locations are available and scenic air tour landings would be discouraged when climbers or mountaineers are present. These areas would be prioritized for monitoring and additional actions would be taken if management area standards are approached or exceeded. Scenic air tour landings could occur at Kahiltna Base Camp throughout the year. In all locations, landings for scenic air tours would be restricted to the hours between 9am and 9pm.

Guided Hiking

- Guided day-hiking in the Wonder Lake area and along the McKinley Bar trail would continue as described in the 1997 *Entrance Area and Road Corridor DCP*.
- Additional guided day-hiking could be continued in the western portion of the Old Park between Toklat River and Wonder Lake with access from Kantishna, limited to the same number of groups as at present (determined by average of last five years).
- Guided day-hiking in the Old Park east of Toklat River would be available only on the following entrance area trails:
    - The Rock Creek Trail and Roadside Trail between the Denali Visitor Center and Park Headquarters
    - The Bike Trail and Jonesville Trails between the Nenana River Bridge and the Denali Visitor Center

    - The Nenana River and Triple Lakes trails when planned construction or rehabilitation is complete (see 1997 *Entrance Area and Road Corridor DCP*)
    - The Savage Alpine Trail between Savage Campground and Savage River, only for those commercial groups staying at Savage Campground.
- In the portion of the Kantishna Hills where designated campsites are available, overnight camping by guided groups would be restricted to these campsites.
- Guided day-hiking and overnight backpacking could be considered throughout the park additions and preserve.

Guided Sport Hunting
The entire southwest Preserve would be divided into two sport-hunting guide areas with the dividing line between areas along the West Fork of the Yentna and through Shellabarger Pass. The change would take place immediately as an amendment to the existing sport-hunting concession contracts. See Map 5.

Other Activities
The following guided activities could continue to be authorized if the criteria described at the beginning of this Commercial Services section are met:

- Guided mountaineering on Mount McKinley and other peaks throughout the glaciated portions of the Alaska Range, (including lowland approaches), in the Old Park, park additions, and preserve
- Dog mushing expeditions in the Old Park, park additions, and preserve
- Winter day- or multi-day trips by ski or snowshoe in the park additions and preserve.

In addition, dog team freight hauling services in the Old Park, park additions, and preserve could continue to be authorized.

BACKCOUNTRY FACILITIES

Communication Facilities

Communications facilities would be considered on a case-by-case basis following the minimum requirement/minimum tool process. New structures would be attached to existing structures wherever possible. For administrative purposes, the National Park Service would phase in the use of satellite phones or similar technology in the backcountry to avoid the need for new temporary or permanent communication facilities in backcountry areas.

Trails

The National Park Service would designate Backcountry Hiker areas and (if needed) construct or improve the following trails:

- Some existing social trails within units 41, 42, and 43 in Kantishna, formalizing a trail system in this area
- From Eielson Visitor Center to Gorge Creek
- A loop from the water tower above Wonder Lake Campground up to the bench west of Wonder Lake and return
- From the Mount Healy overlook down a spur ridge to create a loop to the Taiga Trail
- From the west end of Thorofare Bluffs down to the Thorofare River bar.

No other new summer or winter trails would be added besides those identified in the 1997 *Entrance Area and Road Corridor DCP* and the 1997 *South Side Denali DCP*. Elsewhere in the park and preserve, the National Park Service would maintain a "no formal trails" policy.

Park Road

During winter months, snow on one lane of the park road would continue to be packed from the Headquarters gate to Mile 7 to allow maintenance activities that prevent the buildup of ice on the road in this section. Snow would not be removed from the road until necessary to prepare the road for summer season use. This section of the park road would be designated a Backcountry Hiker area during winter months.

Campsites

Up to 5 designated camping areas of 1-3 sites each would be created in conjunction with the Corridor and Backcountry Hiker areas in units 41, 42, and 43 in the Kantishna Hills. These sites would be farther from the park road than the areas commonly used by day-hikers. Food storage and/or sanitation facilities could be placed in the designated campsites.

Shelters and Cabins

The National Park Service would add visitor facilities at Park Headquarters, such as restrooms, plug-ins, and a warming hut, to support winter use. Otherwise, there would be no new facilities besides those already in approved plans.

Information Facilities

The National Park Service, in cooperation with other land management agencies, would operate a visitor contact station in the Cantwell/Broad Pass area. This facility would provide information and registration/permitting for year-round use of the park and preserve's backcountry, with a particular focus on serving the needs of winter recreational visitors on the south side of the Alaska Range.

ADMINISTRATIVE AND SCIENTIFIC ACTIVITIES

To establish greater accountability and minimize impact to wilderness resource values throughout the park and preserve, all NPS-authorized administrative and research activity throughout the entire park and preserve backcountry would be subject to the minimum requirement/minimum tool process. When the minimum requirement/minimum tool is used, the potential disruption of wilderness character and the physical resource would be considered and given more weight than economic efficiency and convenience. Appendix E provides a sample tool for determining the minimum requirement/minimum tool.

Information and Education

Consistent with the protection of the park and preserve's wilderness character, information about backcountry travel would generally be provided before visitors enter the backcountry. This would minimize or eliminate the need for signs or other markers in the backcountry itself. Trip planning and safety information would be available at park visitor centers, Alaska Public Lands Information Centers, and at visitor facilities in Denali State Park. This information would also be available through the Internet and print materials that could be distributed nationally and internationally.

The National Park Service and its educational partners would provide wilderness education to all park visitors to assist in their understanding of the wilderness resource values protected in the Denali backcountry. Education would focus on interpreting the wilderness resource values articulated in the Wilderness Management section of this plan. Wilderness education could involve non-personal means in park visitor centers and Alaska Public Lands Information Centers, and also remotely via the Internet and print materials. Wilderness education in the backcountry would be provided entirely through personal services by concession, non-profit, or NPS guides.

Day use and overnight educational programs offered by the National Park Service, the Murie Science and Learning Center, and accredited educational institutions and non-profit organizations operating under a cooperative agreement with the National Park Service could be offered throughout the Old Park, park additions, and preserve. All educational programs taking place in the backcountry would be required to meet the criteria identified under Commercial Services.

Aviation

Within three years, the National Park Service would complete a plan for administrative and research use of aircraft in the wilderness, park additions, and preserve, which includes goals and specific objectives for minimizing helicopter and airplane use; specifies a methodology for accounting for NPS administrative and research air traffic; and provides criteria for determining when the use of aircraft meets the minimum requirement/minimum tool test.

Research and Resource Management

All NPS and external research would require a research permit that would be granted only if the parameters of the project meet the management area standards in the location(s) where the project is proposed. Research and resource management activities of the Alaska Department of Fish and Game would require advance consultation under the Master Memorandum of Understanding between the Department of Fish and Game and the National Park Service.

Administrative Camps

The existing patrol structure and administrative camps on Mount McKinley would be retained. There would be no additional administrative camps in the backcountry.

EASEMENTS AND BOUNDARY CHANGES

Easements

The National Park Service would initiate collaborative action with concerned and affected parties in the Cantwell area to acquire an easement over private lands to gain public access to the existing 17(b) easement (EIN 7a C5, DI, L) that provides a route across Ahtna, Inc. land from Cantwell to the park boundary near Windy Creek. The existing easement is 25 feet wide and allows travel by foot, dogsleds, animals, snowmachines, two- and three-wheeled vehicles, and small all-terrain vehicles. See Map 6.

Land Exchanges

The National Park Service would seek a land exchange with the State of Alaska (similar to a previously proposed exchange of land) that would realign the park boundary with the Tokositna, Coffee, and Ruth Rivers (see Map 7). As a result of the exchange, approximately 3,229 acres of Denali State Park land would be transferred to Denali National Park and Preserve, and approximately 2,822 acres of Denali National Park and Preserve land would be transferred to Denali State Park. Land to be transferred to the State of Alaska surrounds approximately 137 acres of privately owned inholdings.

An additional adjustment would be proposed for the area immediately north of Dutch Creek to provide a boundary that is more identifiable in the field and out of the potential placer mining in that floodplain. Completion of the exchanges and determination of actual boundaries and acreage would depend on the outcome of negotiations with the State of Alaska.

IMPLEMENTATION

The backcountry management plan would be implemented through regulations, step-down plans, commercial service authorizations, construction projects, and other means. Implementation actions and requirements are listed in Table 2-13. Public involvement and environmental compliance would be completed as necessary for all actions.

The plan would be implemented using adaptive management. Since the park recognizes the need to make decisions on the best available information, it would continue to gather new information, learn from previous efforts, and adapt the plan as necessary. The National Park Service would gather information from visitor registration and surveys, as well as from the monitoring of soundscapes, wildlife, and other resources. Adaptation and change to the plan can be expected as monitoring continues, new scientific data and information is obtained, new tools and equipment are developed, and new opportunities and circumstances arise.

An important part of adaptive management is ongoing monitoring associated with the resource and social conditions described under the Management Areas section above. The National Park Service would monitor for the general condition of the area not the exceptions. When monitoring shows that standards are exceeded or that trends indicate a risk that standards would be exceeded, the National Park Service would act to manage access and use employing the tools listed Table 2-11.

Another tool used in adaptive management would be the annual backcountry operational management plan, which would be implemented through existing regulations, the Superintendent's Compendium, or additional special regulations if necessary. This operational plan would provide specific guidance for the general actions authorized in the final backcountry management plan, and the guidance would be updated yearly to reflect current information and conditions. Topics addressed would include:

- Permit conditions
- Unit quotas
- Length-of-stay and other restrictions
- Closures
- Operation of registration and permit systems

Table 2-13: Implementation Actions

Backcountry Implementation Advisory Committee	Charter an advisory committee under the Federal Advisory Committee Act (FACA) to advise the NPS on plan implementation. Subcommittees would address specific issues including monitoring, aircraft overflights, and mitigation for hiking impacts as described in the plan.
Monitoring	Develop and implement a comprehensive monitoring plan for the indicators identified by the plan. The development of the monitoring plan would take place entirely or in part in conjunction with the development of the park's Resource Stewardship Plan and the development of monitoring protocols for the Central Alaska Network's Vital Signs Monitoring Plan.

Table 2-13: Implementation Actions, continued

Regulations	Promulgate the following special regulations in 36 CFR 13.63: • Establish group size limits of 6 and 12 where appropriate • Establish seasonal climbing limit on Mount McKinley • Require removal of human waste at certain locations in climbing and mountaineering areas • Prohibit use of power drills for mountaineering activities throughout the park additions and preserve In addition, the NPS would document the need for management action and promulgate regulations if necessary for the following: • Required registration for overnight use or winter day use in the southern park additions east of and including the Kahiltna Glacier • Closure of sensitive locations in the Old Park to motorized access
Commercial Services	Issue prospectuses for commercial air taxi and scenic air tour glacier landing services that reflect plan provisions. Revise description for air taxi Incidental Business Permits (IBP) to reflect plan provisions, or use a Commercial Use Authorization when regulations are available. Issue prospectuses for commercial guided hiking in the Kantishna Hills that reflect plan provisions. Develop a commercial visitor service authorization for guided hiking on designated entrance area trails. Revise IBP area to produce individual maps for air taxi, guided day-hiking, guided overnight hiking, and guided mountaineering services per direction in the plan. Amend guided sport hunting operating plans to reflect approved areas.
Backcountry Operations	Obtain funding for additional patrol and visitor services staff to implement plan provisions. Develop backcountry operational plan and annual updates. Study and implement improvements to backcountry registration system, including advance registration procedure for overnight camping in the Kantishna Hills. Include a voluntary process for registering airplane landings in the Old Park. Identify and map winter corridors in the Dunkle Hills area. Purchase satellite phones and implement procedures for patrol use of phones.
Facility Development	Complete plan for Kantishna trail and backcountry campsite development. Obtain funding and construct. Plan and construct other trails identified in this plan. Add winter backcountry support facilities at Headquarters. Plan and construct Broad Pass visitor contact station. This item would require development of agency partnerships, specific definition of scope, and site selection prior to environmental compliance or other action.
Implementation Plans	Complete plan for NPS aviation management. Obtain easement for access to the Cantwell-Windy Creek 17(b) easement. As necessary, develop ancillary facilities such as trailhead and parking.
Land Exchange	Complete land exchange with the State of Alaska.

ALTERNATIVES CONSIDERED BUT REJECTED

Access

- Limit the number of available permits for the West Buttress route, but do not restrict climbing on other routes. This option was considered but dismissed for safety reasons. There is a concern that if the West Buttress were at capacity, climbers who lack the necessary experience would be tempted to try a route beyond their ability. Also, the limit of 1,500 climbers per season was selected because that is the maximum number that mountaineering rangers believe they could manage with their existing program and facilities, based on several years of experience. The existing program and facilities presently serve all climbers on Mount McKinley, not just those on the West Buttress.

- Establish flight corridors or flight-free zones over the park. The National Park Service lacks the statutory authority to establish flight free zones or flight corridors. However, the backcountry management plan includes recognition that the National Park Service could work through the regulatory authorities of other agencies to manage access as needed to achieve management area standards if other mechanisms were inadequate.

- Employ snow coaches for winter access in the park additions instead of individual snowmachines. Snow coaches require well-groomed surfaces of heavily packed snow, and are typically used only on top of existing roadways. They are not suitable for cross-country travel in the park additions.

- Close the park additions to all snowmachine use. In ANILCA, Congress allowed for ongoing motorized access to the 1980 park additions for certain purposes as detailed in chapter 1. While there are unresolved differences in interpretation of the law, the National Park Service believes that there are valid legal purposes for using snowmachines in the park additions and preserve and that closing the park additions to all snowmachine use would be contrary to the intent of Congress.

Wilderness Management

- Require human waste removal requirement on the entire West Buttress. The National Park Service acknowledges that human waste is an issue along the entire West Buttress route. However, at 14,000 feet and below there are options for waste management (such as crevasse disposal and latrines) that make human waste removal less critical. The NPS mountaineering staff are concerned that the resources and logistics necessary for waste removal from the entire West Buttress would be substantial, would compete with other needs, and might be unachievable. For that reason, the plan specifies that waste removal below 14,000 feet would be encouraged but not required.

Commercial Services

- Provide for commercial airplane landings to support mountaineering activities on the north side of the Alaska Range. There is no need for airplane support for climbers on the north side of the Alaska Range, because the National Park Service already authorizes a concessioner to

deliver supplies to the base of Mount McKinley by dog team during winter months. Climbing parties hike or ski from the park road and retrieve their supplies before starting their climbs (see chapter 3, Visitor Use). This is a unique challenge and opportunity that is consistent with the wilderness values of the Old Park and also is consistent with historical mountaineering and exploration of the Old Park. Several climbing parties each year ascend Mount McKinley or other peaks from the north side.

Backcountry Facilities

- Extend existing hiking trail at Savage River north along the river to State land. This action was dismissed because it conflicts with the retained policy of not establishing formal trails in the backcountry in order to preserve the unique wilderness character and wilderness experience at Denali. Although exceptions have been made to provide visitor opportunities at major visitor nodes or to address resource damage, the suggested trail meets neither criterion.

- Construct public use cabins within the boundaries of the national park and preserve. ANILCA provides the option for constructing public use cabins within wilderness areas if necessary for public health and safety. During public scoping and public review of the original draft plan, no one identified public health and safety reasons for new public use cabins. Because construction of new structures otherwise conflicts with legal and policy mandates, they were not considered among the alternatives. The alternatives do explore the possibility of collaboration with the State of Alaska to construct public use cabins near, but outside of, park and preserve boundaries.

Table 2-14: Summary Table of Alternatives

OVERVIEW					
Topic	**Alternative 1 (no-action)**	**Alternative 2**	**Alternative 3**	**Alternative 4 - Modified (NPS preferred)**	**Alternative 5**
Overview	The National Park Service would continue the present management direction, guided by the 1986 *General Management Plan*, the 1997 *Entrance Area Road Corridor Development Concept Plan*, the 1997 *South Side Denali Development Concept Plan*, the 1997 *Strategic Plan*, and backcountry management plans from 1976 and 1982. Recreational use and access patterns would continue to develop and the agency would respond as necessary on a case-by-case basis. No new services or facilities would be developed to meet increased levels of use in the backcountry, except for those identified in the Entrance Area or South Side plans.	This alternative would distinguish a unique Denali experience based on dispersed use in a wilderness landscape with few sights or sounds of people or mechanized civilization. There would be few services, facilities, or signs of management presence. This alternative would most clearly distinguish the backcountry experience in Denali from the surrounding public lands, providing a place primarily for visitors who are very self-reliant, and including many opportunities for extended expeditions in very remote locations. Backcountry users seeking other experiences would find those opportunities on neighboring lands.	This alternative would provide a variety of wilderness recreational activities by establishing areas to serve those visitors who want to experience the wilderness resource values of the Denali backcountry but require services, assistance, or short time-commitments. The areas would be the minimum necessary to provide these experiences based on present demand and would be focused along the park road in the Old Park and Kantishna and at the existing high activity areas at the Ruth Glacier and Kahiltna Base Camp. The majority of the backcountry would be managed for dispersed, self-reliant travel and would include opportunities for extended expeditions in very remote locations.	This backcountry management plan would guide the National Park Service in providing opportunities for a variety of wilderness recreational activities and experiences while recognizing and protecting the premier wilderness resource values of the entire backcountry. Areas in the Dunkle Hills and around the Ruth and Tokositna Glaciers on the south side of the Alaska Range would be managed for those visitors who want to experience the wilderness resource values or other resource values of the Denali backcountry but require services or assistance, or who are unable to make a lengthy time commitment. Areas along the park road in the Old Park and the Kantishna Hills would provide accessible opportunities for short- or long-duration wilderness recreational activities with only limited options for guidance or assistance the farther one gets from the park road. The remainder of the backcountry would be managed for dispersed, self-reliant travel, and would include opportunities for extended expeditions in very remote locations.	This alternative would create two distinct geographic areas that provide different kinds of visitor experiences in the Denali backcountry. The Old Park and the Denali additions north of the Alaska Range would be primarily managed for dispersed, self-reliant travel although no areas would be managed specifically to preserve opportunities for extended expeditions in remote locations. Areas along the park road and in Kantishna that presently receive a relatively high volume of use and large parts of the additions south of the Alaska Range would be managed for a greater intensity and variety of appropriate recreational activities and would have more visible management presence and opportunities for more services and facilities.

MANAGEMENT AREAS

Topic	Alternative 1 (no-action)	Alternative 2	Alternative 3	Alternative 4 - Modified (NPS preferred)	Alternative 5
Management Areas	There would be no new management areas defined for the backcountry. The entire backcountry would continue to be designated as a "Natural Area" described by the 1986 *General Management Plan*.	Alternatives 2, 3, 4, and 5 would designate new management areas throughout the entire backcountry to accommodate different intensities of use as allowed by indicators and standards. Indicator categories include trail and campsite disturbance, evidence of modern human use, landscape modifications, litter and human waste, natural sound disturbance, encounters with other people, encounters with large groups, camping density, accessibility, and management presence. The NPS preferred alternative also includes an indicator for wildlife population, demographics, and distribution. See Maps 2-1, 2-2, 2-3, and 2-5 in the Revised Draft EIS and Map 2 in this Final EIS.			
		Proportion of Park & Preserve in Each Management Area	Proportion of Park & Preserve in Each Management Area	Proportion of Park & Preserve in Each Management Area	Proportion of Park & Preserve in Each Management Area
		Mgmt Area / Acres / % back-country	Mgmt Area / Acres / % back-Country	Mgmt Area / Acres / % back-country	Mgmt Area / Acres / % back-country
		A: 0 / 0%	A: 257,183 / 4%	A: 358,256 / 6%	A: 1,066,390 / 18%
		B: 222,782 / 4%	B: 519,164 / 9%	B: 962,244 / 16%	B: 3,943,671 / 66%
		C: 477,696 / 8%	C: 370,147 / 6%	C: 312,469 / 5%	C: 0 / 0%
		D: 447,539 / 8%	D: 1,809,987 / 13%	D: 2,242,454 / 38%	D: 1,018,140 / 16%
		E: 2,735,412 / 46%	E: 925,425 / 33%	E: 0 / 0%	E: 0 / 0%
		OP1: 1,408,886 / 24%	OP1: 1,408,886 / 24%	OP1: 1,408,886 / 24%	OP1: 0 / 0%
		OP2: 737,409 / 11%	OP2: 737,409 / 11%	OP2: 737,409 / 11%	OP2: 0 / 0%
		TOTAL: 6,028,202 / 100%	**TOTAL: 6,028,202 / 100%**	**TOTAL: 6,028,202 / 100%**	**TOTAL: 6,028,202 / 100%**
		Special use area: 0 / <1%	Special use area: 30,928 / <1%	Special use area: 150,269 / 2.5%	Special use area: 161,695 / 3%
Corridors	No areas of the park and preserve would receive the Corridor designation.	Year-round Corridor areas would be designated on the Kantishna and Muddy Rivers and the lower Tokositna River (61.5 miles).	Year-round Corridor areas would be designated on the Kantishna and Muddy Rivers, the Tokositna River, and both the east and west forks of the Yentna River (114 miles). Summer season Corridor management areas would be designated on Skyline, Moose Creek, and Eldorado mining access routes within Management Area A in Kantishna (14 miles). Winter season corridors to the Old Park boundary would be established in the Broad Pass/Dunkle Hills area and to the toes of the Ruth, Tokositna, and Kanikula glaciers from the Tokositna River (21 miles).	Summer season Corridors would be designated as follows: • Kantishna and Muddy Rivers (56 mi.) • lower Tokositna River (4 mi.) • Skyline and Moose Creek former mining access routes in Kantishna (10 mi.). If demand is sufficient, the following winter season Corridor management areas could also be designated: • 3 Corridors from the southern park boundary to the Old Park boundary near West Fork Chulitna River, Bull River, and Cantwell Creek (12.5 mi.). • lower Tokositna River (4 mi.) • upper Tokositna River to the mouth of Wildhorse Creek (3 mi.). See Map 3.	Year-round Corridor areas would be designated on the Kantishna and Muddy Rivers, the Tokositna River, and both the east and west forks of the Yentna River (114 miles). Summer season Corridor management areas would be designated on Skyline, Moose Creek, and Eldorado mining access routes within Management Area A in Kantishna (14 miles). Winter season corridors to the Old Park boundary would be established in the Broad Pass/Dunkle Hills area and to the toes of the Ruth, Tokositna, and Kanikula glaciers from the Tokositna River (21 miles).If demand is sufficient, the NPS would also establish a Corridor to Kantishna from the Sushana River (56 miles).

Special Use Areas	No new areas of the park and preserve would receive Special Use Area designation.	The West Buttress Special Use Area would be designated to include the entire West Buttress route on Mount McKinley from the Old Park boundary to the summit.	The West Buttress Special Use Area would be designated to include the entire West Buttress route on Mount McKinley from the Old Park boundary to the summit. The Ruth Glacier Special Use Area would be designated to include portions of the Ruth Amphitheater, Ruth Gorge, and West Fork Ruth Glacier.		
Portals	No areas of the park and preserve would receive the Portal designation.	Portals would be designated on the Pika Glacier, Coffee Glacier, Buckskin Glacier, Eldridge Glacier, and upper Tokositna Glacier. Major Landing Areas would be designated at Kahiltna Base Camp, southwest fork Kahiltna Glacier, and Ruth Amphitheater.		Portals would be designated on the Pika Glacier, Coffee Glacier, Buckskin Glacier, Eldridge Glacier, and upper Tokositna Glacier. Major Landing Areas would be designated at Kahiltna Base Camp and Ruth Amphitheater. See Map 4.	Portals would be designated on the Pika Glacier, Coffee Glacier, Buckskin Glacier, Eldridge Glacier, and upper Tokositna Glacier. Major Landing Areas would be designated at Kahiltna Base Camp, southwest fork Kahiltna Glacier, and Ruth Amphitheater.

ACCESS					
Topic	**Alternative 1 (no-action)**	**Alternative 2**	**Alternative 3**	**Alternative 4 - Modified (NPS preferred)**	**Alternative 5**
General Concept	The National Park Service would continue to manage access in the national park and preserve using only existing guidance from management policies and general management plans. There would be no change in the management of motorized access into Denali by airplane, snowmachine, or motorboat. Airplanes could continue to land in the Old Park and the additions. Snowmachines could be used for traditional activities throughout the park additions and preserve, and no guidance would be provided on the definition of the term "traditional activities" for future regulation.	The National Park Service would define access management tools to be employed as necessary to achieve management area standards, reduce visitor conflict, or protect visitor safety. The NPS would use the least restrictive tool necessary to accomplish the goal. The tools are: 1) Education, 2) Increased enforcement of existing regulations, 3) Voluntary restrictions, 4) Required registration, 5) Technology requirements or other requirements governing the means of access, 6) Management of commercial activity, 7) Regulate numbers of visitors, 8) Temporal restrictions, 9) Temporary and permanent closures, 10) Management authorities of other agencies.			
		Recreational access to the park and preserve would be by foot from the park road, designated Portals within park boundaries, and airplane landing areas or roads outside of park boundaries. The National Park Service would promulgate a special regulation that 1) defines "traditional activities" for all areas of the park and preserve and for all modes of access as "traditional activities" were defined in 2000 for snowmachine access in the Old Park; 2) modifies current regulations that permit airplane and motorboat use and other forms of nonmotorized transportation for any purpose to follow the language of Section 1110(a) which specifically restricts these modes of access, as well as snowmachines, to only traditional activities; 3) allows airplane landings at designated Portals and the McKinley Park and Kantishna airstrips.	Access to the Old Park would be by foot from the park road and roads and airplane landing areas outside the Old Park boundary. Recreational access to the park additions and preserve would be by foot, by airplane to glaciers and existing landing areas, by motorboat, and by snowmachine along designated access corridors. The National Park Service would seek legislation to exempt the "Old Park" from ANILCA 1110(a), returning motorized access to the level legally allowed before 1980. Existing regulations would be modified to remove the general allowance for airplane landings and motorboat use for any purpose at Denali. The National Park Service would close the park additions and preserve to recreational snowmachine access through a rule-making that defines "traditional activities" for snowmachine access in these areas similar to the way that it is defined for the Old Park. It would allow for recreational snowmachine access along the winter season Corridor management areas.	Recreational access to the Old Park would continue to be managed to emphasize non-motorized access, but this area would be accessible by airplane and motorboat. The National Park Service would actively identify locations in the Old Park that have ecological, wildlife, or other resource values that are at substantial risk of harm from airplane landings or motorboat use, and locations where these modes of access would cause unacceptable impacts to visitor safety. The NPS would close or otherwise manage motorized access to these areas as appropriate to alleviate the resource and safety concerns. In the park additions and preserve, airplane and motorboat access, and snowmachine access for traditional activities, would continue.	Recreational access to the Old Park would continue to be managed to emphasize non-motorized access, but this area would be accessible by airplane and motorboat. In the park additions and preserve, airplane and motorboat access, and snowmachine access for traditional activities, would continue.
Aircraft	The National Park Service would not form an advisory group to address resource concerns arising from aircraft overflights.	The National Park Service would establish an Aircraft Overflights Working Group to develop voluntary measures for assuring visitor safety and achieving management area standards.			

Cross-Country Travel	The National Park Service would not form an internal working group for addressing resource impacts of hiking in the backcountry.	The National Park Service would establish a working group to address vegetation damage and social trail formation resulting from backcountry hiking. NPS would institute a decision guide for addressing specific types of trail formation impacts and the working group would develop Leave-No-Trace guidelines specific to Denali.			
Access-Wilderness Proposal	If Congress considers additional wilderness designations for Denali, the National Park Service would not seek special accommodation for the continuation of snowmachine access for non-traditional activities.	If Congress considers additional wilderness designations for Denali, the National Park Service would not seek special accommodation for the continuation of snowmachine access for non-traditional activities.	If Congress considers additional wilderness designations for Denali, the National Park Service would propose that accommodation be made as necessary for recreational snowmachine access along the winter season Corridor management areas.		
Registration	There would be no new registration requirements, nor would the NPS provide for advanced registration in the Kantishna Hills.	Registration would be required for o day-hiking in the Old Park outside of Backcountry Hiker areas during summer months o day use in the southern park additions east of and including the Kahiltna Glacier during winter months o all overnight camping in the park and preserve.	Registration would be required for o day-hiking outside of Backcountry Hiker areas in the Old Park during summer months o day use in the southern park additions east of and including the Kahiltna Glacier during winter months o all overnight camping in the park and preserve. To test the feasibility of advance backcountry registration, an experimental system for advance registration would be employed for dispersed camping and camping at designated campsites within the Corridor Management Areas and Management Area A within the Kantishna Hills.	The National Park Service would impose new registration requirements only in areas where use levels are sufficient that user conflicts and/or resource damage are occurring or would occur, and when other methods for obtaining accurate information on visitor use and conveying essential visitor safety and resource protection information are unlikely to be successful. The National Park Service would begin a system of voluntary registration for airplanes landing in the Old Park. To test the feasibility of advance backcountry registration, an experimental system for advance registration would be employed for dispersed camping and camping at designated campsites in the Kantishna Hills.	To test the feasibility of advance backcountry registration, an experimental system for advance registration would be employed for dispersed camping and camping at designated campsites within the Corridor Management Areas and Management Area A within the Kantishna Hills.
Climbing & Mountaineering	An unlimited number of climbers could continue to register to climb Mount McKinley in a season.	The number of available permits for climbers attempting Mount McKinley would be restricted to existing levels (1,300) for all routes during the main mountaineering season (April 1-August 1).	The number of available permits for climbers attempting to climb Mount McKinley would be restricted to 1,500 during the main mountaineering season (April 1- August 1). The limit of 1,500 would be reevaluated in 10 years after approval of the plan.		There would be no annual limits established for the number of climbers attempting to climb Mount McKinley while the National Park Service gathers additional information.

WILDERNESS MANAGEMENT					
Topic	**Alternative 1 (no-action)**	**Alternative 2**	**Alternative 3**	**Alternative 4 - Modified (NPS preferred)**	**Alternative 5**
General Guidance	The National Park Service would continue to manage wilderness using only existing service-wide policy and park plans.	The National Park Service would manage all backcountry areas of the national park to protect wilderness resource values and provide opportunities for wilderness recreational activities, consistent with the direction of law and policy, and would clarify the meaning of Wilderness Act terms for Denali.			
Group Size	Decisions about group size would continue to be made on a case-by-case basis for guided and educational groups. There would be no group size limit for private parties.	A group size limit of 12 (including guides) would be established for all users and all backcountry areas.		A group size limit of 12 (including guides) would be established for all users and all backcountry areas. In Management Areas OP2 and D the maximum group size would be 6. The park superintendent could make an exception to the group size limit if there would be a benefit to visitor safety or park resources.	A group size limit of 12 (including guides) would be established for all users and all backcountry areas.
Human Waste	There would be no new requirement for carrying out human waste from the West Buttress route or around glacier landing areas.	Removal of human waste would be required in the following areas: • the West Buttress route on Mount McKinley above the 14,000 foot camp • campsites within ½ mile of air taxi landing locations on glaciers unless pit latrines or other waste disposal facilities are provided.			
Climbing Tools	There would be no new prohibition on power drills as a climbing tool, nor a policy on fixed and removable anchors other than those provided for by national policy and regulation.	Power drills would be prohibited throughout the park additions and preserve. A policy on fixed and removable anchors would be implemented.			

COMMERCIAL SERVICES					
Topic	**Alternative 1 (no-action)**	**Alternative 2**	**Alternative 3**	**Alternative 4 - Modified (NPS preferred)**	**Alternative 5**
General Guidance	Existing regulation and policy described in chapter 1 would guide commercial services decisions in the backcountry. The National Park Service would not clarify the interpretation of criteria for providing commercial services at Denali. There would be no guidance on the allocation of capacity in the backcountry between independent travelers, educational programs, and guided activities.	The National Park Service would clarify the definitions of commercial services criteria and apply to both concession contracts and commercial use authorizations. In the park additions and preserve, if a guided activity or educational program takes place in an area where the numbers of visitors are limited, the allowable number of parties or visitors participating in the guided or educational activity generally would be less than a majority of the total potential use of the area in order to allow for non-guided uses. In the Old Park, the number of parties or visitors participating in the guided or educational activity would generally be less than 25% of the total potential use of the area in all alternatives where such use is allowed. The National Park Service would prioritize available capacity for guided activities and educational programs in the following priority order: 1. Ranger-led programs offered by the National Park Service 2. Educational programs of the Murie Science and Learning Center 3. Accredited educational programs and programs of non-profit educational organizations that operate in the park under a cooperative agreement 4. The programs of other entities, including other non-profit organizations, schools, and for-profit businesses.		The National Park Service would clarify the definitions of commercial services criteria and apply to both concession contracts and commercial use authorizations. In the park additions and preserve, if a guided commercial activity or non-commercial educational program takes place in an area where the numbers of visitors are limited, the allowable number of parties or visitors participating in the guided activity would be no more than 50% of the total potential use of the area in order to allow for non-guided uses. In the Old Park, the number of parties or visitors participating in the guided or educational activity would be no more than 25% of the total potential use of the area in all alternatives where such use is allowed. Programs provided directly by the NPS and Murie Science and Learning Center would have priority for available capacity.	Same as alternatives 2 and 3.
		Taken as a whole, commercial services would be limited to the same volume of use that occurred in 2004, as measured by the number of trips into the park backcountry. No guided or commercial use would be allowed in management zone OP2 in the Old Park or west of the Toklat River and north of the Alaska Range in the park additions and preserve, except for the present level of concession activity in the Kantishna Hills units designated as Management Area B. Only existing commercial services and those specified above would be permitted in the park and preserve backcountry.	Activities or services not described in this Commercial Services section could be considered only in the southern additions designated as Management Area A.		Activities or services not described in this Commercial Services section could be considered only in areas designated as Management Area A.

COMMERCIAL SERVICES continued					
Topic	**Alternative 1 (no-action)**	**Alternative 2**	**Alternative 3**	**Alternative 4 - Modified (NPS preferred)**	**Alternative 5**
Ongoing Activities			In the park additions and preserve, excluding the Kantishna Hills between the Toklat and McKinley Rivers, additional commercial authorizations could be awarded to operators for the following activities: • Air taxi operator, including big game transport, except on glaciers covered by existing concessions contracts • Guided mountaineering • Winter day- or multi-day trips by ski, snowshoe, or dog team.	The following guided activities could continue to be authorized: • Guided mountaineering on Mount McKinley and other peaks throughout the glaciated portions of the Alaska Range, including lowland approaches, in the Old Park, park additions, and preserve • Dog mushing expeditions in the Old Park, park additions, and preserve • Winter day- or multi-day trips by ski or snowshoe in the park additions and preserve. In addition, dog team freight hauling services in the Old Park, park additions, and preserve could continue to be authorized.	In the park additions and preserve additional commercial authorizations could be awarded to operators for the following activities: • Air taxi operator, including big game transport, except on glaciers covered by existing concessions contracts • Guided mountaineering • Winter day- or multi-day trips by ski, snowshoe, or dog team.
Commercial Airplane Landings	There would continue to be no limits on the number of commercial airplane landings nor additional limits on where landings can occur in the park additions and preserve.	Commercial air taxi landings would be allowed at all designated Portals for the purpose of dropping off or picking up backcountry visitors who remain in the park overnight. Scenic air tour landings would be allowed only at the Ruth Amphitheater and at Kahiltna Base Camp after July 1, but the number of landings would be limited to 2001 numbers: 1,900 in the Ruth Amphitheater and 200 at Kahiltna Base Camp. Landings would be restricted to the hours of 9am to 9pm.	Air taxi landings could occur throughout the park additions and preserve. Scenic air tour landings would be allowed only on glaciers within Management Area A. Landings would be restricted to the hours of 9am to 9pm.	Air taxi landings could occur throughout the park additions and preserve. Scenic air tour landings would be allowed on glaciers in all areas designated as Management Area A. Scenic air tour landings could also occur at designated landing areas on the Eldridge and Pika Glaciers, however these areas would remain secondary and less-used in accordance with their management area designation. In all locations, landings for scenic air tours would be restricted to the hours between 9am and 9pm. Scenic air tour landings could occur at Kahiltna Base Camp throughout the year.	Air taxi landings could occur throughout the park additions and preserve. Scenic air tour landings would be allowed on glaciers in all areas designated as Management Area A. There would be no prohibition on landing at Kahiltna Base Camp prior to July 1.

Guided Hiking	Guided hiking in the Old Park would stay at the existing levels. There would be no guided backpacking in the Kantishna Hills area. No guided hiking would be allowed on entrance area trails.	In the Old Park, there would be no guided day-hiking or overnight backpacking. Existing concession-operated guided hiking opportunities would be phased out at the time of contract reauthorizations. There would be no concession-operated guided day-hiking or overnight backpacking in the park additions and preserve north of the Alaska Range and west of the Toklat River. An exception is the Kantishna Hills units designated as Management Area B, where the same level of guided day-hiking activity with would be allowed as at present. Guided day-hiking and overnight backpacking could be authorized in areas of the park additions and preserve south of the Alaska Range.	Guided day-hiking could be offered throughout the park additions and preserve. Guided day-hiking could be offered in the Old Park with no more than the current number of guided groups each season and using a similar proportion of off-trail to on-trail (McKinley Bar Trail, Thorofare Ridge) hikes. Only educational programs could use the entrance area trails. Overnight backpacking could be offered in the park additions and preserve. In the portion of the Kantishna Hills designated as Management Area A, camping by guided groups would be restricted to the designated campsites and all day and overnight guided hiking would be restricted to the developed trails identified under "Backcountry Facilities," below.	Guided day-hiking in the Wonder Lake area and along the McKinley Bar trail would continue as described in the 1997 *Entrance Area and Road Corridor DCP*. Additional guided day-hiking could be continued in the western portion of the Old Park between Toklat River and Wonder Lake with access from Kantishna, limited to the same number of groups as at present. Guided day-hiking in the Old Park east of Toklat River would be available only on the following entrance area trails: the Rock Creek Trail and Roadside Trail between the Denali Visitor Center and Park Headquarters, the Bike Trail and Jonesville Trails between the Nenana River Bridge and the Denali Visitor Center, the Nenana River and Triple Lakes trails when planned construction or rehabilitation is complete, and the Savage Alpine Trail between Savage Campground and Savage River, only for those commercial groups staying at Savage Campground. Guided day-hiking and overnight backpacking could be considered throughout the park additions and preserve.	Guided day-hiking and overnight backpacking could be offered throughout the Old Park, park additions, and preserve including day-hiking on entrance area trails. In the portion of the Kantishna Hills designated as Management Area A, camping by guided groups would be restricted to the designated campsites and hiking would be restricted to the developed trails identified under "Backcountry Facilities," below.
Guided Sport Hunting	The two guided sport hunting areas would continue as at present.		When current concession contracts expire, the entire southwest Preserve would be divided into two sport-hunting guide areas with the dividing line between areas along the West Fork of the Yentna and through Shellabarger Pass.	Effective immediately, the entire southwest Preserve would be divided into two sport-hunting guide areas with the dividing line between areas along the West Fork of the Yentna and through Shellabarger Pass. See Map 5.	When current concession contracts expire, the NPS would allow for two additional guide areas. A total of three guide areas would be evenly proportioned across the entire southwest preserve. One guide area would be added in the southern portion of the northwest preserve.

BACKCOUNTRY FACILITIES					
Topic	**Alternative 1 (no-action)**	**Alternative 2**	**Alternative 3**	**Alternative 4 - Modified (NPS preferred)**	**Alternative 5**
Trails	No new trails would be constructed. The NPS would continue its policy of generally not constructing trails in the Old Park and the northern additions.	No new trails would be constructed. A "no formal trails" policy would be maintained for the entire backcountry.	The National Park Service would designate Backcountry Hiker areas and (if needed) improve some social trails presently used by guided hiking concessions within Management Area A in Kantishna. Elsewhere in the park and preserve, the National Park Service would maintain a "no formal trails" policy.	The National Park Service would designate Backcountry Hiker areas and (if needed) construct or improve the following trails: • Some existing social trails within units 41, 42, and 43 in Kantishna, formalizing a trail system in this area • From Eielson Visitor Center to Gorge Creek • A loop from the water tower above Wonder Lake Campground up to the bench west of Wonder Lake and return • From the Mount Healy overlook down a spur ridge to create a loop to the Taiga Trail • From the west end of Thorofare Bluffs down to the Thorofare River bar No other new summer or winter trails would be added besides those identified in the *1997 Entrance Area and Road Corridor DCP* and the *1997 South Side Denali DCP*. Elsewhere in the park and preserve, the National Park Service would maintain a "no formal trails" policy.	The National Park Service would designate Backcountry Hiker areas and (if necessary) construct or improve the following trails: • some existing social trails within Management Area A in Kantishna; • from Eielson Visitor Center to Gorge Creek; • from the water tower above Wonder Lake Campground to the bench west of Wonder Lake • from the west end of Thorofare Bluffs down to the Thorofare River bar • from the Mount Healy overlook down a spur ridge to create a loop to the Taiga Trail; • along Wildhorse Creek connecting to trails associated with the South Denali visitor facilities development. The spring multi-use trail would be upgraded to make it usable in early winter low snow conditions and it would be extended from Mile 7 to Savage Campground. Additional trails could be constructed within Management Area A in the lowland areas surrounding the lower Kahiltna, Tokositna, and Ruth glaciers. In other areas designated Management Area A trails could be established only if necessary to prevent resource damage. Elsewhere in the park and preserve, the NPS would maintain a "no formal trails" policy.

Park Road	During winter months, snow on one lane of the park road would continue to be packed from the Headquarters gate to Mile 7 to allow maintenance activities that prevent the buildup of ice on the road in this section while still allowing it to be used for winter recreational activities such as skiing and dog mushing. Snow would not be removed from the road until necessary to prepare the road for summer season use.	The park road would remain unplowed west of park Headquarters until necessary for summer season use.	During winter months, snow on one lane of the park road would continue to be packed from the Headquarters gate to Mile 7 to allow maintenance activities that prevent the buildup of ice on the road in this section while still allowing it to be used for winter recreational activities such as skiing and dog mushing. Snow would not be removed from the road until necessary to prepare the road for summer season use.	During winter months, snow on one lane of the park road would continue to be packed from the Headquarters gate to Mile 7 to allow maintenance activities that prevent the buildup of ice on the road in this section. Snow would not be removed from the road until necessary to prepare the road for summer season use. This section of the park road would be designated as a Backcountry Hiker area during winter months.	The park road would be kept open to the Savage Campground area throughout the year, and that would become the base for winter activities in that part of the Old Park.
Campsites	There would be no designated campsites.	There would be no designated campsites.	Up to five designated campsites would be created in conjunction with the Corridor areas in the Kantishna Hills.	Up to five designated camping areas of 1-3 sites each would be created in conjunction with the Corridor and Backcountry Hiker areas in units 41, 42, and 43 in the Kantishna Hills.	Up to five designated campsites could be developed in conjunction with the Corridor areas in the Kantishna Hills, and up to three sites in conjunction with the Corridor area in the Wildhorse Creek drainage.
Shelters & Cabins	There would be no new backcountry shelters or cabins.	There would be no new backcountry shelters or cabins.	The National Park Service would add visitor facilities at park headquarters such as restrooms, plug-ins, and a warming hut to support winter use.		The National Park Service would add visitor facilities at park headquarters such as restrooms, plug-ins, and a warming hut to support winter use. A plowed parking area and warming hut would be provided at Savage Campground. Up to 5 public use cabins would be constructed near the southern park boundary in cooperation with Alaska State Parks.
Info Facilities	There would be no new information facilities.	There would be no new information facilities.	The National Park Service, in cooperation with other land management agencies, would operate a visitor contact station in the Cantwell/Broad Pass area.		

ADMINISTRATIVE AND SCIENTIFIC ACTIVITIES					
Topic	**Alternative 1 (no-action)**	**Alternative 2**	**Alternative 3**	**Alternative 4 - Modified (NPS preferred)**	**Alternative 5**
Information & Education	There would be no criteria established for offering educational programs in the backcountry.	In the Old Park, hikes and educational programs led by the National Park Service, Murie Science and Learning Center, and other educational partners would be phased out over two years except on entrance area trails, where existing levels of hikes and activities could continue. All of the park additions and preserve would be available for the educational programs of the National Park Service, Murie Science and Learning Center, accredited educational institutions, and non-profit organizations operating under a cooperative agreement with the NPS.	Day-use educational programs offered by the National Park Service, Murie Science and Learning Center, accredited educational institutions, and non-profit organizations operating under a cooperative agreement with the National Park Service could be offered throughout the Old Park, park additions, and preserve. Educational programs that include an overnight stay in the backcountry could be offered in the park additions and preserve. In the portion of the Kantishna Hills designated as Management Area A, camping by educational programs would be restricted to the designated campsites.	Day use and overnight educational programs offered by the National Park Service, the Murie Science and Learning Center, and accredited educational institutions and non-profit organizations operating under a cooperative agreement with the National Park Service could be offered throughout the Old Park (including entrance area trails), park additions, and preserve. All educational programs taking place in the park and preserve backcountry would be required to meet the criteria identified under Commercial Services.	Day-use and overnight educational programs by the National Park Service, Murie Science and Learning Center, accredited educational institutions, and non-profit organizations operating under a cooperative agreement with the National Park Service could be offered throughout the Old Park, park additions, and preserve. In the portion of the Kantishna Hills designated as Management Area A, overnight camping by educational programs would be restricted to the designated campsites.
Aviation	The NPS would not complete a plan for minimizing and accounting for administrative and research use of aircraft.	The National Park Service would complete a plan for administrative and research use of aircraft in the Wilderness, park additions, and preserve that includes goals and specific objectives for minimizing helicopter and airplane use, specifies a methodology for accounting for NPS administrative and research air traffic, and provides for criteria for determining when the use of aircraft meets the "minimum requirement" test.			
Research & Resource Management	There would be no establishment of management-area-specific criteria for determining appropriate kinds of research activity.	The National Park Service would establish management-area-specific criteria for research and resource management projects taking place within the Denali backcountry.		All NPS and external research would require a research permit that would be granted only if the parameters of the project meet the management area standards in the location(s) where the project is proposed. Research and resource management activities of the Alaska Department of Fish and Game would require advance consultation under the Master Memorandum of Understanding between the Department of Fish and Game and the NPS.	The National Park Service would establish management-area-specific criteria for research and resource management projects taking place within the Denali backcountry.

EASEMENTS AND BOUNDARY CHANGES					
Topic	**Alternative 1 (no-action)**	**Alternative 2**	**Alternative 3**	**Alternative 4 - Modified (NPS preferred)**	**Alternative 5**
Easements	The National Park Service would not seek to establish public access the existing 17(b) easement between Cantwell and the park boundary at Windy Creek.	The National Park Service would initiate collaborative action with concerned and affected parties in the Cantwell area to acquire an easement over private lands to gain public access to the existing 17(b) easement (EIN 7a C5, DI, L) that provides a route across Ahtna, Inc. land from Cantwell to the park boundary near Windy Creek. See Map 6.			
Land Exchanges	The National Park Service would not seek to adjust park boundaries.	The National Park Service would seek a land exchange similar to a previously proposed exchange of land with the State of Alaska that would realign the park boundary with the Tokositna, Coffee, and Ruth Rivers (see Map 7). As a result of the exchange approximately 2,432 acres of Denali State Park land would be transferred to Denali National Park and Preserve and approximately 3,229 acres of national park and preserve land would be transferred to Denali State Park. Land to be transferred to the state surrounds approximately 137 acres of privately owned inholdings. An additional adjustment would be proposed for the area immediately north of Dutch Creek to provide a boundary that is more identifiable in the field and out of the potential placer mining in that floodplain. Completion of the exchanges and determination of actual boundaries and acreage would depend on the outcome of negotiations with the State of Alaska.			

Table 2-15: Summary Table of Environmental Consequences

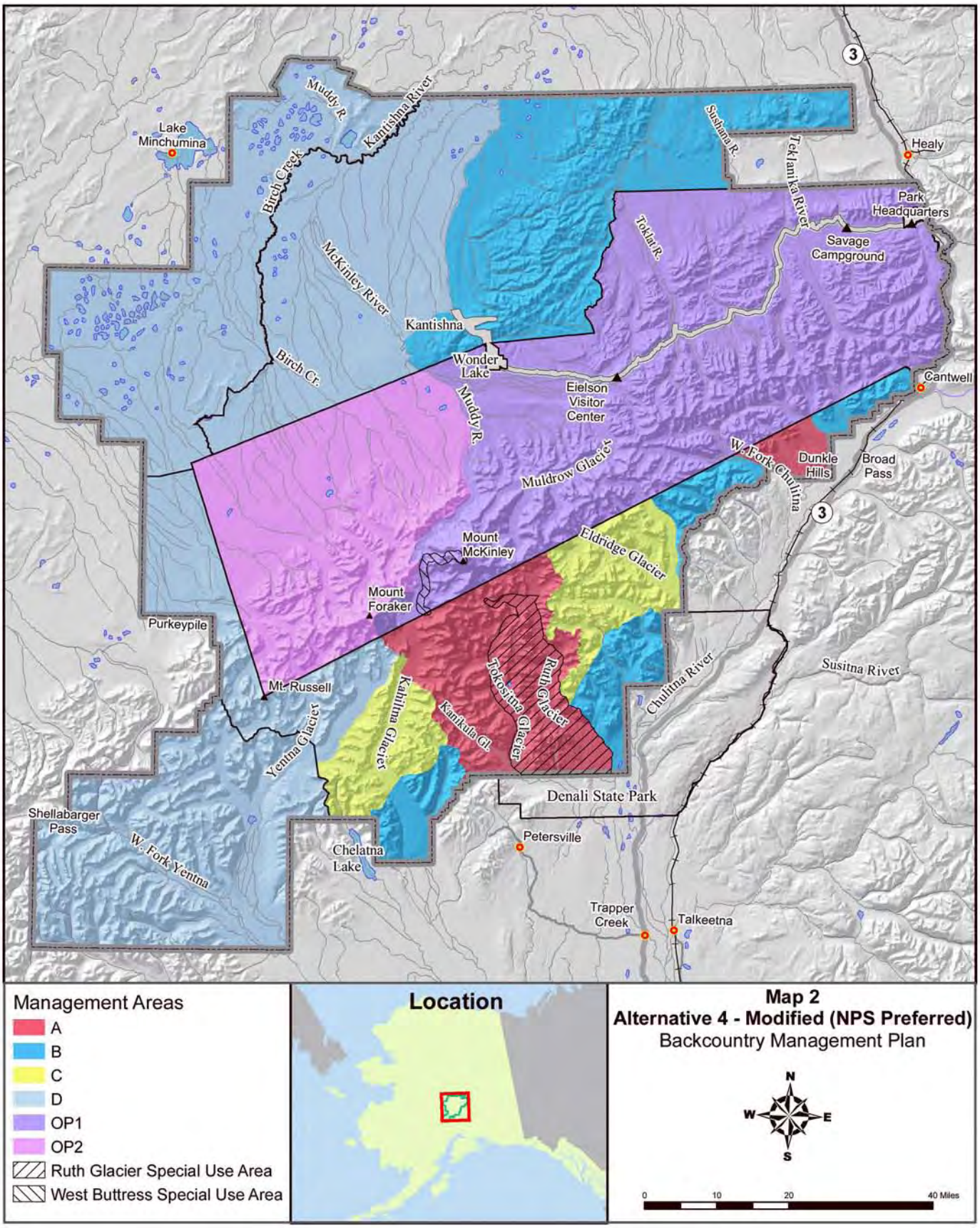
Topic	Alternative 1 No Action	Alternative 2	Alternative 3	Alternative 4 - Modified (NPS preferred)	Alternative 5
Ice-Rich Permafrost Soils	Impacts to ice-rich permafrost soils under would be moderate because this alternative allows for substantial increases in use of snowmachines and dog sleds. Repeated passes of snowmachines and dog sleds over ice-rich permafrost soils would damage these soils. Impacts would be of medium intensity, long-term duration, and would affect an important park resource. The cumulative impact of this alternative plus the aforementioned past, present, and reasonably foreseeable actions would be major.	Impacts to ice-rich permafrost soils would be negligible because use of snowmachines would be reduced and use of dog sleds would be managed to minimize negative impacts. There would be few repeated passes of snowmachines and dog sleds over ice-rich permafrost soils. Under this alternative, recreational and administrative activities would be reduced from current levels, and recreational users may be subject to additional conditions on use. The cumulative impact of this alternative plus the aforementioned past, present, and reasonably foreseeable actions would be moderate.	There would be negligible adverse impacts to ice-rich permafrost soils. Use of snowmachines and dog sleds would increase slightly above current levels, and repeated passes of snowmachines and dog sleds over ice-rich permafrost soils would damage these soils. However, use would be mitigated or restricted if standards outlined for Management Areas D, E, OP1, and OP2 are approached or exceeded. The cumulative adverse impact of this alternative plus the aforementioned past, present, and reasonably foreseeable actions would be moderate.	Impacts to ice-rich permafrost soils would be minor. Use of snowmachines and dog sleds would increase above current levels, and repeated passes of snowmachines and dog sleds over ice-rich permafrost soils would damage these soils. However, use would be mitigated or restricted if standards are approached or exceeded. There would be moderate adverse cumulative impacts of this alternative plus the aforementioned past, present, and reasonably foreseeable actions.	Moderate adverse impacts to ice-rich permafrost soils would occur. Use of snowmachines and dog sleds would increase above current levels, and repeated passes of snowmachines and dog sleds over ice-rich permafrost soils would damage these soils. A high-use corridor would be established in an area with abundant ice-rich permafrost soils. In other locations in the northern additions, use would be mitigated or restricted if standards outlined for Management Area B or D are approached or exceeded. The cumulative adverse impact of this alternative plus the aforementioned past, present, and reasonably foreseeable actions would be major.
Vegetation	Major adverse impacts to vegetation would result from substantial increases in types and levels of use; without management area indicators, standards, and monitoring, the park would have no formal process to determine when impact levels become severe enough to warrant management action. More people recreating in the backcountry would create more impacts to vegetation because there would be more potential for physical trauma to sensitive plants and more potential for the introduction of exotic and invasive species. The cumulative adverse impact of this alternative plus past, present, and reasonably foreseeable actions would be major.	Impacts to vegetation would be negligible because very little vegetation would be lost, trampling would occur only in small areas, and the introduction of exotic species would be unlikely. Recreational and administrative activities would be reduced from current levels, and recreational users could be subject to additional conditions on use. Reducing use would reduce physical trauma to vegetation and would reduce the risk of exotic species spreading into and throughout the park. There would still be a moderate adverse cumulative impact to vegetation resources.	Impacts to vegetation would be minor because very little vegetation would be lost, trampling would occur only in small areas, and the potential for introduction of exotic species would exist but would not be high. Reductions in snowmachine use and management of guided hiking would have a beneficial effect on vegetation compared to the current condition. However, establishing higher use corridors and zoning the park to accommodate higher use levels in some areas would increase the potential for trampling of vegetation and introduction of exotic species. The cumulative impact of this alternative plus the aforementioned past, present, and reasonably foreseeable actions would be moderate.	Impacts to vegetation would be moderate because some vegetation would be lost, trampling would occur in various areas throughout roughly 6% of the park, and the potential for introduction of exotic species from airplane access and new trail construction is considerable. Increases in use would be expected to increase parkwide; however, use would be curtailed or mitigated if impacts to vegetation approach or exceed standards outlined in chapter 2. The cumulative adverse impact of this alternative plus the aforementioned past, present, and reasonably foreseeable actions would be major.	Impacts to vegetation would be major because some vegetation would be lost, trampling would occur in various areas throughout roughly 18% percent of the park, and most importantly, the potential for introduction of exotic species from new trail construction and increased use levels is very high. Increases in both winter and summer recreational activities across the entire park and preserve would cause adverse impacts to vegetation. New trail construction would lead to loss of vegetation. The cumulative impact of this alternative plus the aforementioned past, present, and reasonably foreseeable actions would be major.

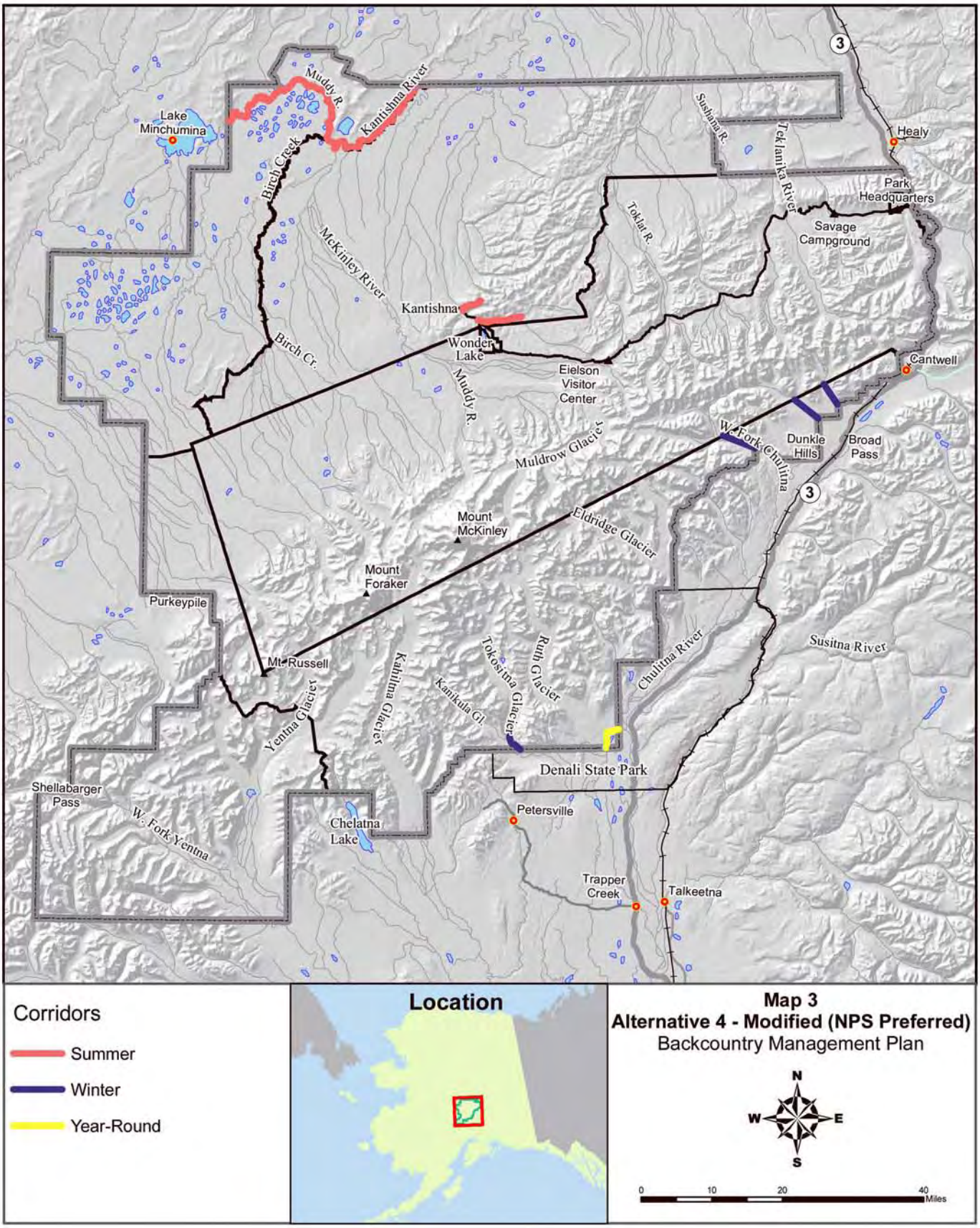
Topic	Alternative 1 No Action	Alternative 2	Alternative 3	Alternative 4 - Modified (NPS preferred)	Alternative 5
Wildlife	Wildlife would be adversely affected in some areas of the park during summer from noise generated by aircraft operations and by human activities in the park such as hiking and camping. During winter, wildlife would be affected primarily by snowmachine use and to a much lesser extent by non-motorized activities. These impacts would not be uniformly distributed across the park but would affect wildlife in areas such as under flight corridors between Healy, Talkeetna, and Mount McKinley, at landing sites, and at access points and routes and areas heavily used by snowmachines on the south side. The overall level of adverse impact would therefore be moderate.	The impacts to wildlife populations and habitats would generally be negligible because of limits on numbers and types of backcountry uses. Minor adverse impacts are possible from some activities, but even then would be limited to short-term effects that would be very localized in scope.	There would be minor adverse impacts to wildlife populations and habitats because limits on numbers and types of backcountry uses would result in only low-intensity, non-permanent disturbances to wildlife.	There would be minor to moderate adverse impacts to wildlife populations and habitats because of the affects of increased snowmachine and motorboat use on various wildlife species.	There would generally be moderate adverse impacts to the populations and habitats of various wildlife species because of increased snowmachine and motorboat use. Although most impacts would be limited to short-term effects, there would be some persistent population-level effects in higher use areas such as Broad Pass, Dunkle Hills, Kantishna Hills, and lower elevations on the south side of the Alaska Range.
Natural Soundscapes	This alternative would result in major adverse impacts to the natural soundscape of Denali because of increases in high intensity, long-term motorized noise – primarily from airplanes and snowmachines – across large portions of the park and preserve. Assuming present trends continue the cumulative impact of this action combined with the impacts of previous actions could result in impairment of this important park resource that fulfills specific purposes specified by legislation.	This alternative would provide a major benefit to the natural sound resource at Denali by mitigating the adverse impacts caused by past actions, particularly by reducing existing snowmachine noise, the noise from scenic air tour landings other than at the Ruth Amphitheater and Kahiltna Base Camp, and the noise of scenic air tours over the Old Park and southern glaciers. However, there would still be minor cumulative adverse impacts to the natural soundscape of the park and preserve primarily because of low-intensity, long-term noise from air traffic over much of the eastern and southern park with higher concentrations around Kahiltna Base Camp and the Ruth Amphitheater.	This alternative would provide a moderate benefit to the natural sound resource at Denali by mitigating the adverse impacts caused by past actions, resulting in low to medium intensity, long-term reductions in noise levels over the Old Park and parts of the southern park additions. However, there would be additional temporary noise associated with construction and maintenance of trails in Kantishna along with increased backcountry monitoring. There would still be moderate adverse cumulative impacts to the natural soundscape of the park and preserve because of high intensity noise on Corridors, at Portals, and over the Ruth Glacier and medium intensity noise across much of the rest of the southern additions.	Alternative 4 would have negligible overall impacts on the natural sound environment of the Denali backcountry. Although the amount of motorized noise would substantially decline in the Old Park, this alternative would allow medium to high intensity, long-term increases in motorized noise in other locations. Some temporary noise would be added because of trail and campsite construction. There would still be major cumulative adverse impacts because of the high intensity airplane noise in the Ruth Amphitheater, over the southern glaciers, lowland areas between the Kahiltna and Ruth Glaciers, and in the Dunkle Hills area.	There would be moderate adverse impacts to the natural soundscape of the park and preserve under this alternative because of medium intensity, long-term increases in motorized noise over broad portions of the park and preserve, particularly the southern additions east of and including the Kahiltna Glacier during summer months and the Dunkle Hills/Broad Pass and Tokositna areas during late winter. There would continue to be major adverse cumulative impacts because of high intensity airplane and snowmachine access in the southern park additions and airplane overflights above the Old Park. The actions do not mitigate the increased motorized noise from previous actions, but do prevent impairment of the natural sound resource.

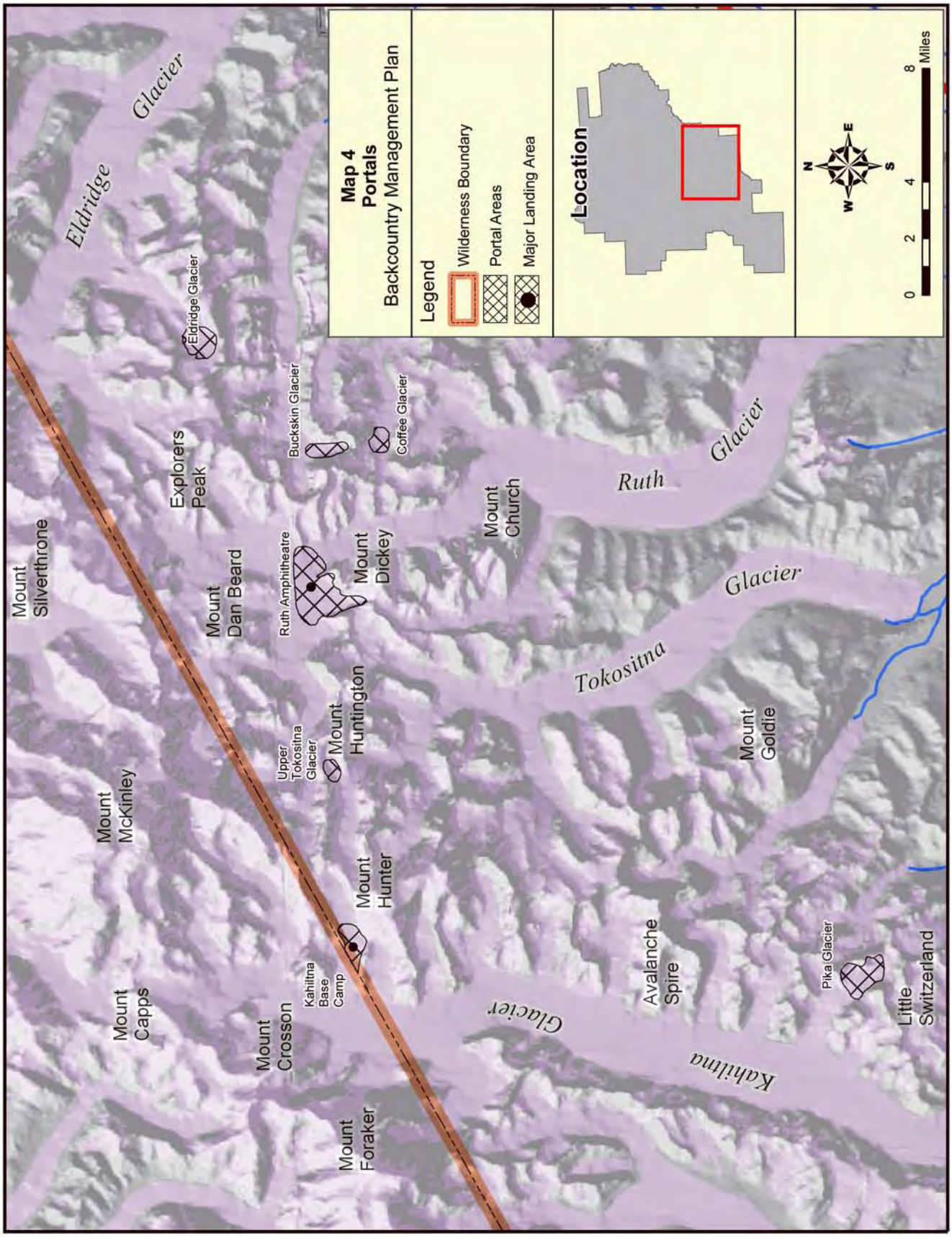
Topic	Alternative 1 No Action	Alternative 2	Alternative 3	Alternative 4 - Modified (NPS preferred)	Alternative 5
Wilderness	Major adverse impacts to wilderness resources of the Denali backcountry would occur because of long-term, high-intensity increases in motorized access in accessible regions. These would compromise wilderness qualities including absence of motorized noise, privacy and isolation, and absence of evidence of modern human use. For some areas, such as portions of the southern glaciers between the Kahiltna and Eldridge Glaciers, the level of motorized noise and evidence of modern human use could reach a level during the summer visitor season that the area would no longer be suitable for wilderness designation. This condition would constitute impairment of a park resource that fulfills a specific purpose identified in legislation.	There would be a moderate benefit to the wilderness resource of the Denali backcountry primarily because of long-term, substantial reductions in motorized access that translates into increased opportunity for solitude. The proposed standards for encounters with other parties, encounters with large groups, ability to camp out of sight and sound, and evidence of modern human use would protect wilderness resource values as visitation grows. A cumulative minor adverse impact to the wilderness resource of the Denali backcountry would occur, primarily because of ongoing absence of opportunities for solitude on the West Buttress route of Mount McKinley, and localized high levels of noise and motorized equipment at Kahiltna Base Camp, the Ruth Amphitheater landing area, and to a lesser degree at other Portals.	There would be a moderate benefit to the wilderness resource of the Denali backcountry, primarily because of long-term, substantial reductions in motorized access that translate into increased opportunity for solitude. The proposed standards for encounters with other parties, encounters with large groups, ability to camp out of sight and sound of others, and evidence of modern human use would protect wilderness resource values as visitation grows. There is a long-term but low-intensity loss of unconfined recreation opportunities because of new registration requirements and climbing limits on Mount McKinley. There would still be a moderate adverse cumulative impact primarily because of ongoing high levels of motorized noise and equipment associated with aircraft use during summer months and with some corridors in the southern additions during winter months.	There would be negligible new impacts to the wilderness resources of the Denali backcountry. Positive changes would occur in some locations, such as in the designated wilderness of the Old Park, but other areas that have wilderness qualities would likely lose some opportunities for solitude. The proposed standards for encounters with other parties, encounters with large groups, ability to camp out of sight and sound of others, and evidence of modern human use would protect wilderness resource values in much of the park as visitation grows. There would be minor adverse impacts from the construction of new trails and campsites and very limited restrictions on freedom of movement. However, there would still be major adverse cumulative impacts because of the ongoing absence of solitude on the West Buttress route of Mount McKinley during the primary climbing season and high levels of encounters, noise, and motorized transport in some areas.	There would be moderate adverse impacts to wilderness resources at Denali. Opportunities for solitude would remain stable in the Old Park but would decline in other locations in the southern park additions and potentially the northern park additions with increases of motorized access, support facilities such as trails, and numbers of visitors. The proposed standards for encounters with other parties, encounters with large groups, ability to camp out of sight and sound of others, and evidence of modern human use would allow higher levels of impacts than presently occur throughout the park additions and preserve. There is, however, no loss of opportunities for unconfined recreation since there would be no new registration requirements or quotas. The existing major cumulative impacts would worsen under this alternative.
Cultural Resources	There is the potential for minor to major adverse impacts on cultural resources because of unmanaged increases in the number of visitors in areas where cultural resources exist.	Impacts to cultural resources under this alternative would be negligible because actions are not proposed that would facilitate or encourage more people to visit areas where cultural resources exist.	Proposed actions could result in minor to major adverse impacts on cultural resources because of the expected increase in use in some areas where cultural sites are found, although determining specific impacts would require site-specific information.	Proposed actions could result in minor to major adverse impacts on cultural resources because of the likelihood of increased visitation to cultural resource sites in the backcountry, although determining specific impacts would require site-specific information.	Proposed actions could result in minor to major adverse impacts on cultural resources because of the likelihood of increased visitation to cultural resource sites in the backcountry, although determining specific impacts would require site-specific information.

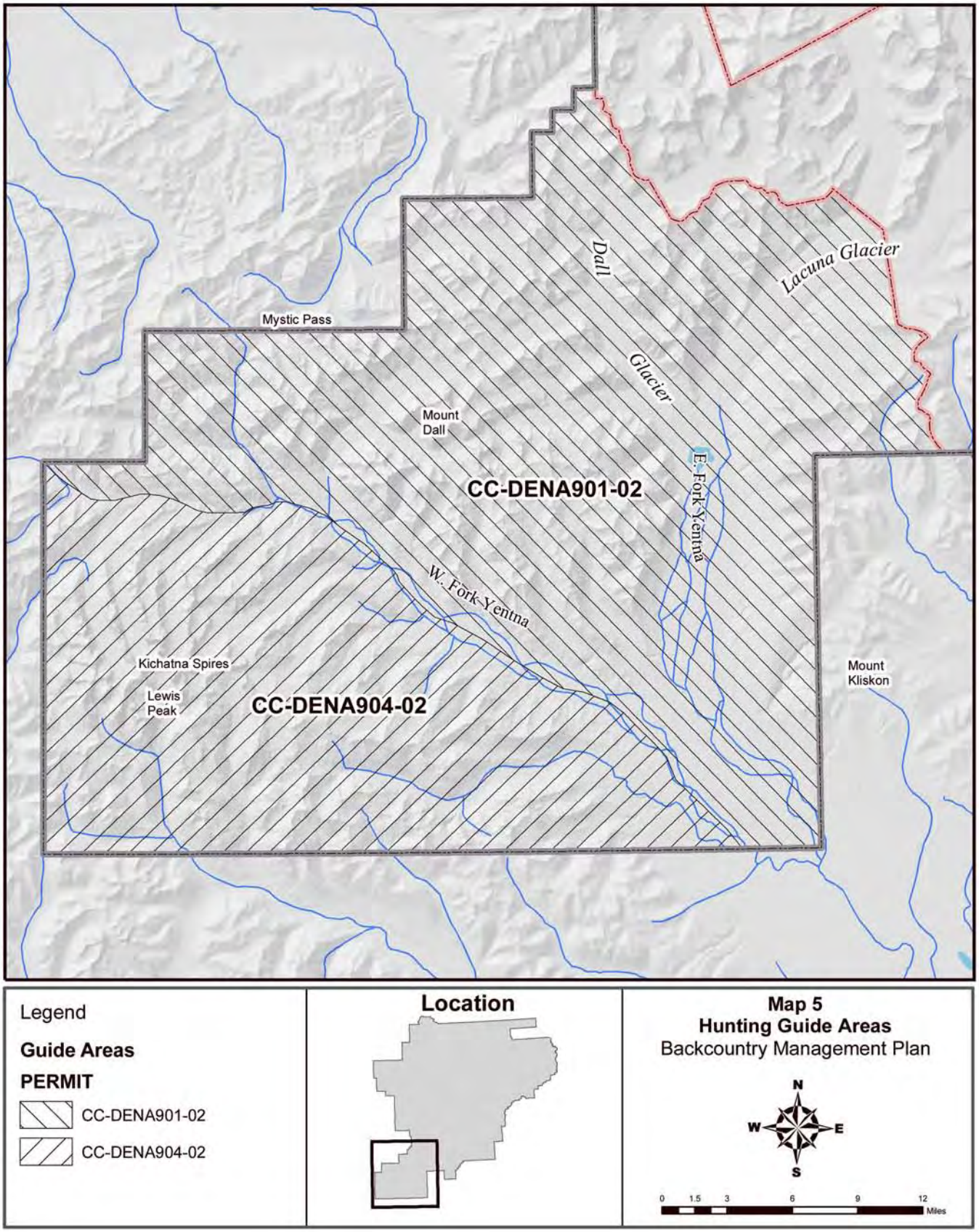
Topic	Alternative 1 No Action	Alternative 2	Alternative 3	Alternative 4 - Modified (NPS preferred)	Alternative 5
Subsistence	There could be major adverse impacts to subsistence resources and opportunities because of the potential for high levels of widespread use of the park, particularly non-subsistence snowmachine use. Dramatic increases in park use would create unfavorable conditions for subsistence wildlife populations. These impacts on subsistence resources and opportunities in the park and preserve additions would persist beyond the life of this plan. The cumulative impact of this alternative plus the aforementioned past, present, and reasonably foreseeable actions would be major.	The impacts to subsistence resources would be negligible because recreational and administrative activities would be reduced from current levels, and recreational users may be subject to additional conditions on use. The cumulative impact of this alternative plus the aforementioned past, present, and reasonably foreseeable actions would be major.	There would be minor adverse impacts to subsistence resources and opportunities because of the potential for conflicts along the winter snowmachine corridors and the year-round river corridors, and the increased visitation in the Kantishna area. The cumulative impact of this alternative plus the aforementioned past, present, and reasonably foreseeable actions would be major.	This alternative would have minor to moderate adverse impacts on subsistence resources and opportunities because it would result in increases in incompatible recreational activities, primarily on trails and corridors in the Cantwell, Kantishna, and Minchumina areas. These activities, including non-subsistence use of snowmachines, would create unfavorable conditions for subsistence wildlife populations and increase conflicts between recreational and subsistence users. The severity of the impact from this alternative would be mitigated by restricting high intensity uses to narrow trails and corridors. There would still be a cumulative major adverse impact of this alternative plus the aforementioned past, present, and reasonably foreseeable actions.	This alternative could have major impacts on subsistence resources and opportunities because of substantial increases in recreational activities – including non-subsistence snowmachine access – in both the Kantishna and Cantwell areas, which could create conflicts between recreational and subsistence users and unfavorable conditions for subsistence wildlife populations. The cumulative impact of this alternative plus the aforementioned past, present, and reasonably foreseeable actions would be major.
Socioeconomics	Impacts to economic values of the park and preserve would be minor over the next several years but effects would likely increase over the next 20 years. There would be a moderate reduction in the current rural quality of life in communities near the park and preserve. Impacts to existence values would increase, while use values would tend to increase over the next several years with some reduction likely in the long term. Impacts to the value of Denali National Park and Preserve for ecosystem services would be minor initially and increase to moderate as higher levels of use occur at popular destinations. Overall impacts on social and economic values would be moderate.	Impacts to economic values of the park and preserve would be minor over the life of the plan. The existing rural quality of life in communities near the park and preserve could be expected to continue. Existence values would be protected and could increase eventually, as would use values for most activities. A moderate increase in the value of ecosystem services contributed by Denali National Park and Preserve could be expected throughout the life of the plan. Overall impacts on social and economic values from the management actions would be minor.	Impacts to economic values of the park and preserve would be minor over the life of the plan. The existing rural quality of life in communities near the park and preserve could be expected to continue. Existence values would be protected and could increase eventually, as would use values for most activities. A moderate increase in the value of ecosystem services possibly contributed by Denali National Park and Preserve could be expected throughout the life of the plan. Overall impacts on social and economic values from the management actions would be minor.	There would be increases in economic activity. Minor impacts to the rural quality of life in communities near the park and preserve could be expected over the life span of the plan. Existence values would be protected and could increase eventually, as would use values for most activities. A moderate increase in the value of ecosystem services contributed by Denali National Park and Preserve could be expected throughout the life of the plan. Overall impacts on social and economic values from the management actions would be minor over the short term (next several years) and moderate over the life of the plan.	There would be increases in economic activity. Moderate impacts to the rural quality of life in communities near the park and preserve could be expected over the life of the plan. There would be a mix of minor positive and negative effects on existence values over the life of the plan, with a slight increase in the Old Park and a slight decrease in the park additions and preserve areas. Use values would tend to increase in the short term and decrease slightly over the next 20 years. A minor increase in the value of ecosystem services contributed by Denali National Park and Preserve could be expected throughout the life of the plan. Overall impacts on social and economic values from the management would be moderate over the life of the plan.

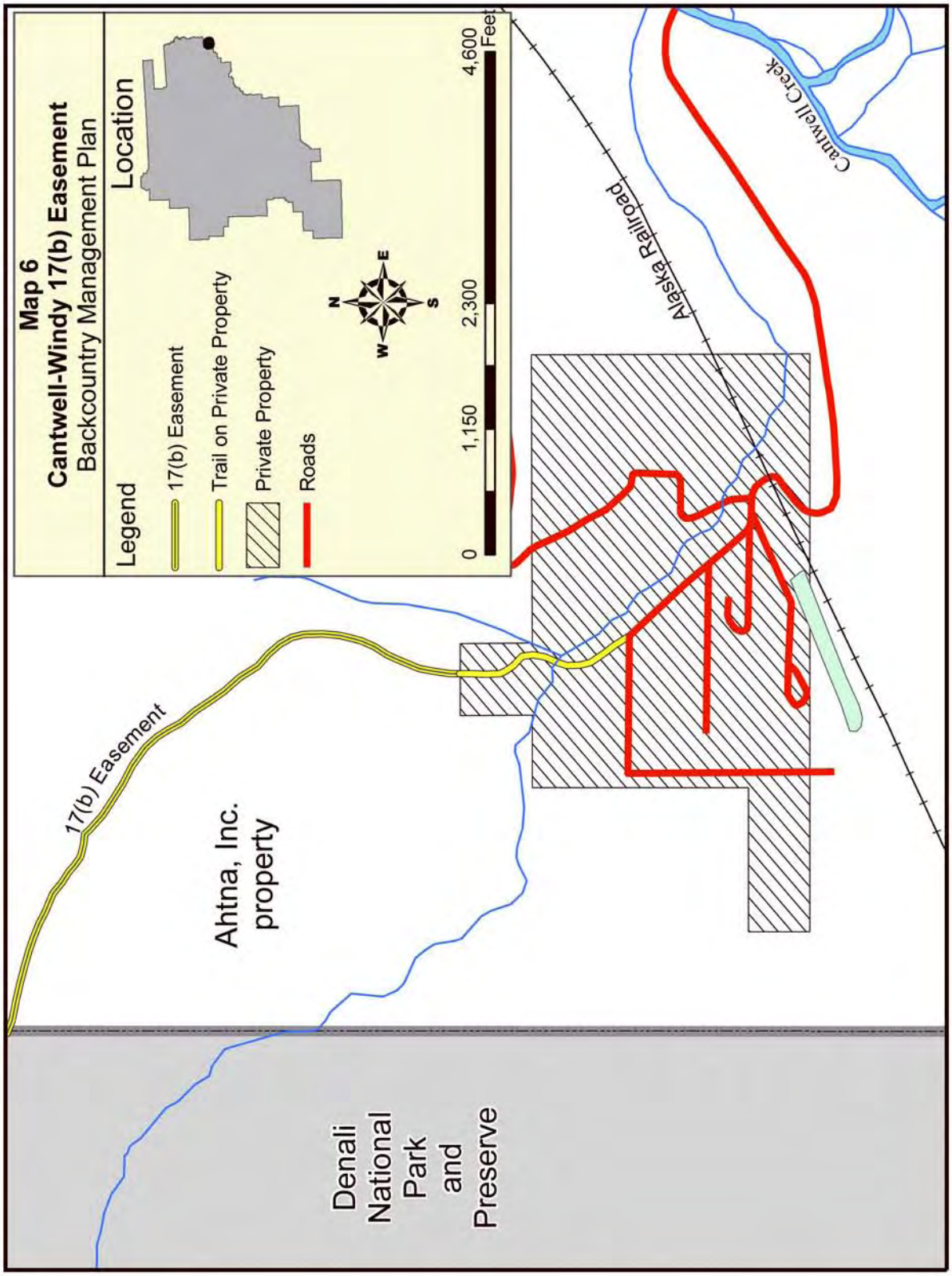
Topic	Alternative 1 No Action	Alternative 2	Alternative 3	Alternative 4 - Modified (NPS preferred)	Alternative 5
Recreational Opportunity & Visitor Safety	Although the amount of visitor use would increase under this alternative, the types of recreational opportunities would shrink, particularly for wilderness-dependent recreational activities sought by non-motorized users in accessible areas. This would cause major adverse impacts to recreational opportunities. There would be moderate adverse impacts to visitor safety from declining drinking water quality in some glaciated areas.	This alternative would have a moderate adverse impact on recreational opportunities at Denali. Although it would protect wilderness-dependent activities, it would exclude many opportunities for individuals who require assistance with access, facilities, and services over most of the park and preserve and constrain some opportunities even for those seeking wilderness-dependent activities. Those visitors seeking appropriate but not wilderness-dependent sightseeing activities would have limited options. There would be a moderate benefit to visitor safety because of education associated with new registration requirements.	This alternative would have a moderate beneficial impact on recreational opportunities at Denali because it would allow for a carefully managed set of appropriate backcountry activities to serve individuals who need more assistance with access, facilities, and services, while still protecting the recreational activities that are dependent upon Denali's wilderness resources and which the NPS is legislatively obligated to provide. There would be opportunity for wilderness-dependent activities to expand in accessible areas. Visitor safety would have a minor benefit from education associated with required registration for some common activities, while adverse impacts to drinking water quality would be minimized.	This alternative would have a minor beneficial impact on recreational opportunities at Denali because it would allow for a carefully managed set of appropriate backcountry activities to serve individuals who need more assistance with access, facilities, and services, while still protecting the recreational activities that are dependent upon Denali's wilderness resources and which the NPS is legislatively obligated to provide. However, there would be limited opportunities for some wilderness-dependent activities to expand in accessible areas. Visitor safety would be improved by education associated with required registration for some common activities, while adverse impacts to water quality would be minimized.	This alternative would have moderate adverse impacts on recreational opportunities because some wilderness-dependent opportunities would become difficult to find. In particular, non-motorized mountaineering and wilderness recreational activities in accessible areas of the park additions on the south side of the Alaska Range would become areas used more for visitors seeking motorized access opportunities. There would be no area of the backcountry that would preserve opportunities to encounter no other people, although some of these opportunities might incidentally remain over time. There would be minimal adverse impacts on visitor safety from declining drinking water quality.
Park Management & Operations	Without a comprehensive backcountry management plan, crisis management will take away from effective resource protection in other park programs. The no-action alternative would therefore result in major adverse impacts to park operations and management over the next 20 years and creates a situation where park management could not prevent impairment of park resource values.	There would be some requirements for additional staff, but most proposals could be implemented by reallocating funding, reassigning existing staff, and changing management emphasis or priorities during the first 5 years of plan implementation. Impacts that have been identified would be mitigated to the degree that the overall impacts to park management would be minor.	Proactive management would negate the need for a reactive approach to management. Implementing actions under this alternative would cause moderate impacts to park operations and management in some areas during 5-10 years of plan implementation, but other actions reduce impacts and even provide beneficial effects that would occur throughout the life of the plan. Therefore, overall impacts to park management would still be minor.	Despite the fact that proactive management would negate the need for a reactive approach to management, major impacts to park operations and management would still occur in several important aspects of park operations during 5-10 years of plan implementation. The required staffing and funding are of a magnitude that would trigger the need for major secondary responses in support services such as administration, (particularly human resources), support facilities and equipment such as office space and vehicles, and facility maintenance activities. Without staffing and funding increases it would not be possible to prevent impairment of park resource values given increases in visitor use.	Implementing this alternative would require a substantial increase in staffing. In some cases, proactive management would negate the need for a reactive approach to management. Moderate to major impacts to park operations and management would be realized in many areas during the 5-10 years of plan implementation and throughout the life of the plan. The required staffing and funding would trigger the need for secondary responses in support services such as administration, particularly human resources, as well as facility maintenance activities. Without the staffing and funding increases described above, it would not be possible to prevent impairment of park resource values given the use increases called for by this alternative.

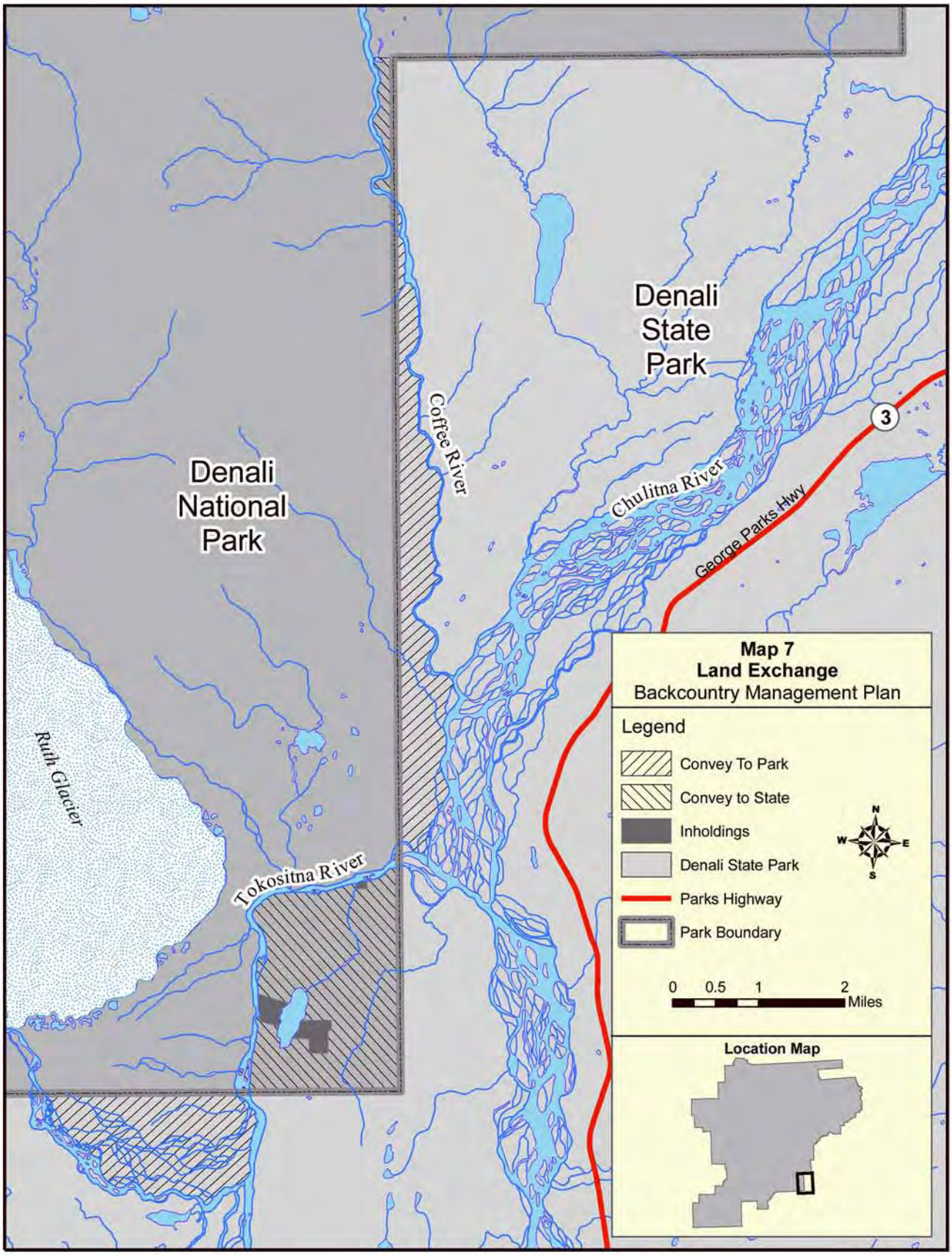

Lake Minchumina
Muddy R.
Kantishna River
Birch Creek
McKinley River
Birch Cr.
Kantishna
Wonder Lake
Muddy R.
Eielson Visitor Center
Muldrow Glacier
Susitna R.
Teklanika River
Toklat R.
Healy
Park Headquarters
Savage Campground
Cantwell
W. Fork Chulitna
Dunkle Hills
Broad Pass
Mount McKinley
Eldridge Glacier
Mount Foraker
Purkeypile
Mt. Russell
Kahiltna Glacier
Kanikula Gl.
Tokositna Glacier
Ruth Glacier
Chulitna River
Susitna River
Yentna Glacier
Denali State Park
Shellabarger Pass
W. Fork Yentna
Chelatna Lake
Petersville
Trapper Creek
Talkeetna
Management Areas
A
B
C
D
OP1
OP2
Ruth Glacier Special Use Area
West Buttress Special Use Area
Location
Map 2
Alternative 4 - Modified (NPS Preferred)
Backcountry Management Plan
N
W
E
S
0
10
20
40 Miles


Lake Minchumina
Muddy R.
Kantishna River
Birch Creek
McKinley River
Kantishna
Wonder Lake
Birch Cr.
Muddy R.
Eielson Visitor Center
Muldrow Glacier
Eldridge Glacier
Mount McKinley
Mount Foraker
Purkeypile
Mt. Russell
Yentna Glacier
Kahiltna Glacier
Kanikula Gl.
Tokositna Glacier
Ruth Glacier
Chulitna River
Susitna River
Denali State Park
Petersville
Chelatna Lake
Shellabarger Pass
W. Fork Yentna
Trapper Creek
Talkeetna
Sushana R.
Tekianika River
Toklat R.
Healy
Park Headquarters
Savage Campground
Cantwell
Dunkle Hills
Broad Pass
W. Fork Chulitna
3
Corridors
Summer
Winter
Year-Round
Location
Map 3
Alternative 4 - Modified (NPS Preferred)
Backcountry Management Plan
N
W
E
S
0
10
20
40
Miles


Map 4
Portals
Backcountry Management Plan
Legend
Wilderness Boundary
Portal Areas
Major Landing Area
Location
N
W
E
S
0
2
4
8
Miles
Eldridge Glacier
Eldridge
Glacier
Mount Silverthrone
Explorers Peak
Mount Dan Beard
Mount McKinley
Mount Capps
Mount Crosson
Mount Foraker
Kahiltna Base Camp
Mount Hunter
Upper Tokositna Glacier
Mount Huntington
Ruth Amphitheatre
Mount Dickey
Buckskin Glacier
Coffee Glacier
Mount Church
Ruth
Glacier
Tokositna
Glacier
Mount Goldie
Avalanche Spire
Kahiltna
Glacier
Pika Glacier
Little Switzerland


Mystic Pass
Mount Dall
Dall Glacier
Lacuna Glacier
CC-DENA901-02
E. Fork Yentna
W. Fork Yentna
Kichatna Spires
Lewis Peak
CC-DENA904-02
Mount Kliskon
Legend
Guide Areas
PERMIT
CC-DENA901-02
CC-DENA904-02
Location
Map 5
Hunting Guide Areas
Backcountry Management Plan
N
W
E
S
0 1.5 3 6 9 12
Miles


Map 6
Cantwell-Windy 17(b) Easement
Backcountry Management Plan
Location
Legend
17(b) Easement
Trail on Private Property
Private Property
Roads
N
E
S
W
0
1,150
2,300
4,600
Feet
Alaska Railroad
Cantwell Creek
17(b) Easement
Ahtna, Inc.
property
Denali
National
Park
and
Preserve


Denali
State
Park
Denali
National
Park
Coffee River
Chulitna River
George Parks Hwy
3
Ruth Glacier
Tokositna River
Map 7
Land Exchange
Backcountry Management Plan
Legend
Convey To Park
Convey to State
Inholdings
Denali State Park
Parks Highway
Park Boundary
N
W
E
S
0
0.5
1
2
Miles
Location Map

Chapter 3: Affected Environment

ERRATA

Chapter 3, Affected Environment, remains the same as it was presented in the *Revised Draft EIS* with the following minor changes. The changes are presented with insertions indicated by underlined text and deletions indicated by strikethrough.

p. 133
Natural Soundscapes

In addition to natural sounds, there are significant human-generated sounds such as aircraft and surface vehicles that are intrusions upon the natural soundscape. Because of the wilderness character of the Denali backcountry, many of the human-made sounds qualify as noise under the definition provided by Directors Order #47, which reads, "noise is generally defined as an unwanted or undesired sound, often unpleasant in quality, intensity or repetition." Noise may often be the byproduct of desirable <u>or legally authorized</u> activities or machines, but it <u>is</u> still ~~requires~~ <u>subject to</u> management to protect park resources.

p. 141
Wilderness Suitability and Proposal

Section 1317(a) of ANILCA required the Secretary of Interior to conduct a wilderness suitability review for the park additions and preserve, which was included in the 1986 *General Management Plan*. The review concluded that approximately 3.73 million additional acres of the nondesignated lands in the park and preserve were suitable for wilderness designation. An area within the Kantishna Hills was determined to be unsuitable for designation as wilderness because of persistent disturbance caused by past mining activity, although since that determination all mining has ceased, many private inholdings have been acquired, and much of this land has been restored, so these lands now share similar values as the rest of the park additions. Various alternatives for additional wilderness designation were subsequently evaluated in an Environmental Impact Statement (NPS 1988) to assist in fulfilling ANILCA 1317(b), which required the President to recommend wilderness designations to Congress in accordance with the process outlined in sections 3(c) and 3(d) of the Wilderness Act. Of the 3.73 million acres of suitable lands, the preferred alternative proposed 2.25 million acres to be recommended for wilderness designation. However, the Secretary of the Interior did not forward the recommendation to the President, so the process prescribed by ANILCA 1317(b) and the Wilderness Act 3(c) and 3(d) was not completed. ~~Pending action by the Secretary of the Interior, President, and Congress, the wilderness values of the recommended lands will continue to be preserved under NPS policy.~~ (See Map 3-1).

p. 144-145
Subsistence

Subsistence community use profile studies were conducted for Cantwell, ~~and~~ Nikolai, and Telida in the early 1980s (Stratton and Georgette 1984; Stokes 1984), and Lake Minchumina in the mid-1970s (Bishop 1978). Cantwell's subsistence harvest assessment data was updated in a 2000 study, and Nikolai's harvest assessment was updated in 2003. Initial harvest assessment surveys were conducted for Telida in 2000 and Lake Minchumina in 2003.

p. 145-146
Subsistence

The National Park Service is engaged in a variety of subsistence ~~related~~ program activities beyond the ~~harvest~~ management of fish and wildlife harvest. These include timber cutting and use, shelters and cabins, trapping and trapline management, eligibility and resident zones, access, acquisition of user data, and resolution of user conflicts and possible closures, and undertaking research on fish, wildlife, subsistence uses, and local traditional knowledge. As identified in Denali's 1986 General Management Plan subsistence section, the park has – in cooperation with the Denali Subsistence Resource Commission, Federal Regional Advisory Councils, State of Alaska, Local Advisory Committees, and the public – prepared a Subsistence Management Plan intended to address major topics related to subsistence management. Comments from other federal agencies and Native groups with park-related resource management concerns were solicited. After consultation and review, the Subsistence Management Plan was approved by the Park Superintendent and Denali Subsistence Resource Commission in 2000 (NPS 2000i).

p. 173
Climbing and Mountaineering

Besides Mount McKinley and Mount Foraker, attempted ascents on peaks within the Alaska Range and the boundaries of the park and preserve include: Mount Hunter (14,573 feet.), Mount Silverthrone (13,220 feet.), Mount Huntington (12,240 feet.), Mount Crosson (12,800 feet.), Peak 11,300', and Moose's Tooth (10,335 feet.) (NPS 2000d and f). Because registration is voluntary unless mountaineers are ascending Mount McKinley or Mount Foraker, or if their travel includes the Old Park, data are ~~likely~~ incomplete. However, table 3-11 ~~3-18~~ still shows a rapid increase in visitor use of Alaska Range destinations from 1997 through 2004.

p.178
Caches

Caches that support climbing and mountaineering activities are allowed in the park additions and preserve subject to the rules provided at 36 CFR 13.22. They are particularly important for expeditions attempting the northern climbing routes on Mount McKinley. The National Park Service authorizes a concessioner to deliver the

caches by dog team. Typically, freight hauling occurs during February and March, and the concessionaire remains in the park for between 7 and 44 days while shuttling freight from the Kantishna airstrip to the cache sites near McGonagall Pass. The weight of freight being transported averages about 4,000 pounds (Jones and Stokes 2000). Unattended property is generally prohibited in the Denali backcountry by 36 CFR 13.63(c).

p. 188
Off-Road Vehicles

The use of ORVs in the backcountry is prohibited throughout the national park and preserve consistent with existing regulations. The only exceptions are for specific permitted access to some inholdings in the Kantishna Hills to meet the requirement of ANILCA 1110(b) and subsistence access on constructed mining access routes in the Kantishna Hills. There is also access along the state right-of-way in the Dunkle Hills. In addition, NPS has determined that ORVs were traditionally employed for subsistence purposes in the Cantwell area under ANILCA 811(b) and is presently developing a management plan for this use.

p.197
Military Overflights

The Air Force's Susitna Military Operating Area (MOA) lies partly over the southern park and preserve. The "floor" is set at 10,000 feet above mean sea level (MSL) or 5,000 feet AGL, whichever is higher. Overflights can occur between 7 a.m. and 10 p.m. (Captain Gary L. Rolf, pers. comm.). ~~The military conducts an average of 3 flights per day (primarily by F-15s) in the Susitna MOA and an average of 8-12 flights per day (U.S. Department of Defense 1995).~~ The Final Environmental Impact Statement for Alaska Military Operations Areas (U.S. Air Force) predicted 3,600 hours per year of use in the Susitna MOA based on 15 sorties per day and 240 days per year. In a recent sample year, the military used the MOA for only 926 hours, much less than anticipated by the EIS (Colonel Jerry I. Siegel, pers. comm.)

p. 197
Backcountry Facilities

Relative to its size, Denali National Park and Preserve has very few facilities. There are ~~no~~ few maintained trails or designated campsites, ~~or~~ and no public use cabins in the backcountry. The majority of facilities in Denali National Park and Preserve are located near the park entrance and along the 92-mile park road (Map 3-2: Cities, Towns, and Boroughs), aside from a ranger station in Talkeetna. The park entrance is located at the intersection of the George Parks Highway and the park road. Many of the park facilities are designed to support the park's visitor transportation and tour bus system that operates during the peak visitor use season between May and September.

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

This chapter analyzes the probable impacts, by resource topic, for the modified preferred alternative described in chapter 2. Impact summaries from the other alternatives are found in Table 2-15 at the end of chapter 2. Complete impact analyses for other alternatives are found in the *Revised Draft EIS*. Because the modified preferred alternative is very similar to the preferred alternative in the *Revised Draft EIS*, the impacts of the proposed actions are also very similar. This chapter repeats the analysis for Alternative 4, the NPS preferred alternative from the *Revised Draft EIS*, and shows changes in that analysis for the modified preferred alternative with insertions indicated by underlined text and deletions indicated with strikethrough text.

The impact assessment evaluates the magnitude of impacts and how these impacts compare to current conditions. The cumulative impact assessment outlines overall impacts resulting from past, current, proposed, and reasonably foreseeable management actions. The impact assessment is intended to guide the decision-maker in choosing a management action that protects the environment based on an objective understanding of environmental consequences.

METHODOLOGY

Various methods were used for the impact analyses in this chapter. The principal method involved a review of published and unpublished literature regarding the effects of human activities on the resources discussed in the individual sections in this chapter. Literature sources presenting data collected from Alaska and other northern environments were given priority, and unpublished data collected in the park were reviewed and assessed for applicability. It is assumed that the results of impact studies in similar tundra and taiga environments in Alaska and Canada can be extrapolated reasonably to the Denali backcountry when specific data are lacking for Denali National Park and Preserve. In addition to literature review, the impact analyses were based on observations by park employees; discussions with residents, interest groups, and businesses at scoping meetings and in telephone conversations; site reconnaissance; and best professional judgment based on previous experience with similar projects and activities. Mitigation measures were assumed to be in place when analyzing the impacts of visitor activities and plan elements under the action alternatives.

In addition to identifying the impacts of actions proposed in the plan, this analysis examines the cumulative effect of plan actions when combined with the effects of past, present, and future actions that are outside the scope of the plan. The general methods used in the cumulative effects analysis are based on impact assessment principles outlined in the handbook produced by the Council on Environmental Quality (CEQ 1997: vii):

- address additive, countervailing, and synergistic effects;
- look beyond the life of the action;
- address the sustainability of resources, ecosystems, and human communities.

Impacts are described in as specific a manner as possible, bearing in mind the programmatic, general nature of the management plan.

NPS Management Policies affirm and clarify that the National Park Service may allow certain impacts in national park system units as long as "park resources and values" are left unimpaired. The Management Policies define park resources and values as:

- The park's scenery, natural and historic objects, and wildlife, and the processes and conditions that sustain them, including, to the extent present in the park: the ecological, biological, and physical processes that created the park and continue to act upon it; scenic features; natural visibility, both in daytime and at night; natural landscapes; natural soundscapes and smells; water and air resources; soils; geological resources; paleontological resources; archeological resources; cultural landscapes; ethnographic resources; historic and prehistoric sites, structures, and objects; museum collections; and native plants and animals;
- Opportunities to experience enjoyment of the above resources, to the extent that can be done without impairing any of them;
- The park's role in contributing to the national dignity, the high public value and integrity, and the superlative environmental quality of the national park system, and the benefit and inspiration provided to the American people by the national park system; and
- Any additional attributes encompassed by the specific values and purposes for which it was established (NPS Management Policies 2001 1.4.6).

At Denali, the National Park Service is particularly concerned with the set of these resources and values that are specifically identified in Sections 101 and 102 of ANILCA, the preservation of which is the reason for the designation of new conservation system units. In other sections, ANILCA refers to these as "resource values" and "natural and other values." For the purposes of evaluating impacts and determining impairment for Denali, this plan equates these two ANILCA terms with the NPS Management Policy term "resources and values."

The geographic scope of this assessment is the entire 6-million-acre area of Denali National Park and Preserve, plus adjacent lands used for subsistence, recreation, and tourism, including the associated communities along the Parks Highway, as well as those off the road system. The temporal scope extends at least 20 years into the future, the duration of the plan.

For each resource, the analysis includes a conclusion about the level of impact and about impairment. For natural and cultural resources, the conclusions are based on the following criteria. The impacts are discussed in terms of intensity, duration, and context.

Intensity

Low: A change in a resource condition is perceptible, but it does not noticeably alter the resource's function in the park's ecosystem, cultural context, or visitor experience.

Medium: A change in a resource condition is measurable/observable and an alteration to the resource's function in the park's ecosystem, cultural context, or visitor experience is detectable.

High: A change in a resource condition is measurable/observable and an alteration to the resource's function in the park's ecosystem, cultural context, or visitor experience is clearly and consistently observable.

Duration

Temporary: Impacts would last only a single visitor season or for the duration of discreet activity, such as construction of a trail (generally less than two years).

Long term: Impacts would extend from several years up to the life of the plan.

Permanent: Impacts are a permanent change in the resource that would last beyond the life of the plan even if the actions that caused the impacts were to cease.

Context

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

Important: The affected resource is identified by enabling legislation or is rare either within or outside the park. The portion of the resource affected does not fill a unique role within the park or its region of the park.

Unique: The affected resource is identified by enabling legislation and the portion of the resource affected uniquely fills a role within the park or its region of the park.

Overall Conclusion

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

Negligible: Impacts are generally low intensity, temporary, and do not affect unique resources.

Minor: Impacts tend to be low intensity or of short duration, although common resources may have more intense, longer-term impacts.

Moderate: Impacts can be of any intensity or duration, although common resources are affected by higher intensity, longer impacts while unique resources are affected by medium or low intensity, shorter-duration impacts.

Major: Impacts are generally medium or high intensity, long term, or permanent, and affect important or unique resources.

Impairment: A resource would no longer fulfill the specific purposes identified in the park's establishing legislation or its role in maintaining the natural integrity of the park.

For some topics, such as Socioeconomics, separate criteria are included in the Methodology section of the topic.

ASSUMPTIONS

Assessing the consequences of the modified preferred alternative requires making some assumptions about changes in human use patterns over time. Listed below are some of the assumptions that are referenced in the impact analysis for individual resources. Additional assumptions useful for the particular impact topic may appear in the Methodology section of the impact topic. For the impact analysis, the following time period references refer to specific "visitor seasons:"

Summer.....Beginning of May to the end of September
Early Winter...October and November
Mid Winter.....December through mid-February
Late Winter ....Mid-February to the end of April

1) Summer visitation at Denali will resume its growth, although not at the 5% annual growth rate of the 1990s. The rate may be closer to the 2% growth seen in visitor arrivals to Alaska over the past several years (ADCED 2001). Much if not all of the growth will be among package tour travelers associated with cruise ships or other tour companies. Cruise ship arrivals in Alaska climbed 27% from 1999-2003 although this period showed a lull in visitation growth at Denali. The tourism industry clearly expects growth to return to Denali, since the number of rooms available for overnight accommodation in the Denali Borough grew 19% from 1999–2004, demonstrating continued industry interest in investment (statistic courtesy of Denali Borough).

2) Those package tour visitors interested in experiencing the Denali backcountry will generally rely on a guided service for access. This means that the demand for a variety of guided activities and commercial services will continue to grow, including the demand for activities and services that have not been offered at Denali in the past.

3) New visitor facilities will be constructed in South Denali consistent with the 1997 *South Side Denali Development Concept Plan*. As a result, some of the growth in visitation to the park backcountry will originate from the south side. Without management intervention, new south-side Denali destinations will develop on their own in locations relatively accessible by road, water, and air such as Windy Creek, Dunkle Hills, Tokositna River, the Chelatna Lake area, and glacier landing areas near Talkeetna.

4) Scenic air tour and air taxi services will be among the most popular of the activities sought by visitors. Although the number of passenger landings on glaciers was flat from 2001–2004, overall passenger growth from 1999–2004 was 38% and growth in landings 11% (2.1% growth in flights with landings, 6.6% annual growth in passenger volume), associated with the opening of new hotel rooms serving package tour travelers in the South Denali area (see Table 3-16).

   While much of the scenic tour traffic will continue to originate from Talkeetna and the park entrance, scenic air tours from more distant locations such as Anchorage and Fairbanks will continue to increase, serving Alaska visitors who do not travel closer to Denali than these two cities. The growth in scenic air tour traffic will be mitigated somewhat by the increasing efficiency of the air tour operators, who will fill a higher percentage of seats on every flight and fly larger planes. For example, among concession flights that landed on glaciers between 1999 and 2004, the average passengers per flight increased from 3.6 to 4.5 (Table 3-16). However, even with an average 3.5% annual growth rate the amount of air traffic over the park could double by 2025.

5) The number of general aviation landings and overflights in the Denali area will remain small relative to the number of commercial scenic tours and air taxi traffic.

6) Overnight independent use of the Old Park backcountry will fluctuate within the same range as it has for the past 15 years (30,000–40,000 user nights), perhaps with some slight increase. Overnight use of accessible parts of the park additions, including mountaineering use on the glaciers and glaciated peaks, will continue to increase gradually. Day hiking will increase in areas where guided hiking opportunities are available (see Table 3-9).

7) Over the life of the plan, only minor growth will occur in overnight stays at accommodations in the Kantishna Hills, resulting both from minor expansions of existing businesses and from the construction of a hostel as described by the 1997 *Entrance Area and Road Corridor Development Concept Plan.*

8) Access to and use of public lands near or adjacent to Denali will continue to improve and grow. Limited numbers of new or improved transportation facilities will be responsible for some of the growth – such as planned improvements to the Petersville Road and the gradual expansion of the road system to serve newly developed settlement areas near the Parks Highway. However, much of the

increased access will occur because of continued technological improvements and increases in ownership of off-road vehicle transportation, including both snowmachines and wheeled or tracked all-terrain vehicles. New trail systems serving both motorized and non-motorized users may be constructed or improved on lands near the park boundary.

9) Winter visitation will increase. In part, this increase will occur as more Alaskans discover that Denali is open in the winter through such promotional activities as the annual Winterfest. Winter visitation also will increase along with the growth of snowmachine technology and ownership (see below). In part, the growth will occur as a larger number of out-of-state winter visitors seek winter recreational opportunities in Alaska – the number of off-season (October–April) visitors in state for reasons other than business grew from 114,000 to 142,400 between the winters of 1996–1997 and 2002–2003, an increase of 25% (ADCED 2003).

10) The power, speed, and range of the average snowmachine in Alaska and at Denali will continue to increase. The number of people using these snowmachines recreationally in Alaska will continue to increase. Most of the use in the Denali area will continue to be on the south side of the Alaska Range from late February through the end of April. The majority of use within park boundaries does not have characteristics that would meet the definition of "traditional activities" presently applied in the Old Park.

11) Adoption of low-impact technology for motorized forms of access – airplane, snowmachine, motorboat – will generally not occur without incentives or regulations.

12) Modes of access to the backcountry such as mountain bike, pack animal (horse, llama), or motorboat that have been only rarely used at Denali may become more popular over the lifetime of the plan.

BACKGROUND FOR ANALYSIS OF CUMULATIVE EFFECTS

Cumulative effects are defined as incremental impacts on the environment that result from adding the proposed action to other past, present, and reasonably foreseeable future actions, including those taken by both federal and nonfederal agencies, as well as actions undertaken by individuals. The next section outlines the actions considered in this analysis for the Denali Backcountry Plan. Cumulative impacts may result from singularly minor but collectively significant actions taking place over a period of time (CEQ Sec 1508.7).

This analysis evaluates the incremental contribution of impacts from the modified preferred alternative to the impacts of unrelated past and reasonably foreseeable future developments and activities in the Denali region. The analysis builds on and extends the information and analyses in the *General Management Plan* EIS (NPS 1986), the *South Side Final Development Concept Plan/EIS* (NPS 1997), the *Entrance Area and Road*

Corridor Development Concept Plan/EIS ("frontcountry" plan; NPS 1997a), the *Spruce Creek Access EA* (NPS 2002a) and the *Environmental Assessment for the Proposed Permanent Closure of the former Mount McKinley National Park to Snowmobile Use* (NPS 2000).

The period considered under cumulative effects stretches from 1972 – the first summer season when the George Parks Highway was open – to 2025, at the end of the life of the plan.

Management Areas

- The 1976 Backcountry Management Plan established backcountry units for the Old Park and quotas for overnight use in many of the units. In 1984, additional units were added to the system and quotas modified.

Access

- The 1986 General Management Plan for Denali established a cap of 10,512 round-trip vehicle trips on the Denali park road per summer season. A regulation implementing this cap went into effect in 2000.

- In 1995, the National Park Service began requiring registration 60 days in advance of the expedition start date for climbing either Mount McKinley or Mount Foraker.

- Technological improvements in snowmachines enabled a large but unquantified expansion of snowmachine use in Denali during the 1990s. Regulations implementing ANILCA section 1110(a) permit the use of snowmachines for traditional activities (where such activities are permitted by ANILCA or other law) but did not define traditional activities. Consequently, the expansion in use has been generally unmanaged. The growth in popularity of snowmachines is demonstrated by an increase in the number of registrations. Since registration in Alaska became a requirement in 2000, the number of registered machines has increased from 33,576 to 41,710, an increase of 7.5% per year. Statewide, 70% of machines are registered in the area between Anchorage and Fairbanks. (DMV 2004)

- In 2000, the National Park Service closed the former Mount McKinley National Park to snowmachine access.

- In 1995, the Department of the Air Force completed an EIS for the establishment of Military Operations Areas and Military Training Routes (MOAs and MTRs) in Alaska. This EIS included the Susitna MOA, which authorizes daily flights over a portion of the southwest Denali preserve and park additions south of the Alaska Range and east to the Tokositna area as depicted in Map 3-9 (U.S. Department of Defense 1995).

- Since 1980, new housing and commercial development has occurred in the Nenana Canyon north of the park entrance, the Yanert Valley east of the park boundary, in the eastern part of the Stampede Road corridor, around Cantwell, and along the Petersville Road. This development has resulted in minor expansion of local road networks or improvements of existing roads. The gradual development spreading out from the Parks Highway corridor is likely to continue, creating increased access to the eastern and southern boundaries of the national park, particularly the park additions.

- Concern for the safety of park visitors prompted the National Park Service to initiate a closure to the discharge of firearms in the Kantishna area in 2000. The restriction on the discharge of firearms applies on federal public lands within 1 mile of the Kantishna road right-of-way from the former Mount McKinley National Park boundary at mile 87.9 to the north end of the Kantishna airport. The firearm restriction is in effect from September 1 through September 15 each year. During the period of the firearms discharge restriction, subsistence harvests utilizing other methods and means of harvest may still take place according to federal subsistence management regulations.

- In 2005, the National Park Service determined that ORV's were traditionally employed for subsistence purposes in the Cantwell area under ANILCA 811(b) and the agency is presently developing a management plan for this use.

Commercial Services

- The National Park Service has awarded new concession contracts and allowed increased service levels for guided hiking and other activities associated with the expansion of private lodges in Kantishna. Additional activities are primarily in the Kantishna and Wonder Lake areas, but also include a road use authorization for the historic concession operator to travel into the Old Park for the purpose of interpretive hikes.

- Lodge owners or property owners in Kantishna have occasionally speculated that they might provide accommodations for winter visitors. Although there are no known plans, it remains a reasonably foreseeable action.

- During the 1990s, the number of glacier landings by air taxi operators significantly expanded, primarily in response to an increase in the number of park visitors interested in scenic tours rather than mountaineering. This rapid growth led to a conversion of the air taxi Incidental Business Permits to concession contracts in 1998 to limit the number of business enterprises able to offer this service.

- In 1998 and again in 2004, the NPS authorized three overnight guided dog-mushing concessions and one day-tour guided dog-mushing concession. Presently, only two of these concessions are active.

- In 1980, the NPS discontinued a permit for horse packing that had been issued originally in 1970. In the mid 1970s a dog-mushing concession was authorized to provide this freighting service; this service continues.

- Developing a winter tourism industry catering either to Alaskans in the major population centers of Anchorage, Fairbanks, and the Mat-Su Valley or to an out-of-state clientele is a possibility. This is a goal frequently expressed by the Healy-Denali Chamber of Commerce and some private business owners. The National Park Service and its partners have assisted in promoting winter visitation in the park entrance area by hosting an annual Winterfest that began in 2001. Further development of winter tourism could happen at many different scales and could involve both motorized and non-motorized recreation, including the potential for snowmachine rentals.

Facilities

- The National Park Service completed the *Entrance Area and Road Corridor Development Concept Plan* in 1997, which specified several new trails in the Old Park. Some of these trails have been constructed and the NPS intends to complete the remainder as funding allows.

- The National Park Service completed the *South Side Denali Development Concept Plan* in 1997, which specified new and improved road access and a visitor facility in the Peters Hills/Dutch Hills; new trails entering the park from the Peters Hills, Dunkle Hills, and Chelatna Lake area; and new campsites and six public use cabins in the Chelatna Lake and Peters Hills areas. A *South Denali Implementation Plan/Draft Environmental Impact Statement* is presently being finalized. This plan proposes a south Curry Ridge site for visitor facility development as an alternative to the Peters Hills area.

- In 2004 a “spring trail” was constructed from Park Headquarters to Mile 7 of the park road to allow for winter access from headquarters to tree line so that winter activities such as dog mushing and skiing can continue from Park Headquarters even if the road is plowed.

- Proposals have been advanced to clear an existing trail from Nenana to allow for winter access to Lake Minchumina. If the trail clearance occurs and services are provided at Minchumina, the community could become a much more popular jumping-off spot for winter trips into Denali.

Administration

- The National Park Service and its partners have greatly increased the amount of research, resource management, and monitoring activity taking place in the park since 1970. The first regular use of airplanes for research activity began in the early 1970s. In 1978, the first administrative airplane became available to the park, although it left in 1981. The summer of 1981 saw the first research use of helicopters, followed shortly afterwards by the stationing of a Firepro helicopter at Denali that has since been used for fire management and many other research and administrative projects. In the late 1980s, the park acquired two airplanes. The present aviation program expanded in 1991 with the annual contracting of a high-altitude Lama helicopter to support the mountaineering program on Mount McKinley and soon after with the increase in mountaineering patrols, which required additional contract aircraft to move rangers, volunteers, and temporary camps on and off the mountain.

- In the 1997 *Entrance Area and Road Corridor Development Concept Plan*, the National Park Service committed to establishing a center for research and education. The Murie Science and Learning Center program is now evolving, but presently includes field-based educational and research programs on trails as well as use of the backcountry. Future programs could include field research and other guided activities in the backcountry.

- The Bear-Human Conflict Management Plan of 1983 established methodologies for preventing conflicts between people and bears by prescribing appropriate methods of food storage and other behavior for people and by specifying protocols for addressing “problem” bears.

ICE-RICH PERMAFROST SOILS

The first part of this section provides an overview of the methodology used to evaluate impacts on ice-rich permafrost soils and water quality, including a literature review of the types of impacts that could result from actions proposed in the plan. The second part is an analysis of the impacts likely to occur under each alternative.

GENERAL IMPACTS BASED ON LITERATURE REVIEW

Analysis of impacts of recreational and administrative activities on ice-rich permafrost soils in Denali National Park and Preserve has relied primarily on a literature review of the types of impacts that can occur and on consultation with NPS subject matter experts and resource managers.

Ice-rich permafrost soils exist in the area between the Stampede mine, the Sushana River, and the Wyoming Hills. They also exist in the flat areas west of Kantishna and north of Purkeypile. Ice-rich permafrost soils could be affected in several ways by the actions proposed in the backcountry management plan and from the no-action alternative. Compaction of insulative surface cover, including vegetation and snow, over ice-rich permafrost soils can lead to premature warming of soils that can lead to ice degradation and thermokarsting. Melting of the ice in ice-rich permafrost soils can lead to a lowering of the ground level, creation of sag ponds and wetlands, thermokarst development, and associated changes in the vegetation regime.

Snowmachines may affect ice-rich permafrost soils indirectly by compacting snow, thereby altering snowmelt, increasing soil moisture, reducing the length of the growing season, and lowering soil temperatures beneath the trail and altering physical processes (Neumann and Merriam 1972; Pesant et al. 1985; Pesant 1987). Impacts on ice-rich permafrost soils from snowmachine use include temperature reductions in soil, which can change soil surface microstructure, which reduces the suitability of a site for seed germination and spring flower viability (Wanek and Schumacher 1975; Keddy et al. 1979). Soil compaction, because of snowmachine use, increases surface runoff, reduces infiltration, and impedes gas exchange between soil and air (Keddy et al. 1979). Compacted soils inhibit root growth and adversely affect soil organisms.

Dog-sled use may have a similar effect on ice-rich permafrost soils, by compaction of insulative layers (snow and soil), causing thermokarsting and ensuing changes in the vegetation regime. Impacts on soils from snowmachine use and dog-sled use would occur primarily in those areas that may become snow-free during certain periods in the winter or that have a thin snow cover that can be reduced further from snowmachine passes (Greller 1974). Areas of thin snow cover include mountain passes and exposed ridges. In addition, steep south-facing slopes tend to become snow-free sooner than other areas in the spring, and low snow years are common. Ice-rich permafrost soils that would normally be protected under snow may become exposed in areas with heavy snowmachine traffic.

IMPACTS OF THE MODIFIED PREFERRED ALTERNATIVE

The following analysis shows that there would be minor adverse impacts to ice-rich permafrost soils under this alternative. Impacts would be of low intensity, long-term duration, and would affect an important park resource. Use of snowmachines and dog sleds would increase above current levels, and repeated passes of snowmachines and dog sleds over ice-rich permafrost soils would damage these soils. However, use would be mitigated or restricted if standards outlined for Management Areas B, D, OP1, and OP2 are approached or exceeded.

Under this alternative, areas of the park that contain ice-rich permafrost soils would be zoned as Management Area B, D, OP1, or OP2. These management areas allow for very low to medium encounters, no landscape modifications, and low to medium trail and campsite disturbances (which include signs of social trails, campsites, or cut or broken vegetation). If standards in these categories are approached or exceeded, use would be curtailed or mitigated. Higher use levels would be accommodated along ~~147 linear miles of corridors in summer and 157 miles in winter. Since~~70 miles of summer Corridors and potentially 19.5 miles winter Corridors, but all of these higher use areas are ~~not~~ located where ice-rich permafrost soils are not abundant, so impacts to ice-rich permafrost soils would be minimal. ~~While the types of management areas assigned to areas of the park that contain ice-rich permafrost soils are similar to those in alternatives 2 and 3, t~~The application of ~~those~~ management areas allows for overall ~~slightly~~ higher levels of use in areas of the park that contain ice-rich permafrost soils than occurs at present. Unless otherwise stated, all impacts would occur throughout the life of the plan.

Snowmachine use would increase over current numbers. Thus, localized impacts on ice-rich permafrost soils from snowmachine use would increase where ice-rich permafrost soils are prevalent (between the Stampede mine, Sushana River, and Wyoming Hills; and also in the flat areas west of Kantishna and north of Purkeypile). Impacts would be confined to routes where riders make multiple passes .

While the adequate snow cover requirement (see Chapter 3: Affected Environment) is intended to prevent these types of effects, they could occur because of the wide variety of terrain and climatic conditions of the park additions and preserve and because the determination of adequate snow cover applies to relatively large areas.

Most mushing in the park starts from the Healy area or the park entrance area to Wonder Lake either via the park road or via the Stampede/Clearwater/Moose Creek route. Use is also common from the Stampede area up the Toklat River. Except for the park road, these mushing routes cover extensive areas of permafrost soils. Impacts to ice-rich permafrost soils from dog sleds are similar to those described for snowmachines. Mushers tend to use established trails rather than construct new ones, and multiple passes over ice-rich permafrost soils damage insulating layers of snow, vegetation, and soil. This increases potential for permafrost degradation and the associated natural resource concerns of changes in hydrology and vegetation regimes.

Levels of dog-sled use could increase above current numbers. The Kantishna and Stampede areas would be zoned as Management Area B, which allows for very little evidence of modern human use and medium levels of encounters (visitors may encounter up to two parties per day). If impacts to ice-rich permafrost soils approach or exceed standards, use would be curtailed or mitigated to reduce impacts.~~Levels of dog-sled use could increase slightly above current numbers but impacts would be minimal because the Kantishna and Stampede areas would be zoned as Management Areas D and OP1, which accommodate low signs of human presence, and low trail and campsite disturbance. If impacts to ice-rich permafrost soils approach or exceed standards, use would be curtailed or mitigated to reduce impacts.~~

Cumulative Effects

Both technological improvements and community growth have led to an expansion of snowmachine use in the Denali park additions, including the northeastern additions west of Healy where ice-rich permafrost soils are found. In addition, the potential of trail clearance to Lake Minchumina could result in increasing snowmachine use in the northwestern park additions and preserve. The NPS authorization of dog freight and guided dog mushing concessions originating from the Stampede Road and Lake Minchumina also provided additional activity in the same ice-rich permafrost areas.

These actions have resulted in a moderate adverse impact to ice-rich permafrost soils. Implementing the preferred alternative alone would have minor adverse impacts on ice-rich permafrost soils. Together with the activities previously described, there would still be only moderate adverse impacts to these physical resources, few of which are attributable to the actions under this alternative.

Conclusion

Impacts to ice-rich permafrost soils under the preferred alternative would be minor. Use of snowmachines and dog sleds would increase above current levels, and repeated passes of snowmachines and dog sleds over ice-rich permafrost soils would damage these soils. However, use would be mitigated or restricted if standards are approached or exceeded. There would be moderate adverse cumulative impacts of the final plan plus the aforementioned past, present, and reasonably foreseeable actions. The level of impacts to physical resources anticipated from this alternative would not result in an impairment of park resources that fulfill specific purposes identified in the establishing legislation or that are essential to the natural integrity of the park.

VEGETATION

This section analyzes the probable impacts to vegetation from the potential actions identified in this plan. For this analysis, vegetation includes vascular and non-vascular flora of Denali National Park and Preserve. The first part of this section provides an overview of the methodology used to evaluate impacts on vegetation, including a literature review of the types of impacts that could result from actions proposed in the plan. The second part is an analysis of the impacts likely to occur ~~under each alternative~~.

GENERAL IMPACTS BASED ON LITERATURE REVIEW

Analysis of impacts of recreational and administrative activities on vegetation in Denali National Park and Preserve has relied primarily on a literature review of the types of impacts that can occur and on consultation with NPS subject matter experts and resource managers.

Loss of Vegetation

A variety of activities can contribute to loss of vegetation in the Denali backcountry. In severely impacted areas, the direct effects to vegetation from snowmachine use include the creation of trails where vegetation has been eliminated. Hiking and overnight camping activities can create informal trails that become established. These trails are typically devoid of vegetation and may gully and impound (in lowland areas).

Impacts to vegetation and wetlands in the Denali backcountry from facility construction can be assessed based on several decades of experience elsewhere in the park. The principal impact of visitor facilities on vegetation is the loss of vegetation because of facility construction.

Vegetation can also be lost due to human-caused fires. After examining the Yellowstone Fire Reports from 1931–2000, Warthin (2002) concluded that incidents of human-caused fire in Yellowstone National Park were higher near trails, roads, and campsites because human use is focused in these places. Fire history at Denali National Park indicates a similar trend (Dan Warthin, pers. comm.).

Trampling and Damage

The direct impacts to vegetation from snowmachine use include structural damage to plant tissues (compression, abrasion, stem breakage) (Neumann et al. 1974, Roland 2000). In ice-rich permafrost areas, trails can form impoundments, which can change plant community composition and promote erosion. Indirect impacts of snowmachine use include changes in the distribution of snow cover and in the thermal properties of the snow from compaction (Pesant et al. 1985). These changes in snow properties can prematurely expose shrubs normally covered by snow; decrease snow density, reducing the insulating value of the snow (Wanek and Schumacher 1975); and increase the

duration of snow cover on trails, thereby shortening the growing season for plants in those areas (Pesant et al. 1985).

The plant species most sensitive to these impacts are those species whose canopy extends above the snowline and/or that are common in thin snow areas. These species include willows (*Salix* spp.) and shrub birch (*Betula glandulosa)*, mountain avens (*Dryas octopetala)*, and blueberries (*Vaccinium* spp). Although no quantitative studies have been completed on the impacts of snowmachine use on vegetation in the Denali National Park area, visual assessments of effects have been made in the Bull River/Foggy Pass area and the Windy–Foggy–Easy Pass area (Roland 2000). Broken shrub stems, stripped bark (from abrasion), trail development, and late-melting snow were evident in high-use snowmachine areas. A Canadian study of the ecological effects of snowmachines found that, after a single pass in a stand of tree saplings, over 78% of the saplings were damaged, and woody stems up to 2.5 cm in diameter were susceptible to damage (Neumann and Merriam 1972).

Hiking and overnight camping activities can affect vegetation in several different ways. In some cases, trails can widen eventually (Lance et al. 1989), especially in moist meadows and bogs, and trail braiding will develop with increased traffic on wet or steep slopes. Shrub-dominated communities are slower to recover than grass-dominated communities (Cloe and Trull 1992). Lichens are particularly sensitive to trampling (Tietz 1996) and may not recover for several years in high-use trail areas in the alpine zone. In areas where camping is frequent, bare mineral surfaces can form from compaction and trampling (Monti and Mackintosh 1979).

Some effects of hiker and horse trampling on various types of vegetation have been described in a 5-year study conducted at Denali (Reid and Schreiner 1985). In alpine tundra areas, total plant cover was reduced by 25% with less than 40 hiker passes per season. Total plant cover in the boreal forest was reduced by 75% under that same treatment level. Cover reduction of vascular plants in the shrub tundra was intermediate between these two types, but the predominant ground cover of nonvascular lichens and mosses was more severely affected than any of the other types of vegetation examined in the study. The recover rate of the graminoid alpine tundra plants was more rapid than the woody vegetation in either the boreal forest or shrub tundra. Impacts from horse use were higher in all vegetation types and recover of trampled sites was slower.

Introduction of Exotic Species

Densmore, et al. (2001) inventoried exotic species in Denali National Park and Preserve and found that the park maintains the very fortunate position of not having a serious exotic species problem. Unlike most parks outside Alaska, Denali currently does not endure the financial burden associated with eradication efforts.

Pack animals and trails contribute to the introduction and spread of exotic species (Campbell and Gibson 2001, Hammit and Cole 1987, Benniger 1989). Examples of exotic species that could be introduced into Denali National Park and Preserve include *Hordeum* and *Chenopodum album*, or any other variety of agricultural weed that could

end up in pack animal forage. Dust effects promote the establishment of invasive plant species, such as dandelion (*Taraxacum officinale*) that compete well in areas experiencing continued disturbance. Exotic plants have been seen on floatplanes in Alaska (pers comm. Carl Roland 3/14/05). *Myriophyllum spicatum* is one example of an aquatic plant that has been introduced via airplane.

Denali National Park and Preserve's invasive species control plan consists primarily of monitoring invasive species along the park road corridor. Resource specialists react to problems as they arise. For example, volunteers pull dandelions along the road corridor, and park staff have eradicated *Crepis tectorum* from the sewage lagoon area in the park's frontcountry.

Many natural landscapes in western North America are covered in exotic plant species, and that trend is starting to occur in Alaska. Resource experts believe that Alaska is on the cusp of a situation where species are starting to creep into interior Alaska at unprecedented rates (pers comm. Carl Roland 3/15/05). As exotic plants become more widespread, the probability of exotics spreading into Denali National Park and Preserve increases. Exotics currently exist at low densities in source areas like Fairbanks, but as densities of exotics increase in source areas, the probability of exotics spreading into the park increases. There are many indications that species are becoming invasive. Resource experts are particularly concerned about white sweet clover *(melilotus spp*.), which has become established on river bars on the Nenana River and Teklanika River outside the park, and about bird vetch (*Vicia cracca*), which has invaded natural areas around Fairbanks and has appeared three times in the park (pers comm. Carl Roland 3/15/05).

IMPACTS OF THE MODIFIED PREFERRED ALTERNATIVE

The following analysis shows that impacts to vegetation under this alternative would be moderate because some vegetation would be lost, trampling would occur in various locations throughout roughly eleven percent of the park, and the potential for introduction of exotic species is considerable. This alternative would provide a variety of appropriate wilderness recreational activities and experiences by establishing areas to serve those visitors who want to experience the wilderness resource values of the Denali backcountry but require services~~,~~ or assistance, or ~~short~~ who are unable to make lengthy time-commitments. The areas would be focused along the park road~~; in~~ in the Old Park and Kantishna ~~near the park road~~; at the Ruth, Tokositna, and Kahiltna Glaciers; and in the Dunkle Hills~~/Broad Pass~~ area.

Under this alternative, ~~55~~49% of the park (~~3,313,878.5~~2,903,388 acres) would be zoned as Management Area D or OP2. These management areas allow for low encounters, very little evidence of modern human use, no landscape modifications, and few, if any, trail and campsite disturbances (which include signs of social trails, campsites, or cut or broken vegetation). In addition, under this alternative, ~~29~~40% of the park (~~1,738,804~~2,383,710 acres) would be zoned as Management Area OP1 or Management Area B. These management areas allow for very little evidence of modern human use, no landscape modifications, and few encounters (visitors will almost always be alone). If

standards in these categories are approached or exceeded, use would be curtailed or mitigated. Therefore, minimal adverse impacts to vegetation are likely to occur in a large portion of the park (~~84~~89% of the total park area falls within one of the aforementioned management areas).

Under this alternative, ~~11~~6% of the park (~~668,314~~358,256 acres) would be designated as Management Area A, and ~~147~~ 70 linear miles of summer corridors and ~~157~~ 19.5 linear miles of winter corridors would be designated. The expectation in these areas would be to encounter up to five parties a day in Management Area A and up to ten parties a day along a corridor. These areas also allow for occasional trails, campsites, or cut or broken vegetation before use would be curtailed or the impacts mitigated. The remaining ~~four~~ five percent of the park would be zoned as Management Area C; this area would accommodate higher use levels, but this region of the park is largely un-vegetated.

Unless otherwise stated, all impacts would occur throughout the life of the plan.

Loss of Vegetation

The National Park Service would designate ~~hiker~~ Backcountry Hiker areas and (if needed) construct or improve the following:

- some of the existing social trails within Management Area A in Kantishna.
- the trail from Eielson Visitor Center to Gorge Creek
- the loop trail from the water tower above Wonder Lake Campground up to the bench west of Wonder Lake
- the Mount Healy trail extension
- the trail from the west end of Thorofare Bluffs down to the Thorofare River bar.
- ~~the area along Wildhorse Creek connecting to trails associated with the South Denali visitor facilities development.~~

Constructing trails in these areas would require removing vegetation.

Management area zoning would allow for increases in hiking and camping so some trampling and social trail formation would be expected around Kantishna and~~,~~ near access corridors ~~along the park road, and in the upper Tokositna drainage on the south side of the park~~. In these areas, social trails are likely to form, resulting in lost vegetation along the trail. Also, established trails and corridors tend to create pressure for new trails, which ~~would~~ could result in additional losses to vegetation. ~~While these impacts would be noticeable in the Kantishna area and along the park road corridor, t~~The area of impact would be small on a parkwide scale.

Impacts would be mitigated by the requirement that all guided cross-country hikes would be subject to the group size limit of either 6 or 12 including guides and would be required to have a group leader who is trained in leave-no-trace principles for tundra environments generally and Denali National Park in particular. The strategy to prevent social trail formation (see chapter 2, Actions Common to All Action Alternatives) would help mitigate loss of vegetation by reducing the potential for social trail establishment.

Up to five designated ~~campsites~~ camping areas would be created in conjunction with the Corridor areas in the Kantishna Hills. Where trails and campsites are created, vegetation would be lost. Increased incidents of human-caused fire are likely to occur near trails and campsites, resulting in burned vegetation. Summer Corridor areas would receive high levels of use and social trails would form in these areas. Loss of vegetation would ~~occur~~ be very localized, primarily in the Kantishna area~~ and, along the park road corridor, and in the Wildhorse Creek drainage on the south side (impacts would occur at localized areas within about 163% of the total park area)~~.

In the northern park additions, winter trails established by snowmachine or dog sled are slower to melt out than the surrounding area. Slower melt out reduces the length of the summer growing season along these trails. Over time, plants may not be able to be as viable in these areas.

Trampling

Under this alternative, access by snowmachine to the park additions and preserves would be allowed to continue and to grow. Designating corridors for winter use would focus snowmachine use ~~in the following places: from~~along~~ the southern park boundary to the Old Park boundary near~~ the West Fork Chulitna, Bull River, and Cantwell Creek to the Old Park boundary~~; to the toes of the Ruth, Tokositna, and Kanikula glaciers from the Tokositna River~~and along the Tokositna and Kanikula Rivers~~along the Yentna, Tokositna, and Kantishna/Muddy Rivers~~. In a future wilderness proposal, accommodation would be made as necessary for recreational snowmachine access along 19.5 miles of winter season corridors~~ and throughout those areas designated as Management Area A (11% of the total park area and along 157 linear miles of corridors)~~. Trampling of vegetation from snowmachine use would increase as use increases. Vegetation in these high-use areas would be trampled and compacted by repeated passes of snowmachines. The peat lands along the southern boundary of the park would be especially susceptible because they are inherently susceptible to trampling and because use in these areas is expected to increase.

Heavily used routes can have long-term effects on vegetation due to crushing and elimination of vegetation, and, in the most severe cases, changes in vegetation community structure. While the adequate snow cover requirement (see Chapter 3: Affected Environment) is intended to prevent these types of impacts, they are still possible in some places because of the wide variety of terrain and climatic conditions of the park additions and preserve and because the determination of adequate snow cover applies to relatively large areas.

Registration would likely become required for overnight use east of and including the Kahiltna Glacier. The registration requirement, along with operating a public lands information center at Broad Pass, would allow park staff to better educate the visitor about low-impact techniques, thereby helping to mitigate adverse impacts to vegetation from hiking and winter uses such as snowmachine use and dog mushing. Registration would provide information that could be used to correlate visitation trends with impacts

to vegetation and help managers choose an appropriate access management tool if impacts exceed standards.

Damage to vegetation from mountain bike use would be minimal since very little off-trail riding would be expected to occur due to difficulty of riding off-trail. If standards in the trail disturbance category are approached or exceeded, use would be curtailed or mitigated.

Most mushing in the park starts from the Healy area or the park entrance area to Wonder Lake via the park road or the Stampede/Clearwater/Moose Creek route. Some mushing also occurs in the northwest preserve, in the Windy/Riley drainages, and from the Stampede area up the Toklat River. Impacts to vegetation from dog sleds would be similar to those described for snowmachines, except that the extent of the disturbance would be less because dog sleds glide over the surface more easily than heavier snowmachines and do not spin tracks. Stem breakage and abrasion are the most common impacts. Mushers tend to use established trails rather than construct new ones, so the impacts would be confined to a smaller total area. In addition, mushing typically is confined to valleys and passes, rather than high alpine areas, thus travel in windswept, snow-free areas is limited (Karen Fortier, pers. comm.). Consequently, alpine tundra is less affected by dog sleds than it would be by snowmachines.

Dog sleds would crush vegetation along the park road corridor and along the north boundary of the park, but the impact would be focused on a small area of the park. Use in areas such as Stampede and Kantishna that currently see the most use would not reach levels high enough to cause substantial impacts. Levels of dog-sled use would increase slightly above current numbers but impacts would be minimal because most of the Kantishna and Stampede areas would be zoned as Management Area B, which accommodates medium encounters, low signs of human presence, and low trail and campsite disturbance. If impacts to vegetation approach or exceed standards, use would be curtailed or mitigated.

Skiers generally use the park road and the Riley/Windy area. Levels of skier use would increase to slightly more than current numbers, but impacts would be minimal because much of the park would be zoned as Management Area B, D, OP1 or OP2, which accommodates low to medium encounters and low or medium trail and campsite disturbance. If impacts to vegetation approach or exceed standards, use would be curtailed or mitigated.

Operating a public lands information center at Broad Pass would provide an opportunity to educate winter recreationists about low-impact techniques, thereby helping to mitigate adverse impacts to vegetation from winter uses like snowmachine use and dog mushing.

Introduction of Exotic Species

Through management area zoning, this alternative would allow for increases in levels of use throughout the park additions and preserve. Increased use from pack animals, hikers, and boats~~, and airplanes~~ would increase the potential for introduction of exotic species. ~~However, the park would have a formal process to determine when impacts from the introduction of exotic species via pack animals and other vectors become severe enough to warrant management action.~~The most severe adverse impact to vegetation would result from the introduction of exotic plant species from airplane landings. Introduction of aquatic exotic species could become especially problematic in the northern addition where increases in motorboat use and floatplane landings could increase the spread of exotics. Exotics could also be carried in by airplanes landing on dry ridges or at non-glaciated landing areas in the Dunkle, Yentna, Tokositna, Stampede, and Kantishna areas.

Trail construction would also contribute to the potential for introduction of exotics because materials used in trail construction could contain exotic species. The National Park Service would designate ~~hiker~~ Backcountry Hiker areas and (if needed) construct or improve the following:

- some of the existing social trails within Management Area A in Kantishna.
- the trail from Eielson Visitor Center to Gorge Creek
- the area from the water tower above Wonder Lake Campground up to the bench west of Wonder Lake
- the Mount Healy trail extension
- the trail from the west end of Thorofare Bluffs down to the Thorofare River bar.
- ~~the area along Wildhorse Creek connecting to trails associated with the South Denali visitor facilities development.~~

Trails provide easier access so they typically attract greater numbers of people than off-trail areas. More trails equate to higher use and higher use creates a greater potential for the introduction of exotics. Trails are especially susceptible to colonization of exotics because exotics can more easily colonize disturbed areas that are free of vegetation. Trails that originate along the road corridor (at Eielson, Wonder Lake, and Kantishna) would connect a disturbed area (the park road corridor) to an undisturbed area, facilitating the spread of exotics into the backcountry. The introduction of exotic plant species could displace native vegetation, alter the composition of plant communities, and disrupt ecological functions.

~~Impacts from exotic species in a management scenario that uses a formal process, such as management area zoning and the use of indicators and standards that is proposed under , would be less than in a situation where no formal process exists and managers react to impacts on a case-by-case basis. A formal process to guide management decisions would allow managers to focus monitoring and mitigation efforts. Still, under this alternative, it could be difficult to monitor all areas that would be most susceptible to the spread of exotic species because there are many areas and some are very remote.~~

Cumulative Effects

The expansion of communities and local road networks near the park's eastern and southern boundaries combined with technology improvements have enhanced access by snowmachine and dog sled in winter, raising use levels and the associated potential for trampling vegetation. This trend is likely to continue in the future and will be supplemented by access improvements and increased visitation associated with South Side Denali plan implementation, and ~~possibly~~ some level of legal ORV use associated with subsistence use, all of which could increase the potential for introducing exotic species as well as increased trampling both summer and winter. Trail construction within the Old Park and additional planned trail construction associated with both the 1997 *South Side Denali* and the 1997 *Entrance Area and Road Corridor* plans has resulted (and will result) in the direct removal of vegetation. Timber harvest for subsistence also removes vegetation.

These actions will result in moderate adverse impacts to the vegetation resources of the park. Implementing this alternative would have moderate adverse impacts on vegetation. The cumulative adverse impact of this alternative plus the aforementioned past, present, and reasonably foreseeable actions would be major.

Conclusion

Under this alternative, impacts to vegetation would be moderate because some vegetation would be lost, trampling would occur in various areas throughout roughly ~~11~~6% of the park, and the potential for introduction of exotic species from new trail construction and airplane access is considerable. Increases in use would be expected ~~to increase~~ parkwide; however, use would be curtailed or mitigated if impacts to vegetation approach or exceed standards outlined in chapter 2. The cumulative adverse impact of this alternative plus the aforementioned past, present, and reasonably foreseeable actions would be major. The level of impacts to vegetation anticipated from this alternative would not result in an impairment of park resources that fulfill specific purposes identified in the establishing legislation or that are essential to the natural integrity of the park.

WILDLIFE

The wildlife section presents a literature review of the types of impacts on wildlife that can result from the various visitor activities that could occur in the park and preserve, outlines the impacts thresholds used to determine the magnitude of effects on wildlife, and provides an analysis of the impacts likely to occur under ~~each~~ the modified preferred alternative.

GENERAL IMPACTS ON WILDLIFE

Analysis of impacts of recreational activities on wildlife in Denali National Park and Preserve has relied primarily on:

- studies and reports compiled for an environmental assessment of closure of the Old Park in Denali National Park and Preserve to snowmachine use
- a review of the effects of winter recreation on wildlife in Yellowstone National Park (Oliff et al. 1999)
- studies and reports cited in the draft environmental impact statement for the winter use plan for Yellowstone and Grand Teton National Parks
- studies and reports cited in *Effects of Recreation on Rocky Mountain Wildlife: A Review for Montana* (Joslin and Youmans, 1999)
- a book on wildlife and recreational use (Knight and Gutzwiller 1995)

In combination, these references provide an excellent summary of the available literature on effects of recreational activities on wildlife. The environmental consequences to wildlife of recreational activities outlined in the Denali Backcountry Management Plan would vary for different species and activities.

Specific research on the effects of backcountry recreational activities on wildlife in Denali National Park and Preserve includes a wolf study by Chapman (1977) and several analyses of the effects of visitor use along the road corridor. Research on the effects of the park road and vehicular traffic with its associated human activities includes several studies over the past 25 years: Tracy 1977, Dean and Tracy 1979, Singer and Beattie 1986, Dalle-Molle and Van Horn 1991, Taylor et al. 1997, and Burson et al. 2000.

Snowmachine Use and other Winter Activities

Several studies have been conducted that show the direct impact of repeated snowmachine use on wildlife behavior and levels of physiological stress (Aune 1981; Dorrance et al., 1975; Freddy et al., 1986; Moen et al., 1982; Neumann and Merriam, 1972; Rudd and Irwin, 1985; Simpson 1987; Tyler 1991; Voyageurs National Park 1996). These studies indicate that exposure of wildlife to snowmachine use can result in behavioral alteration, habitat avoidance, and increased energy expenditures. These changes could occur at critical times when animals are under extreme stress, especially during winter, when energy conservation is crucial. As winter progresses, animals can experience an energy deficit, as more energy is used to survive than is replenished. The

survival of individual animals depends on the severity of energy expenditures as well as the animal's energy stores.

Ungulates: Caribou, Dall Sheep, Moose

Creel et al. (2002) completed a study of the effects of snowmachine activity on elk and wolves, focusing on the occurrence of stress-related hormones (glucocorticoids [GCs]) in fecal samples in areas with differing levels of snowmachine use in Yellowstone, Voyageurs, and Isle Royale national parks. Chronically elevated GC levels have been associated with a variety of problems including reduced reproduction, ulcers, muscle wasting, and immune suppression. This study found significantly higher levels of GCs in elk in Yellowstone during the snowmachine season and when daily numbers of snowmachines increased. In summary, Creel et al. (2002: 812) reports that the data "…show that stress-hormone levels correlate with snowmobile usage on both short (daily) and long (annual) time scales." Although these increased GC levels indicate a clear physiological stress response to snowmachines, no perceptible impacts on population size have been recorded in these parks, which the authors suggest indicates that the elk and wolf populations are able to compensate for the current levels of snowmachine activity.

Observations by Alaska Department of Fish and Game biologists in the Talkeetna Mountains near Denali National Park and Preserve indicate that increasing recreational snowmachine use is beginning to alter moose use of preferred tree line willow habitats (Herman Griese, pers. comm.). Dog-sled use and snowshoeing can also increase negative interactions of human visitors with moose encountered on the trails.

Several sources cite the loss of habitat and the use of traditional migration routes as concerns associated with bighorn sheep (Constan 1975; Horejsi 1976; Reisenhoover et al. 1988; EPFW 1993). Various recreational activities are known to cause displacement from preferred habitats (Horejsi 1976; Hicks and Elder 1979) and fleeing when approached by people (MacArthur et al. 1982). Similar reactions by Dall sheep could be expected when confronted with other forms of human activity, such as the presence of snowmachines, snowshoers, skiers, and dog teams.

Compacted trails also change distribution patterns of animals by providing energy efficient travel ways that alter winter survival rates, predation rates, distribution patterns, availability of carrion for use by other species, and levels of human conflict (Meager et al. 1994). Compaction of snow in forage areas can also have other negative effects on wildlife foraging. It increases energy expenditures by ungulates, such as caribou, that must dig for vegetation in extremely stressful winter months (Fancy and White 1995).

Research at Denali also indicates that snow depth and winter travel conditions are important factors in winter survival for ungulates and the predators that depend on them (Adams and Dale 1998). Traveling through snow compacted by a snowmachine can cost caribou 2–4 times as much energy as traveling through uncrusted snow (Fancy and White 1985).

In certain situations, a snowmachine can be less disturbing than a cross-country skier. As referenced by Joslin and Youmans (1999), Parker et al. (1984:484) observed, "Flight distances decline from early to late winter as the animals become habituated and as body energy reserves are depleted. Greater flight distances occur in response to skiers or individuals on foot than to snowmachines, suggesting that the most detrimental disturbance to the wintering animal is that which is unanticipated." Observations in locations other than well-used trails, where all types of use were equally unfamiliar to animals or not restricted to trails, such as the Denali situation, demonstrate equal or greater responses to snowmachines (Aune 1981). More importantly, the speed and range of snowmachines mean that they have the potential to disturb wildlife over a much larger geographic range than non-motorized travel.

The lack of an overt behavioral response does not necessarily indicate an absence of disturbance. According to Chabot (1991), elk heart rate data showed an increase in heart rates even when their behavior did not demonstrate a response.

Large Carnivores: Black Bear, Brown/Grizzly Bear, Wolf

Research indicates that additional stress from disturbance by increased human activity could have a detrimental effect on bears during critical times (Goodrich and Berger 1994; Watts and Jonkel 1989). Goodrich and Berger (1994) showed that some bears abandoned dens and cubs in response to disturbance.

A four-year study at Voyageurs National Park, Minnesota, found that snowmachines were adversely affecting wolves through displacement and disturbance (Voyageurs National Park 1996). Creel et al. (2002) completed a study of the effects of snowmachine activity on elk and wolves, focusing on the occurrence of stress-related hormones (glucocorticoids [GCs]) in fecal samples in areas with differing levels of snowmachine use in Yellowstone, Voyageurs, and Isle Royale national parks. Chronically elevated GC levels have been associated with a variety of problems including reduced reproduction, ulcers, muscle wasting, and immune suppression. In Voyageurs National Park, a 37% decrease in snowmachine use was accompanied by a 37% decrease in GC levels in wolves, indicating a strong relationship between these parameters. In summary, Creel et al. (2002: 812) reports that the data "…show that stress-hormone levels correlate with snowmobile usage on both short (daily) and long (annual) time scales." Although these increased GC levels indicate a clear physiological stress response to snowmachines, no perceptible impacts on population size have been recorded in these parks, which the authors suggest indicates that the elk and wolf populations are able to compensate for the current levels of snowmachine activity.

Compacted trails also change distribution patterns of animals by providing energy efficient travel ways that alter winter survival rates, predation rates, distribution patterns, availability of carrion for use by other species, and levels of human conflict (Meager et al. 1994). Some activities, such as dog-sledding and snowshoeing, may change movement patterns of some wildlife species such as wolves that use the packed trails.

Joslin and Youmans (1996) referenced several studies to summarize how wolves use snowmachine trails:

> Wolves often take advantage of easy travel on compacted snowmobile trails. Traveling on human-compacted routes has both positive and negative impacts on wolves. Human activities that compact snow (e.g., snowmobiling, cross-country skiing, road-plowing) provide easy travel routes for wolves into areas that would otherwise be difficult to reach in deep snow (Paquet et al. 1996). Wolves have a lighter foot loading than most ungulates (Telfer and Kelsall 1984) and often travel on snow that will not support their prey (Peterson 1977, Paquet 1989). Wolves have difficulty moving in snow deeper than 50 cm (Pulliainen 1965) and normally avoid areas of consistently deep snow. The ease of travel along travel routes compacted by humans may increase the effects of predation on ungulates (O'Karma et al. 1995) as previously unexploited ungulate ranges are discovered by wolves.

Domestic dogs in backcountry areas can negatively affect wildlife by disturbance and disease transmission (Mech and Goyal, 1993; Sime 1999).

Small and Mid-sized Carnivores: Lynx, Coyote, Fox, Mustelids

Hornocker and Hash (1981) suggested that human access via snowmachine or all-terrain vehicles in winter or early spring could disturb wolverines, and in the Lolo National Forest, Montana, denning wolverines appear sensitive to the slightest human disturbance in the denning area (USDA Forest Service 1998). Copeland (1996) believes that technological advances in over-snow vehicles and increased interest in winter recreation has likely displaced wolverines from potential denning habitat and will continue to threaten a possibly limited resource. This could result in lower reproductive success and/or kit survival. In the Lolo National Forest, female wolverines in the area are presumed to have abandoned any potential denning areas that experience snowmachine use (USDA Forest Service 1998). Copeland (1996) also found that snowshoers caused den abandonment in a cirque basin.

Characteristics of snowmachine use, including dispersal over the landscape, operation at night when lynx are active, alteration of the mobility and distribution of snowshoe hares, and winter operations all point to this form of recreation as being potentially adverse to lynx (Olliff et al. 1999). Snowmachine use has affected red fox mobility (Schmid 1983). Dog-sledding and snowshoeing may change movement patterns of coyotes, and foxes that use the packed trails.

Lynx are specialized deep-snow predators, an adaptation that permits them to live year-round at high elevations, thereby minimizing competition during the physically stressful winter months. Snowmachine or cross-country ski trails allow lynx competitors to infiltrate high-elevation habitats during winter, thereby increasing competition for a limited food supply (Idaho Department of Fish and Game et al. 1995).

Compacted trails also change distribution patterns of animals by providing energy efficient travel ways that alter winter survival rates, predation rates, distribution patterns,

availability of carrion for use by other species, and levels of human conflict (Meagher et al. 1994).

Rodents, Lagomorphs, and Insectivores
Snowmachine use has affected snowshoe hare mobility (Schmid 1983). Neumann and Merriam (1972) found snowshoe hares reducing their use of habitat near snowmachine trails.

Small mammals inhabiting the subnivean environment are adversely affected by snowmachine use. Jarvinen and Schmid (1971) noted increased small mammal mortality beneath compacted snow. Some of the possible changes in snow conditions resulting from snow compaction include a decrease in subnivean air space, a change in temperature, and accumulation of toxic air under the snow (Jarvinen and Schmid 1971, Schmid 1971a and b). Multiple passes over the same track will have more impact than a single pass, and the larger the area of compaction, the greater the possible affect to subnivean fauna (Halfpenny and Ozanne 1989).

Fish and Aquatic Life
Snowmachine use could affect fish and other aquatic species through increased use, including at stream crossings, and the possibility of contaminants [fuel spills and unburned fuel deposited by two-stroke engines (EPA, 2001)]. Pollutants from snowmachine emissions, including highly persistent polycyclic aromatic hydrocarbons, can remain within the snow pack until they are released during snowmelt, causing elevated acidity levels in surrounding waterways, which could result in adverse effects on fish (Adams 1975) or higher death rates for aquatic insects. The severity of these occurrences would depend on the level of use near waterways.

Non-motorized forms of winter recreation, such as dog sledding, skijoring, cross-country skiing, and snowshoeing, would cause minimal levels of noise and physical disturbance to aquatic habitats under adequate snow and ice cover.

<u>Hiking, Backpacking and Camping</u>

Knight and Cole (1995b) reviewed literature on the effects to wildlife by humans on foot and found that most responses of wildlife are behavioral and of short duration.

Ungulates: Caribou, Dall Sheep, Moose
Studies of the effects of hikers on large mammals have included several studies on species of horned sheep (Dall sheep and relatives). MacArthur et al. (1982), in a study of the differences in response of mountain sheep in Alberta, found little reaction of sheep to hikers approaching from parked vehicles, but responses increased markedly when sheep were approached from above (from out of view). Papouchis et al. (2001) found that hikers in Canyonlands National Park elicited more severe responses from bighorn sheep (animals fled in 61% of encounters) than did either vehicles (17%) or mountain bikers (6%), and they speculated that part of the reason for the difference in response was that approaches by hikers were more unpredictable.

Large Carnivores: Black Bear, Brown/Grizzly Bear, Wolf
Grizzly bears are sensitive to human disturbance. However, they will readily habituate to ongoing and predictable human activity. Habituation can be both negative and positive. Habituation can be positive in that human activity will not displace bears from preferred foraging areas or disrupt crucial life processes. Habituation can be negative in areas where human activity is not closely regulated because habituation is usually accompanied by food conditioning. Habituated and food-conditioned bears are dangerous because they have come to associate humans with food (Joslin and Youmans 1999).

In several parks and other protected areas, backcountry units have been closed to hiking and other recreation to protect wolf dens and wolf pups from human disturbance and habituation (Chapman 1977, Fritts, et al. 2003, NPS 2002e, NPS 2003).

Birds
Some recent research has focused on the effects of hiking and recreational trails on bird populations, where effects of disturbance may be subtler, such as changes in diversity, nesting success, or distribution. In Colorado, recreational trails adversely affected both the numbers and breeding success of some bird species using habitats adjacent to trails, although it was not clear whether those effects were due primarily to the edge effect of the trail or to human disturbance (Miller et al. 1998). Visitor levels in Colorado were significantly higher (more than 1 million visits per year) than would be expected in Denali National Park and Preserve. In contrast, Miller and Hobbs (2000) found that nest predation was less near trails along a riparian area in Colorado (use averaged 16–22 people/hectare) but increased in adjacent habitats, apparently because of mammalian predators being displaced from areas near the trail. These studies suggest that the habitats likely to receive the greatest disturbance are those where hikers are concentrated, such as at trailheads, or where larger party sizes return frequently, such as with guided tours.

Steidl et al. (1993) found that human disturbance (such as camping at 400 m from nests) negatively affected nesting behaviors of golden eagles. Adults spent less time near their nests, fed their young less frequently, and fed themselves and their young up to 67% less food when observers were camped 400 m from nests than when observers were camped 800 m from nests. The potential impacts from the reduction in food alone could have substantial long-term effects on the golden eagle population (Steidl et al. 1993).

Aircraft

The primary disturbance to wildlife from aircraft (fixed-wing and helicopter) operations is noise. Noise generated by airplanes can be separated into two general components: (1) noise associated with take-offs, landings, and taxiing, where maximum noise levels are generated relatively close to the ground and on the airstrip, and (2) noise generated by airplanes flying over the park.

Ungulates: Caribou, Dall Sheep, Moose
Research on the effects of low-altitude military aircraft on caribou concluded that behavioral impacts generally were mild, but that female caribou reacted to the noise of jet aircraft overflights by lying less and moving more, and that these responses were most

prevalent in June when newborn calves were present (Murphy et al. 1993). Other research on northern mammals has focused on low-flying helicopters and the effects of low-level aerial surveys (Klein 1973, McCourt and Horstman 1974, Calef et al. 1976). These studies provide a framework for how different species are affected by aircraft noise and aircraft activity in general.

Although rare, collisions of aircraft with wildlife are possible either while landing or taking-off at airstrips and while in flight (Cleary et al. 2002). Some animals may be attracted to airstrips by forage availability (willows for moose) or insect-relief habitat (caribou) that places them in locations where aircraft strikes are possible during landings or take-offs.

Watercraft

Motorized boating on rivers can have localized impacts on some wildlife species. Knight and Cole (1995b) found that motorized boating tended to be more disturbing to wildlife than non-motorized boating because it presented not only a visual stimulus (movement), but caused noise as well, which increased disturbance to wildlife.

Birds

Motorized and non-motorized boating on lakes, ponds, and rivers can disturb nesting waterfowl and shorebirds that use those wetlands. Reactions of waterfowl to boating activities can range from swimming away from the disturbance to flying (Hockin et al. 1992, Madsen 1998). Bald eagles were sensitive to boating activities along narrow river corridors and to noisy boats, but responses varied seasonally (Anthony et al. 1995). Motorboat traffic can have negative impacts on loon nests and nesting success (Vermeer 1973).

Fish and Aquatic Life

Motorboat use may cause degradation of fish and wildlife habitats in heavily used areas by destroying vegetation, introducing invasive species, degrading soils, or adversely affecting water quality.

Sport Hunting and Fishing

Sport hunting and fishing (including guided hunting and fishing) result in mortalities (and occasionally injuries) for target animal and fish species. In addition, non-target wildlife may experience short-term behavioral disturbance or displacement from noise and human activity associated with guided hunts.

IMPACTS OF THE MODIFIED PREFERRED ALTERNATIVE

There would generally be minor to moderate adverse impacts to wildlife populations and habitats under this alternative, primarily because of the impacts of increased

snowmachine and motorboat use ~~on various wildlife species~~and to a lesser extent from non-motorized recreational activities.

General Impacts: Wildlife

Under this alternative, snowmachine use would continue to increase and expand into more locations in the park additions and preserve. Use would expand in area (as 64% of the total park area would be open to snowmachine use) and in density. In addition to dispersed use, winter corridors ~~would~~ could be established ~~from the southern park boundary to the Old Park boundary near~~along the West Fork Chulitna, Bull River, and Cantwell Creek up to the Old Park boundary and ~~. If demand is sufficient, this alternative also allows for the establishment of winter corridors to the toes of the Ruth, Tokositna, and Kanikula glaciers from the Tokositna River~~up the Tokositna to the mouth of Wildhorse Creek. Winter corridors would result in areas of more concentrated snowmachine use and areas designated as Management Area A (~~11~~6% of the park and preserve) would allow for an encounter rate of up to five parties per day, including two parties of up to six people. Areas designated Management Area B (~~5~~16%) would allow an encounter rate of up to two parties per day, including parties of up to six people.

Several different impacts to wildlife populations and habitats could be expected from the increased numbers and density of snowmachine use. Encounters with wildlife in the backcountry would cause behavioral disturbance, increase stress levels, and temporarily displace wildlife from areas where snowmachines are regularly used. In some cases, wildlife mortality or injury to species would occur from wildlife-snowmachine collisions. Snowmachine trails would enhance or modify movements of wildlife by providing packed trails that make movements easier and that allow access to new areas. There would be short-term changes in wildlife populations and habitats at several distinct locations in the park and preserve over the next 20 years.

~~Under Alternative 4, scenic air tour landings would be allowed on all glaciers in areas designated as Management Area A, with no daily time restrictions. Noise standards would require overflights to diminish or disperse in some areas, such as over the Old Park. Disturbances would generally be noise-related and short-term (five minutes or less each time).~~

The types of impacts to wildlife that could occur from hiking and camping would include behavioral reactions of short duration and low intensity that would not have long-term impacts on wildlife populations. Areas designated as Management Area A (~~11~~6% of the park and preserve) would allow for encounter rates of up to five parties per day, with two parties of up to six people. A large part of this management area covers glaciated areas that have little wildlife, but the increased density of visitors in ~~these~~ lowland areas could result in increased wildlife disturbance, habituation, and food-conditioning. These impacts would occur only occasionally at localized areas throughout the life of the plan.

Wildlife populations, demography, and distribution would be monitored and management action taken if statistically significant changes in these variables could be correlated to

changes in visitor use. Assuming that monitoring is successful at detecting changes and management action is successful at managing visitor use, the degree of impact should be minimized. However, the reactive nature of this approach would still allow some of the adverse impacts to occur although they might later be reversed.

Ungulates: Caribou, Dall Sheep, Moose. Snowmachine use under this alternative would cause behavioral disturbance, increase stress levels, and temporarily displace ungulates, particularly moose and caribou, from areas where snowmachines are regularly used. In some cases, ungulate mortality or injury would occur from wildlife-snowmachine collisions. Because of existing regulations, wildlife populations would not be adversely affected by harvest from guided hunts. Encounters of ungulates with dog teams and skiers would cause short-term displacement, but the limited number of users and the typically short distance covered would limit this impact. There would be short-term changes in wildlife populations and habitats at several distinct locations in the park and preserve over the next 20 years.

Large Carnivores: Black Bear, Brown/Grizzly Bear, Wolf. Snowmachine use under this alternative would cause behavioral disturbance, increase stress levels, and temporarily displace large carnivores from areas where snowmachines are regularly used. In some cases, mortality or injury would occur from wildlife-snowmachine collisions. Snowmachine trails would enhance or modify movements of large carnivores, such as wolves, by providing packed trails that make movements easier and that allow access to new areas. Snowmachine use would displace denning bears and lead to den abandonment. Because of existing regulations, wildlife populations would not be adversely affected by harvest from guided hunts. There would be short-term changes in wildlife populations and habitats at several distinct locations in the park and preserve over the next 20 years.

Small and Mid-sized Carnivores: Lynx, Coyote, Fox, Mustelids. Snowmachine use under this alternative would cause behavioral disturbance, increase stress levels, and temporarily displace small and mid-sized carnivores from areas where snowmachines are regularly used. In some cases, mortality or injury would occur from wildlife-snowmachine collisions. Snowmachine trails would enhance or modify movements of some species, such as lynx and their competitors (coyotes and foxes), by providing packed trails that make movements easier and that allow access to new areas. There would be short-term changes in wildlife populations and habitats at several distinct locations in the park and preserve over the next 20 years.

Birds. Increased motorboat use could be expected and would increase disturbance and displacement of waterfowl, which could lead to increased nest abandonment and predation. There would be short-term changes in waterfowl populations and habitats at distinct locations in the park and preserve, but long-term impacts to certain species, such as swans, could occur in the designated corridors of the Tokositna~~, Yentna~~ and Kantishna/Muddy Rivers.

Fish. Under this alternative, growth in snowmachine use in the areas of highest present use, such as near Broad Pass and on the upper Tokositna River, would be constrained or dispersed. This would minimize adverse impacts to fish and other aquatic species by reducing potential contaminant fuel spills and unburned fuel deposited by two-stroke engines. Snowmachine use in the proposed access corridors, such as near Broad Pass and the upper Tokositna River, would require additional monitoring to protect aquatic resources. Use in other areas would gradually increase over present use levels, but periodic monitoring of areas would alert managers to any changes in resource health.

Sport fishing in the park and preserve would not result in adverse impacts on fish populations. Dispersed use, restricted use areas, and fish regulations all decrease the relative magnitude of these effects in the park.

Cumulative Effects

Impacts to wildlife in the vicinity of Denali National Park and Preserve are expected to increase as additional development occurs along the Parks Highway corridor and private and commercial activities increase at the southern end of the park. Development on the south side is likely to continue in and adjacent to Denali State Park and in gateway communities such as Petersville, Trapper Creek, and Talkeetna. Continued residential growth, recreational use, and ~~sport~~ hunting from the Healy area west along the Stampede Trail could also result in moderate impacts to wildlife. Commercial rafting on the Nenana River and non-commercial boating on some park rivers and lakes would generate noise and cause temporary displacement of wildlife along the riparian zone, resulting in a minor impact.

Subsistence hunting and trapping, including the potential use of off-road vehicles for subsistence uses (along Cantwell and Windy Creeks) would result in minor adverse impacts on wildlife abundance because of short-term reductions in population of some species such as marten or moose in small areas. Motorized uses, including where permitted for access (Dunkle Hills, Kantishna Hills), can cause noise and visual stimuli that result in behavioral disturbance and temporary displacement of some wildlife species on a seasonal basis. These effects on wildlife species would continue at specific locations throughout the life of the plan.

These activities would result in loss of habitat, behavioral changes such as avoiding developed areas, human-generated noise, and other disturbances to wildlife in the vicinity of Denali National Park and Preserve. (Other disturbances could include introduction of parvovirus and other diseases to wildlife species in Denali from outside sources.)

The combination of impacts from other activities, including those outside the park that directly affect park wildlife, and the management provisions under this alternative, would result in moderate impacts overall, since there would be medium intensity, long-term changes in important wildlife resources. The types and levels of use proposed under this alternative would contribute a minor portion of the overall cumulative impacts to wildlife.

Conclusion

There would be minor to moderate adverse impacts to wildlife populations and habitats under this alternative because of the effects of increased snowmachine and motorboat use on various wildlife species. The level of impacts to wildlife anticipated from this alternative would not result in an impairment of park resources that fulfill specific purposes identified in the enabling legislation or that are essential to the natural integrity of the park.

NATURAL SOUNDSCAPES

As described in chapter 1, NPS Management Policies and Directors Order #47 establish that natural soundscapes are intrinsic elements of the park environment, and thus are part of the resources and values that the NPS is responsible for protecting, no less so than wildlife or other natural features of the parks. At Denali, the sounds of wolves howling, marmots whistling, white-crowned sparrows singing, water rushing through streambeds, wind in the aspen trees, and absolute stillness and quiet are among the natural sounds that are potentially impacted by actions proposed in the alternatives for this plan. Intrusions on the natural soundscape are sounds generated by human activity, much of which qualifies as "noise" under the definition provided by Directors Order #47 that reads, "noise is generally defined as an unwanted or undesired sound, often unpleasant in quality, intensity or repetition." Noises that obscure natural sounds are of particular concern, primarily those generated by mechanical and motorized devices such as aircraft, snowmachines, motorboats, or chainsaws.

METHODOLOGY

Although the science of measuring noise impacts from motorized vehicles, aircraft, or other equipment is well developed, the research applies mostly to industrial and urban situations and is not particularly useful in evaluating impacts to national parks or other natural areas. Three relevant research approaches have been used:

1) Impacts on the natural sound environment, which can be determined by acoustics alone
2) Impacts on visitor enjoyment (e.g. Andersen 1993, Gramann 1999);
3) Impacts on wildlife (e.g. Fletcher 1978, Radle 1997).

This analysis addresses only the first of these topics, impacts to the natural sound environment itself. The other two topics are addressed in the Recreational Opportunity and the Wildlife sections of this chapter as appropriate.

The analysis explores the questions of intensity, duration, and context for this topic by answering three questions for each alternative:

- How much motorized noise disturbance is allowed? This information is specified by standards associated with management area designations.
- How do these desired future conditions compare to current conditions? Information about current conditions is incomplete, but sufficient data is available to at least indicate the relationship if not to draw firm conclusions.
- How much motorized noise disturbance is likely to occur? This information is derived from trends described in chapter 3 and the Assumptions listed at the beginning of this chapter, combined with the guidance from management area designations and other access management actions.

Natural sounds are a component of Denali's wilderness resource values, which are identified as resources in the park's enabling legislation. In some park locations, such as the Old Park, natural sounds are a unique resource; in other park locations natural sounds are at least an "important" resource in terms of the definitions provided at the beginning of the chapter. Natural sound disturbances do not represent permanent changes in park resources; however, if plan actions allow indefinitely recurring seasonal disturbances the affects would be considered long term.

Sound Monitoring Stations

As a resource for the analysis, Table 4-1 shows how existing data for several locations in Denali National Park and Preserve matches the desired future conditions of each management area. The data were collected through the placement of automated sound stations that measure sound levels and make 5-second digital recordings every 5 minutes (12 samples per hour). The numbers in the table are expressed as a percentage of the samples that exceed desired future conditions for natural sounds. Except for some of the Portal areas, each of these locations has at least two possible designations presented in the alternatives. While the data are illustrative, the sample sizes are generally small and most of the areas sampled are known to have among the highest levels of motorized access (such as established airplane landing areas at Kahiltna Base Camp and the Ruth Amphitheater).

Table 4-1: Percentage of Sample Hours, Days, or Events for which Measured Condition Exceeds Standard, by Location and Management Area

Desired Noise Condition	Low			Medium			High			Very High		
Management Areas	D, E, OP1, OP2			B, C			A, Portal, Corridor West Buttress SUA			Ruth Glacier SUA Portal – Major Landing Area		
Indicators / Location/Sample Size	% time audible[1]	# motor noises[2]	max sound level[3]	% time audible[1]	# motor noises[2]	max sound level[3]	% time audible[1]	# motor noises[2]	max sound level[3]	% time audible[1]	# motor noises[2]	max sound level[3]
Kahiltna Base Camp 5 days 5/02	40%	80%	31%	31%	80%	31%	24%	80%	2%	6%	0%	2%
Dunkle Hills 5 days 5/01	24%	40%	6%	16%	0%	6%	8%	0%	0%	0%	0%	0%
Dunkle Hills 5 days 2-3/02	38%	100%	3%	30%	60%	3%	21%	0%	0%	6%	0%	0%
Dunkle Hills 6 days 8/02	28%	83%	8%	16%	0%	8%	10%	0%	0%	2%	0%	0%
Pika Glacier 4 days 7/02	8%	100%	27%	3%	0%	27%	0%	0%	0%	0%	0%	0%
Pika Glacier 9 days 8/02	21%	100%	19%	14%	11%	19%	11%	11%	3%	3%	0%	3%
Ruth Amphitheater 9 days 5/02	45%	89%	33%	40%	89%	33%	34%	89%	4%	18%	0%	4%
Ruth Amphitheater 7 days 6/02	36%	86%	38%	31%	57%	38%	30%	57%	5%	23%	29%	5%
Ruth Amphitheater 7 days 7/02	43%	100%	34%	40%	100%	34%	38%	71%	4%	24%	57%	4%
Stampede Airstrip 13 days 9/02	9%	62%	11%	6%	0%	11%	3%	0%	4%	1%	0%	4%
Stampede Airstrip 31 days 10/02	4%	13%	6%	2%	0%	6%	1%	0%	0%	0%	0%	0%
Stampede Airstrip 20 days 11/02	8%	35%	3%	4%	0%	3%	2%	0%	0%	1%	0%	0%
Stampede Airstrip 15 days 4/03	3%	53%	10%	2%	0%	10%	1%	0%	0%	0%	0%	0%
Stampede Airstrip 31 days 5/03	3%	32%	9%	1%	0%	9%	0%	0%	0%	0%	0%	0%
Stampede Airstrip 29 days 6/03	2%	34%	18%	1%	0%	18%	0%	0%	3%	0%	0%	0%

[1]The indicator is the percentage of each hour that a motorized noise is heard. Because the data collection method presently used records five seconds out of every five minutes, the indicator essentially refers to the percentage of 5-second samples during which a motorized noise is heard, with 12 such samples each hour. The number in this column refers to the percentage of hours when the standard for the management area would be exceeded.

[2]The indicator is the number of motorized noises heard during the course of a 24-hour day. The number in this column reflects the percentage of days when the standard for the management area would be exceeded.

[3]The indicator is the maximum measured sound level of a motorized event. The number in this column reflects the percentage of motorized events for which the sound level would exceed the standard for the management area.

For all locations except the Dunkle Hills area, all of the identifiable motorized noises were aircraft. For the Dunkle Hills in February–March, 37% of the identifiable noises were aircraft, 34% were snowmachines, and 29% were trains. In May, 94% of the noises were aircraft, 5% were snowmachines, and 1% was trains. In August, 66% of the noises were aircraft, 19% were vehicles, and 15% were trains.

Backcountry Ranger Observational Data

In addition to the information collected at automated sound stations, backcountry rangers made systematic observations of motorized noise intrusions during the summer seasons of 1999 and 2000 in the backcountry of the Old Park (Morgan and Van Horn 2001). Although not reported in the same format as this plan's indicators and standards, these observations provide some information by which to evaluate the application of standards in this part of the park and preserve, where no data is yet available from automated sound stations.

Data were collected from 6/12/99 to 9/5/99 and again from 5/28/2000 to 9/5/2000 within the Denali Wilderness, primarily from patrols from the park road corridor, and are thus primarily relevant to the eastern side of the Old Park. Rangers were instructed to listen for aircraft throughout as much of the patrol day as possible, including periods of time when they were around their camp. Each patrol recorded the overall time of the sample period that they (the rangers were usually in pairs) were actively listening for aircraft. While the sampling was opportunistic and statistically non-random, it did parallel the times and locations that park visitors travel through the backcountry.

Within the overall sample period, the observers recorded the start and stop times of audible aircraft noise. This period of time, which could include overlapping noise from several successive aircraft, was labeled an "overflight event." The observers recorded the number and type of aircraft for each overflight event. They also rated the intensity of the noise for each overflight event. The rating for each overflight event was based on the peak noise level that occurred during the event. Key statistics included the following:

- There was an average of 19.5 overflight events (25 aircraft) per patrol, an average of 9.1 overflight events (11.7 aircraft) per day, and an average of 1.4 events (1.8 aircraft) per hour.
- The average duration of overflight events per day of sampling was 32.1 minutes.
- An average sampling day lasted 6.6 hours.
- The average duration of overflight events per hour of sampling was 4.8 minutes.
- The average duration of a single overflight event was 3.4 minutes.

Maximums noted included:

- 8 overflights in an hour that lasted for nearly 30% of that hour
- 31 overflight events (51 separate aircraft) in a day
- Aircraft noise audible for 30% of the time during an afternoon hike

The patrol rangers rated sound level on a three-part scale as follows:

> 1 – Faint, barely audible, aircraft might be only heard and difficult to locate visually.
> 2 – Clearly audible above-normal background noise.
> 3 – Distracting for conversation, completely dominates soundscape drowning out even loud sounds of nature such as wind or sounds of water.

Table 4-2 summarizes the sound level observations of aircraft events.

Table 4-2: Number of Overflight Events by Intensity Rating.

Intensity Rating	Number of Events	Percentage of Total
1	660	43.4
2	695	45.7
3	160	10.5

Backcountry Visitor Survey

One further study provides data about the amount of noise heard in the Denali backcountry. *A Survey of Overnight Backcountry Visitors to Denali National Park and Preserve* conducted in 2000 asked questions of respondents about the number of aircraft encountered while hiking in the backcountry. Because the universe of survey respondents was limited to visitors who obtain a permit for overnight camping during summer months, the response primarily reflects conditions in the backcountry of the eastern side of the Old Park.

Out of 190 hiking parties surveyed, the average number of aircraft seen per day of the trip was 4.87. The average number of aircraft seen or heard per day as a percentage of hiking parties were as follows:

Table 4-3: Average Number Of Aircraft Seen Per Trip Day By Percent Of Hiking Parties

Average Number of Aircraft Seen Per Trip Day	Percent of Hiking Parties*
10 or more	11.1%
6 to 9.99	21.7%
3 to 5.99	33.6%
1 to 2.99	22.1%
less than 1	11.5%

*Survey response included 190 hiking parties. The number indicated reflects the percent of the total that experienced the average number of aircraft per day in the left hand column.

IMPACTS OF THE MODIFIED PREFERRED ALTERNATIVE

This alternative would have negligible overall impacts on the natural sound environment of the Denali backcountry. Standards that would require improvements in sound conditions in some areas, such as the Old Park, would be offset by increasing noise in other locations in the southern additions. There would ~~still~~ continue to be major cumulative adverse impacts because of the high intensity of airplane and snowmachine noise in large portions of the park additions.

In this alternative, there would be new soundscape standards established for management areas throughout the national park and preserve and a set of tools identified for managing access to achieve the standards. The proportion of the park and preserve that falls within each standard would be as follows:

Natural Sound Disturbance	% of park backcountry
Very High	~~3~~2%
High	~~9~~4%
Medium	~~9~~21%
Low	~~79~~73%

In addition, there would be ~~year-round corridors designated on the Kantishna, Muddy, and east and west fork of the Yentna Rivers~~ summer season Corridors designated on the Kantishna, Muddy ~~Rivers~~, and lower Tokositna Rivers~~. While other corridor designation in the Dunkle Hills,~~ and on two mining access routes in the Kantishna Hills. There would also potentially be winter season Corridors designated in the Tokositna River and Dunkle Hills areas.~~, and Tokositna valley areas~~. While Corridors in the Dunkle Hills and Tokositna River areas would not differ in allowed natural sound disturbance from the surrounding area, the~~se~~ ~~109~~ 70 miles of ~~year~~ summer~~round c~~ Corridors and 3.5 miles of winter Corridor along Cantwell Creek would allow a High level of natural sound disturbance that could have border impacts on the surrounding management areas~~,~~ where a lesser degree of disturbance would be expected.

As demonstrated by the table below, where standards can be compared to available data there would be a mixture of results. The amount of motorized noise in the Old Park should decline substantially, as should some localized areas such as the Ruth Amphitheater landing area. Access management tools would be applied to bring conditions into standard. However, the amount of motorized noise in areas such as the northern additions or localized areas like Kahiltna Base Camp could remain the same or even accommodate some additional noise.

Location	Natural Sound Disturbance Standard	Comparison of Existing Conditions to Standard
Eastern portion of Old Park	Low	Both the NPS patrol observations and the report from the 2000 backpacker survey demonstrate that the eastern portion of the Old Park receives considerably more airplane noise than the Low standard for natural sound disturbance would permit. The standard would allow only 1 motorized noise per day louder than natural ambient, while the average for one survey is 9.1 per day, for the other 4.9 per day. Some of these airplane noises may not reach the natural ambient threshold, but from the sound level rating system used by the ranger patrols, at least 56% of the motorized noise likely reaches that level. In addition, 10.5% may exceed the maximum sound level of 40 dBA.
Stampede Airstrip	Medium	Data from the airstrip at Stampede Mine show that the level of natural sound disturbance generally falls within the range of variation allowed by Medium standards. One exception was the maximum sound level, which for five out of six months exceeded the standard of 40 dBA in between 6% and 18% of motorized noise samples.
Dunkle Hills	High	Data from the Dunkle Hills during winter months demonstrate that the standard for a High level of natural sound disturbance is exceeded at times. Existing samples from the area show that about 21% of hours exceed the standard for time audible during late winter months, which allows motorized noise for 25% of any hour. During summer months, the percentage of hours exceeding the standard was only 8% to 10%.
Ruth Amphitheater landing area	Very High	Data from the Ruth Amphitheater show that the Very High standards for the Ruth Glacier Special Use Area are exceeded between 18% and 24% of measured hours for the percent time motorized noise is audible. Standards are also sometimes exceeded for the number of motorized noises louder than natural ambient heard during the course of the day, up to 57% of days during a July sample period. Conditions at the landing area are likely to be considerably noisier than the surrounding area, however.
Kahiltna Base Camp	Very High	The small data sample at Kahiltna Base Camp shows that the Very High standard is generally met.
Pika Glacier	Medium ~~High~~	Measurements taken near the airplane landing area on the Pika Glacier— within the Portal area— show that all standards for a ~~High~~ Medium level of natural sound disturbance were ~~met during a July sampling period; however, 11% of both sample hours (for percent time audible) and sample days (for number of motorized noises over natural ambient) exceeded standard in an August sampling period.~~ exceeded in an August sampling period. Samples show that the 14% of hours exceed the standard for time audible, and 11% of days (one day of the nine sampled) had more than the standard for the number of motorized noises louder than natural ambient. In both July and August sample periods the maximum sound level of 40 dBA was frequently exceeded, 19% and 27% of noise events respectively.

General aviation landings would continue to be allowed throughout the park additions and preserve consistent with existing regulations. This method of access is not expected to grow substantially over time, but this alternative would allow infrequent loud noise associated with take-offs and landings at lakes suitable for float plane landings and other scattered off-airport landing locations.

Scenic air tour landings would be restricted to glaciers in Management Area A ~~and to the Pika and Eldridge Glaciers when climbers and mountaineers are not present~~and would be allowed to a lesser extent on the Pika and Eldridge Glaciers. ~~Present use levels by climbers and mountaineers on the Pika and Eldridge would allow an increase in scenic tour landings over current numbers. However, as climbing and mountaineering use grows, scenic tour use could be limited.~~ Between 1999 and 2004, only two scenic air tour landings took place outside the allowable area under this alternative, thus, there would be little immediate impact on existing airplane landings or the accompanying noise. Large numbers of scenic air tour overflights could continue to produce high intensity levels of noise between the Kanikula~~, Buckskin,~~ and upper Ruth and Kahiltna glaciers in the southern additions, with a particular concentration of noise over the Ruth and Tokositna Glaciers. This noise would be the most distinctive part of the sound environment during the summer visitor season.

A limit of 1,500 per season on climbing Mount McKinley would indirectly restrict growth in air taxi access to Kahiltna Base Camp, ~~and~~ although growth in climber demand is unlikely to reach the limit within the life of the plan. The 1,500 limit would allow 22% more climbers than in 2002, when a small sample of days showed that noise standards were exceeded in this area. As a result, other access management tools are likely to be applied before restrictions on climber numbers would affect the amount of noise.

Snowmachine access would be managed through the application of access management tools to achieve natural sound disturbance standards set for each management area. Snowmachine noise would likely reach those standards on weekend days in late winter during the course of the plan in the Dunkle Hills~~/Broad Pass~~ area as well as the lowlands, lower glaciated areas, and foothills around the Ruth, Tokositna, and Kanikula Glaciers, all of which are designated for a High standard of natural sound disturbance. Noise would also increase during late winter weekdays over the duration of the plan as winter visitation in Alaska increases, although it would not be expected to reach the High standard.

Rivers that support existing use of motorboats (Kantishna, Muddy, and Tokositna, ~~Yentna~~) are designated corridors under this alternative. Noise levels from motorboats are likely to remain below levels allowed under the standard for a High level of natural sound disturbance during the life of the plan. The highest level of noise would be experienced on the lower Tokositna River during the summer visitor season and on the Kantishna and Muddy Rivers during subsistence and ~~sport~~ general hunting seasons. The Yentna River may also have some motorboat use, but the use level is believed to be small and could be accommodated even within the Low natural sound disturbance standard applied to the southwest Preserve.

In this alternative, the Tokositna River also falls into the Ruth Glacier Special Use Area, which allows a Very High standard for natural sound disturbance. This river is likely to have growth in recreational motorboat traffic particularly accessing private visitor facilities along the lower section of the river. During the summer visitor season when

motorboat use occurs, motorboat noise would continue to have relatively little impact compared to airplane noise in this area.

Under this alternative, the park road would be maintained to mile 7 during winter months for administrative purposes only to remove ice from the park road, although a snow-covered surface would remain for winter recreation. This action would result in heavy road equipment traveling up four miles of the park road between October and March. Experimentation has proved that the required maintenance can generally be accomplished before 10am and is required only occasionally. Natural sound disturbance would be minimal and would likely fit within the range allowable for a Low standard of natural sound disturbance.

Several additional trails would be constructed in Kantishna along with designated campsites and single trails ~~that~~ would be constructed at Wonder Lake, Eielson Visitor Center, Healy Overlook, and ~~Wildhorse Creek~~Thorofare Bluffs. Trail construction could include the use of motorized equipment such as power wheelbarrows or chainsaws as well as aerial delivery of material if the minimum tool requirement is met, all of which would create noise disturbances. The same might also be required for trail maintenance in future years. The noise disturbances would be localized in impact to the places near where construction or maintenance was occurring, and could temporarily exceed standards.

The National Park Service would apply the minimum requirement process to the entire backcountry and would develop methodologies for minimizing aircraft use for administrative and research purposes. These actions should improve natural soundscape conditions in the backcountry.

Cumulative Impacts

Denali National Park and Preserve has become a noisier place since the park expansion in 1980. Aircraft are primarily responsible for increased natural sound disturbance, particularly the expansion of scenic air tours since the late 1980s, which produce much of the existing motorized noise over the eastern portion of the Old Park, around Mount McKinley, and along the south side of the Alaska Range between the Kahiltna and Eldridge Glaciers. The National Park Service has contributed by authorizing concessionaire aircraft to land on glaciers, affecting primarily the area between the Kahiltna and Eldridge Glaciers, and through its own gradual expansion of airplane and helicopter use to support research and administrative activities, which has impacts park wide. Military use of the Susitna Military Operations Area, which has been occurring at present levels since 1995, also has a substantial adverse impact on the southwestern park and preserve extending east to the Ruth Glacier.

Snowmachine access plays a role during winter months, particularly in the Broad Pass/Dunkle Hills region and low-lying areas in and around the Tokositna River valley, which have become popular riding destinations from the Parks Highway as power and range have increased and ownership has become more common. The closure of the Old

Park to snowmachine access in 2000 restricted areas that were only lightly used and primarily served to inhibit future expansion of snowmachine access and accompanying noise to new areas.

If one or more lodges in Kantishna began operating in the winter and supported snowmachine access, this alternative would allow such access to occur. In the ~~southern~~ Kantishna Hills, there would be a ~~High~~ Medium standard for motorized noise. Depending on the scale of service provided by the lodges, this threshold could be reached in some parts of the southern Kantishna Hills within the life of the plan. Much of the noise impact would occur during late winter months. ~~Adjacent areas would have a Low or Medium standard for natural sound disturbance, which would require dispersal of snowmachine access in these areas.~~

If a trail were cleared from Nenana to Lake Minchumina and services were offered to support snowmachine access, this alternative would allow only a Low standard of natural sound disturbance within the park and preserve. During late winter months, there would likely be some additional natural sound disturbance, although it would be limited by the standard.

Collectively, these actions have had (and would have) a major adverse impact on the natural soundscape of Denali because of high intensity, long-term motorized disturbances in the Old Park, around Mount McKinley, in the Dunkle Hills/Broad Pass area, and over the southern glaciers. The actions in this alternative provide a negligible impact to the overall natural sound environment, mitigating the impacts of some past actions, but allowing motorized noise to increase in other locations. Overall, there would continue to be a major adverse cumulative impact to the natural soundscape of the park and preserve from the actions in this alternative combined with other past and possible future actions, but this alternative contributes only a minor portion of those impacts.

Conclusion

This alternative would have negligible overall impacts on the natural sound environment of the Denali backcountry. Although the amount of motorized noise would substantially decline in the Old Park, these actions would allow medium to high intensity, long-term increases in motorized noise in other locations, including ~~the portions of the northern additions east of the Kantishna Hills,~~ the Dunkle Hills and Tokositna River areas during winter months at times that use is presently low, and over portions of the southern additions between the Kahiltna and Eldridge Glaciers during summer months. Some temporary noise would be added because of trail and campsite construction. There would still be major cumulative adverse impacts because of the high intensity airplane noise in the Ruth Amphitheater, over the southern glaciers, lowland areas between the Kahiltna and Ruth Glaciers, and in the Dunkle Hills~~/Broad Pass~~ area.

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

WILDERNESS RESOURCES

The Alaska National Interest Lands Conservation Act designated most of the Old Park as the Denali Wilderness, to be managed under the provisions of the Wilderness Act. ANILCA also identified the protection of "wilderness resource values" and the provision of associated "wilderness recreational opportunities" to be important purposes of the park additions and preserves. In addition, a wilderness suitability review conducted as part of the 1986 General Management Plan concluded that 3.73 million acres of the park additions were also suitable for wilderness designation, and NPS Management Policies direct the NPS to "take no action that would diminish the wilderness suitability of an area possessing wilderness characteristics until the legislative process of wilderness designation has been completed." The extent of impact to the wilderness resources of Denali, including both wilderness character and wilderness experience, is therefore a central concern of this analysis.

METHODOLOGY

Working from the definitions given in the Wilderness Act, the clarifications (including ANILCA provisions) under the Wilderness Management section of chapter 2, and the tradition of wilderness preservation at Denali described in chapter 3, the following "wilderness resource values" have been identified for Denali National Park and Preserve.

- Perpetuation of natural ecological relationships and processes and the continued existence of native wildlife populations in largely natural condition
- Absence of permanent human structures, including buildings, roads, trails, dams, and communications facilities
- Opportunities for solitude including:
    - Freedom from the reminders of society
    - Privacy and isolation
    - Absence of distractions such as large groups, mechanization, unnatural noise, signs, and other modern artifacts
- Opportunities for primitive and unconfined recreation, which have the following characteristics:
    - Self-sufficiency, absence of support facilities or motorized transportation
    - Direct experience of weather, terrain, and wildlife with minimal shelter or assistance from devices of modern civilization
    - Lack of restriction on movement; freedom to explore in the way that is desirable given conditions of weather, terrain, and personal ability; ability to be spontaneous
    - Minimal formal regulatory requirements

Impacts on wildlife, soundscapes, and other natural resources are addressed in the Wildlife, Vegetation, Soil and Water, and Natural Soundscapes sections. The analysis in this section will focus on wilderness character and wilderness experience, which are

integrally related because much of wilderness character can only be subjectively determined by the visitor's experience (for example, solitude or freedom of movement).

Impacts on wilderness character and experience are determined by comparing the desired future conditions described by management area standards to current conditions and to likely future conditions given predicted changes in use and varying management area designations among alternatives.

IMPACTS OF THE MODIFIED PREFERRED ALTERNATIVE

The actions in this alternative would have negligible new impacts on wilderness resources in the Denali backcountry, protecting and improving conditions in some areas while allowing the loss of some quality in others. There would still be major adverse cumulative impacts because of ongoing motorized access in parts of the southern additions and the absence of opportunities for solitude on the West Buttress route of Mount McKinley.

Absence of Permanent Structures

There would be new trails and limited designated campsite development in this alternative, bringing not only permanent facilities – potentially including food storage and sanitation facilities at up to five sites in the Kantishna area – but also the noise and human presence associated with trail construction and maintenance.

However, in the Kantishna Hills area the trails would generally either replace or improve existing social trails or old community and mining access trails. The actions would take place outside of areas determined suitable for wilderness designation.

Short sections of trail would be constructed within the Old Park at Wonder Lake, at Eielson Visitor Center, Thorofare Bluffs, and at the Healy Overlook, but they would replace existing obvious social trails and fall partly within the Backcountry Day Use area, outside the designated wilderness.

~~Most impacted would be the Wildhorse Creek area, where an area determined suitable for wilderness designation would have new trail construction in an area that presently has no signs of human structures or ongoing human presence. However, the trail would occupy only part of a single creek valley.~~

Opportunities for Solitude

This alternative establishes a variety of standards that would protect opportunities for solitude. Important among these are the following standards.

Standards for the number of encounters with other parties in this alternative provide a balance between areas that emphasize privacy and isolation and areas that allow more use while still protecting wilderness qualities, as the table below demonstrates.

Number of Encounters with Other Parties				
Descriptor	Low	Medium	High	Very High
Standard	~~3~~0/week	2/day	5/day	10/day
% of Park & Preserve	~~44~~49%	~~29~~40%	~~15~~11%	~~128~~ 70 miles summer Corridors, ~~135~~ 19.5 miles winter Corridors, Backcountry Hiker~~, West Buttress SUA~~
There is no standard for the number of encounters with other parties at 9 Portals and in the West Buttress Special Use Area.				

Standards for encounters with large groups limit impacts on vegetation, wildlife, and the solitude of other visitors, as well as mitigate the impacts of adding group educational and guided activities in areas where allowed.

Possible to Encounter Large Groups?			
Descriptor	No	Yes	
Standard	0 groups	1 group/ day	2 groups/ day
% of Park & Preserve	~~56~~49%	~~29~~40%	~~15~~11%
"Large groups" are parties larger than 6 people.			

Standards for camping density assure that visitors throughout almost the entire backcountry would have the opportunity to camp out of sight and sound of other visitors.

Possible to Camp Out of Sight and Sound of Others?			
Descriptor	Low	Medium	High
Standard	Yes, always	Not always at peak season	No, during peak season
% of Park & Preserve	99%	~~128~~ 70 miles summer Corridors, ~~135~~ 19.5 miles winter Corridors, 5 Portals	~~3~~ 2 Portals, West Buttress Special Use Area

Standards for the number of encounters with evidence of modern human use ensure that in most of the backcountry visitors would continue to encounter few or no signs of modern equipment, as demonstrated by the table below. Some exceptions occur in the West Buttress Special Use area, corridors, Portals, and backcountry hiker areas.

Number of Encounters with Evidence of Modern Human Use			
Descriptor	Low	Medium	High
Standard	1/backcountry trip	3/day	5/day
% of Park & Preserve	~~85~~89%	~~15~~11% + 5 Portals	~~3~~ 2 Portals, BC Hiker Areas, West Buttress SUA, ~~128~~ 70 miles summer Corridors, ~~135~~ 19.5 miles winter Corridors

As visitation to the park increases, these standards protect wilderness character and experience by triggering management action to disperse or limit the density of visitors in locations where ~~problems arise~~wilderness resource values are jeopardized. While Backcountry Hiker areas, Corridors, Portals, and the West Buttress Special Use area allow higher levels of visitor use and landscape impact than is typical of the Denali backcountry, collectively these represent a small area of the park and preserve.

Application of these standards primarily affects the park additions and preserve, since the Denali Wilderness was already managed to achieve similar standards. However, for the Old Park these standards do provide more definition for qualities such as evidence of modern human use, and they do distinguish the western portion of the Old Park (OP2) as an area that should protect current conditions of very low use density.

The amount of motorized equipment used for access and the attendant noise expected under this alternative is described in detail in the Natural Soundscapes section of this chapter. As documented in that section, ~~80~~73% of the park and preserve would be designated within a management area that allows Low levels of natural sound disturbance, ~~9~~21% in areas that allow Medium sound disturbance, and ~~9~~6% in areas that allow a High level of sound disturbance. In addition, there are ~~128~~ 70 miles of corridor in the summer and ~~135~~ 19.5 miles in winter along with five Portals that would allow a High level of sound disturbance, and ~~3~~ 2 Major Landing Areas plus 2.5% of the park and preserve in the seasonal Ruth Glacier Special Use Area that would allow a Very High level of natural sound disturbance. Overall, under this alternative there would be negligible impacts on the natural soundscape at Denali; although conditions over the designated wilderness of the Old Park should improve, they would likely worsen in other areas that have been determined suitable for wilderness designation, particularly those areas designated as Management Area A.

The park road would be maintained to mile 7 during winter months for ice removal only. This action would retain noise and signs of heavy equipment to a 4-mile stretch of road for approximately 6 months, but the impact can be mitigated to a degree by short hours of operation. Only a small portion of the park and preserve and no designated wilderness is affected except for cross-boundary noise.

There would be up to ~~135~~ 19.5 miles of corridors in winter, some of which could be marked with route markers. This action would provide more guidance and add more signs of management and human presence than is typical of the wilderness experience at Denali, but they would be used only if the minimum tool requirement is met and other, less intrusive measures (such as providing maps, guidance with natural land features) are ineffective.

Opportunities for Primitive and Unconfined Recreation

There would be a limit of 1,500 climbers per season on Mount McKinley. Within the 20-year life of the plan, demand would grow to an estimated 1,405-1,470 climbers per year.

Thus, the expectation is that the limit would not be reached and it would serve primarily to establish a ceiling on visitors if growth is faster than anticipated.

Mountaineers would be required to carry out human waste from the West Buttress above the 14,000-foot camp ~~feet~~ and from campsites within one-half mile of air taxi landing locations on glaciers. At present, this would require visiting the NPS ranger station at Talkeetna to obtain a Clean Mountain Can and to return it after use, although other options may be available within the life of the plan.

There would initially be no new registration requirements, but new requirements would be added if certain criteria were met. It is anticipated that these criteria would trigger new requirements on overnight and winter day-use activities from the Kahiltna Glacier east to Cantwell in the near future.

None of these actions would result in restrictions on freedom of movement once the visitor has entered the backcountry. The burden on visitors prior to entering the backcountry is expected to be light if the National Park Service is successful in making registration convenient and simple.

Cumulative Impacts

The establishment of unit quotas in the 1976 Backcountry Management Plan protected wilderness experience in the backcountry of the Old Park by limiting encounters, dispersing visitors and visitor impacts, and insuring that the great majority of visitors could camp out of sight and sound of others. The permit requirement for the Old Park does restrict freedom of movement since visitors must camp in the unit for which they have a permit on any given night. However, day users are not similarly restricted. The 60-day registration requirement for climbing Mount McKinley and Mount Foraker does not restrict freedom of movement once climbers enter the park.

The authorization of commercial air taxi landings for climbers on the Kahiltna glacier at the Denali Wilderness boundary, combined with improvements in climbing equipment and the popularization of the West Buttress as a mostly non-technical route to the summit of Mount McKinley, has led to large increases in the number of climbers in this area, from 124 in 1970 to a peak of 1,305 in 2001. Because each expedition takes 17 days on average and the primary climbing season is only 2-3 months long, a large amount of visitors concentrate on the West Buttress every year, during which time opportunities for solitude are not available.

The increase in snowmachine access particularly in accessible areas of the park additions in the Broad Pass/Dunkle Hills area and the Tokositna River valley has greatly increased the number of encounters with other parties, the evidence of modern human use, and natural sound disturbance, detracting from the wilderness qualities of these areas. Likewise, the expansion of scenic air tour access in response to changes in visitor demand has increased motorized noise across large areas of the Old Park wilderness and the glaciated area between the Kahiltna and Ruth glaciers. This alteration in wilderness

resources is long-term, occurring every season, and is consistently observable over large portions of the backcountry and therefore a high-intensity change to wilderness resources.

The National Park Service has constructed trails that extend into the Congressionally designated wilderness of the Old Park, and will construct additional trails as specified by the 1997 *Entrance Area and Road Corridor DCP*. These trails are permanent new structures in the wilderness area, but total fewer than 20 miles within the 1.9-million-acre Denali Wilderness, and therefore represent a low intensity change in wilderness character. The National Park Service has also established seasonal administrative camps at Kahiltna Base Camp and at the 14,000-foot level on Mount McKinley, and generally increased the amount of research and administrative activity in the backcountry, including the use of aircraft and other motorized equipment and some temporary and long-term installations of research equipment. This heightened administrative presence is observable to the visitor but generally is not a consistent change over any particular area of the park except for the administrative camps, and is therefore a medium intensity, long-term alteration in the wilderness resources of the park and preserve.

These past, present, and future actions have had a major adverse impact on the wilderness resources of the park and preserve, largely because of the long-term, high-intensity changes caused by airplane and snowmachine access over a large portion of the park and preserve and the loss of opportunities for solitude on the West Buttress of Mount McKinley during the primary climbing season. The actions in this alternative constrain these impacts from spreading and may offer limited improvement in some areas because of the imposition of management area standards. However, there would still be major adverse cumulative impacts. This alternative would be responsible only for only small, isolated adverse impacts such as the few additional structures (trails) and the maintenance of a short section of the park road during winter months.

Conclusion

Under this alternative, there would be negligible new impacts to the wilderness resources of the Denali backcountry. Positive changes would occur in some locations, such as in the designated wilderness of the Old Park, but other areas that have wilderness qualities would likely lose some opportunities for solitude. The proposed standards for encounters with other parties, encounters with large groups, ability to camp out of sight and sound of others, and evidence of modern human use would protect wilderness resource values in much of the park as visitation grows, but would generally still allow increases in visitor use across most of the western portion of the Old Park, park additions, and preserve. There are minor adverse impacts from the construction of new trails and campsites and very limited restrictions on freedom of movement. However, there would still be major adverse cumulative impacts because of the ongoing absence of solitude on the West Buttress route of Mount McKinley during the primary climbing season and high levels of encounters, noise, and motorized transport in ~~areas such as~~ the ~~Kantishna Hills,~~ Dunkle Hills~~,~~ and the area between the Kanikula and Ruth Glaciers in the southern park additions.

The level of impacts to wilderness character and experience anticipated from this alternative would not result in an impairment of park resources that fulfill specific purposes identified in the establishing legislation or that are essential to the natural integrity of the park.

SUBSISTENCE RESOURCES AND OPPORTUNITIES

The 1980 additions to Denali National Park and Preserve are open to subsistence uses in accordance with Section 202(3)(a) of ANILCA. Lands within the former Mount McKinley National Park are closed to subsistence activities. Congress found and declared in Title VIII, Subsistence Management and Use, Section 801(3), that the continuation of the opportunity for subsistence uses of resources on public and other lands in Alaska is threatened by the increasing population of Alaska, with resultant pressure on subsistence resources, by sudden decline in the populations of some wildlife species that are crucial subsistence resources, by increased accessibility of remote areas containing subsistence resources, and by the taking of fish and wildlife in a manner inconsistent with recognized principles of fish and wildlife management.

Furthermore, Congress declared it to be the policy in Section 802(1), that, consistent with sound management principles and the conservation of healthy populations of fish and wildlife, the utilization of the public lands in Alaska is to cause the least adverse impact possible on rural residents who depend upon subsistence uses of resources of such lands; consistent with management of fish and wildlife in accordance with recognized scientific principles and the purposes for each unit established, designated, or expanded by Title II; it is the purpose of Title VIII to provide the opportunity for rural residents engaged in a subsistence way of life to do so.

Guided by the enabling legislation and mandates for Denali National Park and Preserve, and policies and Congressional intent of ANILCA Title VIII, the following section presents an analysis of the impacts likely to occur under the preferred alternative.

METHODOLOGY

Methodology for assessing impacts to subsistence consisted of literature review and consultation with subject matter experts.

This analysis focuses on the three key subsistence areas of the park: the northwestern park and preserve region near Lake Minchumina; the southeastern park region near Cantwell; and the southern Kantishna Hills region near Kantishna. This analysis assumes that adverse impacts to subsistence resources and opportunities from subsistence users are negligible because subsistence use is very low, especially compared to recreational use of the park.

IMPACTS OF THE MODIFIED PREFERRED ALTERNATIVE

This alternative would have minor to moderate adverse impacts on subsistence resources and opportunities because it would result in increases in non-subsistence snowmachine use and generally higher levels of recreation use particularly along trails and corridors in

subsistence areas, both of which would create unfavorable conditions for subsistence wildlife populations and increase conflicts between recreational and subsistence users.

Under this alternative, access by snowmachine to the park and preserve additions would continue to grow. Designating corridors for winter use would focus use in the following places: from the southern park boundary to the Old Park boundary near the West Fork Chulitna, Cantwell Creek, and Bull River~~; to the toes of the Ruth, Tokositna, and Kanikula glaciers from the Tokositna River; along the Yentna, Tokositna, and Kantishna/Muddy Rivers.~~ and along the lower and upper Tokositna River as far as the mouth of Wildhorse Creek. In a future wilderness proposal, accommodation would be made as necessary for recreational snowmachine access along these 19.5 miles of winter corridors~~ and throughout those areas designated as Management Area A (11% of the total park area and along 135 linear miles of winter corridors)~~. Winter corridors would result in areas of more concentrated snowmachine use and areas designated as Management Area A would allow for an encounter rate of up to five parties per day, including two parties more than to six people. However, the only places these high use areas would overlap with areas ~~. Nearly all of the winter corridors overlap with areas~~ currently or traditionally used for subsistence activities would be along Cantwell Creek and Bull River, and the Corridors would be designated only if there is sufficient demand.

Except for the ~~Kantishna area and the Broad Pass area between Cantwell Creek and the West Fork of the Chulitna River (which are zoned as Management Area A), all other~~ corridors, all subsistence use areas would be zoned as Management Area B or D. These management areas allow for low to medium encounters with other people, very little evidence of modern human use, and low to medium disturbance of natural sounds. If standards in these categories are approached or exceeded, non-subsistence use would be curtailed or mitigated. If non-subsistence use is curtailed or mitigated, it could have less of an impact on subsistence resources and opportunities. The types of impacts that could be mitigated are described throughout this section.

Cantwell

The Cantwell subsistence area would be zoned as Management Area B, and there could be two winter season Corridors in the vicinity of Cantwell Creek and Bull River. Management Area B allows for medium encounters with other people, very little evidence of modern human use, and medium disturbance of natural sounds. The Corridors allow very high levels of encounters and high levels of natural sound disturbance and evidence of modern human use. If standards in these categories are approached or exceeded, non-subsistence use would be curtailed or mitigated. If non-subsistence use is curtailed or mitigated, it could have less of an impact on subsistence resources and opportunities. The types of impacts that could be mitigated are described throughout this section.~~Under Alternative 4, the Broad Pass area between Cantwell Creek and the West Fork of the Chulitna River would be designated as Management Area A, allowing for high disturbance to natural sounds and an encounter rate of up to five parties per day, including two parties of six people. Increased recreational use in the Broad Pass~~

~~area could negatively affect subsistence hunters who rely on this area for subsistence purposes.~~

Several different impacts to subsistence wildlife populations and subsistence use activities could be expected as documented by the Denali Subsistence Resource Commission. For several years, subsistence users have expressed concerns about the impacts and conflicts of increasing recreational use and increasing non-subsistence snowmachine use on subsistence resources and subsistence activities. Members of Denali's Subsistence Resource Commission have specifically expressed concerns regarding the effects of increasing levels of snowmachine use in the Broad Pass/Cantwell area upon moose, furbearers, and ptarmigan populations and their distributions (Denali Subsistence Resource Commission Meeting Minutes, April 30, 2001; April 29, 1996; August 9, 1996; and June 28, 1993). The Denali Subsistence Resource Commission Meeting Minutes (June 1993) document high levels of non-subsistence related snowmachine use in the Cantwell area. It was noted that riders were primarily using drainages and basins, essentially saturating the area and displacing furbearers, causing local trappers to pull their traps prematurely in December of that year. This trend has persisted in subsequent years (pers comm. Hollis Twitchell 1/13/05). As the range of non-subsistence snowmachine use overlaps with subsistence use areas, the potential for conflict between these user groups increases.

Non-subsistence snowmachine users would interfere with subsistence traplines, displace furbearers, and create paths that encourage animals to travel farther from places where subsistence activities typically occur. ~~Trappers begin trapping as early as November 1. The trapping season closes by the end of February; however, increasing levels of non-subsistence snowmachine use in the Cantwell/Broad Pass area would continue to displace wildlife, and~~ Trappers would continue to pull their traps by December because it would be inefficient to set traps in an area in which furbearers have been displaced. This would constitute a loss of an opportunity for subsistence users in that area.

Increased use of the park, particularly non-subsistence snowmachine use, would likely displace moose and caribou from critical wintering areas on park lands in the Windy Creek, Bull River and Cantwell Creek drainages. Local moose populations and the Cantwell group of the Nelchina Caribou herd use areas within the former Mount McKinley National Park and the ANILCA park additions of Windy Creek, Cantwell Creek, and the Bull River drainages during winter. These areas provide important winter habitat for moose and caribou because snow depths associated with the pass area are less than in other areas.

Non-subsistence snowmachine use is often concentrated in these high-elevation basins where riders spend many hours at a time. These basins provide critical winter habitat for moose and caribou. Moose and caribou would continue to be displaced from these critical wintering areas as non-subsistence snowmachine use increases. This could significantly increase the stress and nutritional demands upon moose and caribou and result in some

moose or caribou mortality, depending on the environmental conditions and the body reserves of moose or caribou in a given year.

Non-subsistence snowmachine use originating in Cantwell begins when adequate snow cover is present, and during early winter, use is relatively low. As snow pack increases so does snowmachine use. In late winter when the days are lighter, warmer, and there is adequate snow cover, non-subsistence snowmachine use is highest. This corresponds with the time of the year when moose and caribou are at their lowest nutritional states. Non-subsistence snowmachine use would continue to induce stress on moose and caribou ~~in the Windy Creek,~~particularly in the Bull River, and Cantwell drainages, especially in late winter when the animals are in a nutritional deficit. The magnitude of the impact would depend on snow depth. Die off would be greater as snow depth increases because displaced animals would have a more difficult time moving through the snow to forage and to get away from snowmachine use.

In addition, the State issues a limited number of permits for the Tier II hunt for the Nelchina Caribou herd, and local Cantwell residents must compete with residents statewide for the permits. Local residents rely on federal permits to hunt caribou in the Cantwell area. Under this alternative, non-subsistence snowmachine use would continue to increase and would either displace caribou from the Windy Creek, Bull River, and Cantwell Creek drainages or it would prevent caribou from going there altogether. If caribou do not travel onto these federal lands, subsistence hunters from Cantwell would not have an opportunity to hunt them. This opportunity would be lost for as long as the caribou remain on lands outside the national park.

Kantishna

Under this alternative, the Kantishna area would be designated as Management Area ~~A~~B, allowing for ~~high~~ medium disturbance to natural sounds and an encounter rate of up to ~~five~~ two parties per day, including ~~two parties of six people~~one large party per day. ~~Up~~ A trail system would be formalized and ~~to~~ five designated campsites would be created in conjunction with the summer Corridor areas in the Kantishna Hills. There could be up to 10 encounters per day on the Corridors and trails. Increased recreational use in the Kantishna area, particularly on Corridors and trails, could negatively affect subsistence hunters who rely on this area for subsistence purposes. During the peak summer season there are approximately 300 overnight visitors to the Kantishna area. Increasing numbers of visitors on trails could necessitate an expansion of the firearms discharge closure to protect public safety in Kantishna. The decision to extend the closure would be evaluated in a separate public process. If the closure were extended, it would have adverse impacts on moose hunters in the Upper and Lower Moose Creek drainages~~, Eldorado,~~ and Skyline Drive area by severely restricting opportunities to hunt moose in those areas because they would not be permitted to use firearms.

Minchumina

~~Year-round recreational corridors would be designated in the northwest part of the park (Muddy/Kantishna Rivers)~~A summer season Corridor would be designated along the Muddy and Kantishna Rivers, ~~inviting~~ allowing ~~more~~ additional use along ~~these corridors~~these rivers and potentially increasing user conflicts and the risk of theft and vandalism at subsistence cabins ~~along these corridors~~. Lake Minchumina area residents mentioned concerns about the impacts of increasing non-subsistence uses during public scoping (see also letter from Collins, 3/3/01).

There are at least five usable subsistence cabins along the Muddy and Kantishna Rivers and many others scattered throughout the preserve. This has been an issue of concern raised by the Subsistence Resource Commission because theft and vandalism have been reported on lands adjacent to the park (Hollis Twitchell, pers. comm. 1/13/05).

Cumulative Effects

The following actions increase the potential for adverse impacts to subsistence:

- In the last five years, non-subsistence snowmachine use has expanded dramatically in and adjacent to the southeastern areas of the park, particularly in the area near Cantwell and Broad Pass. Along with increasing popularity for snowmachining have come dramatic improvements in snowmachine technology. Because of the increased reliability, power and flotation ability of the newer snowmachines, snowmachine users have been accessing more distant areas and operating in significantly steeper and higher terrain than in past years.

  Open habitat, mountain slopes, and reasonably good snow deposition in the Broad Pass area have attracted increasing numbers of snowmachine users from areas of the state accessible to the Parks Highway. Typically, non-subsistence snowmachine groups tend to travel in larger numbers and spend more time traveling in basins and drainages.

  Increases in types and levels of recreation interfere with subsistence activities. Visitors, especially those who travel via motorized means, may disturb wildlife and interfere with subsistence users who are hunting or scouting for subsistence resources. As popular places become crowded, it is expected that recreational use will disperse into more remote or infrequently used places. Potential restrictions to subsistence may occur if visitors frequent areas used for subsistence. Visitors, especially those who travel via motorized means, may disturb wildlife and interfere with subsistence users who are hunting or scouting for subsistence resources.

- New housing and commercial development has occurred in the Nenana Canyon north of the park entrance, the Yanert Valley east of the park, in the eastern part of the Stampede Road corridor, around Cantwell, and along Petersville Road. This

development has resulted in minor expansion of local road networks or improvements of existing roads. This development is likely to continue, creating increased access to the eastern and southern boundaries of the park. Increases in types and levels of recreation can interfere with subsistence activities.

- While brushing a trail from Nenana to Minchumina for snowmachine use is opposed by locals in Minchumina and Telida, there is a reasonable chance that it would happen in the future. This trail would provide easier access to the northwestern part of the park. Increased access means higher use levels and greater potential for impacts to subsistence resources and opportunities.

- Continued growth in commercial developments in Kantishna would attract more visitors to that area, thereby increasing the potential for conflicts between subsistence and non-subsistence users, or increasing the potential for restrictions or conditions on subsistence use in the Kantishna area.

- Concern for the safety of park visitors prompted the National Park Service to initiate a closure to the discharge of firearms in the Kantishna area. This developed area has a large number of summer visitors using the facilities and surrounding area to engage in outdoor activities that could put them at risk of a firearm-related injury. The restriction on the discharge of firearms applies on federal public lands within one mile of the Kantishna road right-of-way from the former Mount McKinley National Park boundary at mile 87.9 to the north end of the Kantishna airport. The firearm discharge restriction is in effect during summer when the Kantishna lodges are in operation. During the closure period, subsistence harvests utilizing other methods and means of harvest may still take place according to federal subsistence management regulations.

- Restrictions and conditions associated with travel on the park road affect subsistence access. Subsistence users are required to obtain a permit, adhere to camping requirements and food storage requirements, and other conditions associated with backcountry use in the Old Park. Park road restrictions and backcountry requirements do not prevent subsistence access; however, subsistence users must be cognizant of and adhere to this additional requirement.

The ~~combined~~ combination of these ~~impact of these actions would be major~~actions would cause a major adverse impact to subsistence resources and opportunities in Cantwell where conflicts between recreation and subsistence already exist and are predicted to increase, moderate adverse impacts in Kantishna where a high level of recreation and infrastructure exists, and minor adverse impacts in Minchumina where low levels of visitation are expected due to its remote location. Implementing this alternative alone would have minor to moderate adverse impacts on subsistence resources and opportunities. There would be a major cumulative adverse impact of this alternative plus the aforementioned past, present, and reasonably foreseeable actions ~~would be major~~.

Conclusion

This alternative would have minor to moderate adverse impacts on subsistence resources and opportunities because it would result in increases in ~~non-subsistence snowmachine use, especially in the Cantwell area, and generally higher levels of recreation use in subsistence areas,~~incompatible activities, primarily on trails and corridors in the Cantwell, Kantishna, and Minchumina areas. These activities, including use of snowmachines, ~~both of which~~ would create unfavorable conditions for subsistence wildlife populations and increase conflicts between recreational and subsistence users. The severity of the impact from this alternative would be mitigated by restricting high intensity uses to narrow trails and corridors, and the impact would certainly be minor if increased use levels do not result in additional firearm closures in Kantishna or the Corridor designation does not increase use along the Muddy and Kantishna Rivers. There would still be a cumulative major adverse impact of this alternative plus the aforementioned past, present, and reasonably foreseeable actions ~~would be major~~. The level of impacts to subsistence resources anticipated from this alternative would not result in an impairment of park resources that fulfill specific purposes identified in the establishing legislation or that are essential to the integrity of the park.

CULTURAL RESOURCES

Cultural resources at Denali include archaeological resources, ethnographic resources, cultural landscapes, and historic structures. While there is some potential for impacts to any of these resources from plan actions, the archaeological resources and historic structures are most at risk while impacts to the other categories are anticipated to be negligible in all alternatives and were dismissed from further analysis (see chapter 1).

METHODOLOGY

The potential for increased pressure on cultural sites increases as the number of visitors increases. Impacts from visitor use can include modification, defacement, displacement, or removal of objects from cultural sites. Management actions to manage visitor use could also result in adverse impacts (for example, disturbing sites during trail construction). However, without site-specific information it is difficult to determine impacts. When specific actions are taken within any alternative further analysis will be required to comply with the requirements of Section 106 of the National Historic Preservation Act (NHPA) in accordance with the Advisory Council on Historic Preservation's regulations implementing Section 106 (36 CFR Part 800, "Protection of Historic Properties").

IMPACTS OF THE MODIFIED PREFERRED ALTERNATIVE

Actions proposed under this alternative would result in increased pressure on cultural resources because of the likelihood of increased visitation to cultural resource sites in the backcountry.

~~Snowmobile~~ There would be dispersed snowmachine use ~~under Alternative 4 would allow dispersed use~~allowed throughout the park additions and preserve and on established winter corridors. ~~Snowmobile~~ Snowmachine use would continue to increase and cultural sites would be more prone to increased visitation throughout the winter months. Under this alternative, the Kantishna area would be designated as Management Area ~~A~~B, allowing for an encounter rate of up to ~~five~~ two parties per day, including ~~two parties of six people~~one party of more than six people. ~~A portion of the Kantishna Hills, including the Stampede Mine (a site determined to be eligible for the National Register of Historic Places), would be designated Management Area B, allowing for an encounter rate of up to two parties per day.~~ This area would include ~~T~~the Stampede Mine ~~site~~, which is one of very few antimony mines to have operated in the state. Cultural resources at this site are therefore unique, and any damage or loss would be significant. Several historic sites in the Kantishna Hills could experience an increase in visitation because of increased recreational use, although this risk could be mitigated by routing trails away from sensitive sites. ~~Year-round recreational corridors would be designated in the northwest part of the park (Muddy/Kantishna Rivers) and the southwest (Yentna and Tokositna Rivers)~~Summer season recreational corridors would be designated along the

Muddy/Kantishna Rivers and the lower Tokositna River, inviting more use along these corridors and potentially increasing the pressure on cultural resources along these rivers. Potential adverse impacts are those described in the Methodology section.

Because the increased recreation use would facilitate or encourage more people to visit areas where cultural resources exist, the potential exists for increased pressure on those resources, particularly in the backcountry.

Cumulative Effects

Adverse impacts on cultural resources could be expected from land development in the Kantishna Hills and increases in regional recreational activities. As outlined in the analysis, the preferred alternative would result in increased pressure on cultural resources. This would not add to overall effects from other past, present, and reasonably foreseeable future actions.

Conclusion

Actions proposed under the preferred alternative could result in minor to major adverse impacts on cultural resources because of the likelihood of increased visitation to cultural resource sites in the backcountry, although determining specific impacts would require site-specific information. This would be the case throughout the life of the plan.

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

SOCIOECONOMICS

The first part of this section provides a literature review of the types of impacts that can result from the various visitor and administrative activities that could occur in the park and preserve. The second part is an analysis of the impacts likely to occur under ~~each~~ the modified preferred alternative.

GENERAL IMPACTS BASED ON LITERATURE REVIEW

Impacts can be analyzed in terms of direct and indirect effects on social and economic values. Values of the social environment mainly include quality of life in the Denali region, which usually includes factors such as the ability to lead a rural lifestyle, availability of schools, libraries, and other basic community amenities, and personal safety (particularly a low incidence of crime). Economic values include direct and indirect economic benefits or losses to local communities, business and employment opportunities, ecosystem services, and less tangible values such as existence value. These values are defined and further explained in the following sections.

Economic Values of Denali National Park and Preserve

Visitor use in Denali National Park and Preserve represents one part of the economic value of the park. Businesses in gateway communities near the park benefit from visitors' requiring food, lodging, and other services. Studies conducted in Alaska provide an indication of the economic value of these services. For example, Fletcher et al. (2000) estimated that current residents with snowmachines spent about $297 per machine for gas for tow vehicles and machines and $286 per household for lodging, meals, snacks, and beverages in 1999. Non-residents were estimated to have spent about $154 per day for tow vehicle and snowmachine rental, and $149 per person per day for lodging, food, and beverages–assuming a 5-day trip–in 1999.

The large expanse of protected land in Denali National Park and Preserve also provides other types of direct and indirect economic benefits. Costanza et al. (1997) and others have recently attempted calculating the economic value of ecosystem services performed by natural systems. Economic values have been assigned to ecosystem services such as nutrient cycling, water supply, climate regulation, erosion control and sediment retention, and many others in addition to commonly recognized values such as recreation. While no specific economic values have been assigned to Denali National Park and Preserve, such a measurement may be possible in the future as its value as a natural, intact, functioning sub-arctic ecosystem is fully assessed and quantified.

Another economic value of Denali National Park and Preserve that has not yet been measured is its value in amenities to the local communities. In analyzing counties in the western U.S. that are close to wilderness areas, Lorah (2000) found that the presence of wilderness is correlated with income, employment, and population growth. According to Power (1995), natural landscapes “often may generate more new jobs and income by

providing the natural resource amenities–water and air quality, recreational opportunities, scenic beauty and the fish and wildlife–that make the…[area] an attractive place to live, work, and do business." In addition, Fausold and Lilieholm (1996) found that real estate prices increase around open space.

Existence and Use Values of Denali National Park and Preserve and the Wilderness Recreational Experience

The existence value of a park or protected area is often phrased as "just knowing it is there." Colt (2001) estimated the economic importance of Alaska's ecosystems and concluded that "the 'existence value' of Alaska's undisturbed lands and waters is likely to become increasingly important in the future, as world population, education, and income continue to grow and ecosystems in other places continue to be degraded."

A number of contingent valuation studies have been conducted over the last 20 years. The purpose of such studies is to determine and compare the socioeconomic values of active and passive use. Active use involves having a wilderness recreational experience by going to the place and setting foot within the boundaries. Passive use involves knowing that such a potential experience exists even if one elects not to participate in wilderness recreational activities (or plans to do so sometime in the future). The results of some of these studies provide a basis for understanding the socioeconomic values affected by different types of wilderness experiences.

Contingent valuation studies have shown that the average household would be willing to invest in passive, non-use of wilderness areas (Gilbert, Glass and More 1991; Barrick and Beazley 1990; Pope and Jones 1990; Walsh, Loomis, and Gillman 1984; Diamond et al. 1993, Kahneman and Knetsch 1992; Vincent et al. 1995; Bjornstad and Kahn 1996). This research indicates that U.S. citizens not only value the existence of wilderness areas because of their importance as a national resource, but also because of the value in having them available in the event that those citizens would like to participate in wilderness recreational activities in the future. In many cases, the passive use value makes up a substantial proportion of the total value (combined use and non-use values) that is placed on wilderness areas.

Impact Thresholds

The following thresholds were used to determine the magnitude of effects on the socioeconomic environment.

Negligible: Little or no noticeable change in economic activity, employment and income levels, or population migration or immigration.

Minor: Local (limited to one community and vicinity) changes in economic activity, employment and income levels, or population migration or immigration.

Moderate: Regional (involves two or more communities in an area) changes in overall economic activity, employment and income levels, or population migration or immigration.

Major: Widespread (may involve a substantial region of the State, such as Interior Alaska) changes in overall economic activity, employment and income levels, or population migration or immigration.

IMPACTS OF THE MODIFIED PREFERRED ALTERNATIVE

Economic Impacts

Summer Season

Under this alternative scenic air tour and air taxi operators would have a variety of options for reducing aircraft noise, only one of which would be rerouting tours to avoid sensitive areas in the park and preserve. Air tour companies could expect continued increases in visitor demand and continued growth in business income throughout the life of the plan.

Management actions proposed as part of this alternative would allow for scenic tour airplane landings throughout much of the south additions between the Kahiltna and Eldridge Glaciers ~~(including the Eldridge and Pika Glaciers when climbers are not present)~~. Based on data from 1999 through 2004, only two scenic air tour landings took place outside of this area. Businesses providing scenic flights could therefore be expected to experience steady growth in income from this activity during the near future and throughout the 20-year life of the plan. The high quality of the scenic air tour experience would result in high demand for the activity throughout the life of the plan. Examples of benefits to scenic air tour operators include decreasing advertising costs as “word of mouth” becomes adequate to market the activity and the competitive advantages realized by providers of quality scenic air tours over Denali as compared to operators elsewhere in the region.

Economic benefits–specifically for business operators serving backcountry users–from other summer backcountry activities such as hiking, camping, and mountaineering, would continue under this alternative. Steady increases in business could be expected over the next 20 years commensurate with increased numbers of visitors. Visitor capacity determinations and management action to protect the overall quality of the wilderness experience would benefit visitors participating in all activities; therefore, continued growth would be likely. Providers of services to these users would benefit from steadily increasing business for the life of the plan. Economic benefits to area communities from these types of park uses would tend to increase eventually because of the quality of the experience and the increasing numbers of users. A higher level of benefit would be likely in Talkeetna, a primary staging area for mountaineering activities.

Winter Season
Snowmachine use in the park additions and preserve would increase moderately under this alternative, especially ~~in the Bull River Unit southwest of Cantwell~~between the Bull River and West Fork Chulitna River and along the upper and lower Tokositna River. There would be a steady increase in overall numbers passing through Denali area communities. Businesses serving these users (lodges, hotels, restaurants, gas stations, and retail businesses) in the Denali area, especially at popular destinations such as Cantwell and Trapper Creek, would benefit from increased income throughout the life of the plan.

The benefits to retail activity and profits, employment, and income from other winter uses, such as skiing and dog mushing, would steadily increase throughout the life of the plan. This plan includes provisions to protect the quality of these experiences for growing numbers of users in the entrance area and for operating a visitor contact center south of Cantwell that could help in encouraging and directing this type of use. Benefits would be attributable to the increasing numbers of winter visitors and the likelihood of visitors spending more time in the park area, both of which can be expected if the variety and quality of recreational opportunities increase.

Population and Housing Impacts

Summer Season
The overall increasing recreational use and associated employment over the next several years in which the plan would be in effect would likely lead to some level of seasonal influx of people to provide the needed retail services, such as lodging, restaurants, gas stations, and retail stores. Increases in the recreational use levels and local seasonal population would likely result in the need for additional community public support services and facilities over the next several years. These impacts would increase eventually and would be attributable to increasing backcountry visitor use, as well as growth in overall park visitation.

Winter Season
The steady increases in winter recreational uses in the park and preserve would result in similar increases in employment opportunities, income, and population in communities near the park throughout the life of the plan. There would be a continued steady increase in demand for emergency services, such as responses to incidents involving injuries and the need for search and rescue. This would affect emergency service providers in area communities for the next several years by requiring continued increases in their capacity.

Other Economic Values

While providing for expanded opportunities for wilderness recreation, this alternative also emphasizes protecting the wilderness character of Denali National Park and Preserve over the long term. There would be similar protection of other economic values such as the value of ecosystem services provided by the park. Ecosystem services values accrue from an undisturbed, expansive subarctic ecosystem, so the park and preserve would have higher value with the managed recreational types and use levels under this alternative that prevent or minimize human impacts on the landscape.

Based on the above descriptions of impacts to the area economy, population and housing, and other economic values, overall impacts to economic values of the park and preserve would be minor in the short term (next several years), but moderate over the life of the plan.

Quality of Life

Summer Season
Increasing numbers of recreational users in the backcountry of Denali over the next several years would likely result in corresponding increases in traffic, demands for parking, and the generally higher level of human activity in gateway communities. Long-term effects could include increased population levels from the influx of people from elsewhere in Alaska and the United States, employment of non-local residents, and development of new businesses by non-local residents. This could reduce the overall rural quality of life for some area residents.

Winter Season
Minor changes are likely to occur in the quality of life for permanent residents near the park. Increased use of snowmachines in the area and the presence of increasing numbers of visitors from other areas could result in increased noise levels for local residents and current users, as well as signs of greater human presence from snowmachine tracks. This would likely result in a minor reduction in the rural and wilderness quality of life currently experienced by area residents over the life of the plan. It would also result in a slight decrease in the overall quality of the remote lifestyle valued by owners of second homes and recreational properties.

Another impact of expanding winter use would be increasing traffic in local communities, especially along the George Parks Highway and the Petersville Road. Residents of Cantwell, for example, have reported safety concerns with the increasing traffic along the Parks Highway through their community.

Existence and Use Values

Actions proposed under this alternative would protect both existence values and the types of recreational use values sought by visitors who desire extended experiences in remote locations. This would correspond with a high level of resource protection because of visitor capacity limits in the park additions and preserve. Existence values could increase eventually if the pristine condition of the park became a more rare and highly valued commodity. Use values for wilderness recreation in a remote setting, including motorized uses such as snowmachine touring, would increase throughout the life of the plan.

Cumulative Impacts

The steady increase in recreational uses up to visitor capacity limits under this alternative would be a moderate contributor to increases in overall economic activity, development, and employment in the Denali region. As stated in the Assumptions section at the

beginning of the Environmental Consequences chapter, the NPS expects an average annual increase of about 2% in overall visitation, including backcountry use, to Denali National Park and Preserve in the reasonably foreseeable future. Regional recreational uses would continue to increase, possibly at a faster rate than park visitor use; and at popular destinations outside the park boundary, the increasing levels of use could be significant. This would result in increased economic activity and employment. Development would likely continue along the Petersville Road, in Trapper Creek and Talkeetna, in the Healy area and on private inholdings and Native allotments, resulting in an increased need for housing and public services, as well as a greater loss in the current rural to wilderness quality of life in these areas. As a result, with backcountry uses under this alternative a moderate contributor, there would be moderate cumulative impacts from increased tourism and economic activity, employment, and population levels in communities and private lands near Denali National Park and Preserve and along the George Parks Highway.

Conclusion

Because of steady increases in a wide variety of recreational uses throughout the park and preserve, this alternative would result in moderate increases in income for many existing businesses throughout the life of the plan. There would be increasing opportunities for new businesses to be initiated as a result of anticipated growth in recreational use levels in the park. These changes would also lead to increased employment opportunities and income levels, commensurate with the levels of increases of recreational use, for concessionaires and other recreation-oriented businesses near Denali National Park and Preserve. The increase in economic activity would result in minor increases in population and the need for additional housing and public services.

Minor impacts to the rural quality of life in communities near the park and preserve could be expected over the life span of the plan. Existence values would be protected and could increase eventually, as would use values for most activities. A moderate increase in the value of ecosystem services possibly contributed by Denali National Park and Preserve could be expected throughout the life of the plan. Overall impacts on social and economic values from the management actions under this alternative would be minor over the short term (next several years) and moderate over the life of the plan.

RECREATIONAL OPPORTUNITY & VISITOR SAFETY

The actions presented in ~~the alternatives~~ the modified preferred alternative could affect the type, amount, and diversity of recreational opportunities in the Denali backcountry and the Denali region, and could affect visitor safety. "Recreational opportunities" include all the potential types of recreation that visitors might engage in while within the boundaries of Denali National Park and Preserve, but do not include subsistence activities.

METHODOLOGY

Recreational Opportunity

Recreational opportunities are defined by examining the management prescriptions under each alternative, including the following:

- The type of experience provided for through the allocation of management areas and accompanying standards;
- The type of access that is possible;
- The extent of facilities and services provided.

The opportunities are considered in light of the park's legislative purposes. For the entire park and preserve, the relevant purposes include "preserve wilderness resource values and related recreational opportunities such as hiking, canoeing, fishing, and sport hunting." For the park additions and preserve, ANILCA 202(3)(a) specifies as a purpose to "provide continued opportunities, including reasonable access, for mountain climbing, mountaineering, and other wilderness recreational activities." The Old Park is a legislatively designated wilderness area, so its recreational purposes include those indicated by the Wilderness Act as discussed in chapter 1.

A useful framework for examining recreational opportunities at Denali is provided by the authors of *Wilderness Management* (Hendee and Dawson, 2002). They characterize various activities in wilderness areas by the degree to which the activities are "wilderness dependent," identifying three categories that apply to recreational activities. They are presented here in increasing order of wilderness dependence:

1) Recreational activities that take place outdoors but that do not require wilderness conditions (for example, naturalness and solitude), such as playing catch or a competitive track meet.
2) Recreational activities that are enhanced by a wilderness setting but do not require it, such as fishing or observing wildlife.
3) Recreational activities that depend on wilderness conditions, such as experiencing solitude and isolation, observing natural ecological processes, or challenging oneself with wilderness travel.

In the Denali backcountry, activities that do not require wilderness conditions include such activities as racing or high-marking with snowmachines, which would fall under the first category of wilderness dependence; that is, not dependent at all and not appropriate at Denali given the park's statutory guidance. Sightseeing for the purpose primarily of witnessing scenic vistas or wildlife falls in the second category, scenic air tours are an example. These activities are appropriate in Denali's backcountry because the wilderness setting enhances them, but they do not require wilderness. The third category comprises those activities that are most consistent with Denali's statutory guidance, and are the most wilderness-dependent, such as the challenge of mounting a mountaineering or backpacking expedition in an area that has no roads or facilities, or seeking the solitude of deep winter on a dog mushing expedition.

Visitor Safety

Visitor safety is also a concern for the recreational experience at Denali. Chapter 3 provides details of past successes the National Park Service has had in addressing visitor safety issues, although additional ones are possible as visitor use increases. For example, in some locations, particularly on glaciers where there are high levels of visitation, drinking water quality could be affected primarily through biological hazards associated with human waste, and unburned vehicle fuel. The severity and causes of recreation-related water pollution problems are poorly known, although health hazards due to fecal contamination have been identified as a potential concern (Temple et al. 1982; Herman and Williams 1987; Cole et al. 1987). Inadequate disposal of human waste has been implicated in the spread of water-borne intestinal parasites (*Giardia* spp.), even in watersheds that receive little recreational use (Suk et al. 1987).

Impact Thresholds

Negligible: There would be little or no change in recreational opportunities or visitor safety.

Minor: There would be a change in recreational opportunities or visitor safety, however it would affect relatively few visitors, or would not affect any wilderness-dependent recreational activities.

Moderate: There would be substantial changes in recreational opportunities or visitor safety, however these changes would not affect the majority of visitors in a wilderness-dependent user group.

Major: There would be substantial changes in wilderness-dependent recreational activities or visitor safety that would affect opportunities for the majority of one or more user groups.

Impairment: Unique opportunities for wilderness-dependent recreational activities would cease to be available at Denali. Uniqueness refers only to uniqueness within Denali National Park and Preserve, and is determined by such characteristics as the type of activity, landscape setting, and ease of access.

IMPACTS OF THE MODIFIED PREFERRED ALTERNATIVE

Recreational Opportunity

This alternative would have a minor beneficial impact on recreational opportunities at Denali because it would allow for growth in a carefully managed set of appropriate backcountry activities to serve individuals who need more assistance with access, facilities, and services, while still protecting the recreational activities that are dependent upon Denali's wilderness resources and which the NPS is legislatively obligated to provide. Visitor safety would be improved by education associated with required registration for some common activities.

The application of management areas and accompanying standards throughout the park and preserve would assure the continuation of a spectrum of recreational opportunity at Denali, with an emphasis on providing continued opportunities for growth in all kinds of appropriate recreational activities.

Approximately ~~11~~6% of the park and preserve plus areas ~~along the park road~~ would accommodate those visitors that need additional facilities or assistance with access to wilderness recreational activities. Some areas along the park road in the Old Park and Kantishna would also have opportunities for some assisted activities, but at a low level of use. About ~~29~~40% would serve those visitors seeking an experience similar to what is presently available along in the Denali Wilderness in terms of the amount of crowding and signs of human presence, and 5% would provide for high-use mountaineering areas.~~;~~ ~~a~~Another 49% would preserve an opportunity to have a remote experience at Denali. ~~About 11% would seek to preserve the experience of visitors who do not wish to encounter any other people during their exploration.~~

In the busy, accessible area between the Kahiltna and Eldridge Glaciers, management area designations would protect 5% as high use but low noise, providing an area where the climbing and mountaineering experience could avoid conflicts with other uses, such as scenic air tour traffic. However, there would be many popular climbing areas in the Ruth Amphitheater, Kahiltna Glacier, and Tokositna Glacier that would continue to have multiple uses; opportunities for climbers to have an undisturbed experience would diminish.

The standards proposed in the plan may reduce some future opportunities for recreation involving some forms of access. For example, standards that limit social trail development would make it difficult for the National Park Service to allow significant backcountry access by bicycle or pack animal, because either would quickly damage

vegetation and lead to social trail development in most parts of the national park and preserve, excepting harder surfaces such as gravel river bars. The standard could lead to prohibiting those activities in the future if such damage were to become likely.

Summer recreational access in the Old Park would require travel by foot from the park road, roads outside of park boundaries, or personal (non-commercial) airplane. Summer access in the remainder of the park and preserve would be facilitated by ongoing opportunities to use motorboats and airplanes, including commercial air taxis, to reach remote areas at established landing areas, glaciers, or lakes. No area would preserve places that would require lengthy overland travel to reach.

Winter recreational access would be facilitated by ongoing opportunities to use ski-equipped airplanes park wide and commercial air taxis in the park additions and preserve to reach remote areas. There would be an ongoing opportunity to use snowmachines for traditional activities in the park additions and preserve. If in the future the term "traditional activities" were defined to exclude ~~recreational~~ non-consumptive ~~use~~activities as for the Old Park, ~~such~~ utilizing a snowmachine~~recreational use~~ for those activities would be prohibited by existing NPS regulation. The level of motorized access could be limited in the future if necessary to achieve management area standards.

The management of motorized access in this alternative would ~~protect~~ allow some adverse impacts to wilderness-dependent opportunities on the Eldridge Glacier and in Little Switzerland~~ and the Rampart Mountains~~. To a lesser degree, some opportunities for non-motorized winter use would be protected in the accessible park additions on the south side of the Alaska Range where snow conditions are more reliable, but only in ~~limited~~ areas east of ~~Cantwell Creek~~the Bull River.

This alternative would allow the development of more guided opportunities than are presently available at Denali and expansion of some existing activities, although the constraints on these activities would be more carefully defined than at present. Guided day hiking in the Old Park would ~~be restricted to existing levels and locations~~generally be restricted to the levels and locations where it occurs now; however, more than 20 miles of entrance area trails (some still to be constructed) would be opened to guided hiking. Scenic air tour landings – an appropriate but not wilderness-dependent activity – would be restricted to glaciers in Management Area A and designated landing areas on the Eldridge and Pika Glaciers, and constrained by natural sound disturbance standards, which would allow some growth but limit some locations where landings presently occur. Guided sport hunting opportunities would be enhanced by extending the two current guide areas across the entire southwest preserve, thereby creating larger guide areas that have a more viable opportunity for regular hunts.

There would also be the opportunity to offer additional types of guided activities, but these would be restricted only to the ~~Kantishna Hills,~~ Dunkle Hills~~,~~ and southern glaciers and lowland areas designated as Management Area A, about ~~11~~6% of the park and preserve backcountry. In addition to the guided activities, there would be additional

opportunities for new and expanded educational programs throughout the park and preserve.

The addition of a formalized trail system in the Kantishna Hills would add the opportunity for visitors to hike in a more traditional format, providing an option for those uncomfortable with cross-country travel. However, the opportunity would be largely limited to those who have the ability to stay overnight at the western end of the park in the backcountry, at a campground, in a private lodge, or in the hostel provided for in the 1997 *Entrance Area and Road Corridor Development Concept Plan*. Designated campsites in the Kantishna Hills would also offer a different experience than is presently available which would appeal to some visitors who prefer to reduce uncertainty and difficulty in selecting a backcountry campsite.

~~The Wildhorse Creek trail would provide an additional trail-hiking opportunity and access option on the south side of the park. The other trails provided for in this alternative largely address resource damage and add little opportunity for backcountry travel.~~

Gaining public access to the 17(b) easement between Cantwell and the park boundary at Windy Creek would benefit recreational opportunities by providing an additional point of access to the park that is road accessible.

Visitor Safety

Experience has demonstrated that the park's mountaineering program can safely accommodate the present number of climbers attempting to climb Mount McKinley. NPS mountaineering rangers believe that current levels of education and rescue services could safely accommodate up to 1,500 visitors.

It is likely that some overnight camping and winter day-use in the southern park additions would trigger registration requirements in the near future. These requirements would enable better visitor education, enhancing visitor safety through better knowledge of common backcountry hazards such as bears, rivers, glaciers, avalanches, and potentially hazardous conflicts with other visitors (e.g., people camping too close to landing areas on glaciers). These new requirements, if implemented, would apply to a substantial but unknown number of visitors who presently do not register. There are presently about 500 overnight mountaineering users per year on south side glaciers that voluntarily register.

Continued increases in climbers attempting Mount McKinley and neighboring peaks would lead to an increase in unconfined human waste and the potential for degrading water quality as ice melts on the Kahiltna, Pika, Ruth, and Eldridge Glaciers. Although most human waste deposition typically is on ice, snow, or rocky soils well away from surface or groundwater movement, the long-term impacts of this practice are unknown. Contamination of water resources could cause health problems for climbers and other visitors in areas drained by these glaciers.

In this management scenario, all of the park's popular climbing areas (West Buttress, Kahiltna Base Camp, and the Ruth Glacier) are zoned as Management Area A, C, Portals or Special Use Areas, which allow for higher levels of encounters with people and with evidence of modern human use. Evidence of human waste should still be low in these areas because NPS staff would continue to educate climbers about waste disposal, conduct regular patrols on the West Buttress, and encourage climbers to use Clean Mountain Cans to dispose of their human waste, which have been shown in the past to reduce waste problems on the West Buttress.

Under this alternative, limiting the number of climbers on Mount McKinley to 1,500 per season would allow use levels to increase by over 15%. Removal of human waste from the park would be required on the West Buttress Route on Mount McKinley ~~at and~~ above the 14,000-foot camp, and at campsites within one-half mile of air taxi landing locations on glaciers. If new registration requirements were imposed in the popular mountaineering areas, they would allow NPS staff to further educate visitors about proper disposal of human waste in other glaciated areas that receive considerable use. These actions would be expected to mitigate most of the potential negative impacts that increased use, and subsequently increased human waste, could have on drinking water quality and human health in these high use areas. Realistically, not all impacts would be mitigated, and impacts to water quality could persist for several years.

Cumulative Impacts

The National Park Service has generally allowed the growth of backcountry recreational activities and encouraged it by authorizing guided activities such as dog sled tours, scenic air tour landings and air taxi services, guided day hiking, and guided mountaineering. Some activities have been constrained to protect park resources by prohibiting snowmachine access to the Old Park in 2000 and imposing quotas on overnight backcountry use in 1976. However, these actions have served to preserve the diversity of recreational opportunity at Denali, particularly for wilderness-dependent activities. Meanwhile, increasing snowmachine access to the southern park additions and the expansion of aircraft overflights on the south side of the Alaska Range and the eastern portion of the Old Park associated with increasing scenic air tour traffic have had an adverse impact on wilderness-dependent activities.

The actions in this alternative would mitigate the adverse impacts of actions originating outside of NPS control and preserve the diversity of recreational opportunity in the face of further changes in recreation demand. Overall, the actions in this alternative combined with these other actions would have a minor beneficial impact on the recreational opportunities in the Denali backcountry. The actions proposed would be responsible for a substantial portion of the benefit, although the previous efforts to limit overnight use and restrict snowmachine access also play an important role.

Conclusion

This alternative would have a minor beneficial impact on recreational opportunities at Denali because it would allow for a carefully managed set of appropriate backcountry activities to serve individuals who need more assistance with access, facilities, and services, while still protecting the recreational activities that are dependent upon Denali's wilderness resources and which the NPS is legislatively obligated to provide. However, there would be limited opportunities for some wilderness-dependent activities to expand in accessible areas. Visitor safety would be improved by education associated with required registration for some common activities, while adverse impacts to water quality would be minimized.

The level of impacts to recreational opportunities anticipated from this alternative would not result in an impairment of park resources that fulfill specific purposes identified in the establishing legislation or that are essential to the integrity of the park.

PARK OPERATIONS AND MANAGEMENT

This section addresses impacts to park operations and management, including needs for staffing, equipment, and facilities within all divisions of the National Park Service at Denali.

METHODOLOGY

Previous management actions in Denali National Park and Preserve and management actions in other units of the national park system (such as those from Rocky Mountain National Park, Zion National Park, Mount Rainier National Park, and Shenandoah National Park) were used to determine impacts to park management from each of the alternatives. For example, examination of operations of Denali's current backcountry quota system indicates the National Park Service can expect impacts of an expanded registration system to be similar to those that have occurred during the last 25 years that the current quota system has been in place.

IMPACTS OF THE MODIFIED PREFERRED ALTERNATIVE

The National Park Service would follow through with its commitment to conduct ecological monitoring and research to implement the plan. Additional park staff and funding will be needed to carry out the baseline studies, research, and subsequent monitoring that is an inherent requirement of the successful implementation of the adaptive management approach that is promoted by this plan. The complexity of monitoring to determine if desired resource conditions are being met is greater than simply regulating a carrying capacity limit such as the number of permits.

Approximately a 25% increase in research and monitoring staffing and funding would ~~need~~ be needed to implement the level of research and monitoring that is required by this alternative. The allowance for motorized access and higher levels of scenic air tour activity would increase the need for the research and monitoring information on natural soundscapes, wildlife disturbance, vegetation damage, and visitor capacity. Four new permanent positions and four new seasonal positions in these disciplines would be ~~needed to help meet the obligations in this alternative for adaptive management~~required to implement plan provisions. Four new seasonal positions to assist in monitoring implementation would be required. Funding sufficient to conduct concurrent contracted research studies on soundscape, vegetation, wildlife, and sociological topics would be required given that the use levels and types of use allowed by this alternative would require more immediate information.

The continuation of recreational snowmachine, airplane, and motorboat use throughout the park and preserve additions as well as continued use of airplanes, motorboats, ~~stock~~pack animals, and bicycles in the Old Park implies major new management responsibilities and operational impacts ~~that are not a consequence of either Alternatives~~

~~2 or 3~~. A well-staffed and funded backcountry management operation along with a research and resource management program that is specifically assigned to address backcountry visitor use related issues would be necessary to implement the actions of this alternative and the resource protection strategies described in this plan.

Higher levels of use in the backcountry, particularly during the winter from snowmachine use, would require 400 flight hours of aerial patrols to enforce regulations and gather resource monitoring information. The infrastructure and staffing exist to absorb this increase with only minor impacts on park operations, but increased funding would be required to pay for flight time.

Three additional permanent positions and 12 additional seasonal positions distributed between visitor contact stations at Park Headquarters, Broad Pass, Talkeetna, and perhaps along the Petersville Road or at Trapper Creek would eventually be necessary to provide visitor information and registration services. An additional supervisory Park Ranger would be needed to oversee a backcountry district that would include four backcountry law-enforcement field Rangers. Two additional staff, one permanent, and one seasonal would be necessary to increase the winter patrol coverage capabilities of the park kennels operation. The establishment of this comprehensive program, which is essential to the accomplishment of the adaptive management strategy inherent in this plan, would be a major impact on park operations.

An important long-term beneficial impact on park operations is the plan's documentation and formalization of standards, limits, guidance, and policies for actions in the backcountry. Park administration and personnel change eventually, and the proposed plan would provide for continuity and consistency of management, decreasing variability and uncertainty about appropriate activities, including commercial activities, in the backcountry.

The addition of one permanent park planner or management assistant would be required to coordinate the implementation of proposals in this alternative such as working with air taxi and scenic air tour operators to reduce aircraft noise, accomplishing required updates to the plan, and carrying out the evaluation of information from required monitoring. The position would also lead the planning for any subsequent adaptive management actions that may be necessary. An additional 50% of a permanent position would be required to work with concessions management to develop provisions for future commercial use authorizations and monitor the increased level of commercial activity.

The National Park Service would maintain the same level of administrative presence on Mount McKinley and the overall impacts to park operations and management would be negligible over 5-10 years of plan implementation.

An additional seasonal trail crew on the north side of the park would be required to construct and maintain trails that are included within this plan. Given the current scale of the trails program, this would be a minor impact.

Maintenance of new facilities such as the new contact station in the Cantwell/Broad Pass area and structures to support winter use in the park headquarters area would require additional operating funds for contract services as well as the addition of one permanent and one seasonal employee.

The additional staff required to implement the plan would exceed ~~the~~ existing administrative capabilities and would therefore trigger additional expenses for office space, administrative staff, vehicles, and parking~~of existing administrative and facility infrastructure~~ and create related impacts to other aspects of park operations, and as a result represent a major impact to park operations overall.

Cumulative Effects

Past, present, and reasonably foreseeable future actions, such as the private and commercial development in and near the park and regional increases in recreational uses will require additional time and effort from park management for the next 20 years. Impacts to park management would be major because these projects will have serious ramifications on the visitor experience and condition of the park. Existing staff are fully utilized with existing projects; therefore, new duties would require new staff. To work effectively on these and other projects, more funding would be necessary and/or existing staff would have to shift priorities.

Conclusion

Despite the fact that there would be increases in park staff and funding to manage increased use and additional facilities, and that proactive management would negate the need for a reactive (and thus, a more costly and effort-intensive) approach to management, major impacts to park operations and management would still occur in several important aspects of park operations during 5-10 years of plan implementation. These changes would be of a degree that cannot be absorbed within existing infrastructure. The required staffing and funding are of a magnitude that would trigger the need for major secondary responses in support services such as administration, (particularly human resources), support facilities and equipment such as office space and vehicles, and ~~as well as~~ facility maintenance activities. Overall, there would ~~still~~ be major impacts to park operations as a consequence of this alternative. Without the staffing and funding increases described above, it would not be possible to prevent impairment of park resource values given the use increases called for by this alternative.

SUSTAINABILITY

MODIFIED PREFERRED ALTERNATIVE

Relationship Between Short-Term Uses and Long-Term Productivity

The dispersed motorized access that would continue and grow in the Dunkle Hills/Broad Pass and lowland areas around the bases of the Kahiltna, Tokositna, and Ruth Glaciers could compromise the ability of the park to sustain wildlife resources, which could be displaced. Close to Cantwell, these wildlife resources are also subsistence resources. The same displacement could occur in other areas of the park and preserve~~, particularly Kantishna,~~ if snowmachine access became popular in the future. In addition, these areas could decline in their ability to provide wilderness recreational opportunities because of the high levels of motorized equipment and noise that would make it difficult for visitors to find solitude.

Irretrievable or Irreversible Commitments of Resources

There would be no irreversible or irretrievable commitments of resources made under this alternative.

Unavoidable Adverse Environmental Impacts

There would be unavoidable adverse environmental impacts to natural soundscape and wilderness resources in areas where motorized access would be common, such the southern glaciers between the Kanikula/upper Kahiltna and Ruth glaciers because of airplane access and the Corridors in the Broad Pass/Dunkle Hills and Tokositna River areas. There would also be damage to vegetation and ice-rich permafrost soils in ~~Corridors and other~~ areas where snowmachines commonly travel. All of these impacts would be mitigated by the standards provided by management areas.

CHAPTER 5: CONSULTATION AND COORDINATION

The National Park Service consulted and coordinated with numerous agencies, organizations, and interested persons in addressing the proposed Backcountry Management Plan and General Management Plan amendment for Denali National Park and Preserve. Individual members of the public and other interested agencies and organizations have had the opportunity to shape this plan from the definition of issues and concerns through the initial development of alternatives, *Draft EIS*, and *Revised Draft EIS*. The following is a brief overview of the extent of public and agency involvement.

Public Involvement

Public Scoping

The National Park Service held scoping meetings within the park and the regional office during fall 1998 and spring 1999. A Notice of Intent (NOI) to prepare an environmental impact statement was published in the *Federal Register* on August 31, 1999. After publishing the Notice of Intent, the National Park Service hosted public scoping meetings in Anchorage, Fairbanks, Talkeetna/Trapper Creek, and McKinley Village to define issues and impact topics to address in the plan. Approximately 150 people attended these meetings and an additional 65 written comments were received.

Newsletter

As a result of these scoping efforts, the NPS issued in January 2001 the Special Winter 2001 Edition of the *Denali Dispatch* (Volume 6, Issue #4) to about 2,000 addresses on the park mailing list. This document described the primary activities and a range of alternatives to be evaluated in the environmental impact statement. (Recipients included those receiving the *Draft Backcountry Management Plan and EIS*–see list at the end of this section).

Open Houses – Alternatives Development

The National Park Service held open house meetings in Anchorage, Fairbanks, Talkeetna/Trapper Creek, Cantwell, and Healy during the first two weeks of February 2001 to help fine-tune the alternatives and impact topics.

Open Houses – Draft Plan and EIS Review

Upon release of the *Draft Backcountry Management Plan and EIS* in February 2003, the National Park Service held a series of informational workshops in Anchorage, Wasilla, Talkeetna/Trapper Creek, Cantwell, Healy, and Fairbanks to explain the plan so members of the public would be better equipped to respond in public comment.

Public Comment on Draft Plan

The public comment period on the draft plan was open for 75 days from February 25 to May 7, 2003, and then extended at public request to May 30, 2003. In April, public hearings were held in Anchorage, Wasilla, Talkeetna/Trapper Creek, Cantwell, Healy,

and Fairbanks. The National Park Service received 9,370 comments. These comments are summarized and responses to substantive comments provided in Appendix A of the *Revised Draft EIS*. As a result of the comments, the National Park Service decided to revise the draft plan and solicit additional public comment before publishing a final plan.

Public Comment on Revised Draft Plan

A Notice of Availability for the *Revised Draft EIS* was published in the Federal Register on April 26, 2005, and public comment was accepted through July 15, 2005. National Park Service staff received 15,198 comments. See Chapter 6 for a summary and analysis of these comments and the NPS responses to substantive comments. Public hearings on the *Revised Draft EIS* were held during June, 2005, in Anchorage, Talkeetna/Trapper Creek, Cantwell, Healy, and Fairbanks.

Consultation With Federal Agencies

U.S. Fish and Wildlife Service

Section 7 of the Endangered Species Act, as amended, prohibits federal agencies such as the National Park Service from implementing any action that is likely to jeopardize the continued existence of a federally protected (i.e., endangered, threatened) species. Further, the act requires that the National Park Service consult with the U.S. Fish and Wildlife Service on any action it authorizes, funds, or executes that could potentially affect a protected species or its designated critical habitat.

To help meet its responsibilities under the act, the National Park Service has consulted with the U.S. Fish and Wildlife Service to identify those listed plant and animal species that may inhabit the backcountry area. On July 17, 2000, Superintendent Stephen P. Martin sent a letter to Ann Rappaport, Ecological Services and Endangered Species, requesting information on federally endangered or threatened plant and animal species in Denali National Park and Preserve for the backcountry management plan. On July 27, 2000, Arthur E. Davenport, Endangered Species Biologist, indicated in his letter that the U. S. Fish and Wildlife Service had no endangered or threatened plant and animal species occurring within the area of the proposed new backcountry management plan for the park. Copies of the correspondence were included in full in Appendix D of the original *Draft Backcountry Management Plan and EIS (*NPS 2003d).

In addition to this communication, National Park Service planning staff met with counterparts in the Alaska Region of the U.S. Fish and Wildlife Service on May 13, 2004, to discuss the draft plan.

Bureau of Land Management

The National Park Service held discussions with Bureau of Land Management staff, Glenallen Field Office, and submitted written comments regarding the East Alaska

Resource Management Plan (EARMP). The NPS comments sought coordination between the EARMP and the backcountry management plan on regional recreation opportunities, and particularly for combining efforts on the proposed visitor contact station in the Broad Pass/Cantwell area.

Denali Subsistence Resources Commission

Several presentations have been made to the Denali Subsistence Resources Commission, which has maintained an active interest in the plan because of potential conflicts between subsistence users and recreational users in the park additions and preserve. Presentations have occurred at the April and October meetings in 2001, February meeting in 2002, March meeting in 2004, and June meeting in 2005. The Commission passed formal motions regarding both the original *Draft EIS* and the *Revised Draft EIS*. The motions and commission discussion have consistently called for recognizing a subsistence priority over recreational uses in areas where subsistence use occurs, zoning the southern park additions between Cantwell and the Bull River to protect subsistence activities, and providing more guidance on the resolution of conflicts between subsistence and recreational use. The complete motions regarding the *Revised Draft EIS* and the NPS responses appear in the following chapter of this document, Chapter 6: Public Comments and Response.

Consultation with State and Local Governments

State Of Alaska

The planning team shared a draft copy of the affected environment section of the *Draft EIS* with the State of Alaska during winter 2000-2001 with a 60-day comment period. The Office of the Governor in Anchorage sent a comment letter to the park on April 20, 2001, along with an edited electronic version of the affected environment section. The planning team incorporated most of the state's suggestions. Suggested comments that were not incorporated into the draft plan were discussed with the Division of Governmental Coordination during fall 2001. The National Park Service provided the State of Alaska with a copy of the internal review draft backcountry management plan on January 18, 2002. The State provided verbal comments in a meeting on July 26, 2002.

During the comment period for the draft plan, the State submitted extensive comments that are published in appendix A of the *Revised Draft EIS* with responses. The National Park Service involved the State extensively in the process of crafting the revised draft plan, holding 10 meetings with representatives of the Office of the Governor, Department of Natural Resources, and Department of Fish and Game between December, 2003, and December, 2004. The State also participated in internal review of the revised draft plan during November 2004. The planning team met with the State during July and September 2005 to discuss the State's comments on the *Revised Draft EIS* and potential NPS responses to them, and the State was included in the internal review of the *Final EIS* during late November and early December 2005.

Alaska State Historic Preservation Office and the Western Office of the Advisory Council on Historic Preservation

The National Park Service has consulted with the Alaska State Historic Preservation Office and the Western Office of the Advisory Council on Historic Preservation since initiating this project. An advance copy of the document was provided for their review. A copy of the *Draft Backcountry Management Plan and EIS* was sent to both of these offices in order to initiate and plan for coordination survey, eligibility, effect, and mitigation of possible cultural resources in the proposed project areas early in the planning process. Copies of correspondence were included in Appendix D of the original *Draft Backcountry Management Plan* (NPS 2003d). All implementation actions that could affect historic properties as defined under the National Historic Preservation Act and the 1995 Nationwide Programmatic Agreement will be evaluated through consultation with the state historic preservation officer. These actions include, but are not limited to, proposed changes to historic buildings or districts and ground-disturbing activities.

Consultation with Native Tribal Governments

The National Park Service sent copies of the draft plan and letters requesting government-to-government consultation to six affected Native tribal governments. A meeting with the Nenana Native Council was held in summer of 2003 to discuss the backcountry management plan and other issues. These Native tribal governments were also provided with a copy of the *Revised Draft EIS* in April 2005.

Additional Consultation

In addition to the publicized public involvement opportunities and consultation with public agencies, the National Park Service has sought comments and responded to requests for meetings, discussion, or informational presentations with a wide variety of organizations throughout the process of preparing the original and revised draft of the plan. In winter and spring 2002, the National Park Service held collaborative planning workshops in Anchorage and Talkeetna to discuss alternatives and issues associated with climbing and mountaineering, snowmachine use, and airplane use. Park staff frequently met with snowmachine groups, air taxi operators, environmental groups, inholders, subsistence users, and members of the travel and tourism industry to provide updates and solicit ideas and information.

List of Agencies, Organizations, and Businesses to Whom Copies of the *Revised Draft Backcountry Management Plan/Environmental Impact Statement* Were Sent

ALASKA CONGRESSIONAL DELEGATION

Congressman Don Young
Senator Lisa Murkowski
Senator Ted Stevens

FEDERAL DEPARTMENTS, AGENCIES, AND OFFICES

Advisory Council on Historic Preservation
Alaska Public Lands Information Center, Anchorage
Alaska Public Lands Information Center, Fairbanks
Department of the Interior
- All Alaska National Parks
- Assistant to the Secretary for Alaska
- Bureau of Land Management
- National Park Service, Alaska Region
- National Park Service, Washington office
- U.S. Fish and Wildlife Service

Environmental Protection Agency
Federal Highway Administration

NATIVE ORGANIZATIONS AND CORPORATIONS

Ahtna Development Corporation
Alaska Village Initiatives
Cook Inlet Region, Inc.
Doyon, Limited
Subsistence Resource Commissions
Native Village of Cantwell
Native Village of Tanana
Nenana Native Council
Nikolai Edzeno' Village Council
Tanana Chiefs Conference

STATE OF ALASKA

Governor Frank Murkowski
Alaska Department of Fish and Game
Alaska Department of Natural Resources
Alaska Department of Transportation and Public Facilities
Alaska Railroad Corporation
Alaska State Historic Preservation Office

Alaska State Parks
State Representative David Guttenberg
State Senator Ralph Seekins
State Senator Gene Therriault

LOCAL GOVERNMENT AGENCIES

Anchorage Convention and Visitors Bureau
City of Anderson
City of Fairbanks
City of Talkeetna
Denali Borough
Fairbanks Chamber of Commerce
Fairbanks Convention and Visitors Bureau
Fairbanks North Star Borough
Greater Palmer Chamber of Commerce
Greater Fairbanks Chamber of Commerce
Healy Chamber of Commerce
Matanuska-Susitna Borough
Municipality of Anchorage
Talkeetna Chamber of Commerce
Talkeetna Community Council
Trapper Creek Community Council
Village of Nenana

ORGANIZATIONS

Access Fund
Alaska Airmens Association
Alaska Alpine Club
Alaska Aviation Safety Foundation
Alaska Center for the Environment
Alaska Conservation Alliance
Alaska Conservation Foundation
Alaska Environmental Lobby
Alaska Lands Act Coordinating Committee
Alaska Miners Association
Alaska Natural Heritage Program
Alaska Natural History Association
Alaska Outdoor Council
Alaska Professional Hunters Association
Alaska Public Interest Research Group
Alaska Quiet Rights Coalition
Alaska State Snowmobile Association
Alaska Tourism Industry Association
Alaska Wilderness Recreation & Tourism Association

Alaska Wildlife Alliance
Alaska Women of the Wilderness
American Alpine Club
American Alpine Institute
American Wilderness Alliance
Anchorage Audubon Society
Anchorage Snowmobile Club
Blue Ribbon Coalition
Commonwealth North
Denali Citizens Council
Denali Foundation
Denali Visitors Association
Earth First, Ltd.
Earth Justice Legal Defense Fund
Fairbanks Snow Travelers
Greenpeace USA
Lake Minchumina Advisory Committee
Mat-Su State Park Citizen's Advisory Board
McCarthy Area Council
Middle Nenana River Advisory Committee
Mountaineers Club of Alaska
National Audubon Society
National Outdoor Leadership School
National Parks and Conservation Association
National Wildlife Federation
Northern Alaska Environmental Center
Panguingue Creek Homeowners Association
Resource Development Council for Alaska, Inc.
Seaplane Pilots Association
Sierra Club, Alaska Chapter
Sierra Club, Alaska Field Office
Southeast Alaska Conservation Council
Susitna Valley Association
Talkeetna Environmental Center
Talkeetna Historical Society
The Conservation Fund
The Nature Conservancy of Alaska
The Wilderness Society
Trustees for Alaska
Wilderness Watch
Wildlife Federation of Alaska

BUSINESSES

The *Revised Draft EIS* was sent to over 200 businesses, which fall into one of the following categories:

Accommodations
Climbing services
Dog sled tour and freighters
Engineering and consulting firms
Fishing services
Flying services
Hiking services
Hunting services
Inholders associations
Leisure services
Mining companies
Mountaineering services
Raft and kayak services
Restaurants, local
Ski tour services
Transportation services, automobile
Wilderness schools

EDUCATIONAL INSTITUTIONS

Alaska Pacific University
Denali Institute
Fairbanks Noel Wein Library
Loussac Public Library
Prescott College
Talkeetna Public Library
Tri-Valley Community Library
University of Alaska-Anchorage
University of Alaska-Fairbanks

MEDIA

Alaska Snowrider
Airmen's Magazine
All Public Radio and Television Stations
Alaska Geographic
Alaska Magazine
Anchorage Daily News
Denali Summer Times
Fairbanks Daily News Miner
The Frontiersman