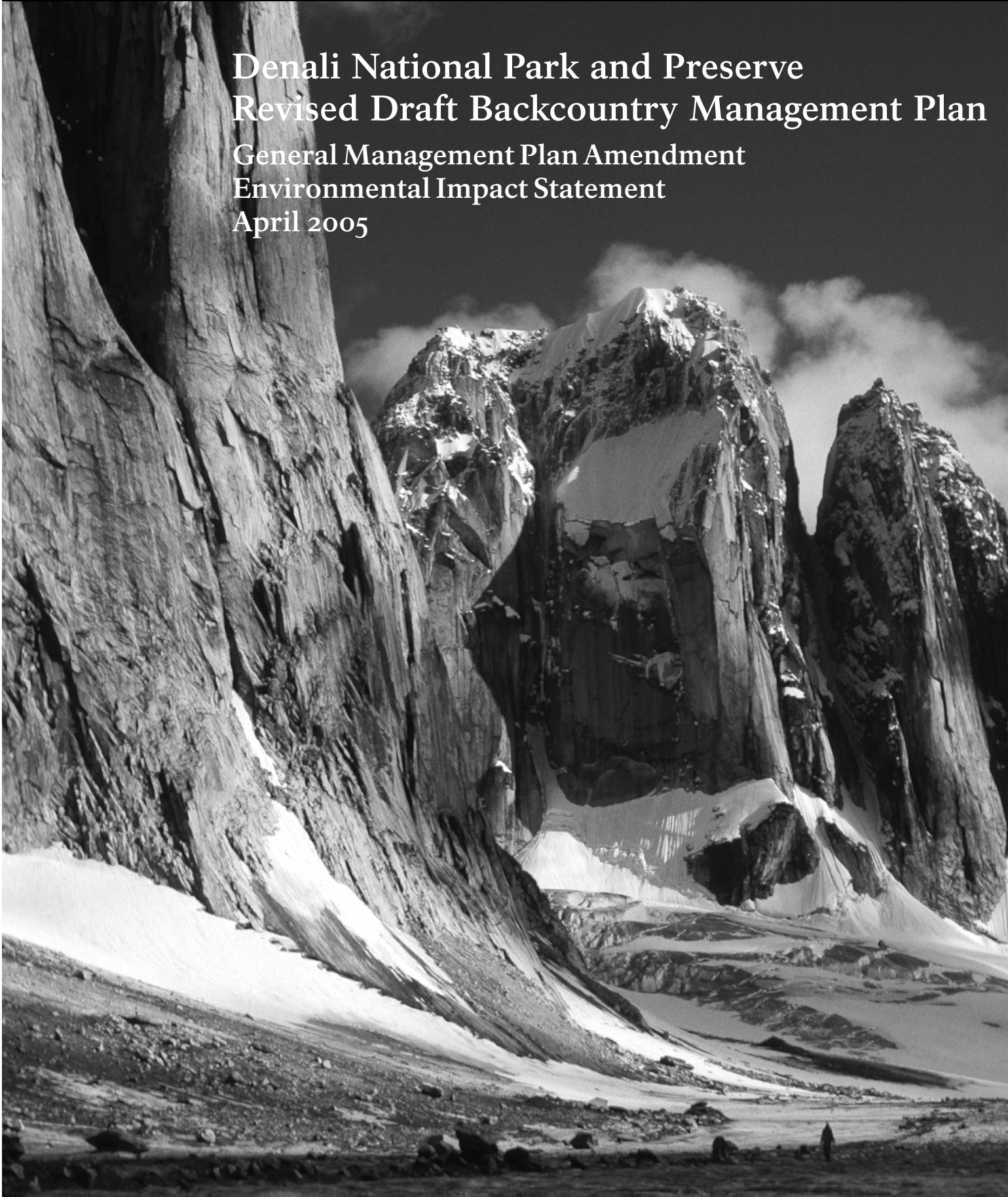


A black and white photograph of a rugged mountain range, likely Denali. The foreground shows steep, rocky slopes with patches of snow. In the background, several sharp, snow-capped peaks rise against a cloudy sky. A small figure of a person is visible in the lower right foreground, providing a sense of scale to the massive landscape.

Denali National Park and Preserve Revised Draft Backcountry Management Plan General Management Plan Amendment Environmental Impact Statement April 2005

Denali National Park and Preserve

Revised Draft Backcountry Management Plan,

General Management Plan Amendment, and Environmental Impact Statement

April 2005

Produced by Denali National Park and Preserve
National Park Service

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

Denali National Park and Preserve

Revised Draft Backcountry Management Plan
General Management Plan Amendment
Environmental Impact Statement

Lead Agency: **National Park Service**

Abstract: This *Revised Draft 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. 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. Four action alternatives are presented, each of which provides for growth in the level of backcountry use, with additional facilities and services proposed in three of the alternatives. The intent is to manage growth so that in the long term a greater number of users can experience the park with reduced resource impacts.

This document is a Revised Draft Environmental Impact Statement, which replaces the *Draft Backcountry Management Plan, General Management Plan Amendment, and Environmental Impact Statement* (DEIS) released in February 2003. The comment period on the revised draft plan and environmental impact statement will extend through **June 30, 2005**. Additional information can be obtained and comments submitted through the National Park Service's *Planning, Environment and Public Comment* web site at:

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

Information may also be obtained and written comments submitted at the following address:

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Executive Summary

This document is a *Revised Draft Backcountry Management Plan, General Plan Amendment, and Environmental Impact Statement*, which replaces the *Draft Backcountry Management Plan, General Management Plan Amendment, and Environmental Impact Statement* (DEIS) for Denali National Park and Preserve released in February 2003. This RDEIS substantially changed the actions in the plan alternatives in response to public comment on the original draft. This revised draft broadens the range of actions considered, provides quantitative descriptions of management areas, reallocates management areas, defines access management strategies, distinguishes between commercial guided and educational activities, and clarifies the appropriate locations, types, and scale of commercial services in the backcountry.

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, as a *Wilderness Management Plan* as required by NPS Director's Order 41, 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 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 DCP*; 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 ANILCA, and the 1986 GMP 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 maximum 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;
- define the recreational opportunities provided in Denali’s backcountry within the context of a spectrum of recreational opportunities available on public lands 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 RDEIS includes a no-action alternative and four action alternatives. The action alternatives address seven essential components of backcountry management.

- 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. The management areas are defined in tables 2-1 through 2-9 and applied in maps 2-1 through 2-5.
- 2) Access Management: Each alternative has a distinct strategy for managing motorized and non-motorized access to the park and preserve, including general tools that would be applied under any alternative.
- 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 policies 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 proposed land exchanges 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 represents a distinct vision for the Denali backcountry and proposes a set of actions under the seven topic categories which would result in achievement of the vision. The action alternatives fall roughly along a spectrum. Experiential values related to wilderness character – typically defined by opportunities for solitude, to hear natural sounds, to explore with minimal guidance, and to encounter wildlife undisturbed in its native habitat – are at one end of the spectrum. Values related to recreational opportunity in a wilderness context including diversity of opportunities, more options for access, and more supportive services and infrastructure are at the other end. All alternatives propose measures to protect wilderness resource values and provide opportunities for wilderness recreational activities. The alternatives are fully developed in chapter 2 and summarized in Table 2-10, which appears at the end of the chapter. The general vision for each alternative is as follows.

Alternative 1 (No Action)

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*, and the 1976 backcountry management plans with amendments. 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 previous plans.

Alternative 2

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 would include many opportunities for extended expeditions in very remote locations. Backcountry users seeking other experiences would find those opportunities on neighboring lands.

Alternative 3

This alternative would provide opportunities for 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 the 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.

Alternative 4 (Preferred Alternative)

This alternative would also provide opportunities for a variety of 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, assistance, or short time-commitments. However, the areas would be of sufficient size to accommodate anticipated growth in the next 20 years and would be focused along the park road in the Old Park and Kantishna; at the Ruth, Tokositna, and Kahiltna Glaciers; and in the Dunkle Hills/Broad Pass area. The remainder of the backcountry would be managed for dispersed, self-reliant travel, and would include opportunities for extended expeditions in very remote locations.

Alternative 5

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 managed primarily 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.

Environmental Consequences

Following the alternatives is an analysis of the environmental consequences of the actions in each alternative. 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. The analysis is intended to guide the decision-maker in choosing a management action based on an objective understanding of environmental consequences.

The National Park Service considered in detail 10 resource categories for analysis. 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

The environmental consequences are analyzed in chapter 4 and summarized in Table 2-11, which appears at the end of chapter 2. Conclusions for each alternative may be stated as follows.

Alternative 1 (No Action)

Ongoing increases in visitor use and motorized access without new management initiatives would result in moderate to major adverse impacts to many park resources, including ice-rich permafrost soils, vegetation, wildlife, and subsistence resources and opportunities. Wilderness-dependent recreational opportunities would decline. Most affected would be natural soundscape and wilderness resources, for which major cumulative adverse impacts could lead to impairment of these park resources.

Alternative 2

The actions in this alternative would constrain recreation opportunities to those that are most wilderness-dependent, and primarily those dependent on non-motorized forms of access. As a result, there would be moderate adverse impacts to recreational opportunities because of a decline in availability of some types of appropriate activities, although moderate to major benefits would occur for wilderness and natural soundscape resources. The actions would result in negligible impacts to ice-rich permafrost soils, vegetation, wildlife, and subsistence resources and opportunities.

Alternative 3

This alternative would provide for a diversity of wilderness recreational activities and limited motorized access, creating moderate benefits to the diversity of recreational opportunities that would be accompanied by moderate benefits to both wilderness and natural soundscape resources. Only minor adverse impacts would occur to wildlife, subsistence, and vegetation resources and there would be negligible impacts to ice-rich permafrost soils. The actions in this alternative would mitigate the affects of some past actions, reducing the level of adverse impact to wilderness and natural soundscape resources.

Alternative 4 (Preferred Alternative)

Providing for growth in recreational activities that require services, assistance, or short time-commitments 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 moderate adverse impacts to vegetation and subsistence resources and opportunities. 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.

Alternative 5

The actions proposed under this alternative would allow substantial increases in use levels and motorized access parkwide, with particular concentrations on the south side of the Alaska Range. As a result, there would be moderate adverse impacts on recreational opportunities because some kinds of wilderness-dependent activities would become difficult to find over the life of the plan. This alternative would also cause moderate adverse impacts to wildlife, wilderness, and natural soundscape resources as well as major adverse impacts to vegetation and subsistence resources and opportunities. This alternative would not provide mitigation for past actions, so there would still be major adverse impacts to many park resources including wilderness and natural soundscapes, but these resources would not become impaired.

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CHAPTER 1: PURPOSE AND NEED

SUMMARY

This *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.

REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT (RDEIS)

This document is a Revised Draft Environmental Impact Statement, which replaces the *Draft Backcountry Management Plan, General Management Plan Amendment, and Environmental Impact Statement* (DEIS) released in February 2003. This RDEIS substantially changed the actions in the plan alternatives in response to public comment on the original draft. These changes were significant enough to require a new round of public review before publication of the final plan and environmental impact statement.

Summary of Changes Between Original and Revised Drafts

The National Park Service received 9,370 comments on the original draft of the Denali Backcountry Management Plan, including many substantive comments that recommended changes in the approach of the plan. Appendix A contains summaries of those comments and their NPS responses. After a thorough analysis of the comments and consultation with planning partners, the National Park Service determined the plan merited a new approach and that the changes would require a revised draft plan and environmental impact statement.

The major differences between the original plan and the revised draft are as follows:

- The alternatives of the revised draft provide for a more diverse set of potential outcomes for the future of the park and preserve backcountry than did the original draft, although the alternatives are still organized along a spectrum that at one end emphasizes limiting development and use levels to protect wilderness resource values and at the other end emphasizes the provision of access, services, and facilities to support a diversity of wilderness recreational activities.
- Management areas are described using specific indicators and standards in addition to narrative language.
- The number of management areas is expanded to provide a greater diversity of possible backcountry experiences. Mountaineering Study Areas are not used, but a new management area is introduced to preserve conditions sought by the mountaineering community. A Corridor zone is added to provide for high use travel routes.
- Management area designations are changed to reflect public interest in preserving the ecological and wilderness values of the northern additions and southwest preserve.
- The preferred alternative has few prescriptive measures for managing access. Instead, the alternative proposes a flexible approach to access management with a focus on achieving the goals set through management area standards. For example, there is no initial prohibition on airplane landings in the Old Park in the preferred alternative, but there are standards for minimizing noise and mechanized equipment in the backcountry and a set of access management tools that can be applied if those standards are not met.
- The preferred alternative imposes no new registration requirements, but it sets criteria for establishing new registration requirements. It is likely that some activities in some areas of the park additions and preserve will satisfy the criteria in the near future, and that eventuality is examined in the environmental consequences chapter.
- The preferred alternative contains no explicit authorization for recreational snowmachine access. All access by snowmachine is managed to achieve the desired future conditions specified for each management area.
- Appropriate locations, types, and scale of commercial services are clarified for all activities, including scenic air tours and guided hiking.
- Educational activities are distinguished from commercial services and are addressed in the Administration section.
- A flexible management system is set up to address impacts from educational programs and guided hiking activities.

The rationale for each of these changes can be found in the National Park Service's response to comments in appendix A.

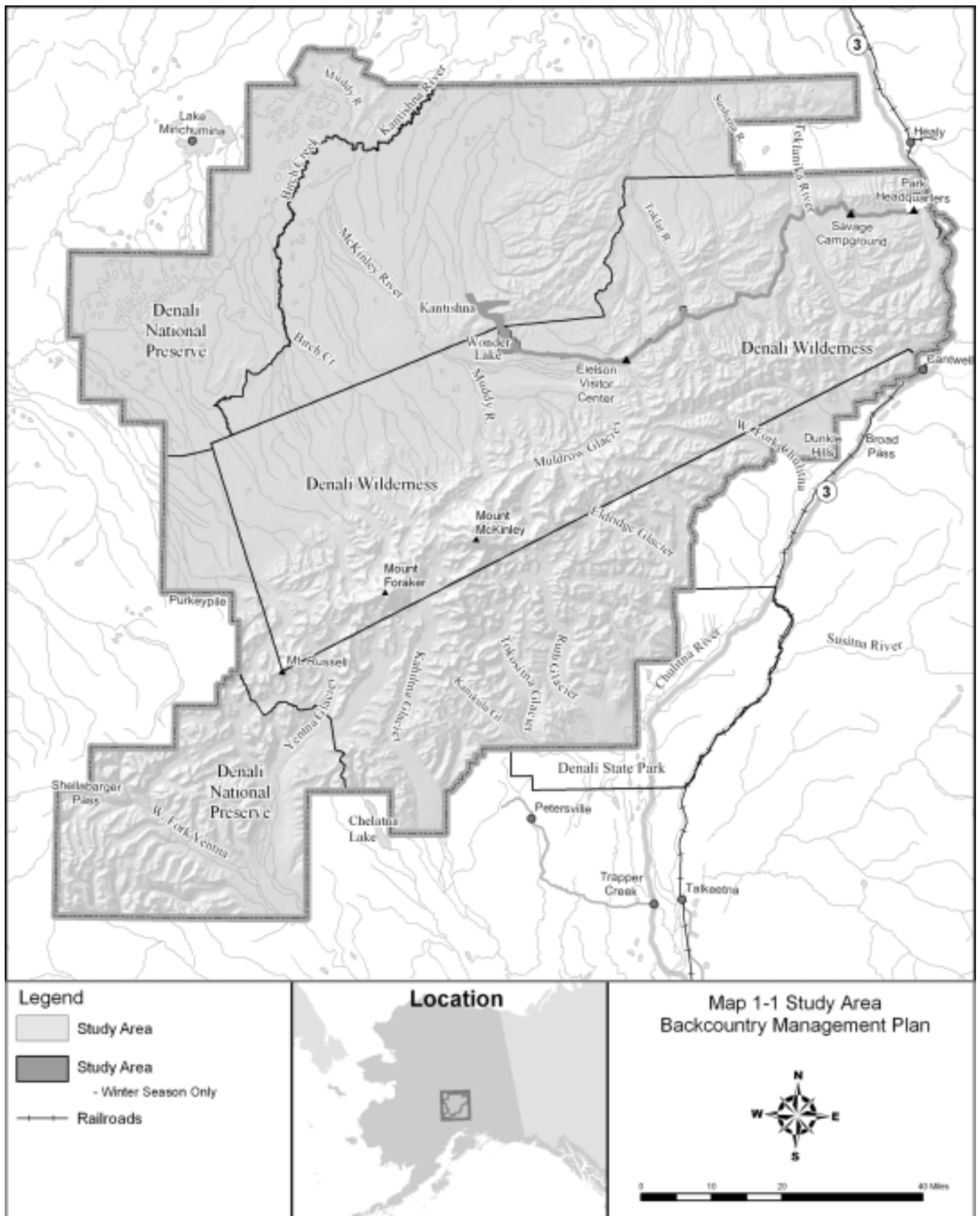
PURPOSE OF PLAN

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 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 DCP*; 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 1-1. 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 created legal mandates 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:

Aircraft Overflights and Airplane Landings: 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 access 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).

Mount McKinley National Park (Old Park)

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).

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 on the north side of the Alaska Range 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 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 public 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 maximum 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;
- define the recreational opportunities provided in Denali’s backcountry within the context of a spectrum of recreational opportunities available on public lands 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): Compiled in the United States Code (USC), 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/lawrevisioncounsel.php> .

- 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://165.83.219.72/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://165.83.219.72/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*.

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 Revised Draft Environmental Impact Statement. The original Draft Environmental Impact Statement published in February 2003, needed sufficient revision after public review that it was necessary to return to step two of the process before completing the *Backcountry Management Plan and EIS*.

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 (Old 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 Backcountry Management Plan* provides 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.

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 guarantees 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)(1))

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 designation take place as a special park regulation and established 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 untrammelled 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 95% of the entire park and preserve are 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 shows designated wilderness and areas determined suitable for wilderness designation at Denali.

Guided Activities and 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:

6.4.4 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.

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. Special authorizations are also in ANILCA.

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

- 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 Denali 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 five 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 a connecting trail 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.

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 need to 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. 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. Because of the complexity of the process and the fact that wilderness designation requires congressional action, wilderness recommendations are not addressed in this plan.

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 are not authorized for subsistence purposes under ANILCA 811 because they were not traditionally employed for subsistence purposes.

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 (habituation), 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 impact 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 TWO: ALTERNATIVES

OVERVIEW

This section describes four action alternatives and a no-action alternative for managing the backcountry of Denali National Park and Preserve. Each alternative represents a distinct vision for the park's backcountry as described by a set of actions related to the establishment of management areas, wilderness management, access, commercial services, facility development, administrative activities, and easements and boundary changes. Matrices at the end of this section summarize these actions by topic and alternative. These alternatives replace the “action alternatives” from the *Draft Denali National Park and Preserve Backcountry Management Plan and Environmental Impact Statement* published in February 2003.

DEVELOPMENT OF THE ALTERNATIVES

The backcountry of Denali National Park and Preserve includes the entire park, except for the development sub-areas delineated in the 1997 *Entrance Area and Road Corridor Development Concept Plan (DCP)*. During winter months, the backcountry also includes any portion of the road corridor not open to public vehicle traffic. The National Park Service developed the alternatives for backcountry management based on the legal, regulatory, and policy direction presented in chapter 1, combined with resource and use information and concerns gathered by research in the park, at public scoping sessions (see Chapter 5, Consultation and Coordination), and from public comments on the Draft Environmental Impact Statement. Appendix J of the original draft plan (NPS 2003d) provides additional information about considerations used in developing alternatives.

This plan is intended to guide backcountry management for 20 years. Because of this long timeline, the National Park Service made an effort not only to address the specific issues and concerns of today, but to craft alternatives that provide sufficient general guidance future managers could use to address concerns arising during the life of the plan. Among other topics, the section Actions Common to All Action Alternatives addresses some of the underlying approaches the National Park Service would use to manage the Denali backcountry under any of the action alternatives.

The four alternatives outlined in this section replace the four action alternatives from the original Draft Backcountry Management Plan and Environmental Impact Statement released in February, 2003. Alternative A – the “no action” alternative from that plan – is still valid. The new alternatives were developed in response to public comment on the original draft.

Each management alternative represents a vision for the future character of the Denali backcountry that is distinct from the other alternatives. The National Park Service believes each alternative is consistent with direction provided by law and policy; the alternatives differ only in the degree to which they emphasize particular values for which the park was established. The action alternatives fall roughly along a spectrum. Experiential values related to wilderness character – typically defined by opportunities for solitude, to hear natural sounds, to explore with minimal guidance, and to

encounter wildlife undisturbed in its native habitat – are at one end of the spectrum. Values related to recreational opportunity in a wilderness context including diversity of opportunities, more options for access, and more supportive services and infrastructure are at the other end. All alternatives propose measures to protect wilderness resource values and provide opportunities for wilderness recreational activities.

Each of the alternatives is described thoroughly in the sections below through the following topics.

- Management Areas
- Access
- Wilderness Management
- Commercial Services
- Backcountry Facilities
- Administration 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 continue unless modified by actions in the alternatives. This guidance is explained in appendix D.

Alternative 1 – No Action

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 the 1976 backcountry management plan with amendments. 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.

MANAGEMENT AREAS

There would be no new management areas defined for the backcountry of Denali National Park and Preserve. The entire backcountry would continue to be designated as a “Natural Area” described by the 1986 *General Management Plan* as follows:

Lands and waters in this zone are managed to protect natural resources, processes, and habitat for wildlife, and to provide opportunities for recreational activities.

Subsistence uses by local rural residents are permitted in the 1980 additions to the park where such uses are traditional in accordance with the provisions of Title VIII of ANILCA. Because of the relatively pristine nature of the park, more than 97 percent of the total acreage is in this zone. This zone includes those lands either designated as wilderness or determined suitable for designation as wilderness. These lands will be managed to ensure that natural processes prevail. Those uses compatible with the 1964 Wilderness Act and special uses allowed by ANILCA will be permitted in this subzone.

The only distinctions between areas of the backcountry would be the legislative distinctions of the designated wilderness in the former Mount McKinley National Park, the 1980 national park additions, and the national preserves. There would be no resource or social standards defined for any portion of the backcountry.

ACCESS

The National Park Service would continue to manage access in the national park and preserve using only existing guidance from regulations, management policies, and general management plans.

There would be no new registration requirements, nor would the NPS provide for advanced registration in the Kantishna Hills. An unlimited number of climbers could continue to register to climb Mount McKinley in a season.

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, park additions, and preserve. 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. 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.

The National Park Service would not form an advisory group to address resource concerns arising from aircraft overflights, nor would the NPS establish an internal working group for addressing the resource impacts of educational and guided group hiking in the backcountry.

WILDERNESS MANAGEMENT

The National Park Service would continue to manage wilderness using only existing service-wide policy as described in the Wilderness Management section of chapter 1.

Group Size

Decisions about group size would continue to be made on a case-by-case basis for commercial and educational groups. There would be no established group size limit for private parties.

Human Waste

There would be no new requirement for carrying out human waste from the West Buttress route or around glacier landing areas. The human waste policy in the Superintendent’s Compendium would continue to apply.

Climbing Tools

There would be no 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.

COMMERCIAL SERVICES

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.

Existing backcountry commercial services would continue as described in the Visitor Use and Experience section of chapter 3.

Commercial Airplane Landings

There would be neither limits established on the number of commercial airplane landings nor additional limits on where landings can occur in the park additions and preserve.

Guided Hiking

Guided hiking in the Old Park would stay at the existing levels described in the Visitor Use and Experience section of chapter 3. There would be no guided backpacking in the Old Park or Kantishna Hills area. No guided hiking would be allowed on entrance area trails.

Guided Sport Hunting

The two guided sport hunting areas would continue as at present.

BACKCOUNTRY FACILITIES

Trails

No new backcountry trails would be constructed other than those approved in the 1997 *Entrance Area and Road Corridor DCP*, including the Nenana River, the Triple Lakes (reconstruction), the Savage Alpine, and Savage Campground-Savage River Trails. Existing trails would be maintained; these are described in the Visitor Use and Experience section of chapter 3. The NPS would continue its policy of generally not constructing trails in the Old Park and the northern additions.

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.

Campsites

There would be no designated campsites in the backcountry.

Shelters and Cabins

The National Park Service would not construct any new public use cabins. There would be no public use cabins in the park; however, NPS would still pursue as a joint project the six public use cabins on state land near the park boundary in the Tokositna and Chelatna Lake areas as described in the 1997 *South Side Denali Development Concept Plan (DCP)*.

Information Facilities

There would be no new information facilities. The Wilderness Access Center (summer only), Murie Science and Learning Center (winter only), and the Talkeetna Ranger Station would remain the primary points of contact for backcountry visitors. Information would also be available at the park entrance area Visitor Center and Eielson Visitor Center.

ADMINISTRATIVE AND SCIENTIFIC ACTIVITIES

Administrative Camps

The existing patrol structure and administrative camps on Mount McKinley would be retained. New administrative camps would be considered on an *ad hoc* basis.

Information and Education

There would be no criteria established for offering educational programs in the backcountry.

Aviation

The NPS would not complete a plan for minimizing and accounting for administrative and research use of aircraft.

Research and Resource Management

There would be no establishment of management-area-specific criteria for determining appropriate kinds of research activity.

EASEMENTS AND BOUNDARY CHANGES

Easements

There would continue to be no public access to the existing 17(b) easement between Cantwell and the park boundary at Windy Creek.

Land Exchanges

The National Park Service would not seek to adjust park boundaries.

Actions Common to All Action Alternatives

The following actions are included in each of the action alternatives, alternatives 2, 3, 4, and 5.

MANAGEMENT AREAS

All action alternatives in the plan would establish management areas for the entire park and preserve. Each management area 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)

Maps 2-1, 2-2, 2-3, 2-4, and 2-5 show how management areas would be applied under each alternative.

Inholdings in various areas are not shown on the maps, but the National Park Service recognizes these private lands and respects the rights of landowners. Inholdings are located primarily in the Kantishna area, with some in the northwest part of the preserve and a few on the south side, such as the Mountain House in the Ruth Amphitheater and the Tokosha Mountain Lodge along the Tokositna River. Management areas do not apply to lands that have been conveyed to private owners (including Native corporations) or the State of Alaska.

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 and that play a specific role within the context of recreational opportunities within the region. Not every management area is applied in every alternative. 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. In most alternatives 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 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

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.

Table 2-1: Management Area Descriptions

Management Area	Purpose	Minimally Acceptable Resource Conditions	Minimally Acceptable Social Conditions
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:	Encounters with people: High
		Evidence of modern human use: Medium	<i>Encounters w/large groups:</i> Yes
		<i>Landscape modifications:</i> No	Camping density: Low
		Litter & human waste: Low	Accessibility: Medium
B	Provide opportunities for wilderness recreational activities suitable for day-users and overnight users that are remote and require self-reliance.	Natural sound disturbance: High	Administrative presence: Medium
		Trail & campsite disturbance: Low	Encounters with people: Medium
		Evidence of modern human use: Low	<i>Encounters w/large groups:</i> Yes
		<i>Landscape modifications:</i> No	Camping density: Low
C	Provide for opportunities for climbing and mountaineering experiences in a wilderness setting.	Litter & human waste: Low	Accessibility: Low - Medium
		Natural sound disturbance: Medium	Administrative presence: Low
		Trail & campsite disturbance: Medium	Encounters with people: High
		Evidence of modern human use: Medium	<i>Encounters w/large groups:</i> Yes
D	Provide opportunities for extended expeditions that are remote and require self-reliance, significant time commitment, and thorough advance planning.	<i>Landscape modifications:</i> No	Camping density: Low
		Litter & human waste: Low	Accessibility: Low - Very Low
		Natural sound disturbance: Medium	Administrative presence: Low
		Trail & campsite disturbance: Low	Encounters with people: Low
E	Provide opportunities for extended expeditions in remote areas where other parties and signs of civilization would generally not be encountered.	Evidence of modern human use: Low	<i>Encounters w/large groups:</i> No
		<i>Landscape modifications:</i> No	Camping density: Low
		Litter & human waste: Low	Accessibility: Low
		Natural sound disturbance: Low	Administrative presence: Low

Table 2-1: Management Area Descriptions, continued

Management Area	Purpose	Minimally Acceptable Resource Conditions	Minimally Acceptable Social Conditions
Portal	Provide high-use airplane landing areas that provide access to remote parts of the park and preserve. Year-round or seasonal. * <i>Natural sound disturbance standard is same as for surrounding area, but no lower than Medium.</i>	Trail & campsite disturbance: N/A Evidence of modern human use: Medium <i>Landscape modifications:</i> No Litter & human waste: Low Natural sound disturbance: Medium-High*	Encounters with people: N/A <i>Encounters w/large groups:</i> Yes Camping density: Medium Accessibility: Medium 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.	Trail & campsite disturbance: N/A Evidence of modern human use: High <i>Landscape modifications:</i> Yes Litter & human waste: Low Natural sound disturbance: Very High	Encounters with people: N/A <i>Encounters w/large groups:</i> 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 <i>Landscape modifications:</i> Yes Litter & human waste: Low Natural sound disturbance: High	Encounters with people: Very High <i>Encounters w/large groups:</i> 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. Seasonal, May-September.	Trail & campsite disturbance: N/A Evidence of modern human use: High <i>Landscape modifications:</i> Yes Litter & human waste: Low Natural sound disturbance: Medium	Encounters with people: Very High <i>Encounters w/large groups:</i> Yes Camping density: No camping 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-August.	Trail & campsite disturbance: Medium Evidence of modern human use: Medium <i>Landscape modifications:</i> No Litter & human waste: Low Natural sound disturbance: Very High	Encounters with people: High <i>Encounters w/large groups:</i> Yes Camping density: Low Accessibility: Low – Very Low Administrative presence: Medium

Table 2-1: Management Area Descriptions, continued

Management Area	Purpose	Minimally Acceptable Resource Conditions	Minimally Acceptable Social Conditions
Old Park			
OP1	Provide opportunities for day use and overnight wilderness recreational activities that are remote and require self-reliance in an area that is not accessible to motorized transportation besides from the existing road system.	Trail & campsite disturbance: Medium Evidence of modern human use: Low <i>Landscape modifications:</i> Litter & human waste: Low Natural sound disturbance: Low	Encounters with people: Medium <i>Encounters w/large groups:</i> Yes Camping density: Low Accessibility: Medium - High Administrative presence: Medium
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 is not accessible to motorized transportation.	Trail & campsite disturbance: Low Evidence of modern human use: Low <i>Landscape modifications:</i> Litter & human waste: Low Natural sound disturbance: Low	Encounters with people: Very Low <i>Encounters w/large groups:</i> No Camping density: Low Accessibility: Low Administrative presence: Low
West Buttriss 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 Evidence of modern human use: High <i>Landscape modifications:</i> Litter & human waste: Low Natural sound disturbance: High	Encounters with people: Very High <i>Encounters w/large groups:</i> Yes Camping density: High Accessibility: Low – Very 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 minimally acceptable standards are approached, 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 will 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 will 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 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 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 may always be within sight and sound of other parties. In Corridors, visitors generally encounter 10 or fewer parties per day.	Monitoring would be conducted 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 can reasonably expect to encounter no other parties in these areas, although occasionally chance encounters occur. They generally encounter 3 or fewer parties per week.		
Very Low	Visitors can expect to encounter no other parties in these areas during the course of their backcountry trip.		
N/A	There is no standard for encounter rate in this area.		
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 <i>encounter</i> 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 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 <u>opportunity</u> 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 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.			

Indicators are selected to represent those resources and conditions that are allowed to change until they reach the minimally acceptable condition. 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.

Management Area Designations

Management area designations vary through most alternatives. However, Major Landing Areas and Portals would be designated the same in all alternatives as follows (see Map 2-6):

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

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.

ACCESS

General Guidance

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 described 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 for each alternative. 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. Restrictions and closures would be accomplished consistent with the process outlined in 43 CFR 36.11 and/or other relevant regulations.

The following are 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.

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 desired future conditions for all management areas.

2) Increased enforcement of existing regulations

The National Park Service would prioritize enforcement of existing regulations to assist in achieving desired future conditions for management areas. For example, enforcement of the snowmachine speed limit or the sound level limits on motorized equipment could assist in achieving desired future conditions for sound quality.

3) Voluntary restrictions

The National Park Service would ask visitors to voluntarily restrict their use. 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 their use. 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 desired future conditions, 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 sound standards 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 desired future conditions.

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 desired future conditions. 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, Department of Defense, or State of Alaska, to apply regulatory or other measures to protect park resource values and achieve desired future conditions.

Registration and Permit Systems

On approval of one of the action alternatives, 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 required by the final plan, 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)

Aircraft Overflights Working Group

The National Park Service would establish an aircraft overflights working group, which would include scenic air tour operators, commercial airlines, the military, and other concerned parties, to develop voluntary measures for achieving desired future resource conditions at Denali.

Cross-Country Travel

Except as otherwise specified in the management area descriptions and the alternatives (see particularly Backcountry Hiker and Corridor management areas and the Backcountry Facilities sections in the alternatives), 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 2-9a.

Table 2-9a: 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 internal 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 NPS may temporarily close some areas around social trails to allow rehabilitation even if conditions are stable.

- 2) Establish an internal 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) Consulting with the internal working group, NPS resource managers and the Murie Science and Learning Center would develop Leave-No-Trace guidelines that are specific for Denali National Park and Preserve.

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 NPS 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 snowmobiles, motorboats, and other means of surface transportation traditionally employed for such purposes.
- ANILCA 1110(a) allows use of snowmobiles, 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 limit group size in all backcountry areas of Denali to 12, including guides for both private and guided groups. 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. Guided hikes are 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

In other glaciated locations, including the West Buttress of Mount McKinley below 14,000 feet, 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 policy on human waste in the Denali backcountry would remain in force. As described in the 2004 Superintendent's Compendium, this policy is 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 policy 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 agency will 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

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 both commercial use authorizations and concessions. The criteria would be applied in a way that meets the minimum requirement/minimum tool test required by the Wilderness Act, so they would be interpreted 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 desired future conditions for solitude, natural sounds, and other wilderness characteristics for each management area.

In all alternatives, the existing commercial services described in chapter 3 would continue unless otherwise specified. However, those activities and services are subject to the same management guidelines and constraints as new activities authorized under this plan.

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.

To avoid resource impacts, 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.

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

BACKCOUNTRY FACILITIES

Communication Facilities

Communications facilities would be considered on a case-by-case basis following the minimum requirement/minimum tool process described in appendix E. 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 in the backcountry to avoid the need for new temporary or permanent communication facilities in backcountry areas.

ADMINISTRATIVE AND SCIENTIFIC ACTIVITIES

To establish greater accountability and minimize impact to wilderness resource values throughout the park and preserve, all administrative and research activity throughout the entire park and preserve backcountry would be subject to the minimum requirement/minimum tool process. This process focuses the evaluation on impacts to wilderness character, as well as damage to more tangible resources. 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 describes how the minimum requirement/minimum tool determination would be made.

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 to 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 through 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.

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

Within three years, the National Park Service would establish management area-specific criteria for research and resource management projects taking place within the Denali backcountry that would be used to determine which activities and what scale of activities are appropriate. The criteria also would address the overall scale of research and resource management activity taking place in the park and preserve 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, snowmobiles, two- and three-wheeled vehicles, and small all-terrain vehicles. See Map 2-7.

Land Exchanges

The National Park Service would seek a land exchange with the State of Alaska (similar to a previously proposed exchange of land) which would realign the park boundary with the Tokositna, Coffee, and Ruth Rivers (see Map 2-8). 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.

ADAPTIVE MANAGEMENT

This backcountry management plan would be implemented using adaptive management. Since the park recognizes the need to make decisions on the best available information, it will 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, then the National Park Service would act to manage access and use employing the tools listed in the Access section. Some of these tools would require regulation, environmental review, or other public process. The National Park Service would develop detailed monitoring methodologies as part of plan implementation, some of which could be achieved as part of existing programs, such as the long-term Inventory and Monitoring Program.

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

Alternative 2

OVERVIEW

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 would include many opportunities for extended expeditions in very remote locations. Backcountry users seeking other experiences would find those opportunities on neighboring lands.

MANAGEMENT AREAS

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

Management Area	Acres	% Backcountry
A	0	0%
B	221,086	4%
C	477,696	8%
D	447,539	8%
E	2,735,412	46%
OP1	1,421,754	24%
OP2	660,893	11%
TOTAL	5,964,381	100%
Seasonal Special Use Areas	9,907	<1%

Year-round Corridor management areas totaling 61.5 miles would be designated on the Kantishna and Muddy Rivers and the lower Tokositna River (see Map 2-9).

ACCESS

Access to all parts of the Old Park, park additions, and preserve would be managed to achieve desired future conditions using the tools identified under Actions Common to All Action Alternatives. 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:

- defines “traditional activities” for all areas of the park and preserve and for all modes of access using the present definition employed for snowmachine access in the Old Park (36 CFR § 13.63(h));

- 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; and
- allows airplane landings at designated Portals and on the McKinley Park and Kantishna airstrips.

As a result, airplanes would not be allowed for recreational access to the Old Park, except that airplane access to the McKinley Park and Kantishna airstrips for recreation would continue. Access by snowmachine, airplane, or motorboat to the park additions and preserves would be allowed only for traditional activities, except for airplanes at Portals. 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.

Registration would be required for day-hiking in the Old Park outside of Backcountry Hiker areas during summer months, for day use in the southern park additions east of and including the Kahiltina Glacier during winter months, and for all overnight camping in the park and preserve.

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).

WILDERNESS MANAGEMENT

See Actions Common to All Action Alternatives.

COMMERCIAL SERVICES

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. An exception to this rule would be those operators who are allowed a specific number of trips in their commercial authorization; these would be constrained by the current allowances in their contracts. Future commercial authorizations would set these limits for other operators. 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.

Commercial Airplane Landings

- Commercial air taxi landings would be allowed only at 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 Kahiltina Base Camp after July 1st and at the Ruth Amphitheater (Mountain House landing area), but the number of landings would be limited to 2001 numbers: 1,900 in the Ruth Amphitheater and 200 at Kahiltina Base Camp. Landings would be restricted to the hours of 9am to 9pm.

Guided Hiking

- In the Old Park, there would be no guided day-hiking or overnight backpacking. Existing concession-operated guided hiking opportunities would be phased out when current contracts expire.
- There would be no 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 would be allowed as at present. No guided overnight backpacking would be permitted.
- Guided day-hiking and overnight backpacking could be authorized in areas of the park additions and preserve south of the Alaska Range.

Guided Sport Hunting

The two existing guided sport hunting areas would continue as at present. The remainder of the southwest Preserve would be formally recognized as a “no-guide” area.

Other Activities

Only the existing commercial services and those specified above would be permitted in the park and preserve backcountry even if new proposals would meet the criteria identified under Actions Common to All Action Alternatives.

BACKCOUNTRY FACILITIES

The National Park Service generally would not provide additional backcountry facilities to support visitor use.

Trails

No new trails would be constructed. A “no formal trails” policy would be maintained for the entire backcountry.

Park Road

The National Park Service would resume its previous informal policy of not plowing the park road past Park Headquarters until necessary to prepare the road for summer season use.

Campsites

There would be no designated campsites.

Shelters and Cabins

There would be no new backcountry shelters or cabins.

Information Facilities

There would be no new information facilities.

ADMINISTRATIVE AND SCIENTIFIC ACTIVITIES

See Actions Common to All Action Alternatives.

Administrative Camps

The National Park Service would discontinue use of the temporary 14,000-foot administrative camp on Mount McKinley. There would be no additional administrative camps in the backcountry.

Educational Programs

- 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 National Park Service.
- All educational programs taking place in the park and preserve backcountry would be required to meet the criteria identified under Commercial Services in Actions Common to All Action Alternatives.

EASEMENTS AND BOUNDARY CHANGES

See Actions Common to All Action Alternatives.

Alternative 3

OVERVIEW

This alternative would provide opportunities for 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 the 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.

MANAGEMENT AREAS

Management areas would be applied as depicted in Map 2-3. The percentage of the park and preserve allocated to each management area is as follows:

Management Area	Acres	% Backcountry
A	259,552	4%
B	516,622	9%
C	370,147	6%
D	794,727	13%
E	1,940,685	33%
OP1	1,421,755	24%
OP2	660,893	11%
TOTAL	5,964,381	100%
Seasonal Special Use Areas	30,928	<1%

Year-round Corridor management areas totaling 114 miles would be designated on the Kantishna and Muddy Rivers, the lower Tokositna River, and both the east and west forks of the Yentna River. Fourteen miles of summer season Corridor management areas would be designated on Skyline, Moose Creek, and Eldorado former mining access routes within Management Area A in Kantishna. The National Park Service would designate three winter season Corridor management areas from the southern park boundary to the Old Park boundary near the West Fork Chulitna, Bull River, and Cantwell Creek (12.5 miles). If demand is sufficient, the NPS could also establish winter season Corridor management areas to the toes of the Ruth, Tokositna, and Kanikula glaciers from the Tokositna River (8.5 miles). (See Map 2-10)

The Ruth Glacier Special Use Area would be designated to include portions of the Ruth Amphitheater, Ruth Gorge, and West Fork Ruth Glacier as shown in Map 2-3.

Backcountry Hiker designations are described below under Backcountry Facilities.

ACCESS

Access to all parts of the Old Park, park additions and preserve would be managed to achieve desired future conditions using the tools identified under Actions Common to All Action Alternatives. 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. As a result, airplane landings and motorboat access to the Old Park would not be allowed, except for airplane landings on the McKinley and Kantishna airstrips.

The National Park Service would promulgate a rule that defines “traditional activities” for snowmachine use in the park additions and preserve similar to the way that it is defined for the Old Park. The effect of this rule would be to close the park and preserve to recreational snowmachine use. The rule would provide some exceptions by allowing recreational snowmachine access along the winter season Corridor management areas in the Broad Pass and Tokositna River areas. The routes would be marked as necessary. Motorboat and airplane access in the park additions and preserve would continue under existing regulations. 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 would be required for day-hiking outside of Backcountry Hiker areas in the Old Park during summer months, for day use in the southern park additions east of and including the Kahiltna Glacier during winter months, and for 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 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 backcountry management plan.

WILDERNESS MANAGEMENT

See Actions Common to All Action Alternatives.

COMMERCIAL SERVICES

All new commercial services, and both new and existing operators, would be required to meet the criteria listed under Actions Common to All Action Alternatives. 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 an overnight stay.
- Scenic air tour landings would be allowed only at Kahiltna Base Camp after July 1, and on glaciers within Management Area A, with contract provisions to achieve desired future resource conditions. Landings would be restricted to the hours of 9am to 9pm. “Scenic air tours” are flights in which the passengers generally stay with their airplane throughout their trip.

Guided Hiking

- Guided day-hiking could be offered in the Old Park with no more than the 2004 number of guided groups each season and using a similar proportion of off-trail to on-trail (McKinley Bar Trail, Thorofare Ridge) hikes. All entrance area trails would continue to be unavailable for commercial guided hiking.
- 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 Corridors and to the designated trails identified under Backcountry Facilities, below.
- Guided day-hiking could be offered throughout the park additions and preserve.
- Overnight backpacking could be offered in the park additions and preserve.

Guided Sport Hunting

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.

Other 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

BACKCOUNTRY FACILITIES

Trails

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, formalizing a trail system in this area. 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 as a Backcountry Hiker area during winter months.

Campsites

Up to five designated campsites would be created in conjunction with the Corridor areas in the Kantishna Hills. 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 use of the park and preserve’s backcountry year-round, with a particular focus on serving the needs of winter recreational visitors on the south side of the Alaska Range.

ADMINISTRATIVE AND SCIENTIFIC ACTIVITIES

See Actions Common to All Action Alternatives.

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.

Educational Programs

- 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.
- All educational programs taking place in the park and preserve backcountry would be required to meet the criteria identified under Commercial Services in Actions Common to All Action Alternatives.

EASEMENTS AND BOUNDARY CHANGES

See Actions Common to All Action Alternatives.

Alternative 4 – Preferred Alternative

OVERVIEW

This alternative would also provide opportunities for a variety of 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, assistance, or short time-commitments. However, the areas would be of sufficient size to accommodate anticipated growth in the next 20 years and would be focused along the park road in the Old Park and Kantishna; at the Ruth, Tokositna, and Kahiltna Glaciers; and in the Dunkle Hills/Broad Pass area. 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

Management areas would be applied as depicted in Map 2-4. The percentage of the park and preserve allocated to each management area is as follows:

Management Area	Acres	% Backcountry
A	668,314	11%
B	317,049	5%
C	243,384	4%
D	2,652,986	44%
E	0	0%
OP1	1,421,755	24%
OP2	660,893	11%
TOTAL	5,964,381	100%
Seasonal Special Use Areas	161,695	3%

Year-round Corridor areas totaling 114 miles would be designated on the Kantishna and Muddy Rivers, the lower Tokositna River, and both the east and west forks of the Yentna River. Fourteen miles of summer season Corridor management areas would be designated on Skyline, Moose Creek, and Eldorado former mining access routes within Management Area A in Kantishna. The National Park Service would designate three winter season Corridor management areas from the southern park boundary to the Old Park boundary near the West Fork Chulitna, Bull River, and Cantwell Creek (12.5 miles). If demand is sufficient, the NPS could also establish winter season Corridor management areas to the toes of the Ruth, Tokositna, and Kanikula glaciers from the Tokositna River (8.5 miles). (See Map 2-10)

The Ruth Glacier Special Use Area would be designated to include areas of the Ruth and Tokositna Glaciers as shown on Map 2-4. Backcountry Hiker designations are described below under Backcountry Facilities.

ACCESS

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. All airplane, motorboat, and snowmachine access would be managed to meet the standards for resource and social conditions specified for each management area. 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 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 within the Corridor management areas and Management Area A within 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 in 10 years after approval of the backcountry management plan.

WILDERNESS MANAGEMENT

See Actions Common to All Action Alternatives.

COMMERCIAL SERVICES

All new commercial services, and both new and existing operators, would be required to meet the criteria listed under Actions Common to All Action Alternatives. Activities or services not described in this section could be considered in areas designated as Management Area A only.

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 an overnight stay.
- Scenic air tour landings would be allowed on glaciers in all areas designated as Management Area A, and also at specified landing areas on the Eldridge and Pika Glaciers when climbers and mountaineers are not present, with contract provisions to achieve desired future resource

conditions. There would be no prohibition on landing at Kahiltna Base Camp before July 1. “Scenic air tours” are flights in which the passengers generally stay with their airplane throughout their trip.

Guided Hiking

- Guided day-hiking could be offered in the Old Park with no more than the 2004 number of guided groups each season and using a similar proportion of off-trail to on-trail (McKinley Bar Trail, Thorofare Ridge) hikes.
- The following entrance area trails would be available for guided hiking:
 - The Rock Creek Trail and Roadside Trail between the Visitor Center and Park Headquarters
 - The Roadside and Jonesville Trails between the Nenana River Bridge and the Visitor Center
 - The Nenana River and Triple Lakes trails when planned construction or rehabilitation is complete (see 1997 *Entrance Area and Road Corridor DCP*)
- In the portion of the Kantishna Hills designated as Management Area A, overnight camping by guided groups would be restricted to the designated campsites and all day and overnight hiking would be restricted to Corridors and the designated trails identified under Backcountry Facilities below.
- Guided day-hiking could be offered throughout the park additions and preserve.
- Overnight backpacking could be offered in 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.

Other Activities

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 multiday trips by ski, snowshoe, or dog team

BACKCOUNTRY FACILITIES

Trails

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

- Some existing social trails within Management Area A in Kantishna, formalizing a trail system in this area
- From Eielson Visitor Center to Gorge Creek
- From the water tower above Wonder Lake Campground up to the bench west of Wonder Lake

- 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.

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. If there is sufficient snow on the spring trail from Headquarters for safe travel by ski, skijor, and dog sled by March 1, the road would be plowed to Savage Campground. Otherwise, the park road would remain unplowed until clearing is needed to provide for road opening activities for summer season use. This section of the park road would be designated as a Backcountry Hiker area during winter months.

Campsites

Up to five designated campsites would be created in conjunction with the Corridor areas in the Kantishna Hills. 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 use of the park and preserve’s backcountry year-round, with a particular focus on serving the needs of winter recreational visitors on the south side of the Alaska Range.

ADMINISTRATIVE AND SCIENTIFIC ACTIVITIES

See Actions Common to All Action Alternatives.

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.

Educational Programs

- Day use and overnight 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 (including entrance area trails), 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.
- All educational programs taking place in the park and preserve backcountry would be required to meet the criteria identified under Commercial Services in Actions Common to All Action Alternatives.

EASEMENTS AND BOUNDARY CHANGES

See Actions Common to All Action Alternatives.

Alternative 5

OVERVIEW

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 managed primarily 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

Management areas would be applied as depicted in Map 2-5. The percentage of the park and preserve allocated to each management area is as follows:

Management Area	Acres	% Backcountry
A	1,066,218	18%
B	3,956,539	66%
C	0	0%
D	941,624	16%
E	0	0%
OP1	0	0%
OP2	0	0%
TOTAL	5,964,381	100%
Seasonal Special Use Areas	161,695	3%

Year-round Corridor areas totaling 114 miles would be designated on the Kantishna and Muddy Rivers, the lower Tokositna River, and both the east and west forks of the Yentna River. Fourteen miles of summer season management areas would be designated on Skyline, Moose Creek, and Eldorado former mining access routes within Management Area A in Kantishna. The National Park Service would designate three winter season Corridor management areas from the southern park boundary to the Old Park boundary near the West Fork Chulitna, Bull River, and Cantwell Creek (12.5 miles). If demand is sufficient, the National Park Service also would establish winter season Corridor management areas to the toes of the Ruth, Tokositna, and Kanikula glaciers from the Tokositna River and to Kantishna from the Sushana River (56 miles). (See Map 2-11)

The Ruth Glacier Special Use Area would be designated to include areas of the Ruth and Tokositna Glaciers as shown on Map 2-5. Backcountry Hiker designations are described below under Backcountry Facilities.

ACCESS

Recreational access in 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. All airplane, motorboat, and snowmachine access would be managed to meet the standards for resource and social conditions specified for each management area. 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.

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.

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 on social and resource carrying capacity. The possibility of setting a limit would be reevaluated five years after approval of the plan once additional information is available.

WILDERNESS MANAGEMENT

See Actions Common to All Action Alternatives.

COMMERCIAL SERVICES

All new commercial services and both new and existing operators would be required to meet the criteria listed under Actions Common to All Action Alternatives. Activities or services not described in this section could be considered in areas designated as Management Area A only.

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 an overnight stay.
- Scenic air tour landings would be allowed on glaciers in all areas designated as Management Area A, with contract provisions to achieve desired future resource conditions. There would be no prohibition on landing at Kahiltna Base Camp before July 1. “Scenic air tours” are flights in which the passengers generally stay with their airplane throughout their trip.

Guided Hiking

- 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 Corridors and to the designated trails identified under Backcountry Facilities below.

Guided Sport Hunting

When existing concession contracts expire, the National Park Service would allow for two additional guide areas. Three guide areas would be proportioned evenly across the entire southwest preserve. One guide area would be added in the southern portion of the northwest preserve.

Other Activities

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 multiday trips by ski, snowshoe, or dog team

BACKCOUNTRY FACILITIES

Trails

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, formalizing a trail system in this area
- From Eielson Visitor Center to Gorge Creek
- From the water tower above Wonder Lake Campground up 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

Additional trails could be constructed and Backcountry Hiker or Corridor management areas could be designated in the future within the designated Management Area A in the lowland areas surrounding the lower Kahiltna, Tokositna, and Ruth glaciers. The National Park Service would establish additional designated trails in other locations designated Management Area A only if necessary to prevent resource damage. 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*.

The spring multi-use trail would be upgraded through widening and straightening to make it usable in early winter low snow conditions, and it would be extended from Mile 7 to Savage Campground. The additional trail section would be designated as a winter season Backcountry Hiker area.

Elsewhere in the park and preserve, the National Park Service would maintain a “no formal trails” policy.

Park Road

The park road would be plowed to the Savage Campground area in the winter, and that would become the base for winter activities in that part of the Old Park.

Campsites

The following campsites could be designated:

- Up to five sites in conjunction with the Corridor areas in the Kantishna Hills
- Up to three sites in conjunction with the Corridor area in the Wildhorse Creek drainage

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. A plowed parking area and warming hut would be provided at Savage Campground. In cooperation with Alaska State Parks, the National Park Service would propose construction of five public use cabins in addition to those planned for in the *South Side Denali DCP* outside the national park and preserve but near the boundary.

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 use of the park and preserve’s backcountry year-round, with a particular focus on serving the needs of winter recreational visitors on the south side of the Alaska Range.

ADMINISTRATIVE AND SCIENTIFIC ACTIVITIES

See Actions Common to All Action Alternatives.

Administrative Camps

The existing patrol structure and administrative camps on Mount McKinley would be retained. The National Park Service could establish additional temporary camps in the backcountry for research or administrative purposes if they meet the tests of the minimum requirement/minimum tool process.

Educational Programs

- 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.

- All educational programs taking place in the park and preserve backcountry would be required to meet the criteria identified under Commercial Services in Actions Common to All Action Alternatives.

EASEMENTS AND BOUNDARY CHANGES

See Actions Common to All Action Alternatives.

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 was 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 in the preferred alternative of both the original and revised drafts was selected because that is the maximum number that mountaineering rangers believe they can 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 revised draft 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 in all of the action alternatives if other mechanisms are 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 NPS 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, below 14,000 feet there are options for waste management (such as crevasse disposal and latrines) that make human waste removal less critical. 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.
- Limit group size to 6 or 9 instead of 12 to minimize impacts on resources. NPS Discovery Hikes have had a cap of 15 people plus the ranger guide since the mid-1990s. Resource impacts from these hikes have been within an acceptable range during that time period. However, resource experts and interpretive staff and partners agree that, for interpretive purposes, as well as for the purposes of minimizing resource impacts, a limit of 12 is usually appropriate. For that reason, the revised draft limits both guided and unguided hikes to a group size of 12, including the guide.

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 to 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 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

Trails

- 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 to preserve the unique wilderness character and wilderness experience at Denali. Although exceptions have been made to provide visitor opportunities at major visitor nodes, to address resource damage, or to provide access on the south side of the Alaska Range where vegetation renders off-trail travel difficult, the suggested trail meets none of these criteria.

Shelters and Cabins

- 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 a collaboration with the State of Alaska to construct public use cabins near, but outside of, park and preserve boundaries.

Environmentally Preferred Alternative

The environmentally preferred alternative is defined as “the alternative that will promote the national environmental policy as expressed in Section 101 of the National Environmental Policy Act” (CEQ “Forty Most Asked Questions on CEQ NEPA Regulations”). Section 101 states “...it is the continuing responsibility of the federal government to...

- 1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.
- 2) ensure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings.
- 3) attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences.
- 4) preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice.
- 5) achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life’s amenities.
- 6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.”

Based on these criteria, the National Park Service has determined that Alternatives 3 and 4 are the Environmentally Preferred Alternatives, because they attain the widest range of beneficial uses of the environment and support a diversity and variety of individual choice without substantially degrading park resources. As documented in Chapter 4, Environmental Consequences, Alternative 2 narrows the range of opportunity for using resources substantially while Alternative 5 allows for major adverse impacts to park resources such as natural soundscapes and wilderness while decreasing the range of available wilderness recreational opportunities.

Table 2-10: Summary Table of Alternatives

Topic	Alternative 1 (no-action)	Alternative 2	Alternative 3	Alternative 4 (NPS preferred)	Alternative 5																																																																																																																								
Overview	The National Park Service would continue the present management direction, guided by the 1986 <i>General Management Plan</i> , the 1997 <i>Entrance Area Road Corridor Development Concept Plan</i> , the 1997 <i>South Side Denali Development Concept Plan</i> , and the 1997 <i>Strategic Plan</i> , 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 and experiences 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 of sufficient size to accommodate anticipated growth in the next 20 years and would be focused along the park road in the Old Park and Kantishna; at the Ruth, Tokositna, and Kahiltna Glaciers; and in the Dunkle Hills/Broad Pass area. 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 also 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. However, 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 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.																																																																																																																								
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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 <i>General Management Plan</i> .	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.	Proportion of Park & Preserve in Each Management Area	Proportion of Park & Preserve in Each Management Area	Proportion of Park & Preserve in Each Management Area																																																																																																																								
		<table><tr><th>Mgmt Area</th><th>Acres</th><th>% back-country</th></tr><tr><td>A</td><td>0</td><td>0%</td></tr><tr><td>B</td><td>222,782</td><td>4%</td></tr><tr><td>C</td><td>477,696</td><td>8%</td></tr><tr><td>D</td><td>447,539</td><td>8%</td></tr><tr><td>E</td><td>2,735,412</td><td>46%</td></tr><tr><td>OP1</td><td>1,408,886</td><td>24%</td></tr><tr><td>OP2</td><td>737,409</td><td>11%</td></tr><tr><td>TOTAL</td><td>6,028,202</td><td>100%</td></tr><tr><td>Special use area</td><td>0</td><td><1%</td></tr></table>	Mgmt Area	Acres	% back-country	A	0	0%	B	222,782	4%	C	477,696	8%	D	447,539	8%	E	2,735,412	46%	OP1	1,408,886	24%	OP2	737,409	11%	TOTAL	6,028,202	100%	Special use area	0	<1%	<table><tr><th>Mgmt Area</th><th>Acres</th><th>% back-country</th></tr><tr><td>A</td><td>257,183</td><td>4%</td></tr><tr><td>B</td><td>519,164</td><td>9%</td></tr><tr><td>C</td><td>370,147</td><td>6%</td></tr><tr><td>D</td><td>1,809,987</td><td>13%</td></tr><tr><td>E</td><td>925,425</td><td>33%</td></tr><tr><td>OP1</td><td>1,408,886</td><td>24%</td></tr><tr><td>OP2</td><td>737,409</td><td>11%</td></tr><tr><td>TOTAL</td><td>6,028,202</td><td>100%</td></tr><tr><td>Special use area</td><td>30,928</td><td><1%</td></tr></table>	Mgmt Area	Acres	% back-country	A	257,183	4%	B	519,164	9%	C	370,147	6%	D	1,809,987	13%	E	925,425	33%	OP1	1,408,886	24%	OP2	737,409	11%	TOTAL	6,028,202	100%	Special use area	30,928	<1%	<table><tr><th>Mgmt Area</th><th>Acres</th><th>% back-country</th></tr><tr><td>A</td><td>668,487</td><td>11%</td></tr><tr><td>B</td><td>782,742</td><td>5%</td></tr><tr><td>C</td><td>243,384</td><td>4%</td></tr><tr><td>D</td><td>2,187,292</td><td>44%</td></tr><tr><td>E</td><td>0</td><td>0%</td></tr><tr><td>OP1</td><td>1,408,886</td><td>24%</td></tr><tr><td>OP2</td><td>737,409</td><td>11%</td></tr><tr><td>TOTAL</td><td>6,028,202</td><td>100%</td></tr><tr><td>Special use area</td><td>161,695</td><td>3%</td></tr></table>	Mgmt Area	Acres	% back-country	A	668,487	11%	B	782,742	5%	C	243,384	4%	D	2,187,292	44%	E	0	0%	OP1	1,408,886	24%	OP2	737,409	11%	TOTAL	6,028,202	100%	Special use area	161,695	3%	<table><tr><th>Mgmt Area</th><th>Acres</th><th>% back-country</th></tr><tr><td>A</td><td>1,066,390</td><td>18%</td></tr><tr><td>B</td><td>3,943,671</td><td>66%</td></tr><tr><td>C</td><td>0</td><td>0%</td></tr><tr><td>D</td><td>1,018,140</td><td>16%</td></tr><tr><td>E</td><td>0</td><td>0%</td></tr><tr><td>OP1</td><td>0</td><td>0%</td></tr><tr><td>OP2</td><td>0</td><td>0%</td></tr><tr><td>TOTAL</td><td>6,028,202</td><td>100%</td></tr><tr><td>Special use area</td><td>161,695</td><td>3%</td></tr></table>	Mgmt Area	Acres	% back-country	A	1,066,390	18%	B	3,943,671	66%	C	0	0%	D	1,018,140	16%	E	0	0%	OP1	0	0%	OP2	0	0%	TOTAL	6,028,202	100%	Special use area	161,695	3%
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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).	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 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.	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 and Tokositna Glaciers.
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.		

Table 2-10: Summary Table of Alternatives, continued

Topic	Alternative 1 (no-action)	Alternative 2	Alternative 3	Alternative 4 (NPS preferred)	Alternative 5
General Concept	ACCESS				
	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.	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 Kamishna 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. In the park additions and preserve, airplane and motorboat access, and snowmachine access for traditional activities, would continue.	The National Park Service would define access management tools to be employed as necessary to achieve desired future social and resource conditions, 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.
	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 achieving desired resource conditions.			
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 an internal 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 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 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 within the Corridor Management Areas and Management Area A within 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 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 on social and resource carrying capacity. The possibility of setting a limit would be reevaluated 5 years after approval of the plan once additional information is available.	

Table 2-10: Summary Table of Alternatives, continued

Topic	Alternative 1 (no-action)	Alternative 2	Alternative 3	Alternative 4 (NPS preferred)	Alternative 5
WILDERNESS MANAGEMENT					
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.			
Human Waste	There would be no new requirement for carrying out human waste from the West Buttress route or around glacier landing areas. The human waste policy in the Superintendent's Compendium would continue to apply.	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			
Climbing Tools	There would be no 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					
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 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. 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. An exception			Activities or services not described in this Commercial Services section could be considered only in the southern additions designated as Management Area A.

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.	to this rule would be those operators who are allowed a specific number of trips in their commercial authorization; these would be constrained by the current allowances in their contracts. Future commercial authorizations would set these limits for other operators. 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. 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 Kahiltina 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 Kahiltina Base Camp. Landings would be restricted to the hours of 9am to 9pm.	In the park additions and preserve, excluding the Kantishna Hills 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.	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.
		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, and on the Eldridge and Pika Glaciers when climbers and mountaineers are not present. There would be no prohibition on landing at Kahiltina Base Camp prior to July 1.	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 Kahiltina Base Camp prior to July 1.

Table 2-10: Summary Table of Alternatives, continued

Topic	Alternative 1 (no-action)	Alternative 2	Alternative 3	Alternative 4 (NPS preferred)	Alternative 5
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 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. The following entrance area trails would be available for guided hiking: the Rock Creek Trail and Roadside Trail between the Visitor Center and Park Headquarters; the Roadside and Jonesville Trails between the Nemana River Bridge and the Visitor Center; the Nemana River and Triple Lakes trails when planned construction or rehabilitation is complete. Other entrance area trails could only be used for educational activities as described under Administration. Overnight backpacking could be offered in the park additions and preserve. In the portion of the Kantishna Hills designated as Management Area A, overnight camping by guided groups would be restricted to the designated campsites and all day and overnight hiking would be restricted to the developed trails identified under "Backcountry Facilities," below. 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.	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.	The two existing 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.	When current concession contracts expire, the National Park Service 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				
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 Management Area A in Kantishna; - from Eielson Visitor Center to Gorge Creek; - from the water tower above Wonder Lake Campground up 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. Additional trails could be constructed and Backcountry Hiker or Corridor management areas could be designated within the designated Management Area A in the lowland areas surrounding the lower Kahilma, Tokositna, and Ruth glaciers. The NPS would establish additional designated trails in other locations designated Management Area A only if necessary to prevent resource damage. The spring multi-use trail would be upgraded through widening and straightening to make it usable in early winter low snow conditions and it would be extended from Mile 7 to Savage Campground. The additional trail would be designated as a winter season Backcountry Hiker area. Elsewhere in the park and preserve, the National Park Service would maintain a "no formal trails" policy.

Table 2-10: Summary Table of Alternatives, continued

Topic	Alternative 1 (no-action)	Alternative 2	Alternative 3	Alternative 4 (NPS preferred)	Alternative 5
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 while still allowing it to be used for winter recreational activities such as skiing and dog mushing. If there is sufficient snow on the spring trail from Headquarters for safe travel by ski, skijor, and dog sled by March 1, the road would be plowed to Savage Campground. Otherwise, the park road would remain unplowed until clearing is needed to provide for road opening activities for summer season use.	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 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.	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.	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				
Administrative Camps	The existing patrol structure and administrative camps on Mount McKinley would be retained. The National Park Service could establish additional temporary camps in the backcountry for research or administrative purposes if they meet the tests of the minimum requirement process.	The existing patrol structure and administrative camps on Mount McKinley would be retained.	The National Park Service would discontinue use of the temporary administrative camp at 14,000' on Mount McKinley. There would be no additional administrative camps in the backcountry.	
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 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 Kamistishna Hills designated as Management Area A, overnight camping by educational programs would be restricted to the designated campsites.	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. In the portion of the Kamistishna Hills designated as Management Area A, overnight camping by educational programs would be restricted to the designated campsites.	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 Kamistishna 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 Mgmt	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.		

Table 2-10: Summary Table of Alternatives, continued

Topic	Alternative 1 (no-action)	Alternative 2	Alternative 3	Alternative 4 (NPS preferred)	Alternative 5
EASEMENTS AND BOUNDARY CHANGES					
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, D1, L) that provides a route across Ahlma, Inc. land from Cantwell to the park boundary near Windy Creek. See Map 2-7.			
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 2-8). 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 2,822 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 2-11: Summary Table of Environmental Consequences

Topic	Alternative 1 (no-action)	Alternative 2	Alternative 3	Alternative 4 (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 prescriptions, desired future conditions, and indicators and standards, 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 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 11% of the park, and the potential for introduction of exotic species from 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.

Table 2-11: Summary Table of Environmental Consequences, continued

Topic	Alternative 1 (no-action)	Alternative 2	Alternative 3	Alternative 4 (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 effects of increased snowmachine and motorboat use on various wildlife species.	There would generally be moderate adverse impacts to wildlife populations and habitats because of increased snowmachine and motorboat use on various wildlife species. 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/Broad Pass 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.

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 no longer 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 associated 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.
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 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.	There would be moderate adverse impacts on subsistence resources and opportunities because of increases in non-subsistence snowmachine use, especially in the Cantwell area, and generally higher levels of recreation use in subsistence areas, both of which would create unfavorable conditions for subsistence wildlife populations and increase conflicts between recreational and subsistence users. The cumulative impact of this alternative plus the aforementioned past, present, and reasonably foreseeable actions would be major.	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.

Table 2-11: Summary Table of Environmental Consequences, continued

Topic	Alternative 1 (no-action)	Alternative 2	Alternative 3	Alternative 4 (NPS preferred)	Alternative 5
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 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.
Socioeconomics	Impacts to economic values of the park and preserve would be minor over the next several years. Effects would likely increase to moderate levels 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 eventually, 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 over the next several years 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.

Table 2-11: Summary Table of Environmental Consequences, continued

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. 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.	This alternative would have a moderate beneficial impact on 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 in the 20 years that the backcountry management plan is expected to be in effect and creates a situation where park management could not prevent impairment of park resource values.	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 include mitigation and even 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 would trigger the need for secondary responses in support services such as administration, particularly human resources, as well as 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.	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.



CHAPTER 3: AFFECTED ENVIRONMENT

INTRODUCTION

This section describes the existing environment and the current conditions of important resources and values of Denali National Park and Preserve that would be affected by any of the five alternatives in the plan. Topics examined include physical resources (air, water, soils), vegetation and wetlands, fish, wildlife, natural sounds, wilderness, subsistence, cultural resources, socioeconomics, visitor use, and park management.

OVERVIEW: GEOGRAPHY AND CLIMATE

Denali National Park and Preserve is dominated by three physiographic provinces in central Alaska: the Alaska Range, Northern Foothills of the Alaska Range, and the Tanana-Kuskokwim Lowlands, while small portions of the park extend into the Cook Inlet-Susitna Lowlands, the Broad Pass Depression, and the Kuskokwim Mountains. The Alaska Range forms the northernmost portion of the Pacific Mountain System, and is one of the great mountain uplifts in North America, rising to the pinnacle of Mount McKinley at 20,320 feet. Mount Foraker is the second highest peak, rising to 17,400 feet, while nearby Mount Hunter, third highest, is 14,573 feet high. In addition, numerous peaks in the vicinity of Mount McKinley stand at elevations of 10,000-13,000 feet. The lower southern slopes of the Alaska Range are generally steep between the glaciers and contain spectacular lower elevation walls, spires, and peaks of their own. Examples include the granitic spires of the Tokosha Range between the lower ends of the Tokositna and Ruth glaciers, and the towering granitic walls on the west side of Cripple Creek. Because of the rugged relief, extensive glaciers, and dramatic scenery, the Alaska Range region has been the area of most interest to park visitors.

The northern foothills of the Alaska Range consist of a series of east-west trending ridges, starting with the Kantishna Hills and running eastward. Summit altitudes generally range between 2,000 to 4,500 feet. The foothills vary from 3 to 7 miles in width and from 5 to 20 miles in length (Wahrhaftig 1965). They are separated by broad flat valleys of glacial origin, which range from 2 to 10 miles in width. The Tanana-Kuskokwim Lowlands to the north of the foothills form a broad region of flat to gently rolling lowlands drained by the Tanana and the Kuskokwim rivers. There are more than 10,000 mapped lakes within the park and preserve boundaries, most of them in the northwestern park additions and preserve.

Another prominent feature of the geology of the area is extensive glaciation in the Alaska Range. The range is perpetually snowclad above approximately 7,500 feet on the north and 6,000 feet on the south. Glaciers are numerous and tend to be larger and longer on the south side of the range than on the north. The larger glaciers range between 35 to 45 miles in length and include the Kahiltna (the largest), Ruth, Eldridge, Tokositna, Yentna, and the Muldrow. On the north side of the Alaska Range beyond the existing glaciers, morainal and glacial outwash deposits extend into the foothills belt and cover large areas of bedrock. Except for some valleys, the foothills section was never glaciated.

Denali National Park and Preserve straddles two of the four major climatic zones of Alaska –the transitional maritime zone south of the Alaska Range and the continental zone in the interior north of the range. The Alaska Range exerts a major influence on the climate of the interior by blocking much of the moisture that sweeps inland from the Gulf of Alaska. Therefore, the north side of the park and preserve is characterized by less precipitation and greater fluctuations in temperature (hotter in summer and colder in winter) than the south side.

Weather is an important factor in other forms of visitor use. Cross-country hiking often is not practical until early June, and snow commonly closes the park road in mid-September. Winters are cold, particularly north of the Alaska Range where temperatures at Park Headquarters have reached -52°F. Average maximum temperature for January is 13°F, minimum is -5°F. Deeper snow and milder temperatures south of the range encourage a broader range of winter visitor use over a longer period. The period from late February to early April generally provides the best opportunities for cross-country skiing, snowshoeing, dog mushing, and snowmobiling. During summer, up to 20 hours of daylight provide many opportunities to enjoy the park, and temperatures have been as high as 90°F. The average maximum temperature for July is 66°F, minimum 44°F.

Precipitation at Park Headquarters averages about 15 inches annually, including an average snowfall of 76 inches annually. At higher elevations in the Alaska Range, however, the total precipitation exceeds 80 inches in some locations, and snowfall exceeds 400 inches. Precipitation in summer exceeds that in winter and is greater on the south side of the Alaska Range than on the north side. Rainfall occurs on an average of 21 days during June, July, and August at the McKinley Park and Lake Minchumina recording stations, 45 days at Summit, and 36 days at Talkeetna. Sudden showers and thunderstorms occur occasionally and flash floods can occur throughout the region.

PHYSICAL RESOURCES

Air Quality and Visibility

Air quality in the park and preserve is very good to excellent, with the notable exception of haze and smoke from wildfires in summer and, on a local basis, “fugitive” dust from the park road. The park and preserve are managed to achieve the highest attainable air quality levels and visibility standards, consistent with the applicable provisions of the Clean Air Act (42 USC 7401 et seq.) and mandates specified by ANILCA and the NPS Organic Act.

The exceptional air quality and lack of nearby city lights provide conditions for outstanding daytime panoramic views and winter night sky visibility (the long days of summer render stars invisible from May to August). Mount McKinley is the dominant landscape feature of the region. On a clear day the mountain can be seen from both Anchorage and Fairbanks at distances of 150 miles or more.

The 1977 amendments to the Clean Air Act designated the original Mount McKinley National Park as a Class I airshed, which requires the prevention of significant deterioration of air quality over baseline conditions. That classification was extended to cover the 1980 ANILCA additions to the park and preserve. Denali National Park and Preserve is the only national park unit in Alaska that is designated as a mandatory Class I airshed. The primary values to be protected under the Clean Air Act are human health and the secondary values include a variety of air quality-related values (AQRV), such as visibility and scenic, cultural, biological, and recreational resources. Protection of visibility is also a high priority under both Alaska regulations and national “regional haze” regulations issued by the EPA in June 1999.

The CAA also established National Ambient Air Quality Standards (NAAQS) for six priority pollutants (sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, lead, and fine particulate matter) to protect public health and the environment. No exceedances of NAAQS have been documented within Denali National Park and Preserve. Air quality data have been collected at a sampling station at Park Headquarters since 1980, and south of the Alaska Range near Trapper Creek since 1998. The park participates in four national sampling programs: the National Atmospheric Deposition Program/National Trends Network (NADP/NTN), which monitors acid precipitation; the NPS ozone monitoring program; the Interagency Monitoring of Protected Visual Environments (IMPROVE) program, which monitors aerosols; and the Clean Air Status and Trends Network (CASTNet), which measures dry deposition of particles and gases.

Water Quality

The surface waters of Denali National Park and Preserve generally appear to be of good quality, with indications of some impacts from human activities. Potential sources of contaminants are principally associated with mining claims; or glacial streams that drain high-altitude mountainous areas and carry high sediment loads (NPS 1995c). Most surface waters in the backcountry receive little recreational use because of difficult access, challenging boating conditions, or lack of fisheries. The surface waters probably receiving heaviest recreational use are the Nenana River, Moose Creek (in the Kantishna area), Horseshoe and Triple Lakes (in the frontcountry near Park Headquarters), and Wonder Lake (in the frontcountry near the road to Kantishna). In recent years, the Nenana River has supported an estimated 30,000-35,000 visitors each summer on commercial rafting tours. However, no water quality impairments attributable to use impacts have been detected in the Nenana River or on Moose Creek (NPS, unpublished data [Edwards and Tranel 1995]). Although they have not been measured recently, no use-related water quality impacts are expected at current use levels in the three frontcountry lakes (NPS 1996).

Streams and rivers can be grouped by type on the basis of the three main factors that affect water quality in the Denali National Park and Preserve: source (glacial or clear water), geology (marine sedimentary, primarily north side of the Alaska Range, or granitic, primarily south side of the Alaska Range), and mining impacts (placer mined or not mined) (Edwards and Tranel 1998). The primary effect of glacial water inputs is to increase suspended sediment and turbidity. Some of the effects of placer mining on water quality in the past have included increased suspended sediment levels and turbidity, depressed pH levels, and increased water temperatures. However,

there has been minimal mining activity in the park since 1985 and recent monitoring in the Kantishna area found few differences between mined and unmined streams, suggesting substantial recovery of water quality (Edwards and Tranel 1998).

Except in the Kantishna Hills, nearly all-surface water is potable, although iron is sometimes present in undesirable quantities. However, boiling or otherwise treating surface water is advised due to the presence of *Giardia*.

Soils

Soils within the park vary according to climate, parent material, topography, and vegetative cover and can be classified into four broad soil orders, the Entisols, Histosols, Inceptisols, and Spodosols (Rieger et al. 1979, <http://www.ak.nrcs.usda.gov>). The Entisols are relatively young soils that show little or no evidence of weathering. In Denali National Park and Preserve, they commonly are associated with outwash plains, upland areas adjacent to rivers where eolian deposition of silt and sand is frequent, recently exposed glacial moraines, and on steep, unstable areas.

Histosols are made up completely or in large part by organic material that has accumulated under wet conditions in depressions or other low areas. Histosols are uncommon and typically are associated with moraine depressions, thermokarst depressions in permafrost areas in the Tanana-Kuskokwim Lowlands.

Inceptisols have undergone relatively minor modification of the soil parent material by soil-forming processes. These soils are common in the Tanana-Kuskokwim Lowland and the northern foothills of the Alaska Range. These soils are found on both well-drained upland areas and in wet lowland areas associated with permafrost.

Spodosols are well-developed soils in which soil materials have been leached from the upper part of the soil and deposited at greater depth. Spodosols are common in the lower foothills on the south side of the Alaska Range and upland areas in the Cook Inlet-Susitna Lowlands because of the relatively high precipitation in that region.

Finally, there also is rugged mountainous land comprised of poorly weathered bedrock and glaciers where soils have not developed due to absence of fine-grained material. This land type is extensive in the Alaska Range region.

Permafrost, where ground temperatures are below 32°F for at least two years, occurs in most areas of Denali National Park and Preserve. Permafrost is discontinuous (50–90% of area), relatively warm (30–32°F), and of low ice content (0–10% excess ice) in the Tanana-Kuskokwim Lowlands, northern foothills, and the Alaska Range (Ferrians 1965, Ferrians et al. 1969, Brown et al. 1997). There are, however, some isolated areas of permafrost with moderate ice contents in the Tanana-Kuskokwim Lowlands, which makes the terrain more susceptible to thermokarst. In these areas, permafrost typically is found in wet, low-lying areas with fine-grained soils, on steep north facing slopes and at high elevations. Permafrost occurs sporadically (10-50% of

area) in the Cook Inlet-Susitna Lowlands. Exact permafrost thicknesses have not been documented, but thicknesses of up to 100 feet have been recorded near the eastern entrance to the park.

Thermokarst terrain caused by melting of the permafrost and subsequent subsidence of the ground surface is common because permafrost temperatures are relatively warm, (Osterkamp and Romanovsky 1999, Jorgenson et al. 2001). Fires are common disturbances that initiate thermokarst (Viereck 1973). Permafrost also is sensitive to human disturbance (Brown and Grave 1979). The extent of thermokarst depends on soil texture, ice content, air and soil temperatures, and degree of disturbance. Thermokarst can be highly detrimental to buried cables and utility lines, paved surfaces, roadbed foundations, buildings, and other developments.

Permafrost also poses problems for the disposal of liquid and solid waste. Decay rates in frozen ground are extremely slow. Frozen ground is also impermeable to subsurface flow of fluids because ice fills all rock or soil pore spaces.

VEGETATION

The vegetation of Denali National Park and Preserve is a mosaic of taiga and tundra ecosystems controlled by the interaction of climate, topography, substrate, and site history. These determining factors vary considerably across the landscape of the park. Thus we find a diversity of plant communities and vegetation types in the park that vary across all spatial scales, ranging from patterns caused by micro-topography within individual sites to patterns on the scale of the landscape that are driven by differences in regional climatic factors. The major vegetation zones found in the park are described below.

Denali is located between 62 and 64 degrees north latitude. This area of the earth's surface lies within the taiga, or northern boreal forest biome. As such, Denali is predominantly forested below elevations of about 763 meters (2,500 feet), although local treeline varies with topography and location. Above treeline, we find two other vegetation zones: subalpine and alpine.

Lowlands/ Forested zone: Black spruce forest and woodland occupies areas underlain by permafrost, mostly north of the Alaska Range crest. The cold soil temperatures and impeded drainage found in these sites result in relatively low annual productivity and slow growth. Common understory shrubs in these areas include Alder (*Alnus crispa*), Dwarf birch (*Betula glandulosa*), Labrador tea (*Ledum groenlandicum*), Shrub cinquefoil (*Potentilla fruticosa*), several species of willow (including *Salix arbusculoides*, *Salix glauca*, and *Salix planifolia* ssp. *pulchra*) and blueberry (*Vaccinium uliginosum*). Black spruce stands burn periodically, and trees of more than 100 years of age are uncommon (Viereck et al. 1992). Black spruce is a fire-adapted species, with serotinous cones that generally require fire for seed dispersal.

River corridors and upland areas with better drainage support more productive forest types than sites with permafrost, because of higher soil temperatures and increased nutrient availability. White spruce (*Picea glauca*) forest occupies uplands, sometimes mixed with paper birch (*Betula*

papyrifera) on hillsides. Birch occupies early successional sites in relatively moist facies while aspen (*Populus tremuloides*) is locally abundant in very dry or more xeric early successional sites. Common shrubs in upland Spruce-Birch forests are dwarf birch (*B. glandulosa*), rose (*Rosa acicularis*), willows (including *Salix bebbiana*) high-bush cranberry (*Viburnum edule*). Common mosses in the understory of spruce forest are *Hylocomium splendens* and *Pleurozium schreberi*. White spruce also requires a mineral seed bed for establishment, so that recruitment of trees is generally tied to disturbance events, which is most frequently fire (particularly north of the Alaska Range).

Dry and open sites in the forested zone of the park often have high cover of kinnikinnik (*Arctostaphylos uva-ursi*) and soapberry (*Shepherdia canadensis*). In southerly aspects, spruce forest is gradually replaced by aspen woodland with increasing slope. Aspen forest is characteristic of warm, relatively steep slopes in the interior, and is much less common on the south side of the Alaska Range, where balsam poplar more commonly occupies warmer slope facies within the forest.

The very warmest and driest sites within the forest zone in the interior are occupied by dry meadow and steppe-like vegetation dominated by grasses such as *Calamagrostis purpurascens* and *Poa glauca*, sagebrush (*Artemisia* spp.) scattered shrubs of juniper (*Juniperus communis*) and a variety of herbaceous perennials of the genera *Arabis*, *Erigeron*, *Pulsatilla*, and *Solidago*. Equivalent slope facies to the south of the Alaska Range are more likely to support lush graminoid-forb meadows dominated by Nootka lupine (*Lupinus nootkatensis*) geranium (*G. erianthum*) cow parsnip (*Heracleum lanatum*), and *Carex* species, as a result of moister growing conditions and historical factors.

Terraces along the major rivers support colonial herbs in newly abandoned channels grading into thickets of alder (*Alnus crispa*) and willow (*Salix* spp.). Older surfaces support mature balsam poplar forest (*Populus balsamifera*) grading into closed white spruce (*Picea glauca*) forest. Black spruce, and mixed black and white spruce forest occupy areas where permafrost has developed and drainage is impeded.

Interspersed within the forested zone on both sides of the Alaska Range in Denali are numerous wetland and riparian areas dominated by herbaceous taxa, including sedges, rushes, grasses, forbs, and mosses. Wetlands in this area are often topographically controlled and occupy topographic depressions, thaw features, and sites with impeded drainage. Numerous ponds and wetlands dot large areas underlain by glacial till of Wisconsin age and represent relicts of kettlehole ponds formed as glacial ice retreated with strong climatic warming through the Holocene. Beaver (*Castor canadensis*) also have a considerable influence on the distribution of wetlands through the impounding of streams, particularly in the forested lowlands of the Yentna, Susitna, Kantishna, and Kuskokwim river basins.

Subalpine zone: In the subalpine zone, roughly 2,500-4,000 feet in elevation, scrub vegetation dominated by dwarf birch (*Betula glandulosa*), alder (*Alnus crispa*), and willow (*Salix* spp.) alternates with open spruce woodland and meadow sites depending on drainage, topography, and site history. As the upper elevational limit of trees is approached, spruce woodland becomes

more open with a higher relative cover of tundra shrubs such as blueberry (*Vaccinium uliginosum*), dwarf birch, rhododendron (*R. lapponicum*), and willow (*Salix* spp.). Common graminoid species in the shrub zone are *Arctagrostis latifolia*, *Carex bigelowii*, *Carex podocarpa*, *Carex scirpoidea*, *Festuca altaica*, and *Poa arctica*. Common forbs in this zone are arctic wormwood (*Artemisia arctica*), lupine (*Lupinus arcticus*), parrya (*Parrya nudicaulis*), coltsfoot (*Petasites* spp.), wintergreen (*Pyrola* spp.), groundsels (*Senecio atropurpureus* and *S. lugens*), and goldenrod (*Solidago multiradiata*). Dwarf shrub species that are important in this vegetation are bearberry (*Arctostaphylos alpina* and *A. rubra*), mountain avens (*Dryas* spp.), crowberry (*Empetrum nigrum*), and netted willow (*Salix reticulata*).

The subalpine zone south of the Alaska Range crest, particularly in the Kahiltna and Yentna River drainages, is dominated by dense thickets of alder (*Alnus* spp.), devil's club (*Echinopanax horridum*), and other shrubs of more coastal distribution. The vegetation in these areas is considerably denser than equivalent sites north of the Alaska Range.

Alpine Zone: The alpine zone occupies elevations above about 3,500 feet. The alpine vegetation of the park is tundra, most often dominated by dwarf shrubs of the families rose (Rosaceae) and heath (Ericaceae), as well as graminoids and forbs. Due to the large amount of geomorphic activity and the relatively young age of many of the surfaces in the alpine, many slopes are essentially barren, supporting only a few scattered cushion plants. The upper limit of plant growth is about 7,500 feet, above which is an area of permanent snowcover.

Alpine tundra is variable within the park, depending on site characteristics and geographic location. In well-drained sites too dry or rocky to support dwarf birch, alpine tundra occurs above about 2,800 feet; in more favorable sites it occurs above the elevational limit of the shrub-tundra zone, which varies between approximately 3,500 and 4,000 feet. The most important class of vascular plant species of alpine tundra in the park are dwarf shrubs of the rose (Rosaceae), heath (Ericaceae), and willow (Salicaceae) families. The dominant plant species that occur in alpine tundra include mountain avens (*Dryas alaskensis*, *D. integrifolia*, and *D. octopetala*), bearberry (*Arctostaphylos alpina* and *A. rubra*), cassiope (*C. tetragona*), crowberry (*Empetrum nigrum*), and dwarf willows (*Salix arctica*, *S. polaris*, *S. reticulata*).

Snowbed areas and north-facing slopes in the alpine zone are characterized by high cover of heath species (principally *Cassiope tetragona*), Alaska mountain avens (*Dryas alaskensis*), polar willow (*Salix polaris*) and netted willow (*Salix reticulata*). These cool, moist sites support a characteristic assemblage of common forbs including *Antennaria monocephala*, spring beauty (*Claytonia sarmentosa*), mountain sorrel (*Oxyria digyna*), and buttercups (*Ranunculus eschscholtzii*, *R. nivalis* and *R. pygmaeus*). Club moss (*Huperzia selago*) and the grasses *Hierochloa alpina* and *Trisetum spicatum* are also common in snowbed sites. In rivulet areas, and more gravelly and disturbed snowbed sites, several saxifrages (*Saxifraga calycina*, *S. nelsoniana*, *S. nivalis*, *S. oppositifolia*, *S. rivularis*, *Boykinia richardsonii*) are very common throughout the park, particularly in high elevations. The distribution of these spatially-limited snowbed communities on the landscape is controlled by late lying snow, which is determined by local topography and wind patterns that redistribute the snowpack. Accumulation zones in the lee of exposed slopes, and topographic depressions are areas commonly associated with snowbed plant communities.

Dwarf scrub-sedge alpine tundra associations occupy mesic topographic positions in the park. These associations occur in more insulated sites than snowbeds and north-facing heath tundra. Dominant taxa can include the dwarf shrubs *Arctostaphylos alpina* and *A. rubra*, *Dryas octopetala*, *Empetrum nigrum*, *Salix arctica* and *S. reticulata* and the sedges *Carex bigelowii*, *C. microcheata*, and *C. scirpoidea*. Forbs common in mesic alpine tundra throughout the Park include mouse-ear chickweed (*Cerastium beeringianum*), *Minuartia arctica*, *Pedicularis capitata* and *P. lanata*, cinquefoil (*Potentilla hyparctica* and *P. uniflora*), spotted saxifrage (*S. bronchialis*), and moss campion (*Silene acaulis*). The grasses *Festuca brachyphylla*, *Hierochloa alpina*, *Poa arctica*, *Poa glauca*, and *Trisetum spicatum* are also common and are codominant in some associations. Dwarf-scrub-lichen tundra occurs on windswept ridges, sometimes with relatively sparse vascular plant cover of *Dryas* spp. and graminoids and abundant lichen of the genera *Cetraria*, *Cladonia*, and *Stereocaulon*.

Dry sites from the subalpine to alpine zone support a range of plant communities from discontinuous graminoid-forb associations to continuous *Dryas*-graminoid-forb tundra depending on slope, aspect, substrate, and slope morphology. Common vascular plant species in xeric alpine associations include mountain avens (*Dryas octopetala*), snow draba (*Draba nivalis*), *Minuartia arctica*, *M. obtusiloba*, and cinquefoil (*Potentilla nivea* and *P. uniflora*). Graminoid species common in dry alpine sites include *Calamagrostis purpurascens*, *C. rupestris*, northern fescue (*Festuca brachyphylla*), and *Kobresia myosuroides*.

Xeric alpine plant communities in the park harbor numerous endemic plant species. Endemic species that occur in dry sites throughout alpine areas of the park include *Astragalus nuttalinensis*, *Saxifraga reflexa*, and *Senecio ogoturukensis*. A number of uncommon arctic-alpine xerophytes occur in the northern section of the park. These include *Douglasia gormanii*, *Erysimum pallasii*, *Phlox sibirica* ssp., *richardsonii*, *Smelowskia calycina*, and *Synthyris borealis*.

Disturbance: The vegetation types most sensitive to disturbance are alpine tundra communities (Racine and Johnson 1988, Emers et al. 1995). The alpine tundra communities are particularly vulnerable because of the steep terrain commonly associated with these communities and thin soil that supports the vegetation mat. Disruption of the mat can lead to erosion of the thin soil, and the steep terrain exacerbates this process.

Vegetation surveys are an important component of the Long-Term Ecological Monitoring program. Sampling sites occur on plots throughout the park and preserve.

Wetlands

Wetland resources vary in type and distribution in Denali. Wetlands comprise less than approximately 15 percent of the total landscape within the alpine mountains regions in the park to over 80 percent on hills, plains, and flood plains in the northern boreal lowlands. The three essential characteristics of wetlands include hydrophytic vegetation, hydric soils, and hydrology. Hydric soils include soils that formed under conditions of saturation, flooding, or ponding for periods long enough during the growing season to support the growth and reproduction of

hydrophytic vegetation. The Soil Survey of Denali provides a description of hydric soils and major vegetation communities found within the park and thus provides a good resource for determining the extent and types of wetlands.

Within the high alpine mountains, hills, and plains regions of the park, wetlands are of limited extent or “sporadic” (less than 15%) across the landscape and “occasional” (15 to 49%) on low alpine mountains, hills and plains. In the high alpine mountains, wetlands are restricted to snowbed swales and flood plains in narrow valleys. Snowbed swales include areas beneath or directly down slope from snow drifts and saturated conditions exist primarily during spring. Soils consist of a thin layer of organic rich loess over gravelly till and colluvium with relatively low permeability. Vegetation consists of a mosaic of alder (*Alnus* spp) or willow (*Salix* spp.) scrub communities, and sedge (*Carex* spp.)-herbaceous meadow types. Wetlands on low mountains and glacial plains include saturated soils over permafrost. Saturated conditions result from the perching of water over an impermeable permafrost table that commonly occurs within a meter of the surface. Permafrost wetlands within the mountains have predominantly ericaceous-sedge (*Carex* spp.) scrub communities. Flood plain wetlands within the mountainous regions have water tables that fluctuate and often pond in response to changes in discharge associated with the riverine system. Vegetation is typically willow (*Salix* spp.), scrub, and sedge (*Carex* spp.) wet meadow types. Soils are formed in a thin layer of loamy alluvium underlain by sandy and gravelly alluvium.

At lower elevations, wetlands underlain by permafrost and characterized by stunted spruce woodlands referred to as “taiga” dominate the uplands. These wetlands are the single most extensive wetland type identified in Denali Park and often comprise from 50 to 100 percent of the landscape. Soils consist of a thick organic mat 20 or more centimeters thick over saturated loamy loess and alluvium, with permafrost at depths less than a meter.

Other noteworthy wetlands include the wet sedge (*Carex* spp.) meadow and sedge-sphagnum (*Sphagnum* spp.) bog wetlands found interspersed among permafrost wetlands and the many lakes of the northwestern part of Denali near Minchumina Lake. This wetland type is also common in uplands of the Susitna Valley portion of the park. Soils of the wet meadows and bogs consist of thick organic mats of sedge and sphagnum peat with layers often occurring as floating mats around lakes and ponds. A unique wetland type is found along the lower reaches of the Kantishna River north of Chilchikabena Lake where groundwater discharges at the surface, providing a unique wetland community of tufted bulrush (*Trichophorum cespitosum*) meadow. Soils consist of an organic mat over gravelly alluvium.

Other wetlands of minor extent in Denali, though of regional significance, include forested riparian wetlands with white spruce (*Picea glauca*)-willow (*Salix* spp.) forest or mixed white spruce-tamarack (*Larix* spp.) forest. Both of these types have soils with loamy alluvial mantles over sandy and gravelly alluvium and both have saturated conditions due to local groundwater discharge from the water table associated with the riparian system. Wet mixed paper birch (*Betula Neoalaskensis*)-white spruce (*Picea glauca*) forest and alder (*Alnus* spp.) scrub wetlands are identified along mountain slopes of the south side of the Alaska Range in Denali. These wetlands consist of a loamy volcanic ash mantle over glacial till and glacio-fluvial deposits. The

relatively high precipitation on the south side of the Alaska Range in combination with low permeability subsoil characteristics contributes to the saturated conditions in these soils.

Threatened and Endangered Species

No threatened or endangered plants are known to occur in Denali National Park and Preserve, but one plant species is considered a federal species of concern (former Candidate 2 species): a composite (*Taraxacum carneocoloratum*), the pink dandelion, which is found on alpine slopes and coarse, well-drained substrates. This species has been found in this general region of the Alaska Range (Murray and Lipkin 1987), and has been documented in the north side of the park and preserve in gravelly areas and scree slopes (Carl Roland, pers. comm.). The Alaska Natural Heritage Program also maintains a list of regionally sensitive plants (S1–S3) and surveys for these plant species are currently underway, with 47 species already documented within the park and preserve (Carl Roland, pers. comm.).

WILDLIFE

Birds

Denali National Park and Preserve supports a cosmopolitan avian fauna. All of the major groups of birds (waterfowl, raptors, grouse, shorebirds, near-passerines, and passerines) found in Interior Alaska are found in Denali. As of August 2001, 164 species were documented in Denali (C. McIntyre, pers. comm.). Of these, at least 106 species breed in Denali, including at least 25 resident species. The rich avifauna is supported by a diversity of habitats in Denali. The distribution of avian species in Denali is a function of habitat and elevation; however, studies of avifaunal communities are just beginning in Denali. In most cases, the available information is limited to presence and few data are available on relative abundance of species and habitat relationships. Except for approximately 25 resident species, most birds are migratory and occur in Denali only during the breeding season (April to October). Migratory species include those wintering in North, Central and South America, Southeast Asia, Africa, and the southern Pacific Ocean.

Passerines

Since 1992, the Denali Long-term Ecological Monitoring Program has supported studies to examine population trends of selected passerine species within Denali's frontcountry. The Alaska Bird Observatory (ABO) uses a survey-based monitoring approach, point counts, to determine population trends in selected species of passerines. The Institute for Bird Population studies uses a demographic-based monitoring approach, constant effort mist netting, to determine survival and productivity in selected species of passerines. These studies provide information on the relative abundance, survivorship, productivity, and habitat relationships of the most common passerines primarily in spruce-dominated forests in Denali's front country. In 1998, ABO and the Denali Institute initiated a migratory bird banding station along Moose Creek on Camp Denali property in the Kantishna Hills (Benson 1999). This study provides information on the timing and diversity of migration in the Moose Creek area.

Few surveys for passerines have been conducted in the Denali backcountry. However, in 2001 Denali staff initiated passerine surveys in several backcountry areas and is designing a Denali-wide sampling plan for passerines and other land birds (McIntyre and Roland 2002).

Waterfowl

Park-wide waterfowl surveys are conducted in coordination with the U.S. Fish and Wildlife Service. Except for a few species, waterfowl distribution on the south side is limited to the wetlands, lakes, and ponds along the southern park boundary. Lands south of the park boundary contain more waterfowl habitat. The Minchumina basin, in the northwestern portion of Denali, supports the highest densities of breeding waterfowl in Denali (McIntyre 2002). Of the 20 species of migratory waterfowl that breed in Denali, trumpeter swans, harlequin ducks, and Tule greater white-fronted geese are of particular interest on a nationwide basis. Additional species of interest included those used by subsistence users and those particularly sensitive to human disturbance.

Breeding and staging trumpeter swans occur on the south side of the Alaska Range, particularly in the Yenta and Tokositna drainages, and in the Minchumina basin on the north side of the Alaska Range (McIntyre 2002). However, there is limited swan habitat within the boundaries of Denali on the south side of the Alaska Range. In 2000, a park-wide trumpeter swan survey was completed by the USFWS (McIntyre 2002). While results from these surveys show that the wetlands and waterways from the Yenta River drainage east to the Ruth River drainage contain large numbers of breeding swans, the highest concentrations of swans were observed in the Minchumina basin. In September 2000, observations were also made of large flocks of staging swans in the Chulitna River area, especially between the Tokositna drainage and West Fork of the Chulitna River (Bryant, pers. comm.). Currently, Denali staff is conducting surveys for staging swans and developing habitat models for trumpeter swans on the south side of the Alaska Range (McIntyre 2002).

The Tule greater white-fronted goose, a subspecies of the greater white-fronted goose, is considered “at risk” by the International Waterfowl Research Bureau, although it is not listed federally or by the state. They nest at very low densities from the Yenta River drainage to the Tokositna River drainage within and adjacent to Denali’s boundaries (Ely et al. 1994).

In autumn, tens of thousands of Sandhill cranes, Canada geese, greater white-fronted geese, trumpeter and tundra swans, and other waterfowl migrate through the area, especially along the north side of the Alaska Range, the Wonder Lake and eastern Kantishna Hills area, and the northern additions. Many of these species also use wetlands and tundra areas for feeding and resting during migration. Trumpeter and tundra swans regularly use lakes and ponds in Denali during migration periods. In spring, migratory waterfowl are often forced to congregate in relatively small areas of open water. For instance, flocks of white-winged scoters numbering in the hundreds often stage at the south end of Wonder Lake in spring.

Raptors

Most raptor surveys in Denali have been limited to the mountainous regions and waterways within and adjacent to Denali. Raptors are well represented in the avifauna of Denali, including eagles (bald and golden), falcons (gyrfalcons and peregrines), merlins and kestrels, accipiters (northern goshawk and sharp-shinned hawk), northern harriers, and owls (great gray, short-eared, northern hawk, boreal, great horned, and snowy). Until recently, most quantitative data on raptor abundance, distribution, and habitat preferences in Denali were restricted to studies on the north side of the park on a few species: golden eagles (McIntyre and Adams 1999; on-going studies), gyrfalcons, (McIntyre, unpublished data), merlins (Wilbor 1996), and northern hawk owls (Kertell 1986).

In 2000, Denali staff initiated a three-year study to quantify cliff-nesting raptor habitat and bald eagle habitat on the south side of the Alaska Range (McIntyre 2002). Denali staff is also developing habitat models to predict the occurrence of golden eagles throughout Denali and habitat models to predict occurrence of cliff nesting raptors and bald eagles on the south side of the Alaska Range (McIntyre 2002). Golden eagles and gyrfalcons occur in the mountainous regions of the park, with the highest densities in the northeastern portion of Denali. Bald eagles are numerous at lower elevations on the south side of the Alaska Range (McIntyre, unpublished

data); the highest concentrations occur on lands adjacent to Denali. Surveys in 2001 found over 25 occupied bald eagle nesting areas in the Yenta, Kahiltna, Tokositna, Ruth, and Chulitna drainages (McIntyre, unpublished data).

Known species of owls that breed in Denali include short-eared owl, great gray owl, great horned owl, northern hawk owl, and boreal owl. Great-gray owls and northern hawk owls occur at very low densities. Short-eared owls are the most common owl species breeding in the area and great-horned owl and boreal owls are the most common resident species in Denali (McIntyre, pers. comm.)

Alaska Department of Fish and Game staff reports an increasing number of ospreys observed south of Denali, with at least one pair nesting in the Trapper Creek area. Farther to the south at least three pairs were present in the Willow Creek area (ADFG 1996b). Osprey are occasionally seen in the Wonder Lake area, and abundance and distribution of this species is probably greater than currently reported based on the abundance of suitable habitat in the southern and western portions of Denali and increases in their breeding populations statewide. However, ospreys were not located during bald eagle surveys on the south side of the Alaska Range in 2001 (McIntyre, unpublished data).

Other species

Ruffed and spruce grouse, and all three species of ptarmigan (willow, rock, and white-tailed), are residents in Denali. Woodpeckers are also well represented in Denali. All woodpeckers are resident, except for the yellow-shafted flicker. Kingfishers and American dippers occur in riparian areas. Shorebirds are represented by species nesting in sub-alpine and alpine habitats (whimbrel, upland sandpiper, surfbird, semipalmated plover) and wetland and riparian areas (yellowlegs, common snipe, solitary sandpiper, wandering tattler). Denali provides important summer breeding grounds for two species that winter at sea, arctic tern and long-tailed jaeger. The numerous lakes and ponds at lower elevations provide important breeding habitats for the arctic tern and long-tailed jaegers breed in subalpine and alpine areas of Denali.

The Boreal Partners in Flight Working Group (PIF) identified 19 bird species as “priority species” for Central Alaska, which includes Denali. The PIF system ranks each species of North American breeding birds based upon seven measures of conservation vulnerability. All but three of these species (sharp-tailed Grouse, Townsend’s warbler, and Smith’s longspur) occur in Denali. The Smith’s longspur occurs infrequently in the Wonder Lake area and is expected to occur on the south side. Suitable habitats for sharp-tailed grouse and Townsend’s Warblers (mature white-spruce forests) are limited in Denali; however, Townsend’s warblers are seen occasionally.

Threatened and Endangered Species

Currently, no bird species occur in Denali National Park and Preserve that are listed as threatened or endangered under the Endangered Species Act (USFWS 1999). The American peregrine falcon (*Falco peregrinus anatum*) was delisted in August 1999 (*Federal Register* 64: 46542-46558). Nesting peregrine falcons are relatively rare in Denali, but two pairs have been found nesting on the north side near the Toklat River and near Chilchuckabena Lake (McIntyre,

pers. comm.). No nest sites have been documented in the south side of the park. Foraging and transient birds may occur in that area, however; and peregrines are considered rare in Denali State Park (ADNR 1989).

Some wildlife species formerly were listed by the U.S. Fish and Wildlife Service as category 2 candidate species for possible future listing under the Endangered Species Act. These candidate species were redesignated as “species of concern,” which provides no protection under the Endangered Species Act. Under NPS policy, however, such taxa are treated as threatened or endangered until additional data on their population sizes and distributions show otherwise. Federal species of concern that occur in Denali National Park and Preserve include two bird species, the harlequin duck and olive-sided flycatcher.

Harlequin ducks occur in fast-moving clear streams and rivers in the Alaska Range, including Denali National Park and Preserve. Although population surveys have not been conducted in the park, Moose Creek in the Kantishna area and other clear water streams probably support breeding harlequin ducks.

In Alaska, olive-sided flycatchers nest in open coniferous forests with bog ponds and marshy streams, and in woodland/dwarf forest, usually in black spruce trees located near the drainages (Gabrielson and Lincoln 1959). This species has been recorded annually on point counts and Breeding Bird Surveys on the north and south sides of the Alaska Range. It has been found breeding on the north side near Moose Creek (Benson 1999); they are an uncommon summer visitor to the state park (ADNR 1989).

In addition to federal species of concern, the State of Alaska maintains a list of “species of special concern,” which includes American peregrine falcon, olive-sided flycatcher, gray-cheeked thrush, Townsend’s warbler, and blackpoll warbler (ADFG 1996). Except for Townsend’s warbler, all of these bird species occur within the park and preserve boundaries in suitable habitats, although little is known about population abundance or distribution.

Mammals

Moose

Moose are abundant throughout the year within and near the numerous drainages in Denali National Park and Preserve. Moose concentrations vary seasonally and, during winter, correlate with snow depth and timing (ADFG 1992b). Most calving takes place from late May through June. During calving, cows tend to seek areas within their home range that provide low predator densities (islands in rivers) or improved visibility (open muskeg areas) (ADFG 1996b). Post-calving moose generally move to higher elevations. Fall rutting and post-rutting concentrations occur in subalpine habitats, with moose moving down from these areas in winter as snow depths increase (ADFG 1992a). Riparian willow stands provide a large part of winter forage and upland coniferous forests provide thermal cover and shallower snow depths (ADNR 1991).

Moose inhabit the entire vegetated planning area in the park except the highest tundra communities. The area from the Park Headquarters to the Savage River supports a relatively

high density of moose for Interior Alaska. During early autumn, large rutting congregations occur between mile 6 and mile 15 of the park road. Fall rutting congregations can reach sizes of 50 or more moose, and it may be possible to witness bulls sparring to determine dominance. On the north side of the Alaska Range in Denali National Park and Preserve, the overall population of moose has remained relatively constant since 1986 (Meier 1987, Meier et al. 1991). However, the moose population along the road corridor, at least from Headquarters to Teklanika, has declined by about half since the early 1970s (Burson et al. 2000), as has the number of moose sighted from the park road (Burson et al. 2000). Autumn density estimates in various regions of the park have ranged from <0.1 - 1.4 moose/mi² (Meier 1987, Meier et al. 1991), with overall autumn densities of 0.4 - 0.5 moose/mi² (Meier 1987).

Prior to the 1990s moose were abundant within the broad drainages on the south side of the Alaska Range, particularly within the Tokositna, Ruth, and upper Yentna drainages. The Yentna drainage alone supported approximately 300 moose (Troyer 1979). During a 1996 survey, park staff observed only 202 moose within the Yentna River drainage within the Preserve boundary (ADFG 1996a). Since that survey ADF&G reports a 50% or greater decline in moose numbers throughout the southern slope of the Alaska Range, likely due to deep snow winters and increasing predator numbers (ADFG 1996b).

Concentrations of moose are often seen mid and late winter in the Windy Creek area above Cantwell and where Ohio Creek emerges from the mountains (NPS unpublished data). Important moose concentrations within the south side region (primarily outside the national park boundary) include the Sunflower basin (next to Chelatna Lake), the Kahiltna Flats, the Petersville Road, Moose Creek, Bear Creek, Peters Creek, Little Peters Hills, Peters and Dutch Hills, the Tokositna River valley sides and bottom, the south end of Curry Ridge, upper Troublesome Creek, and Twenty Mile Creek (ADFG 1984a; ADFG 1995a). The upper Tokositna River valley was identified by the state as important winter range (ADNR 1989). Rangers also reported high numbers of moose in this area in the winter. This concentration of moose is especially the case on the south side of the Tokosha Range where a flyover counted 88 moose in a 2–3 mi² area (this area is known as “Moose Meadows” to pilots who lead scenic flights out of Talkeetna) (NPS 1995). High numbers of moose also wintered in the Little Peters Hills and Petersville area where the riparian zones of Moose, Kroto, and Peters Creeks provide critical habitat for winter survival (ADNR 1991). Mean density of moose during late winter (late March) ranged from 0.7 to 3.2 moose/mi² on the south side (ADFG 1990b). A large rutting concentration roughly coincides with caribou calving grounds in the higher country north of Broad Pass between Windy Creek and the Bull River (ADNR 1985; ADFG 1985a). The drainages in the area of the old Dunkle Mine – the upper Bull River, Costello and Cantwell creeks, and the West Fork of the Chulitna – are identified as prime early-winter moose range (NPS 1984a; ADNR 1985). Critical winter range also includes the Kahiltna Glacier moraines and west of Little Peters Hills.

Caribou

Caribou are migratory herd animals that use varying habitats for wintering, calving (late May to early June), summer range, and rutting (September and October). Caribou are common along the park road and may be observed throughout the summer. Caribou are usually visible during early morning and evening while they are foraging, or during midday while bedded. Caribou are

relentlessly harassed by insects during warm days in summer, when they commonly bed on snow fields or windy ridgetops to avoid insects. Most visitors observe caribou in open areas above treeline. Caribou are a popular game animal and are generally hunted south of Denali National Park and Preserve in the late summer and early fall, although in some areas, the hunting season extends through late winter (March).

The Denali caribou herd currently numbers approximately 2,000 caribou and ranges over approximately 3,900 mi², including most of Denali National Park and Preserve north of the Alaska Range, and areas south of the range and east of Mount McKinley. Historically, the Denali herd may have exceeded 20,000 animals from the turn of the century to the early 1940s (Murie 1944). The herd declined to about 10,000 caribou in the mid-1940s and maintained that size until the mid-1960s. Along with many other Alaskan caribou herds, the Denali herd again declined after the mid-1960s reaching a low of about 1,000 caribou in 1975 (Troyer 1977). This latter decline resulted from poor recruitment and lowered adult survival during a period of relatively severe winters (Adams et al. 1989).

After 1975, the Denali herd sustained annual growth of about 7% per year during a period of favorable winter weather, reaching a peak size of about 3,200 caribou in 1990 (Adams and Mech 1995c). With heavy snowfalls during winters of 1988-89 to 1993-94, the herd again declined to its current size. Researchers have conducted intensive studies on the dynamics of the Denali Herd since 1984 (Adams et al. 1995a,b; Adams and Mech 1995c; Adams 1996; Adams and Dale 1998b). They found high losses of calves to predation are an important factor in limiting the growth of this caribou population.

The Denali herd has been known to use three areas where cow caribou drop their calves – Cantwell on the south side and Wonder Lake and Stampede on the north side of the Alaska Range. Historically, 10–90% of the herd crossed to the Cantwell calving grounds each year for calving or immediately after calving. In the past these calving grounds may have been the most significant in terms of the percentage of the herd using them and of overall calf survival (NPS 1982; Kline et al 1983.; Kline and Boertje 1984). Now, however, studies indicate the Cantwell grounds have recently been used less extensively for calving by the Denali herd than the two northern areas (NPS 1989b). For the last decade, approximately half of the cows in the Denali herd have calved in the foothills of Mount McKinley from the Muldrow Glacier to the Straightaway Glacier. The other half of the cows do not congregate on calving grounds but disperse throughout the range of the herd (Adams et al. 1995b). The proportion of cows on the calving grounds increases in years with low spring snowpacks and decreases when the mountains are blanketed in snow.

Following calving, caribou predominantly move to higher mountainous areas greater than 5,000 feet in elevation for the first half of the summer. These high altitude areas provide relief from insect harassment as well as nutritious, newly growing forage (Boertje 1985). By mid-summer, when insect harassment is reduced by cooler temperatures and increased rainfall, caribou disperse widely throughout the mountains and foothills of the park to forage.

With the onset of the breeding season in mid-September, caribou aggregate into rutting herds. These rutting groups can be found from the foothills of Mount McKinley, north through the Upper Moose Creek drainages and into the Toklat, East Fork, and Sushana River drainages. In general, rutting occurs farther to the north and at lower elevations with increased autumn snowfall.

Since 1986 caribou have predominantly wintered on the tussock flats north of the Outer Range and the associated foothills. The Broad Pass area also is used as winter range by the Denali herd because of good habitat and because the hill tops are wind-blown and cleared of snow. Often some caribou winter in the forested and treeline areas from Eagle Gorge on the McKinley River west to the Foraker River. In years of high winter snowfall, caribou are restricted to wind-blown alpine ridges of the Outer Range, Kantishna Hills, and the Stampede Hills.

When moving between the north and south sides of the Alaska Range, most caribou move from the Sanctuary River over a pass to the upper West Fork of Windy Creek. About 90% of the caribou migrating to the south side were estimated to use this pass in the late 1970s. From Windy Creek they move through Foggy Pass to Cantwell Creek and beyond to the Bull River. Crossing of the range also occurs between the Sanctuary River and Windy Creek itself, from the East Fork of the Toklat to the Bull River, and over Anderson Pass. Historical movements occurred in the 1920s and 1930s from Riley Creek to the main fork of Windy Creek. Recent field observations indicate that caribou movement occurs over nearly all negotiable passes between the Toklat and Sanctuary Rivers.

In addition to caribou from the Denali herd, small numbers of caribou from the Nelchina herd venture into Denali National Park and Preserve in the Broad Pass and Yanert Valley areas. The Nelchina herd, which reached about 45,500 animals in the early 1990s (ADFG 1993a), has recently declined to about 30,000 animals. The Rainy Pass herd ranges into the southwest corner of the Preserve in the upper reaches of the Kichatna River drainage and in the Simpson Pass area (ADFG 1996a). The Rainy Pass herd was estimated by Masteller et al. (1997) at 1,500–2,000 animals following a summer survey conducted by both ADFG and park staff during 1996. The Tonzona herd ranges into the northwestern portion of the southwest preserve.

Dall Sheep

The mountainous terrain throughout most of Denali National Park and Preserve provides habitat for Dall sheep except for the south slopes of the range, which are prone to deep winter snow that excludes sheep. Sheep migrate annually between the Alaska Range and the Outer Range (Dalle-Molle, J. and Van Horn, J. 1991).

Sheep are gregarious and are usually observed in groups of 10 or more. Rams are in bachelor groups during most of the year and only join the ewe-lamb groups during the breeding season in November. The park road travels along several nursery areas on mountains near Toklat and Polychrome Pass where it is common to observe ewes with lambs. The white coloration of Dall sheep makes them visible from great distances.

During 1996 park staff along with ADF&G surveyed the portion of the park and preserve and adjacent mountains south and west of McKinley River and documented 1,055 sheep (Masteller et al. 1997). The highest densities were found in the West Fork of the Yentna River.

Bears

Both brown (grizzly) and black bears inhabit Denali National Park and Preserve, where habitats provide abundant foods, as well as denning areas. Brown bears inhabit open tundra throughout the park, which facilitates their observation from great distances by backcountry hikers and park visitors from the road system. In contrast, black bears inhabit forested areas and are more difficult to see.

Brown Bear:

Brown bears range throughout the park and preserve, but generally prefer high-elevation tall shrub, low shrub, and alpine tundra communities. Bears are omnivorous, opportunistic feeders and move to areas when foods become seasonally available. Roots, sedges, early herbaceous plants, and overwintered berries constitute the bulk of their diet after they emerge from dens in late April (Stelmock 1981). Denali brown bears prefer peavine (*Hedysarum alpinum americanum*) roots, which grow on low slopes and valleys (Murie 1981). They also prey on moose and caribou calves. By mid-summer, brown bears turn from digging to grazing and feed on grasses and sedges growing on upper hillsides. In late July, brown bears turn to a diet of berries, especially soapberries (*Shepherdia canadensis*), that grow on floodplain gravel bars. This diet is supplemented by ground squirrels and, where available, salmon. They return to eating roots in the fall.

Brown bear densities are poorly known for most of Denali, but recent work on the south side of the park indicates that densities there vary from 0.03–0.10 bears per square mile (ADFG 1990a, ADFG 1993f; ADFG 1996b). Dean (1987) estimated grizzly bear density for the 1,000 mi² area from Riley Creek to the Muldrow from the AK range to just north of the Outer Range. The density estimate for all bears expanded for estimated sighting efficiency was 1 bear for every 12 mi²-all bears. Keay (1995) estimated bear density in a 660 mi² study area from the Muldrow glacier west to the Herron River. Density estimate for all bears was 1 bear per 10.4 mi².

Black Bears

Little is known about the density of black bears in Denali. In the Susitna River area, southeast of the park, black bear densities reach about 0.2 bears per square mile (Miller et al.1987). Overall concentrations of black bears on the south side are thought to be decreasing (ADFG 1995a). In contrast to brown bears, black bears prefer upland forest and floodplain forest communities below 2,000 feet in elevation (ADFG 1978a).

Black bears are known to be present in relatively large numbers in the lowland forests of the Chulitna, Ruth, and Tokositna Rivers; however, their home ranges often extend out of these forests well up into the open tundra vegetation classes of the higher foothills (NPS 1995c). During spring 2000 bear surveys, ADFG staff noted high spring concentrations of black bears on south facing slopes of the Hidden River, Coffee River, Tokositna River, and the Chelatna Lake area (ADFG 1995a).

Black bears den in all types of habitats in holes, brush piles, or simply under a blanket of snow (Smith et al. 1994). After emerging from their den in the spring, black bears seek new plant growth. They are opportunistic feeders and readily eat whatever food they encounter, including carrion. Salmon, where available, may be substituted for herbaceous vegetation. Berries are an important part of their diet in late summer and early autumn. Black bears are considered bolder than brown bears and have a high potential to be adversely affected by human activity (NPS 1990).

Gray Wolf

Wolves have been studied intensively in Denali north of the Alaska Range since 1986 (Mech et al. 1998). During that time, the estimated late-winter population of wolves in the park and preserve has varied from 60 in 1986 to 135 in 1990. In late winter 1998, approximately 80 wolves appeared in Denali (L. Adams, personal communication). In contrast, little effort to document population status and trend has been conducted on the south slope of Denali. However, during an investigation of the presence of dog-biting louse in the Lower Susitna River-Yentna River drainage in 1998 and during recent moose surveys, staff from ADFG identified a minimum of five packs using Denali National Park and Preserve lands between Ruth Glacier and Kitchatna River (ADFG 1996b).

The size of the park's wolf population is primarily dependent on the abundance and vulnerability of ungulate prey species. During periods of low winter snowfall, when prey are in particularly good nutritional condition, wolf numbers tend to be low because of low pup production and survival and high dispersal and mortality of older wolves (Adams and Mech 1995c, Mech et al. 1998). When winters are severe, making prey more vulnerable, the wolf population can quickly increase by higher pup production and reduced dispersal of young adults. For example, the park's known wolf population more than doubled during 1987-1990 when winter snowfalls were particularly severe.

Wolves occur throughout all areas of the park that support ungulate prey (i.e., areas less than 6,000 feet elevation). The wolf population is comprised of territorial packs that can include from 2-30 individual wolves (Mech et al. 1998). Wolf packs are usually comprised of a breeding pair, the pups of the year, and possibly a few young wolves from previous litters. Although a single litter produced by one female in the pack each year is the rule, up to three litters per pack have been documented in Denali (Meier et al. 1995).

During much of the year, wolves travel nomadically throughout their territory in search of vulnerable prey, and occasionally make forays into adjacent territories. In Denali, marked overlap occurs among annual pack territories, probably resulting from shifts in territory boundaries throughout the year and movements of wolves in response to migratory prey, particularly caribou (Mech et al. 1998).

From May to September, movements of wolves in a pack radiate from a central point, where the young pups remain because they are too small to travel with the adults. Pups are born in dens during mid-May where they usually remain for the first several weeks. Den sites have been located throughout the park. Some dens are used repeatedly, while others are used only rarely.

Although wolves most commonly use underground dens, these dens are not required to rear young pups successfully (Mech 1993). As the summer progresses, pups may remain at a densite or they may be moved to an area away from the den, called a rendezvous site. Regardless, the adults continue to hunt from this central location throughout the remainder of the summer. By about mid-September, pups are large enough to travel with the adults and the pack resumes its winter nomadism (Mech et al. 1998). The seasonal habitat selection of wolves is largely dictated by habitat use patterns of their prey during the various seasons (Mech et al. 1995). Park management closes the areas immediately around active den sites during the season the dens are in use.

Smaller Carnivores, Rodents, Lagomorphs, and Insectivores

Although much of the emphasis on Denali's wildlife focuses on larger mammals, Denali supports a large suite of smaller carnivores (coyote, red fox, lynx, river otter, wolverine, marten, ermine, least weasel and mink), rodents (hoary marmot, arctic ground squirrel, red squirrel, northern flying squirrel, beaver, voles, brown lemming, and porcupine), two lagomorphs (snowshoe hare and collared pika), insectivores (shrews), and at least one species of bat (little brown bat). These species inhabit a variety of habitats across Denali and form integral links in Denali's food web. Many of the furbearers, beavers, and snowshoe hare are important resources for subsistence users in Denali. Many of the rodents are prey sources for many larger omnivores and carnivores. For instance, beavers are one of the primary alternate prey animals for wolves in summer, especially in Denali's western half (Mech et al. 1998); grizzly bears may prey heavily on voles when they are available; and golden eagles depend heavily on snowshoe hare and arctic ground squirrel during the breeding season. Many herbivores, including snowshoe hare and arctic ground squirrel, are important forces in browsing and dispersing vegetation across the landscape.

Red fox are common throughout the park and are very conspicuous along the Denali park road. Coyote occur but are not common. Lynx occur at relatively low densities and depend heavily on snowshoe hare as a prey source. River otter and wolverine occur at relatively low densities. Marten, ermine, least weasel, and mink occur across the park; however little is documented about their abundance. Hoary marmots are usually found in family groups in loosely formed colonies in subalpine and alpine areas, often in proximity to talus slopes and boulder fields. Marmots are obligate hibernators and spend nearly eight months of the year in hibernation. Flying squirrels and red squirrels are usually found in spruce dominated forests, although densities of flying squirrels are low.

One of the most common and most conspicuous smaller mammals in Denali is the arctic ground squirrel. These open-country squirrels inhabit many different vegetation communities in Denali, but are usually found in areas where they can build burrows that are protected from flooding. Arctic ground squirrels are obligate hibernators and spend nearly seven months hibernating in their burrows.

Another common herbivore in Denali is the snowshoe hare. Snowshoe hare inhabit forested regions of Denali, but they often occur outside forested areas in years when their populations are high. Populations of snowshoe hare in Denali fluctuate on 8- to 11- year cycles.

Collared pika live in subalpine and alpine areas and are active year round. They depend on seeds and grass collected throughout the short summer season to survive throughout the year. Beavers and muskrat live in areas dominated by ponds, lakes, and streams. Beavers play a major role in diverting water and creating small to large ponds.

Voles, shrews, and lemmings occur in abundance across the park in a diversity of habitats, but are rarely seen because of their size, habits, and habitats. Populations exhibit tremendous fluctuations between years. These animals are active year round and during winter they live under the snow. They form the prey base for many of Denali's carnivorous and omnivorous animals. NPS researchers are beginning to better understand the population dynamics of small mammals through intensive research funded through Denali's Long-Term Ecological Monitoring program.

One species of bat, the little brown bat, has been recorded in Denali. Its distribution and abundance are unknown.

Threatened and Endangered Species

There are no threatened or endangered mammal species at Denali, but the lynx is a "species of concern" under the Endangered Species Act. Low densities of lynx occur in forest communities in the northern areas of the park. Little is known about lynx on the south side of the park, although indications of lynx have been found in the southern development zone of Denali State Park (ADNR 1995a). In general, the potential for high lynx densities on the south side is thought to be low due to low hare densities during cyclic peaks (ADFG 1995a).

Amphibians

One species of amphibian, the wood frog, occurs in Denali. The wood frog spends its life in the woodlands and vegetated wetlands across Alaska and occur in Denali at lower elevations (Travis 2000). The wood frog hibernates through the winter in shallow depressions in the upper layer of the previous year's dead vegetation

Fish

All five species of Pacific salmon and at least six other species of freshwater fish commonly harvested for subsistence and sport inhabit streams and lakes in various portions of Denali National Park and Preserve. In addition, four species of nongame fish inhabit park waters: blackfish, longnose sucker, slimy sculpin, and Arctic lamprey. The five species of salmon, Dolly Varden, several species of whitefish, and lamprey, are anadromous species that migrate from salt water to fresh water to spawn. Depending on the species, juveniles remain in freshwater rearing habitats for varying periods before migrating to salt water. Resident species, such as grayling, sheefish, rainbow and lake trout, blackfish, suckers, and sculpins, live in freshwater habitats year-round, although some undertake extensive seasonal migrations. Waters used by anadromous species receive high levels of protection because of the value of these species for subsistence, commercial, and sport harvest. Under Alaska Statute Title 41 regulations, the Alaska Department of Natural Resources administers a permit system to regulate human activities that may affect anadromous fish habitat and the free passage of resident species.

The glacial character of many of Denali's rivers precludes the development of significant fisheries because of the high turbidity and sediment loads in glacial meltwater, which significantly reduce habitat quality for spawning and feeding. Arctic grayling, the most common resident species of gamefish in park waters, inhabit many streams throughout the park and preserve. Because grayling prefer clear, cold, gravel-bottomed streams, however, they do not tolerate the silt-laden flows of glacial rivers during the summer months. Arctic grayling spawn early in the summer, from mid-May to June. Rainbow trout spawn in the spring, mainly between mid-April and late June. Other resident species spawn at different times of the year: northern pike in early spring (coinciding with spring break-up); lake trout in September and October; whitefish and ciscos in late September and October; and burbot from December through February.

Salmon and other anadromous species use freshwater habitats for migration, spawning, and rearing of young. Spawning seasons differ among species (ADFG 1984a), and there are often multiple spawning runs of salmon in some drainages. Coho salmon generally spawn from midsummer to early winter at the head of riffle areas in narrow side channels and tributaries of mainstream rivers. Pink salmon usually enter natal streams from late June to September. Sockeye salmon spawn during the summer and fall from July to October (sometimes as late as December), primarily in streams connected to lakes and along lake shorelines. Chinook salmon spawn from July to early September. Most chum salmon spawn in August and September. Dolly Varden char spawn between the end of July and the beginning of December, with most occurring in September and October. The amount of time spent in freshwater habitats by juveniles of the anadromous species is highly variable, depending on the species; some migrate downstream from spawning areas within a few months of hatching, whereas others may spend several years in freshwater before migrating to the ocean.

On the south side of the park and preserve, Peters Creek and its major tributaries are rated the seventh most important waterway system in the Susitna Basin by the Alaska Department of Fish and Game (ADNR 1985). Chelatna Lake contains important salmon spawning habitat (ADNR 1991). The Susitna River and its tributaries support the largest stock of king salmon in the Cook Inlet drainage, which is thought to be the fourth largest stock in Alaska. The Susitna River also supports the largest coho salmon stock in northern Cook Inlet (ADFG 1994b). Fishing is generally permitted throughout the south side; however, the Tokositna River drainage and Byers Creek are closed to Chinook salmon fishing.

NATURAL SOUNDSCAPES

NPS Management Policies define natural soundscapes as follows:

Natural soundscapes exist in the absence of human-caused sound. The natural soundscape is the aggregate of all the natural sounds that occur in parks, together with the physical capacity for transmitting natural sounds. Natural sounds occur within and beyond the range of sounds that humans can perceive, and can be transmitted through air, water, or solid materials.

Natural sounds are intrinsic elements of the environment that are often associated with parks and park purposes. They are inherent components of “the scenery and the natural and historic objects and wild life” protected by the NPS Organic Act. NPS Management Policies and Director’s Order #47 also make it clear that the National Park Service is obligated to protect and restore natural soundscapes as it would any other natural resource of the parks (NPS 2001; NPS 2000e). As was reported to the U.S. Congress in the “Report on the Effects of Aircraft Overflights on the National Park System,” a system-wide survey of park visitors revealed that nearly as many visitors come to national parks to enjoy the natural soundscape (91 percent) as come to view the scenery (93 percent) (NPS 1995b).

Characterizing soundscapes at Denali is an ongoing process. Researchers use sound level meters and digital media storage devices both to record sound level measurements in decibels (dB) and to collect digital sound recordings. Decibel levels are generally described using an A-weighted scale (dBA) to better approximate human hearing sensitivities. The digital sound recordings are important because the National Park Service can determine the percent of time that particular sounds are audible and identify the source of those sounds. The sound recording stations have been used at 11 locations and more are planned.

The natural soundscape of Denali National Park and Preserve varies depending on the acoustical attributes of the location. The size of Denali makes it difficult to briefly summarize the soundscape. Season, animal life, vegetation, climatic conditions, topography, and proximity to water all influence the production and propagation of sounds. Despite this inherent complexity, it is helpful to simplify the park into three acoustical zones (those areas with similar soundscapes): alpine (rock, glacier, and snow), sub-alpine, and scrub/forest zones. The natural soundscape in each of these three zones relies on the interplay of sound generation and attenuation.

Park staff recently collected high quality dB and audibility data in each of the three main acoustical zones in the park (Burson, unpublished data). Generalizing from a subsample of these 10,524 hours, 480 days, and 1,250,251,000 dB points, the following paragraphs will describe our current understanding of the soundscape of the park. Several sound sources are common to the three zones including natural sounds of wind, snowfall and rain, flowing water, thunder, migrating birds (e.g., Sandhill Cranes, geese, swans) and ravens.

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 activities or machines, but it still requires management to protect park resources. In each of the three zones, noise intrusions on the natural soundscape are also characterized.

Alpine acoustical zone: Wind is the most common natural sound heard, but avalanches, flowing water, glacier movements, occasional mammals (caribou, sheep, and grizzly bears) and several species of birds (ravens and passerines) are frequently audible. Intruding on the natural

soundscape are the frequent high-altitude overflights of commercial jetliner traffic, lower altitude propeller general aviation, flightseeing, and air taxi traffic. Sounds originating from the ground near foci of human activity (Don Sheldon Amphitheater, Eldridge Glacier, Little Switzerland, and at base camp on the Kahiltna Glacier) include human-generated sounds from voices, traveling, and camping activity. Winter soundscapes differ by having fewer animal and propeller planes sounds, and no flowing water. Sound often carries long distances in this zone because of the lack of sound attenuation from vegetation (Rossing et al. 2002). Sound reflection and echoes are common from vertical faces of rock and ice. Fresh snow absorbs sounds well and therefore diminishes sound propagation, but loses this absorptive property upon compaction and metamorphosis.

Data collected about 100 meters from a glacier landing zone in the Don Sheldon Amphitheater during the summer of 2002 documented dBA levels from the low 20s when there was no wind or human sound to levels near 100 dBA during airplane takeoffs. Because decibels are logarithmic and a 10-dBA increase is a doubling of loudness, 100 dBA is 512 times the perceived loudness of 20 dBA. This area is a popular scenic flight and glacier landing site and thus, on clear summer days, many air tour flights are audible and loud. Five-second digital recordings (samples) were made every five minutes 24 hours/day. During one week in May, the mean number of samples/day with propeller planes audible was 67, in June the mean was 59 samples/day (including 3 days of poor flying conditions), and in July the mean was 73 samples/day. Four days had over 100 propeller samples (130 max.). Most good-weather days had aircraft audible over 50% (max. 80%) of the samples during the period between 8 a.m. and 8 p.m. Jets and helicopters were often also audible. Human voices associated with glacier landings and camping were audible in 51% of the samples in May, 25% in June, and 13% in July. Unlike aircraft sounds, these human sounds are generally audible only in the local area of activity, but occurred late into the night. The expected sound level range of the natural soundscape is from the high teens during quiet winter days to near 90 dBA from nearby large avalanches and infrequent distant thunderstorms. Wind was audible in 0–33% (avg. 11%) of the daily samples. Avalanches were audible much less frequently, from 0–9/day (0–3% of the daily samples). Loud aircraft sounds during the day likely drowned out normally audible wind, avalanche, and human voice sounds.

Sub-alpine acoustical zone: The sub-alpine acoustical zone in Denali is vegetated by low plants. Though the natural soundscape is dominated by wind, during non-winter months, flowing water and a diversity of birds, insects and mammals are often audible. The relative absence of sheer cliffs of rock and ice reduce reflection and echoes in this zone. Low vegetation absorbs sound propagation but is offset by wide-open spaces that allow long distance travel from distant sound sources. In this zone, flowing water is developing into larger streams and having a greater influence on the nearby soundscape. In addition to natural sounds, human-generated noise is more diverse and widespread than in the alpine zone. Jet, propeller, and helicopter aircraft are often audible, as well as road and rail traffic near these corridors. Human voices are audible near backpacking routes and other travel and recreation corridors. Other than the higher diversity of human-generated sounds, during the winter the soundscape in this zone becomes similar to the alpine zone.

Sound data was collected from April 2001 through August 2002 at a 3,000-foot elevation in the Dunkle Hills south of Cantwell on the south side of the Alaska Range. The equipment documented many wind events in addition to bird and mammal sounds during the non-winter months. Wind was audible most days; some days wind could be heard in almost every sample. Flying insects were abundant and audible in early and mid-summer. Arctic ground squirrels were often audible along with ravens, ptarmigan, and other passerines. This site was 8 miles from the Parks Highway and the Alaska Railroad tracks, yet vehicle sounds originating from these corridors were clearly audible, especially during the winter when the highly absorptive vegetation was covered by snow and sound propagation was enhanced. Snowmachine use was audible during many days during the winter and spring, especially during weekend days. No flowing water or rustling leaves elevated the sound level. Sound levels could be very quiet; dBA in the high teens were not uncommon. This level approaches the noise floor limit of the sound equipment.

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

Sound data collected near the toe of the Tokositna Glacier and at Wonder Lake during July and August 2001 are examples from the scrub/forest acoustical zone but also demonstrate intra-zone variability. The soundscape of the Tokositna Glacier site is dominated by river sounds. The sound level of this site rarely dipped below 40 dBA due to the flowing water. Even river sounds were not constant, however. There was a distinctive rise and fall of river sound level depending on time of day, wind direction, and amount of recent rainfall. At this riparian site, distant or quieter sounds that would be audible away from the river were "drowned" out by the river sound, although nearby birds and mammals were audible. On days without low clouds or rain, frequent aircraft sounds were audible. Most of these were single-engine propeller planes likely on scenic air-tours from Talkeetna to the Alaska Range. The sound levels on a typical sunny spring/summer day followed a predictable pattern. The Leq (average sound level) was steady about 43 dBA (from river sounds) until about 9 a.m. and then increased 4-10 dBA for the next 12 hours and dropped again after 9 p.m. These increases were mostly driven by aircraft overflights.

The sound data collection site about 1 km from Wonder Lake was far removed from flowing water and the sound level often approached the equipment noise floor in the high teens dBA. Many bird and animal vocalizations were audible due to the low ambient sound level. Road traffic from the Park Road (about 2 km) and the campground spur road (1 km) was frequently audible as was propeller plane traffic likely coming from the airstrip at Kantishna. For illustrative purposes, on a day in mid-August 2001 light rain started about 2 p.m. and continued for the rest of the day. Bird vocalizations were audible on 63 (23%) of the daily digital recording samples, 4 with insects (1%), 100 with rain (35%), 29 with wind (10%), 67 with road vehicles (23%), and 18 with propeller planes (6%). The day began with a sound level about 20 dBA (Leq) and at 4 a.m. climbed to about 30 dBA by 9 a.m., but dropped and stayed in the mid 20s dBA by 4 p.m. for the rest of the day. Levels below 30 dBA are very quiet. The maximum sound level (Lmax) (as continuously measured) peaked at 65 dBA during the 11 a.m. hour, but during most of the daylight hours the Lmax was in the 40s dBA and at night 30 dBA or below. These Lmax document that although propeller planes were often heard, sound levels are much quieter below overflights than below low-level flights and landings and take-offs.

Sound data was also collected and analyzed for the Stampede Airstrip, which is near the historic Stampede Mine. Motorized sounds were audible on average 4 times per day and audible on average 0–8% of each hour. Natural ambient sound levels depended mostly on wind. When no wind was present natural sound levels were near the noise floor of the instruments used, approximately 21 dBA. Wind was constant throughout the seasons, especially during summer, and caused natural ambient sound levels to range around 30 dBA with occasional gusts that would raise the level up to 40 dBA. Three seasons were captured and analyzed for the site; spring, summer, and fall. Spring days consisted of nearly 24 hours of wind and abundant bird-song (audible 20–30% of a day) with occasional squirrel vocalizations. Natural ambient levels ranged from 23–28 dBA. A typical summer day consisted of nearly 24 hours of wind and bird-song (audible 80–100% of a day) with occasional squirrel vocalizations and insect sounds. Natural ambient levels ranged from 25–35 dBA. Fall days contained much less bird song (audible 0–10% of a day) and contained occasional squirrel vocalizations. Natural ambient levels on fall days ranged from 25–30 dBA.

Other Studies

In addition to the information gained from the automated sound monitoring stations described above, there are two more important sources of information about the extent of human noise intrusions on the natural soundscape of the Denali backcountry.

Backcountry Ranger Observational Data

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). Data were collected from June 12–September 5, 1999 and again from May 28–September 5, 2000 within the Denali Wilderness. 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. The patrols recorded the overall time of the sample period that they (the rangers were usually in pairs) actively listened for aircraft. While the sampling was opportunistic and

statistically non-random, it did parallel the times and locations that park visitors traveled 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:

- Eight overflights in an hour that lasted for nearly 30% of that hour
- Thirty-one 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 with no difficulty.
- 3 – Distracting for conversation, completely dominates soundscape drowning out even loud sounds of nature such as wind or sounds of water.

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

A Survey of Overnight Backcountry Visitors to Denali National Park and Preserve conducted in 2000 (Swanson, et al. 2002) 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 obtained a permit for overnight camping during summer months, the response primarily reflects conditions in the backcountry of the Old Park.

Out of 190 hiking parties surveyed, the average of the average number of aircraft seen per day of the trip was 4.87. The average numbers 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.	

WILDERNESS

The Wilderness Act of 1964 (P.L. 88-577) describes wilderness as an area “untrammeled by man...retaining its primeval character and influence, without permanent improvements or human habitation... [with] outstanding opportunities for solitude or a primitive and unconfined type of recreation.” Most of the land within the boundaries of Denali National Park and Preserve meets the above criteria, offering superlative opportunities for wilderness recreation in an environment where human influences are minimal.

However, the association of Denali with wilderness began before the advent of the Wilderness Act, and before the passage of the 1980 Alaska National Interest Lands Conservation Act, which formally associated portions of the park with the legal designation of wilderness. In fact, the recognition and protection of Denali’s wilderness resource values stretches back to the earliest period of the park’s history, creating a lengthy legacy of wilderness management. The legal framework and national policy direction for Denali’s wilderness management mandate is addressed in Chapter 1. This section describes the historic decisions and vision that created Denali’s existing wilderness management policy.

Wildlife and Wilderness

At Denali, the protection of wildlife and an intact ecosystem is integral to the present day management philosophy regarding wilderness. Charles Sheldon, Denali’s “founding father,” first called attention to the importance of wildlife for Denali’s wilderness character in his diaries of 1906-1908, published in 1932 under the title *The Wilderness of Denali* (Sheldon 1930). Sheldon and many others who spoke for Denali’s establishment clearly had in mind the protection of wildlife as well as the wilderness setting they inhabited; the two values were linked and

complementary. The concern for wildlife became a concern for ecosystem protection in later decades, particularly through the work of wildlife researcher Adolph Murie. Murie's authoritative research eventually brought an end to predator control at Denali and established a general policy of avoiding management manipulation of wildlife or ecosystems. Murie's work also established the basis for incorporating the northern additions into the park in 1980, to more completely protect the habitat of major mammal species found in the park.

Development and Wilderness

A second thread of early wilderness protection at Denali was comprised of decisions to minimize or avoid facility development and to strive for the highest possible standard for maintaining a primitive, wilderness landscape throughout the park. Debates over development at then-Mount McKinley National Park were first played out during the NPS Mission 66 program, which advanced many proposals for development in the park interior including hotels, road upgrades, trail and hut systems, and other visitor facilities. The ultimate rejection of most of the proposed facilities and the cessation of road upgrades established a clear direction for the national park – that the undeveloped wilderness character of the park was extremely important and should be preserved.

These decisions were reinforced by the implementation of the bus system to address increased visitation associated with the opening of the George Parks Highway in 1972 and the 1973 Master Plan, requiring visitors to change their usual means of access (private automobile) in order to preserve wildlife viewing experiences and the primitive character of the Denali road. The philosophy was extended to the park backcountry in the 1976 Backcountry Management Plan (NPS 1976), which affirmed a policy of a “trail-less” backcountry, and the 1986 General Management Plan (NPS 1986) which indicated the park would maintain a “no formal trails” policy in the designated wilderness and extend that policy to the northern additions wherever possible.

Backcountry Visitor Use

A third thread in the protection of the park's wilderness character emerged in the management of visitor use in the backcountry that incorporated the concepts of dispersed use and use limits. Use limits for the backcountry were established in 1974 as a response to increased interest in backcountry hiking as well as easier access to Alaska and the Denali area. A system of backcountry units was delineated and quotas were set for each unit. The 1976 Backcountry Management Plan affirmed the desirability of the unit system for dispersing use, maintaining opportunities for solitude, preventing trail and campsite formation, and minimizing wildlife disturbance. The plan also noted the utility of the unit system for maintaining freedom of movement and opportunities for self-discovery as well as limiting the consciousness of regulation for visitors in the backcountry.

In 1977 a study by the University of Washington Cooperative Parks Study Unit was conducted to determine visitor opinions about the permit system, compliance with the system, support for other regulations such as wildlife closures, levels of use that created the feeling of crowding, day

use activities, and many other basic visitor use statistics that were need to evaluate the effectiveness and assumptions of the 1976 plan. It was found that the expectations for solitude were not met for the majority of users if they encountered more than two parties per day. In 1978 the average number of parties seen per day was one. Therefore, the expectations of visitors for solitude were being met. Based on this information, use limits could have been increased somewhat above the 1976 plan levels while still meeting the management objective for crowding. Some increases were made in 1982, and overall backcountry visitation was higher than in 1978. The permit system was overwhelmingly supported as were the wildlife closures. The majority of users did not support the further development of trails, designated campsites, toilets, and other backcountry facilities typical of other wilderness areas in the Lower 48. The level of impact in the backcountry in 1978 met visitor expectations for an exceptional wilderness experience.

The 1986 General Management Plan reaffirmed the strategy set forth in 1976 and indicated that areas outside the Old Park could be incorporated into the backcountry unit and quota system as necessary.

Spectrum of Opportunity and Non-Degradation

Advocates of wilderness protection during the Mission 66 debate noted that the wilderness qualities of then-Mount McKinley National Park were much greater than those in other parks, and argued that management should seek to preserve this unique character rather than develop the national park like those in other states. The 1976 Backcountry Management Plan noted that the remoteness of the park backcountry; the absence of typical signs of human presence such as trails, bridges, and established campsites; the existence of native wildlife populations in a largely natural condition; and the opportunity for a high degree of solitude were all “extremely rare and easily degraded resources.” The plan direction was to sustain these resources and continue distinguishing the Mount McKinley backcountry from that of other parks in the system.

For Denali, these plans provided the genesis of management practice that favored maintaining Denali to provide a unique park experience and backcountry experience within a spectrum of opportunities afforded throughout the national park system. This evolution at Denali coincided with a national debate over the Eastern Wilderness Act of 1975 during which great concern was expressed that designated wilderness in some of the eastern areas of the U.S., which barely met the basic requirement of the 1964 Wilderness Act, would degrade other areas in the West that were of a higher quality. What clearly emerged from this debate was that the minimum requirements for wilderness designation are a limit, not a goal.

As a result of these debates, the principle of nondegradation has been incorporated into wilderness management (Hendee et al. 1978). As applied to wilderness, this nondegradation principle recognizes variation in the level of naturalness and solitude available in individual wildernesses. The objective is to prevent further degradation of current naturalness and solitude in each wilderness and to restore substandard settings to minimum levels, rather than letting all areas in the National Wilderness Preservation System deteriorate to a minimum standard.

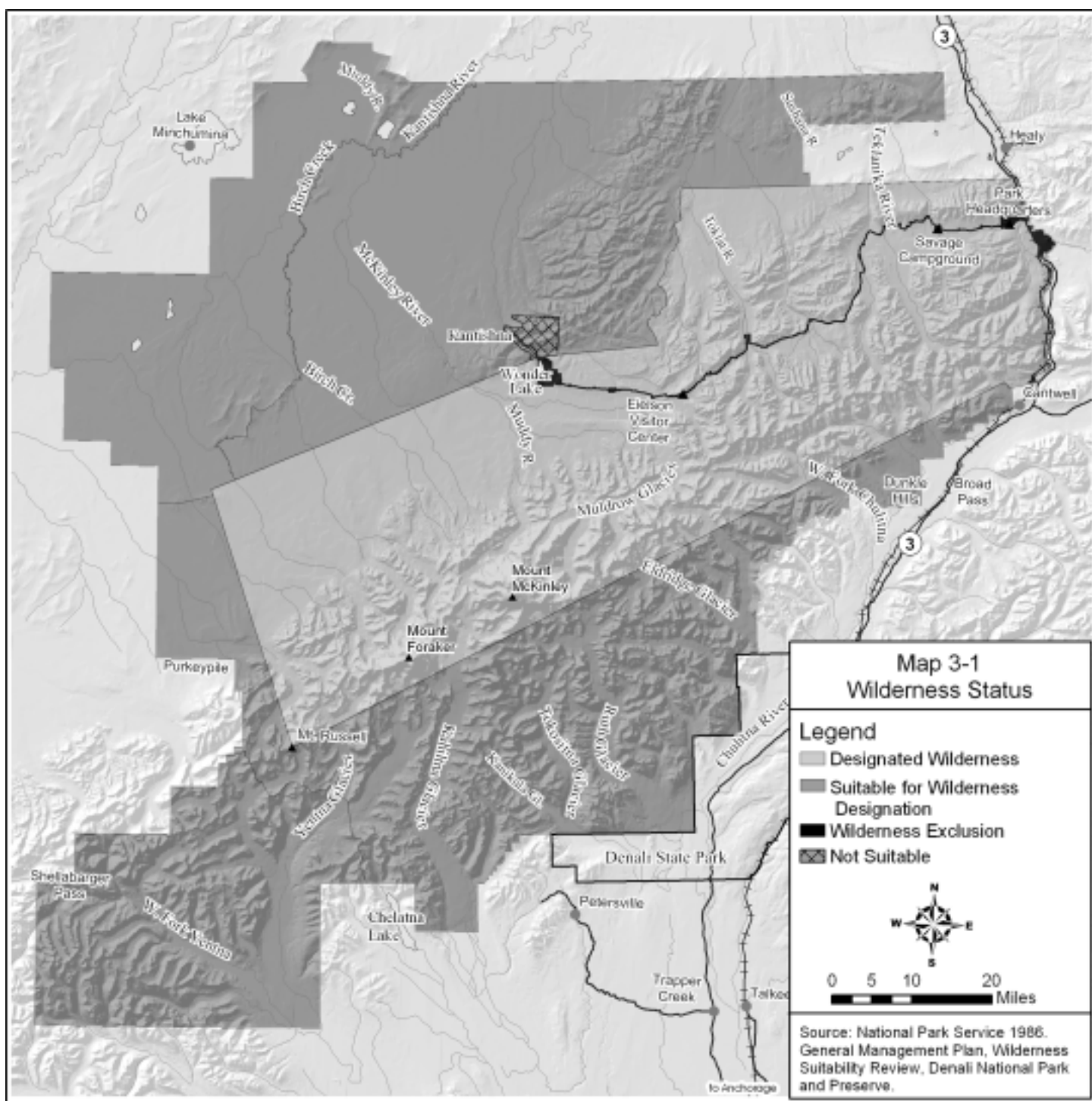
Alaska National Interest Lands Conservation Act (ANILCA)

The passage of ANILCA in 1980 tripled the size of Mount McKinley National Park and recognized the wilderness resource values of the original park and the additions. Section 701 designated 99% of the former Mount McKinley National Park (2.126 million acres) as the Denali Wilderness to be managed under the provisions of the Wilderness Act. Sections 101 and 202 of ANILCA mandated the preservation of wilderness resource values and wilderness recreational activities in the additions, along with related values such as wildlife, wildlife habitat, and undisturbed ecosystems.

Because of the traditional uses and means of access, relatively few roads, great travel distances, areas of vast size, and often severe weather conditions common to most national park system units in Alaska, ANILCA made special provisions for certain types of access and uses in Alaska wilderness that are generally not permitted in wilderness in the lower 48 states. Under reasonable regulations to protect natural and other values, ANILCA specifically allows the use of snowmachines, motorboats, airplanes, and various modes of nonmotorized surface transportation for traditional activities, and for travel to and from villages and home sites.

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).



SUBSISTENCE

The Alaska National Interest Lands Conservation Act provides the opportunity for local, rural residents engaged in a subsistence way of life to continue that lifestyle on federal public lands. Accordingly, Congress provided for traditional subsistence uses by local rural residents within the ANILCA additions to Denali National Park and Preserve, with the area within the former boundaries of Mount McKinley National Park not open to subsistence uses. Many Native and non-native local rural residents engage in, and depend upon, resources from the park and preserve for personal consumption, cultural identity, and maintenance of a subsistence way of life.

The Alaska National Interest Lands Conservation Act recognizes the significance of traditional Native and non-Native subsistence use as a cultural value and a vital piece of America's heritage. ANILCA also recognizes the importance of maintaining unimpaired ecosystems and natural and healthy populations of fish and wildlife to ensure the continued opportunity for traditional subsistence use. This view does not separate people from the landscape, but rather maintains the continuum of people's vital connection and relationships with the land. Striking a balance between the physical and social-cultural needs for subsistence requires close working relationships between park managers and subsistence users.

To achieve this complex synthesis of protection and use, Congress felt it was important to include input from those who have a personal knowledge of traditional subsistence activities and resources on federal lands. For national parks and monuments, ANILCA directed subsistence resource commissions be established to advise the Park Superintendent, Secretary of the Interior, and the Governor of Alaska on subsistence programs for those areas (Section 808). These commissions provide a key element on NPS management by providing a direct link between subsistence users and NPS superintendents and resource managers. Since the early 1980s, the Denali Subsistence Resource Commission and park staff have been discussing and developing a subsistence management program specific to Denali National Park and Preserve.

The National Park Service determines eligible subsistence users of park lands by the use of subsistence resident zone communities and individual's subsistence use permits. The communities of Cantwell, Lake Minchumina, Nikolai, and Telida are identified as subsistence resident zone communities containing significant concentrations of residents who have customarily and traditionally used park lands for subsistence purposes. By virtue of their residence, local rural residents of these communities are eligible to pursue subsistence activities in the new park subject to federal subsistence management regulations. Individuals not residing in one of Denali's subsistence resident zones communities, who have a personal or family history of using the park lands for subsistence, are authorized use by issuance of a subsistence use permit. The National Park Service has issued approximately fifteen subsistence use permits to families from Tanana, Nenana, Healy, McKinley Village, and the Broad Pass area.

To be eligible to harvest subsistence fish and wildlife in Denali National Park and Preserve under federal subsistence regulations, one must be a "local rural resident" (36 CFR 13.41) and comply with Federal subsistence harvest requirements. This includes a "positive" customary and

traditional use determination for the intended species and area to take fish and wildlife (50 CFR Part 100). Federal and State of Alaska regulations allow residents and non-residents to harvest fish and wildlife in Denali National Park and Preserve (ANILCA 13.13 and 36 CFR Part 100). ANILCA provides a preference for local rural residents over other consumptive users should a shortage of subsistence resources occur and allocation of harvest becomes necessary.

The National Park Service and the Denali Subsistence Resource Commission participate in the Federal Subsistence Management Program at both the park and regional levels. With the federal government's assumption of managing federal subsistence hunting and trapping on Federal Public Lands in 1990, park staff and the Denali Subsistence Resource Commission have been actively involved with the Southcentral, Eastern and Western Interior Regional Subsistence Advisory Councils and the Federal Subsistence Board. Portions of Denali National Park and Preserve are included within these three Regional Advisory Council's geographic boundaries. The Federal Subsistence Board is advised and informed by 10 Regional Advisory Councils. These Regional Advisory Councils represent specific geographic areas of Alaska and serve as public forums to provide recommendations on regulatory proposals, policies, management plans, and other issues related to subsistence management on Federal lands. The Councils, in turn, actively seek direct input and recommendations from Subsistence Resource Commissions on park-specific subsistence issues and federal fish and wildlife regulatory proposals.

Subsistence activities are diverse with hunting usually occurring in the fall and winter months. Fishing is concentrated during the summer and fall, and trapping efforts occur in the mid-to-late winter months when snow cover is adequate for travel and fur is prime. Berry picking and use of plant greens occur in the summer and fall months. Timber harvest typically occurs in the winter when frozen rivers, lakes, and snowcover make access and transportation more efficient. The different means and methods of subsistence access and the seasonal timing of their use are critical for acquiring resources and are as diverse as the resources being sought. Common methods of access include hiking, skiing, snowshoeing, dog sled teams, horses, snowmachines, motorboats or canoes, and in some cases such as near Cantwell and in the Kantishna Hills, the use of off road vehicles. There is no known use of airplanes by local rural subsistence users to access preserve lands for the taking of subsistence fish or wildlife.

Based upon 2000 U.S. Census Bureau data for Denali's resident zone communities there are approximately 357 local rural residents eligible to engage in subsistence use activities within Denali National Park and Preserve, excluding the 15 families not in a residence zone. A comparative review of census data between 1980 and 2000 indicates that the Cantwell resident zone community is experiencing consistent population growth, while Nikolai and Lake Minchumina's population grew from 1980 to 1990 but then stabilized, and Telida's population is consistently declining. For social, political, economic, or regulatory reasons, not all members of these communities are active subsistence users. Since 1980, the overall populations for most communities surrounding Denali has increased, but the relative number of subsistence users actively involved in subsistence activities at Denali has remained about the same as in the past.

Subsistence community use profile studies were conducted for Cantwell and Nikolai in the early 1980s (Stratton and Georgette, 1984; Stokes, 1984). 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. These studies indicate a dependence primarily upon moose, caribou, salmon, hare, rock and willow ptarmigan, spruce grouse, ducks and geese, and a few species of freshwater fish. Less frequently used large mammals include black bear, brown bear, and Dall sheep. Freshwater fish include burbot, dolly varden, grayling, lake trout, northern pike, rainbow trout and whitefish. Important fur animals include marten, mink, red fox, wolf, lynx, weasel, wolverine, land otter, beaver, muskrat, and coyote.

Denali National Park and Preserve lands are responsible for only a portion of the estimated community subsistence harvests reported by these communities since a significant portion of the areas used by these communities for subsistence are beyond the park and preserve boundaries. The most recent summary data from Cantwell's Community Harvest Assessment indicates a total harvest of wild resources of 27,599 pounds usable weight, or an average household harvest of 293 pounds, with a per capita harvest of 135 pounds. Moose made up the largest harvest component of the community's resource harvest as measured by edible weight (12,368 pounds; 44.8 percent of all resources). Households harvested on average 131 pounds of moose, or 60 pounds per capita. Caribou was second at 3,698 pounds, or 39 pounds per capita, and sockeye salmon was third at 3,084 pounds or 33 pounds per capita. Other resources with a mean household harvest of 10 pounds or more were berries (15 pounds), king salmon (11 pounds), and hare (10 pounds). In summary, the current research found that the harvest and use of wild resources played a significant role in the socioeconomic system of Cantwell and that these results were not that different from those reported by Stratton and Geoette in 1984 (Simeone 2000).

Cantwell is a road- and railroad-accessible community with greater employment and economic opportunities than Denali's other remote subsistence resident zone communities. However, cash wages and subsistence activities form a mixed economy in all of Denali's subsistence communities. Subsistence activities are dynamic, varying in intensity and scope depending on the seasonal availability of wildlife, fish, plants, and the availability of wage earning work. Changes in socio-economic conditions, such as fur prices, and availability of seasonal jobs, greatly influence the reliance on, and ability to engage in traditional subsistence hunting, gathering, fishing, and trapping activities.

Subsistence harvests also may vary considerably from year to year due to such factors as weather, migration patterns, natural cyclic population fluctuations, or from political and regulatory factors. Although the magnitude of subsistence use was probably much greater historically than it is now in Denali, the seasonal rounds and use and relative importance of certain species are still similar today. Ever-changing environmental and political conditions, as well as seasonal fluctuations of many resources, continue to make flexibility and adaptability key components to a successful subsistence lifestyle.

The National Park Service is engaged in a variety of subsistence-related activities beyond the harvest of fish and wildlife. 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).

The Subsistence Management Plan is a dynamic document that is amended to respond to new information and approved Subsistence Resource Commission subsistence program recommendations. Significant revisions to the Denali Subsistence Management Plan or formal subsistence hunting program recommendations made by the Denali Subsistence Resource Commission are available for public review and comment prior to final action. Park staff and the Denali Subsistence Resource Commission hold public meetings at least twice annually to review federal fishing, hunting and trapping regulatory proposals, and to discuss resource and subsistence issues.

The continuation of traditional subsistence activities depends directly on the availability of healthy and diverse wildlife, plant, and fish populations. The natural diversity and abundance of resources important to subsistence activities is, in turn, directly dependent upon intact and healthy ecosystems. The systems and the subtle interplay of natural processes, including subsistence use, must be carefully protected. In order to protect these resources and social values, the traditional ecological knowledge of Native people and other long-term residents must be integrated with the technical scientific approach to park management.

CULTURAL RESOURCES

Denali National Park and Preserve is home to a host of cultural resources that date back to the earliest period of human settlement of North America. Many of these resources are from prehistoric time periods – archeological investigations conducted within and immediately adjacent to the park strongly suggest that sites dating from the Paleoarctic tradition (11,000 years before present) through the Protohistoric period (200 years before present) exist within the park.

In historical times, the 1905 gold discoveries in the Kantishna Hills to the west of the park brought large numbers of prospectors and miners to the area and settlements such as Diamond, Glacier City, and Kantishna (Eureka) developed in support of the mining activities. As the population of Interior Alaska grew, development of transportation systems became essential. Construction of the Alaska Railroad (1915-1923) connected the southern coast of Alaska to the Interior city of Fairbanks, skirting the eastern boundary of the new Mount McKinley National Park, established in 1917. The first visitors arrived by train and headed into the park by pack train (later bus and auto), to spend a few days at Savage River Tourist Camp. The park road, constructed between 1922 and 1938, eventually connected the Kantishna Mining District to the

railroad at McKinley Park Station and provided tourists a second destination camp near the site of the present-day Eielson Visitor Center at Mile 66. The completion of the park hotel in 1939 served as the catalyst for eventually closing both the Savage River Camp and the camp at Eielson.

Over the years, Mount McKinley National Park grew as boundary changes added more land and resources to the park. In an effort to provide more wildlife protection and conservation, the park boundaries were expanded in 1922, 1932, and 1980 (the 1980 expansion was accompanied by the name change to Denali National Park and Preserve). These extensions also added important natural features such as Wonder Lake and the south slopes of the Alaska Range and added significant cultural resources associated with McKinley Park Station, the Kantishna Mining District, and trapping and subsistence use areas to the northwest of the original park.

Throughout the park there are 257 known cultural sites and complexes representing Denali's rich cultural history. Because cultural resource inventories have been limited to date, this number most likely represents a fraction of the total sites contained in the park. Known resources include archeological and historic sites associated with Athabaskan Native culture, mining activity, trapping and subsistence use, mountaineering, conservation, transportation, and park administration.

Archeological Resources

The Teklanika Archeological District is the only archeology site in the park listed on the National Register of Historic Places. This site was excavated in the 1960s with additional work conducted in the 1970s and again in 1992. The site is located near the road corridor in the Old Park.

Other known archeological resources consist of lithic scatters and a few isolated points. The majority of these sites are located in the western area of the Old Park and Kantishna. None has been evaluated for National Register significance (NPS ASMIS, NPS 1990a)

Ethnographic Resources

Ethnographic resources are traditional sites, structures, objects, landscapes, natural resources, and other material features associated with cultural systems or ways of life. Many ethnographic resources have been identified in Denali in various publications, including Haynes et al. 2001, Schneider et al. 1984, Gudgel-Holmes 1991, and Kari 2000. However, no systematic work has been completed to define the significance of any of these resources.

Cultural Landscapes

Four Cultural Landscapes have been identified in Denali. The Headquarters Historic District is the only one listed on the National Register of Historic Places and is not in the backcountry. The other three cultural landscapes have not been inventoried, boundaries defined, or significance determined (NPS CLAIMS).

Historic Structures

In the backcountry of Denali the historic structures consist mainly of isolated patrol cabins, trapping cabins, and resources related to mining in the Kantishna and Dunkle Hills areas. The patrol cabins are listed on the National Register of Historic Places and many of the historic resources relating to mining in Kantishna have been determined eligible for listing on the National Register. The resources in the Dunkle Hills area were determined ineligible for the National Register. With increasing visitor use a potential exists for increased pressure on the historic resources and their associated archeological deposits. (NPS LCS, Brown et al. 1982, Saleeby 2000).

SOCIOECONOMICS

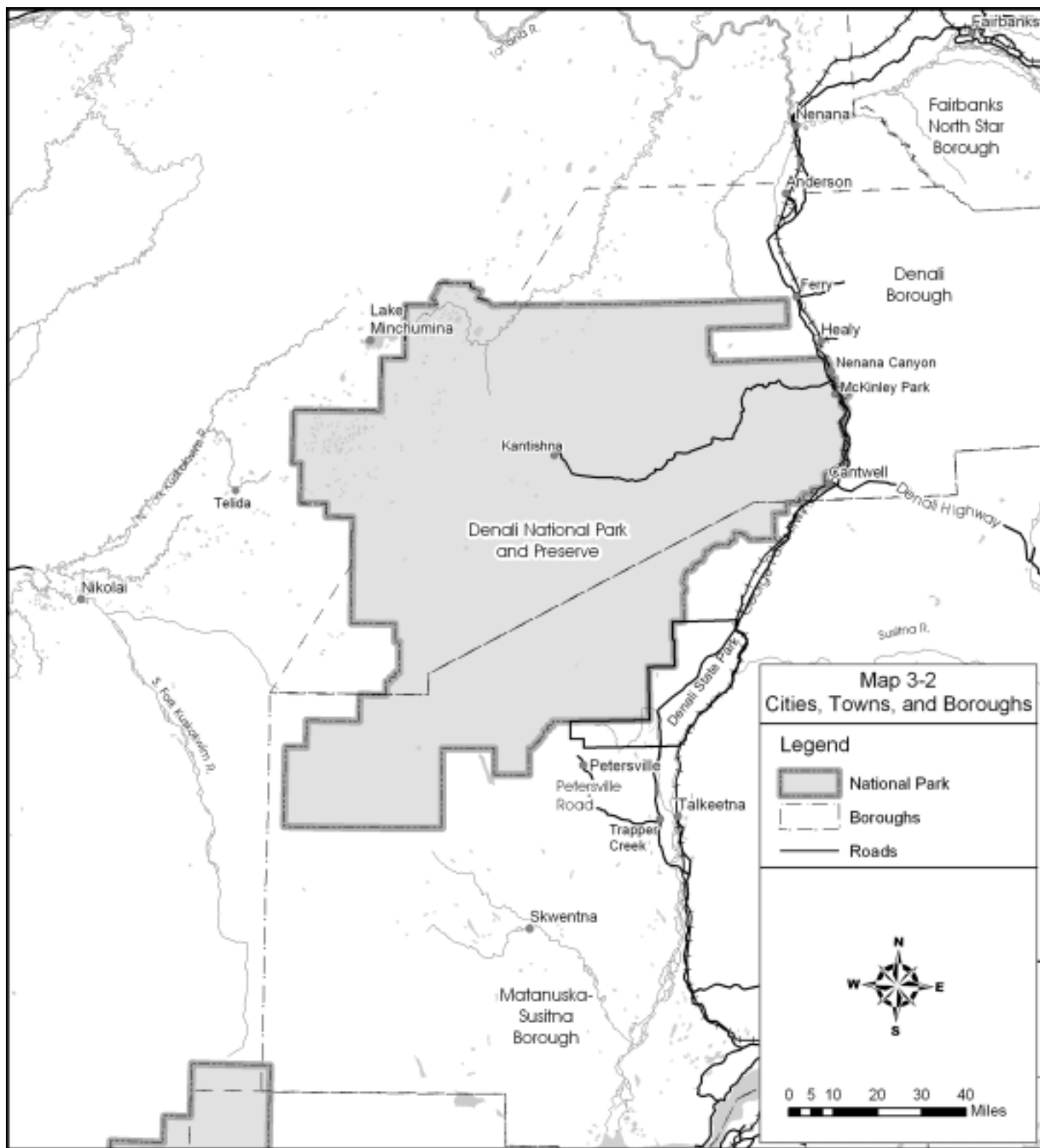
It is possible for Alaska visitors and residents to see Mount McKinley from both Anchorage and Fairbanks, and it is the area between these cities where the presence of Denali National Park and Preserve has an impact on the local population and economy. The rural communities in the Denali Borough and northern Matanuska-Susitna Borough are most affected because they are very near the national park, their economies are much smaller and less diverse than the Fairbanks North-Star Borough or the Municipality of Anchorage, and a significant portion of their economy is already linked to park-oriented tourism. Additionally, there are communities that are not within organized boroughs to the north and west of Denali that have connections to the park. Each of the boroughs and the small communities is described below according to the history, demographics, economy and employment, and economic characteristics of the population. Only the boroughs and one of the small communities are incorporated, so the “Census Designated Place” is used for census information.

Community Histories

Denali Borough

The Denali Borough was incorporated on December 7, 1990 as a home-rule borough. The borough provides limited services to its residents including planning, education, and administration. The borough encompasses 12,780 square miles (8,179,200 acres) and encompasses the majority of Denali National Park and Preserve (Map 3-2 – Cities, Towns, and Boroughs). The borough is largely rural, with most lands undeveloped and used for dispersed recreational and subsistence activities.

The earliest inhabitants of the lands forming the Denali Borough were nomadic Natives who subsisted on fishing, trapping, and hunting. Mining opportunities brought the first non-Natives into the area. Camps were established at Hoseanna Creek (now known as Lignite Creek) near Healy prior to 1902. Construction of the Alaska Railroad in the 1920s brought additional settlers to the area. The establishment of the Clear Missile Early Warning Station (U.S. Air Force) near Anderson, the Usibelli Coal Mine near Healy, and tourism associated with the park and preserve has brought growth and development to the area.



- Cantwell

Cantwell is located in the Denali Borough just north of the Matanuska-Susitna/Denali Borough boundary near the intersection of the George Parks and Denali Highways (Map 3-2– Cities, Towns, and Boroughs). The community lies on the Alaska Railroad. It can be accessed year-round from the Parks Highway by a 2.5-mile spur road. During the summer, the 135-mile gravel Denali Highway links Cantwell with Paxson to the east.

Cantwell began as a construction camp for the Alaska Railroad in 1917 and later was made a flag stop on the 1922 Alaska Railroad Timetable. It served as a supply and transportation center for nearby mining camps. Several Ahtna native families moved to Cantwell in the 1940s to work on the railroad; in the 2000 census about 23% of the population were identified as Alaska native.

Through funding by the borough, the community provides limited services including the Cantwell School (part of the Denali Borough School District), a library, emergency medical services, and a volunteer fire department. When surveyed by the Denali Borough in 1993, 55.9% of the Cantwell respondents were opposed to the borough encouraging tourism development in the immediate area. A similar percentage of respondents were in favor of some development depending upon the circumstances. The survey yielded 34 responses from a total of 121 mailed survey instruments, a low response rate of 28.1% (NPS 1997).

- McKinley Park

McKinley Park is located along the Parks Highway near the entrance to Denali (Map 3-2 – Cities, Towns, and Boroughs). The community offers a community association and fire hall to its residents. McKinley Park has developed around National Park Service employment at the entrance to Denali and the associated tourism-related industries and services.

- Kantishna

Kantishna, also known as Eureka after the nearby stream, was established as a gold mining camp in 1905, two years after Judge James Wickersham discovered gold in the Kantishna Hills. There remain a few patented and unpatented mining properties, although future mining activity is very unlikely. The area now is primarily developed as a seasonal tourist destination and has no year-round residents.

Kantishna is the site of four major lodges: Denali Backcountry Lodge, Kantishna Roadhouse, Camp Denali, and North Face Lodge. The latter two are owned and operated by the same company. Additional seasonal residents include National Park Service personnel nearby at Wonder Lake and a few other private inholders. Because Kantishna is seasonally occupied, there is no census information for the community in the sections below.

- Nenana Canyon

The name “Nenana Canyon” has only recently come into popular currency to describe the highway business district just north of the park entrance. The area was originally staked as three

Trade and Manufacturing sites around the time of Parks Highway construction. Over the ensuing 30 years it developed first as a mixed residential and commercial district before transitioning into the major commercial services area for the national park. Now there are few permanent residents in Nenana Canyon and the community is almost deserted in winter except for hotel property caretakers. During the summer, however, it is the largest single community in the borough with a population of hotel guests and seasonal workers. In 2004, there were almost 1,600 guest rooms, cabins, and RV sites, and occupancy was close to 100% for most of the summer visitor season. Because Nenana Canyon is seasonally occupied, there is no census information about the population in the sections below.

- Healy

Healy is located approximately 12 miles north of the entrance to Denali National Park and Preserve (Map 3-2 – Cities, Towns, and Boroughs). The community of Healy began as a mining camp in 1905, transitioning in the 1920s to a coal-mining town that was located at the confluence of Healy Creek and the Nenana River. The Usibelli Coal Mine further developed the community with its establishment in 1943. Since the construction of the Parks Highway, the commercial center of town has moved away from the river and railroad to the junction of the Parks Highway and the Healy Spur Road. The Tri-Valley subdivision, built on leased land belonging to the Alaska Railroad, comprises the central residential area. Other residents live in subdivisions at Otto Lake, along Dry Creek, and in a state subdivision along the Stampede Road. Through funding from the borough, the community provides basic services, including the Tri-Valley School (part of the Denali Borough School District), a library, and a volunteer fire department.

- Ferry

Ferry is a community of scattered residences that straddles the Nenana River at the site of an Alaska Railroad trestle. It appeared in the Alaska Railroad timetable in 1922 as a flag stop, and in a 1919 Seattle Chamber of Commerce promotional folder about farming in Alaska. The west side of the community is accessible from a spur road from the Parks Highway, but homes on the east side of the river can only be reached by off-road vehicle or by walking across the railroad trestle. Residents find employment in the national park or in Fairbanks.

- Anderson

Several homesteaders settled along the Nenana River near Lost Slough in the mid-1950s. Shortly thereafter, the U.S. Air Force selected a site nearby for construction of the 9-square-mile Clear Air Force Station, which was completed in 1961. Arthur Anderson, one of the homesteaders, subdivided his 80-acre homestead into quarter-acre lots and placed them on the market in 1959. Most of them were purchased by civilian workers from Clear, and the homestead became the nucleus of a new community.

Anderson incorporated as a second-class city in 1962, and is the only incorporated city in the Denali Borough. Anderson has a school, library, and volunteer fire department.

Matanuska-Susitna Borough (“Mat-Su” Borough)

The Matanuska-Susitna Borough was incorporated in 1964 as a second-class borough. The borough is located just north of 61° N latitude and to the south of the Denali Borough (Map 3-2 – Cities, Towns, and Boroughs). It encompasses 24,694 square miles of land (15,804,160 acres) and 539 square miles of water (344,960 acres). The borough includes the southern third of Denali National Park and Preserve. While still largely rural, the borough is more developed than Denali Borough.

The earliest inhabitants of the lands forming the Matanuska-Susitna Borough were nomadic Natives who subsisted by fishing, trapping, and hunting. Mining for gold and coal plus the construction of the Alaska Railroad had established a local, non-Native population in the area by 1920. Homesteaders seeking agricultural lands settled the Matanuska Valley in the 1930s. Further growth in the area was spurred by the construction of a statewide road system and the locally rich farmlands.

The Matanuska-Susitna Borough has 23 recognized community councils. The borough provides basic areawide and non-areawide services to its residents. Areawide services include planning and zoning, education, administration, parks and recreation, ambulance service, ports, harbors and wharves, transportation systems, air pollution control, daycare facilities, and historic preservation functions. Non-areawide services include solid waste, libraries, limited health and social service, septic tank waste disposal, natural gas and electrical local improvement districts, animal control, and water pollution control. The borough is a Certified Local Government, an official partner in the nationwide historic preservation program under the National Historic Preservation Act.

Borough communities particularly affected by activities at Denali National Park and Preserve include Talkeetna, Trapper Creek, and Petersville.

- Talkeetna

Talkeetna is located at the confluence of the Chulitna, Susitna, and Talkeetna Rivers, approximately 120 miles north of Anchorage (Map 3-2 – Cities, Towns, and Boroughs). The community is located along the Alaska Railroad and is accessible by a 14-mile spur road from the Parks Highway. The spur road is open year-round.

Talkeetna was originally the site of a Tanaina Indian village. Talkeetna was established as a supply station for miners and mining camps in 1896. A gold rush, the establishment of a riverboat steamer station in 1910, and the siting of the Alaska Engineering Commission in 1915 increased development of the community. The community declined in size after the Alaska Railroad was completed and the planning and construction workforce left. The decline was reversed over time with the Civil Aeronautics Authority (predecessor to the current Federal Aviation Administration) building the Talkeetna airport in 1941, the construction of the spur road linking the community to the George Parks Highway in 1965, and the establishment of the community as the most common departure point for mountaineering expeditions in the Alaska Range.

- Trapper Creek

Trapper Creek is located at the intersection of the Parks Highway and Petersville Road, approximately 115 miles north of Anchorage (Map 3-2 – Cities, Towns, and Boroughs). Most businesses in the community are located near the intersection of Petersville Road and the highway. Kroto Creek and the Petersville area bound Trapper Creek to the west.

Miners built the Petersville Road in the 1920s. Homesteading in the Trapper Creek area began in 1948, though few homesteaders remained long after arriving. The completion of the Parks Highway as far as Trapper Creek in 1967 fueled further growth in the area.

- Petersville

The Petersville settlement is approximately 200 square miles (128,000 acres) located along the Petersville Road, beginning at approximately 12 miles west of its intersection with the George Parks Highway and extending to the end of the road (Map 3-2 – Cities, Towns, and Boroughs). The area is bounded on the east by Kroto Creek and includes Petersville and Peters Creek.

Non-Natives first settled the Petersville area in the early 1900s after gold was discovered in the upper tributaries of Peters Creek. A freighting trail was developed between the numerous mining operations and Peters Creek. Mining activities in the area went through a series of declines due to World War II, increased operating costs and fixed gold pricing in the 1960s. Each decline was followed by resurgence. Most recently, increased tourism led to increased growth in the area, which has become a popular destination for winter sports enthusiasts, primarily snowmachiners.

Non-Borough Communities

- Lake Minchumina

This community is located on the northwestern shore of Lake Minchumina, approximately 5 miles northwest of the Denali National Park and Preserve boundary (also the Denali Borough boundary). The community is not incorporated and has no connection to the statewide road system. A 4,200-foot state-owned gravel airstrip is located in the community.

Lake Minchumina is historically a Native Athabascan area, although its population is now primarily Caucasian. A post office was established in 1930. The community now supports a small village, a lodge, and a store. Many of the residents run dog teams for transportation and most practice a subsistence lifestyle (DCED 2000).

- Nikolai

Nikolai is located approximately 65 miles west of Denali National Park and Preserve (Map 3-2 – Cities, Towns, and Boroughs), and is incorporated as a second-class city. The city has no road connection but is accessible via air (2,350-foot gravel airstrip) or water (Kuskokwim River).

Nikolai is historically an Athabascan Indian village that has been relocated at least twice since 1880. Nikolai has been at its current location since 1918. The community now supports a post office and school. The city school is part of the Iditarod Area Schools. Most of its residents practice a subsistence lifestyle.

- Telida

The community of Telida is located approximately 15 miles west of the park boundary (Map 3-2 – Cities, Towns, and Boroughs). The community is not incorporated and is primarily accessible via air (2,270-foot airstrip). Telida is historically an Athabascan Indian village that has been relocated three times since the 1890s. Telida has been at its current location since 1916. The community's residents practice a subsistence lifestyle.

Demographics

The population of the Denali region is growing, albeit very unevenly. The Matanuska-Susitna Borough and the communities of Talkeetna and Trapper Creek show particularly vigorous growth, particularly when compared to the more moderate growth of the large cities of Anchorage and Fairbanks (see Table 3-1: Population Distribution in the Denali National Park and Preserve Region). The Mat-Su Borough is known as the fastest growing area in the state (Fried 2000).

Population growth in the Denali Borough is much slower and lags the state, although some communities such as Cantwell and Healy show growth rates comparable to those in Mat-Su. However, Anderson, Ferry, and McKinley Park are losing population. The Bush communities of Lake Minchumina and Nikolai have relatively stable, small populations. Telida has shrunk to two residents (Hollis Twitchell, personal comm.).

Table 3-1: Population Distribution in the Denali National Park and Preserve Region, 2000

Geographical Area	Population			Annualized Growth Rate	
	1980	1990	2000	% per year 1990-2000	Relative Growth Rate
State of Alaska	401,851	550,043	626,932	1.3	Moderate
Denali Borough	na ^a	1,764	1,893	0.7	Low
Anderson City	517	628	367	-5.2	Negative
Cantwell CDP	89	147	222	4.2	High
Ferry CDP	na	56	29	-6.4	Negative
Healy CDP	334	586 ^b	1,000	5.5	High
McKinley Park CDP	60	171	142	-1.8	Negative
Matanuska-Susitna Borough	17,816	39,683	59,322	4.1	High
Petersville CDP	na	na	27	na	
Talkeetna CDP	264	250	772	na ^c	High
Trapper Creek CDP	na	296	423	3.6	High
Lake Minchumina CDP	22	32	32	0.0	Stable
Nikolai city	91	109	100	-0.4	Negative
Telida	33	11	3	-12.2	Negative
Municipality of Anchorage	174,431	226,338	260,283	1.4	Moderate
Fairbanks-North Star Borough	53,983	77,720	82,840	0.6	Low

^a Denali Borough was incorporated on December 7, 1990

^b 1990 population figure for Healy CDP includes Lignite CDP, which was reported separately only in that year

^c The Talkeetna CDP was enlarged in 2000 so population numbers are not directly comparable to 1990 figures

CDP = Census Designated Place

na = not available

Source: U.S. Census Bureau, 1980, 1990, and 2000 Census of Population & Housing

Economy and Employment

The region surrounding Denali National Park and Preserve supports a remarkable diversity of economic activity, only a portion of which is dependent upon the national park. The Air Force, mining, labor export, tourism unrelated to Denali, retail, and services make up a large portion of the economic mix. In addition, in many of the communities, non-market activities such as gardening and subsistence hunting, fishing, and gathering make up a significant portion of the economic activity, along with activities that do not fit well within standard economic reporting—systems such as trapping, and the manufacture and sale of arts and crafts. This is particularly true for communities in the Bush that have no road access, but is also relevant to rural communities on the road system such as Talkeetna, Trapper Creek, and Cantwell.

Denali Borough and Its Communities

The Denali Borough has a diverse economy for a rural community. Major sources of employment include Clear Air Force Station near Anderson, the Usibelli Coal Mine and an associated Golden Valley Electric Association (GVEA) a coal-fired power plant in Healy, Denali National Park and Preserve, and tourism businesses that depend upon visitation to the national park. While all four are substantial contributors to the borough's economy, growth is largely driven by the national park. Table 3-2 shows the number of employees in each industrial sector in 2000, while Table 3-3 lists the top 10 employers in the borough.

Table 3-2: Denali Borough Wage and Salary Employment by Industry, Annual Average 1991 and 2000

	1991	% of Total	2000	% of Total
Total Employment	762	100.0%	1,810	100.0%
Mining	112	14.7%	132	7.3%
Construction	11	1.4%	15	0.8%
Trans., Communication, Utilities	68	8.9%	607	33.5%
Trade	253	33.2%	397	21.9%
Finance, Insurance, Real Estate	2	0.3%	10	0.6%
Services, total	163	21.4%	318	17.6%
Hotels	121	15.9%	259	14.3%
Government, total	153	20.1%	331	18.3%
Federal	111	14.6%	198	10.9%
State	29	3.8%	20	1.1%
Local	13	1.7%	113	6.2%

Source: Fried and Windisch-Cole, 2001

Federal employment and contracts associated with the Clear Air Force Station are the most important source of employment and income in the community of Anderson. Clear Air Force Station is a radar surveillance site that tracks missile movement and space objects. Employment at the station consists of military personnel, civilian Department of Defense employees, and the employees of service contractors (Arctec Services being the largest – see chart below). The Air Force is in the process of turning the station over to the Air National Guard.

Federal employees are also one of the underpinnings of employment in the central part of the borough through the National Park Service – particularly the Healy and McKinley Park areas. The National Park Service also hires a significant number of seasonal employees from both the local community and elsewhere.

The tourism industry is the driving force behind employment growth in the borough, although the growth is scattered among several different economic sectors. Hotels, restaurants, transport services, retail shops, gas stations, and guide services are among the many services available for people coming to visit the national park. To illustrate the growth, in 1980 the National Park Service counted just 133 hotel rooms near the park's entrance. By 2004, there were 1,900 rooms, 346 cabins, and 587 RV spaces, excluding campsites and RV sites within the park (Denali Borough, pers. comm.). Half of the top 10 employers in the borough in 2000 were in the tourism industry.

The Usibelli Coal Mine is the largest employer in the borough that is not associated with the federal government or related industries. Founded in 1943, Usibelli became the state's single producer of coal in 1981. In recent years, the mine produced on average 1.5 million tons of coal per year, a rate that fluctuated little from 1985 to early 2002. For these years, half of the coal was consumed by local electric generation facilities from Healy north to Fairbanks and half exported to South Korea. However, the Korean contract has recently become smaller and less reliable.

The Healy Clean Coal Project, a new 50-megawatt power plant constructed between 1995 and 1997 by the Alaska Industrial Development and Export Authority with the assistance of federal grants, would consume 300,000 tons of coal annually if it were operating. However, after its initial test period the Golden Valley Electrical Association refused to take over operation of the facility as per its contract with AIDEA, claiming the experimental clean coal technology proved too expensive and unreliable during its test period. The plant has been idle since completion of the test period, awaiting potential modifications, a full retrofit to conventional coal-burning technology, or another operator.

Employment in the Denali Borough is strongly seasonal because of the importance of the tourism industry within the borough's economy compared to the other industries. By conservative estimates, the population of the area at least triples during the summer season, which is roughly mid-May to mid-September (Fried and Windisch-Cole 2001). The fluctuation in the jobless rate is one indicator of this seasonality; in 2000 the rate peaked at 17.7% in January and then declined to just 3.1% in July. Even more telling is workforce residency. In 1999, 39 percent of the private sector wage and salary workforce in the borough were nonresidents of the state. Another 42 percent resided somewhere else in Alaska. That means that during the summer, non-resident private-sector workers outnumber the local workers 4 to 1. (Fried and Windisch-Cole 2001) One entire community in the borough – the Nenana Canyon business area just outside the park boundary along the Parks Highway – is inhabited by thousands of employees and visitors any given night of the summer, but is closed up entirely from October through April.

Despite the seasonality of tourism, its impact is felt year-round in two ways. First, many local residents work in tourism during the summer, but spend their earnings throughout the year. Second, the borough government depends on bed taxes for approximately 86% of its revenue, much of which is used to fund the borough school district (Fried and Windisch-Cole 2001). For the latter reason, communities throughout the borough are strongly concerned about national park visitation even if they do not benefit directly from tourism and other park-related employment.

Table 3-3: Top Employers in the Denali Borough in 2000

Rank	Employer	Employment
1	ARAMARK Leisure Services	285
2	Arctec Services (contractor to Clear Air Force Station)	208
3	National Park Service	133
4	Alaska Hotel Properties	132
5	Usibelli Coal Mine	119
6	Denali Borough School District	83
7	U.S. Department of Defense	56
8	Golden Valley Electrical Association	44
9	Royal Highway Tours	32
10	Denali Bluffs Hotel	26
10	Denali National Park Wilderness Centers	26

Source: Fried and Windisch-Cole, 2001

The Matanuska-Susitna Borough and Its Northern Communities

Historically, mining and agriculture were the economic activities that brought people to the Mat-Su Borough. In fact, the borough is still the state's largest agriculture producer. However, in the context of a rapidly growing population agriculture has become relatively unimportant, amount to \$9 million in production in 1998 (Fried 2000). Now, the rapid population increase in the Matanuska-Susitna Borough is directly linked to export of labor, particularly to Anchorage. In 1990, the census estimated that 28% of borough residents could be working in Anchorage; in 2003, the estimate was 35.4% with an additional 11.5% of borough residents commuting to work in the oil industry on the North Slope or elsewhere in the state. The comparative affordability of housing is one of the primary factors attracting residents to the Mat-Su Valley (Fried 2003).

Because labor is the borough's major export, it is unsurprising that services and retail dominate employment within the boundaries of the borough itself. Expansion in these sectors over the last decade means that more income is retained in the borough rather than going to Anchorage and elsewhere. Construction and the finance-insurance-real estate sectors have also prospered from residential and commercial construction. Table 3-4 shows wage and salary employment for the Matanuska-Susitna Borough for 1991 and 2001.

Table 3-4: Matanuska-Susitna Borough Wage and Salary Employment, 1991 and 2001

	1991	% of Total	2001	% of Total
Total Employment	7,878	100.00%	12,874	100.00%
Mining	162	2.10%	34	0.26%
Construction	397	5.00%	1,317	10.23%
Manufacturing	95	1.20%	149	1.16%
Trans., Communication, Utilities	784	10.00%	874	6.79%
Trade, total	2,012	25.50%	3,553	27.60%
Wholesale Trade	133	1.70%	156	1.21%
Retail Trade	1,879	23.90%	3,397	26.39%
Finance, Insurance, Real Estate	195	2.50%	312	2.42%
Services	1,540	19.50%	3,364	26.13%
Government, total	2,640	33.50%	3,140	24.39%
Federal	107	1.40%	163	1.27%
State	810	10.30%	896	6.96%
Local	1,723	21.90%	2,081	16.16%
Misc./Unclassified	53	0.70%	129	1.00%

Source: Fried, 2003

The tourism industry is also strong in the Matanuska-Susitna Borough, although its character differs from the rest of the state. The visitor industry in Mat-Su caters in large part to Alaskans and others who have recreational property in the borough. According to the 2000 census, 19.2% of the housing in the borough is recreational or seasonal, and hundreds of new cabins are added each year. The owners of these recreational properties buy services and pay property taxes.

While Denali-bound visitors spend some money for food and gas on the way through the borough, only the northern communities of Trapper Creek and particularly Talkeetna are tied directly to the park economically. For several decades, Talkeetna has been the gateway to Denali for mountaineers who fly from the town airstrip into the Alaska Range to climb Mount McKinley or adventure on other peaks or glaciers. Although this type of visitor traffic has had considerable effect on Talkeetna's character, the number of people entering the park this way has always been relatively minor (see below under Visitor Activities). However, other visitors come to the town to enjoy the mountain views, take flight-seeing trips over the park, listen to stories of mountaineers and bush pilots, and experience life in a small Alaska town. This kind of tourism is growing dramatically with an increase in interest in "South Denali." In 1992, the Talkeetna Visitor Impact Assessment estimated that 40,000 visitors came to Talkeetna over the course of a year. For 2001, Christopher Beck & Associates estimated 110,000 visitors came to Talkeetna (Beck, 2002).

The opening of two large new lodges serving the package tour industry has driven much of the tourism growth in Talkeetna and nearby northern Mat-Su communities. The Mount McKinley Princess Lodge opened 20 miles north of Trapper Creek in 1997. The Cook Inlet Region, Inc. opened its Talkeetna Alaskan Lodge in 1998 and within a year began working on plans to double its size. Proximity to and views of Mount McKinley, accessibility from road and rail, a diversity of attractions, and available land have made this area a magnet for the rapidly expanding package tourism industry (Talkeetna Community Tourism Plan – Issues and Needs Workbook, March, 2002). These two lodges are now two of the largest employers in the borough (see Table 3-5).

It is important to note that not all tourism in the northern Mat-Su is Denali-related. Sport fishing, hunting, snowmachining, and other non-park tourism have been important at least as long as park-related visitation, and still provide a substantial part of tourism activity.

Table 3-5: Top Employers in the Matanuska-Susitna Borough, 2001

Rank	Employer	1999 Average Annual Employment
1	Mat-Su Borough Schools	1,650
2	Valley Hospital	467
3	Wal-Mart	341
4	Safeway	335
5	Fred Meyer Stores	283
6	Matanuska-Susitna Borough	237
7	Matanuska Telephone Association	231
8	University of Alaska	159
9	Alaska Department of Corrections	150
10	Ma-Su Services for Children and Adults	137
11	Advanced Concepts (Job Corps)	131
12	Nye Frontier Ford	123
13	Alaska Department of Administration	120
14	Mat-Su Community Counseling Center	109
15	Sears Roebuck	104
16	Matanuska Electric Association	100
17	New Horizons Telecom	98
18	McDonalds	97
19	Wolverine Supply	93
20	Alaska Dep't of Health & Social Services	92
21	Mount McKinley Princess	92
22	Bailey's Furniture	90
23	City of Wasilla	80
24	Tony Chevrolet	80
25	GCI Communications	79
26	Spenard Builders Supply	74
27	Talkeetna Lodge*	70
28	Alaska Department of Natural Resources	69
29	Fishers Fuel	64
30	K&G Enterprises	64

Source: Fried, 2003

Lake Minchumina, Nikolai, and Telida

The economies of Lake Minchumina, Nikolai, and Telida are rooted in subsistence, with hunting, gathering, and gardening providing much of what residents need. Residents depend on cash income that is linked to federal and state programs, the local school district, and seasonal construction work (Simeone and Haynes 2001). Trapping and handicrafts also provide cash income for some residents. At Lake Minchumina, there is a small lodge that is partially-dependent on park-related visitation, including winter visitation as the lodge has a concession to take sled dog tours into the park and preserve.

Economic Characteristics

Denali Borough residents tend to be wealthier than the state as a whole, with median household income and per capita income above the level of the state as a whole for the borough and most of its communities. The Matanuska-Susitna Borough has a very similar median household income and per capita income to the state, but for northern communities more strongly tied to the park the income is substantially lower than the borough and the state. The percentage of the workforce that is unemployed is significantly higher across most of the Denali-area communities than the state as a whole, perhaps because of the seasonality of work (note that Healy has less unemployment than the state, along with an economy more closely related to coal mining than to tourism). The poverty rate of families is slightly higher than the state average through most of the communities, although Anderson and Ferry have more than double the statewide rate and Trapper Creek and Nikolai have extremely high rates of poverty – 27.6% and 21.1% respectively (see Table 3-6: Selected Economic Characteristics).

Table 3-6: Selected Economic Characteristics, 2000

Geographical Area	Median Household Income	Per Capita Income	Unemployment (%)	Families below poverty level (%)
State of Alaska	51,571	22,600	9.0	6.7
Denali Borough	53,654	25,251	11.6	5.7
Anderson City	58,750	23,837	10.2	15.6
Cantwell CDP	43,750	22,615	11.0	0.0
Ferry CDP	38,750	18,323	60.9	16.7
Healy CDP	60,000	28,225	8.8	2.5
McKinley Park CDP	53,750	27,255	14.7	8.6
Matanuska-Susitna Borough	51,221	21,105	10.3	7.8
Petersville CDP	43,750	43,000	50.0	0.0
Talkeetna CDP	38,289	23,695	14.4	7.2
Trapper Creek CDP	27,031	18,247	8.1	27.6
Lake Minchumina CDP	36,250	26,780	--	--
Nikolai city	15,000	11,029	37.9	21.1
Telida	--	--	--	--
Municipality of Anchorage	55,546	25,287	6.8	5.1
Fairbanks-North Star Borough	49,076	21,553	9.1	5.5

Source: U.S. Census of Population and Housing, U.S. Bureau of the Census, 2000

VISITOR USE AND EXPERIENCE

This analysis of visitor use is organized into four categories: general visitation, backcountry activities, access, and facilities. General visitation describes the primary users of Denali National Park and Preserve. The backcountry activities section provides an overview of the types of recreational activities occurring within the boundaries of the park and preserve. Access describes the various means by which visitors reach Denali and travel into the park. The facilities discussion describes the park infrastructure that supports and facilitates visitor access to recreational activities in the backcountry.

General Visitation

Denali National Park and Preserve has the most visitation of any national park in Alaska. This has been attributed to its location between Anchorage and Fairbanks, ease of access by both rail and road, the fame of its resources, and its relatively long history in the national park system. Visitation grew rapidly during the 1990s, when the number of recreation visits peaked in 1999 at 386,867— an increase of 13% in four years. Visitation rates then stagnated or declined through the early years of the current decade before a resurgence and record visitation in 2004. Table 3-7 shows the trend in recreational visits since 1996.

Table 3-7: Recreational Visits for Denali National Park and Preserve, 1996–2004

Year	Recreation Visits ¹	% Change from previous year
1996	341,385	
1997	354,278	4.1
1998	372,519	5.1
1999	386,867	4.7
2000	363,983	-5.9
2001	360,192	-1.0
2002	353,560	-1.8
2003	359,841	1.8
2004	404,236	12.3

¹ Number of people entering the park and preserve during any part of the day

Source: NPS Visitation Database. The number of visits for 2002 was adjusted to correct errors using original statistics at park Headquarters.

Although Denali National Park and Preserve is open year-round, nearly all visitor use of the park and preserve occurs during the short summer season (late May through early September). Only about 2% of visitation occurs outside this time period, and over 80% generally occurs within three months: June, July, and August (See Table 3-8).

Table 3-8: Monthly Visitation for Denali National Park and Preserve, 2003-2004.

Month	2003		2004	
	# Visitors	% of Total	# Visitors	% of Total
January	979	0.3%	313	0.1%
February	524	0.1%	392	0.1%
March	751	0.2%	1,441	0.4%
April	2,985	0.8%	3,087	0.8%
May	27,260	7.6%	30,132	7.5%
June	88,471	24.6%	100,127	24.8%
July	104,686	29.1%	116,601	28.8%
August	97,821	27.2%	108,097	26.7%
September	34,639	9.6%	39,969	9.9%
October	889	0.3%	2,525	0.6%
November	374	0.1%	1,059	0.3%
December	462	0.1%	493	0.1%
Total for Year	359,841	100.0%	404,236	100%

Source: NPS Visitation Database.

Denali National Park and Preserve is a destination park with national and international appeal. Denali provides a variety of unique opportunities and experiences for visitors, including opportunities to view Mount McKinley and wildlife throughout the park and preserve. According to a 1995 survey, 90% of the visitors were from out-of-state. Included in that figure were a significant number of international visitors – 12%, according to the same survey. During the off-season (October through April), the majority of visitor use is by Alaska residents.

The average length of stay for visitors to Denali National Park and Preserve varies according to the mode of transportation used to access the park and preserve. For visitors arriving by private vehicle, the average length of stay is estimated to be about two hours. The National Park Service estimates that visitors arriving by commercial motor coach or bus will spend an average of eight hours in the park and preserve. Passengers of the Alaska Railroad spend an estimated 18 hours within the boundaries of the park and preserve.

Length of stay can be divided into those visitors who spend fewer than 24 hours in the park (day use) and those who spend more (overnight stays). Day-use visitors may spend only a few hours in the entrance area and along the unrestricted first 15 miles of the park road. Other day-use visitors may take a bus that travels beyond the Savage River either as part of a 6-7 hour narrated wildlife and wilderness tour or as a passenger on the park's Visitor Transportation System which offers the potential for day-hiking, picnicking, or sightseeing in addition to wildlife viewing.

For visitors spending one or more nights at Denali, there are accommodations both inside and outside of the park. Inside the park, overnight use within the national park is documented in Table 3-9. An overnight stay is one visitor spending one night in the park for recreational purposes and is counted separately from a recreational visit. Despite such variables as the closure of the park hotel and campground expansion, overnight stays have remained stable, looking at the period as a whole. Overnight stays can be divided into four categories:

concessioner lodging, NPS standard campgrounds, NPS group campgrounds, and NPS backcountry use. Most relevant to this backcountry plan are the numbers on overnight backcountry use, which have oscillated dramatically in the last 16 years, peaking in the mid 1990s at a level 22% higher than the most recent year.

The Denali Park Hotel closed after the 2001 season, so now camping is the only opportunity that the National Park Service offers for staying inside the park. Most visitors stay at hotels in adjacent communities. There are four lodges that provide overnight accommodations on privately-owned inholdings in Kantishna at the western end of the 92-mile park road, and a remote lodge on a privately-owned inholding along the Tokositna River on the south side of Denali.

Table 3–9: Overnight Stays at Denali National Park and Preserve, 1985-2004

Year	Number Overnight Stays ¹				
	Concessioner Lodging ²	NPS Campgrounds	NPS Group Campground	NPS Backcountry	Total Overnight Stays
1985	28,020	67,963	3,001	26,029	125,013
1986	29,752	67,071	2,693	27,999	127,515
1987	23,780	65,649	2,086	28,962	120,477
1988	22,101	77,500	1,191	29,460	130,252
1989	23,429	63,789	1,637	34,113	122,968
1990	24,459	56,329	1,534	35,918	118,240
1991	24,311	62,539	2,683	29,798	119,331
1992	27,452	73,066	2,831	38,262	114,159
1993	25,683	63,957	2,034	33,010	124,684
1994	23,942	63,082	2,592	41,455	131,071
1995	24,459	65,105	1,807	39,500	130,871
1996	23,586	59,871	2,240	37,188	122,885
1997	22,223	65,999	2,019	39,224	129,465
1998	18,330	64,438	962	37,504	122,150
1999	19,912	66,722	1,349	35,826	123,809
2000	19,095	67,431	1,883	32,579	121,107
2001	19,106	42,830	1,457	35,306	98,699
2002		26,309	455	36,212	62,976
2003		62,570	801	34,127	97,498
2004		85,752	3,309	34,016	123,077

¹Person-nights

²The concessioner lodging was the Denali Park Hotel, which closed after the 2001 season.

Source: NPS Visitation Database.

Backcountry Activities

There are both guided and unguided visitor activities in the Denali backcountry. Some activities, such as flightseeing and horseback riding, are generally – although never exclusively – done through a commercial service while others, such as hiking, climbing, skiing, and camping, are more commonly done independently. Visitors are also able to participate in a variety of educational programs offered by the National Park Service, Murie Science and Learning Center, and other educational partners. With the exception of overnight camping in the Old Park and portions of the Kantishna Hills and climbing on Mount McKinley and Mount Foraker, most independent travel does not require a permit from the National Park Service, so there is little data available on the amount of visitor activity. Commercial operators are required to report on their use of the park.

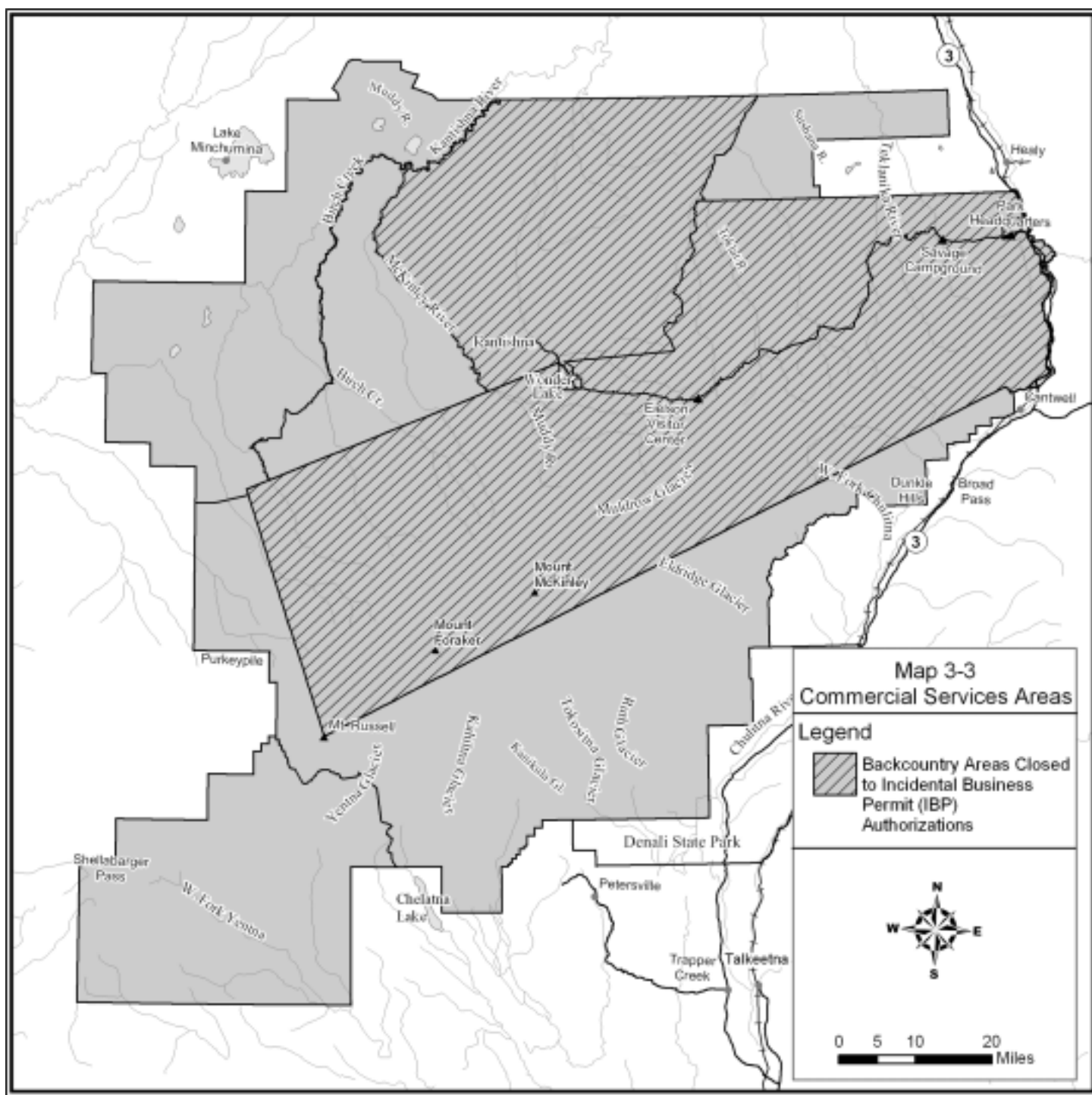
Commercial operators authorized to offer their services to park visitors must obtain either a concessions contract or an incidental business permit. Twenty-three companies had National Park Service concessions contracts and thirty-two had incidental business permits to operate in Denali National Park and Preserve during 2004; the number fluctuates from year to year.

Concessions contracts are awarded to successful bidders on prospectuses issued by the National Park Service for activities and services which the NPS has determined should be offered to visitors (see Chapter 1). Only a limited number of contracts are awarded. Presently, backcountry activities authorized by concession contract include:

- Guided hiking in the Old Park and Kantishna
- Guided climbing on Mount McKinley
- Air taxi and scenic tour landing service on glaciers in the southern park additions
- Air taxi and scenic tour service in Kantishna
- Guided sport hunting
- Winter dog sled tours
- Freight hauling by dog team in the Old Park

Incidental business permits are issued to businesses providing appropriate services where there are no fixed commercial facilities in the park, the commercial activity originates and terminates outside the park, no money changes hands on park lands, and no commercial solicitation occurs on park lands. Permits are generally available for a specified set of authorized activities within a specified area. Map 3-3 shows areas that are open to backcountry activities authorized through incidental business permits. The backcountry activities that may be authorized through an IBP are the following:

- Air Taxi Operator
- Big Game transport
- Mountaineering
- Day hiking
- Backpacking or overnight camping
- Winter backcountry trips (guided overnight camping in winter snow conditions).



All operators are subject to the requirements of National Park Service commercial visitor services guidelines, and operating plans required of concessions contract holders.

For some activities, the distinction between “activity” and “access” is indistinct, such as for air tours or horseback riding. For that reason, some topic headings occur in both the access and backcountry activities sections.

Day Hiking

Hiking is one of the most common visitor activities in Denali, whether a short stroll along trails in the entrance area or a grueling multi-day, off-trail backpacking adventure. The term “day hike” encompasses any hike that does not include camping overnight (the latter will be referred to as “backpacking”). There is little data about the extent of day hiking in the park. Most day hikers either use the entrance area trails or take a bus into the park and start their hikes from anywhere along the park road. As a result, except for the few trails in the park (see “Facilities” below), independent day-hiking is widely dispersed.

Guided day-hiking is primarily offered by the lodges in Kantishna for their clients, and tends to have a more concentrated use pattern. All lodges take guided parties to the Moose Creek and the Skyline Drive areas. Those hiking up Moose Creek generally use the former mining access route that follows the creek. Groups hiking in the Skyline Drive area usually hike up or down the Friday Creek drainage to Wickersham Dome and back down to Kantishna. Some groups are shuttled up Skyline Drive to start at higher locations, and then hike back. The Kantishna lodges are able to bring their clients into the Wonder Lake area for guided hikes, including use of the McKinley Bar Trail. One Kantishna lodge operator has pre-ANILCA historic rights to lead guided hikes in the Old Park and brings clients by van as far east as Highway Pass.

About one party per day visits each hiking area with group sizes averaging 12 to 17 people. Duration of the guided hikes varies from 2 to 6 hours. The lodges coordinate group hikes so that usually no more than one group visits a hiking area at any one time. The annual average number of people participating in guided hiking in the Kantishna area between 1995 and 1998 was 6,043 people.

A company that offers big-wheeled truck tours along a state right-of-way in the Dunkle Hills area also provides a limited number of guided hikes for its clients.

Except for the historic operator, there is no commercial guided hiking available in the Old Park. There are educational programs – in particular the NPS Discovery Hikes – that provide opportunities for those who want to join a group or feel they need assistance. Guided groups that visit the Old Park by bus or in the entrance area may be accompanied by their guides, but their guides may not guide or engage in activities with their clients even if the company has a contract or IBP for guiding elsewhere in the park and preserve.

Backpacking

Backpacking primarily occurs in the Old Park where shuttle buses are used for drop-offs and pick-ups along the park road corridor. Backcountry permits are required, at no charge, for

overnight stays in 42 of the designated backcountry units, as detailed in Appendix D. For the north side of the park during 2001, there were 11,532 user nights: 2,296 backcountry permits were issued to 4,752 people, resulting in an average of 2.07 people and 2.38 nights per permit (Joe Van Horn, pers. comm.).

Permits for backpacking are available at the Wilderness Access Center (WAC) during summer and at the Murie Science and Learning Center during winter months. Reservations are not required for the permit and are issued only one day in advance. Many areas of the park also require the use of bear-resistant food containers (BRFC), which are distributed with the backcountry permit and must be returned at the end of the trip; the units where BRFCs are required are also detailed in Appendix D.

Registration for other areas of the park was voluntary in 1999 and 2000 and was strongly recommended in 2001, particularly for overnight users entering the park on the south side of the Alaska Range. In 1999, 328 backcountry users voluntarily registered; 426 registered in 2000; and 684 registered in 2001.

Visitors are encouraged to practice Leave No Trace skills and ethics during their time in the backcountry. These include planning ahead, camping and traveling on durable surfaces, packing out all garbage, properly disposing of human waste, and not disturbing vegetation, wildlife, or cultural sites.

2000 Backpacker Survey

A survey of overnight backcountry visitors who obtained permits from the backcountry desk at the Visitor (now Wilderness) Access Center was conducted in 2000 (Swanson et al. 2002).

Results indicated the following:

- 81% of visitors reported camping within sight or sound of no other parties. Backcountry users interacted with an average of 0.65 hiking parties per day.
- 73% felt they saw about the right number of hiking parties, while 25% would have preferred to see fewer hiking parties.
- 94% agree with the present objective that backpackers should be able to camp out of sight or sound of other parties.
- 75% of respondents to the survey were satisfied or very satisfied with the experience in obtaining a backcountry permit.
- 87% oppose or strongly oppose the National Park Service's allowing unlimited use in the backcountry.
- 97% support or strongly support the National Park Service's permanently closing areas to protect wildlife habitat.
- 96% support or strongly support requiring all overnight hiking parties to obtain a backcountry permit.
- 95% rated overall satisfaction with their backcountry trip as good or very good (Swanson et al. 2003).

The average total number of aircraft seen per day by survey respondents was 4.9.

- 76% of respondents said they would prefer to not see or hear any aircraft during their visit.

- 48% of respondents in the control condition who saw or heard aircraft were annoyed by those aircraft.

Lawson and Manning (2001) evaluated the choices overnight wilderness visitors in Denali National Park make when faced with hypothetical tradeoffs among the conditions of social, resource, and management attributes of the wilderness portion of the park. Their results implied that, in general, Denali overnight wilderness visitors would prefer to forgo some freedom from management to improve opportunities to experience solitude. The study also concluded that:

... management actions that provide Denali overnight wilderness visitors with places to camp that have no more than some signs of human use will make substantial positive contributions to the quality of their wilderness experiences. Camping conditions characterized by sites with extensive signs of human use greatly detract from the quality of visitors' wilderness experience in Denali. Further, Denali overnight visitors place relatively high importance on having limited contact with other groups while hiking and camping. Denali overnight wilderness visitors would prefer a wilderness setting that emphasizes solitude through relatively restrictive management actions over a more congested wilderness setting with limited management restrictions by a margin of three to one (Lawson and Manning 2001).

There is a limited amount of guided backpacking in the park additions. No guided overnight backpacking is authorized in the Old Park or areas closed to IBPs.

Bicycling

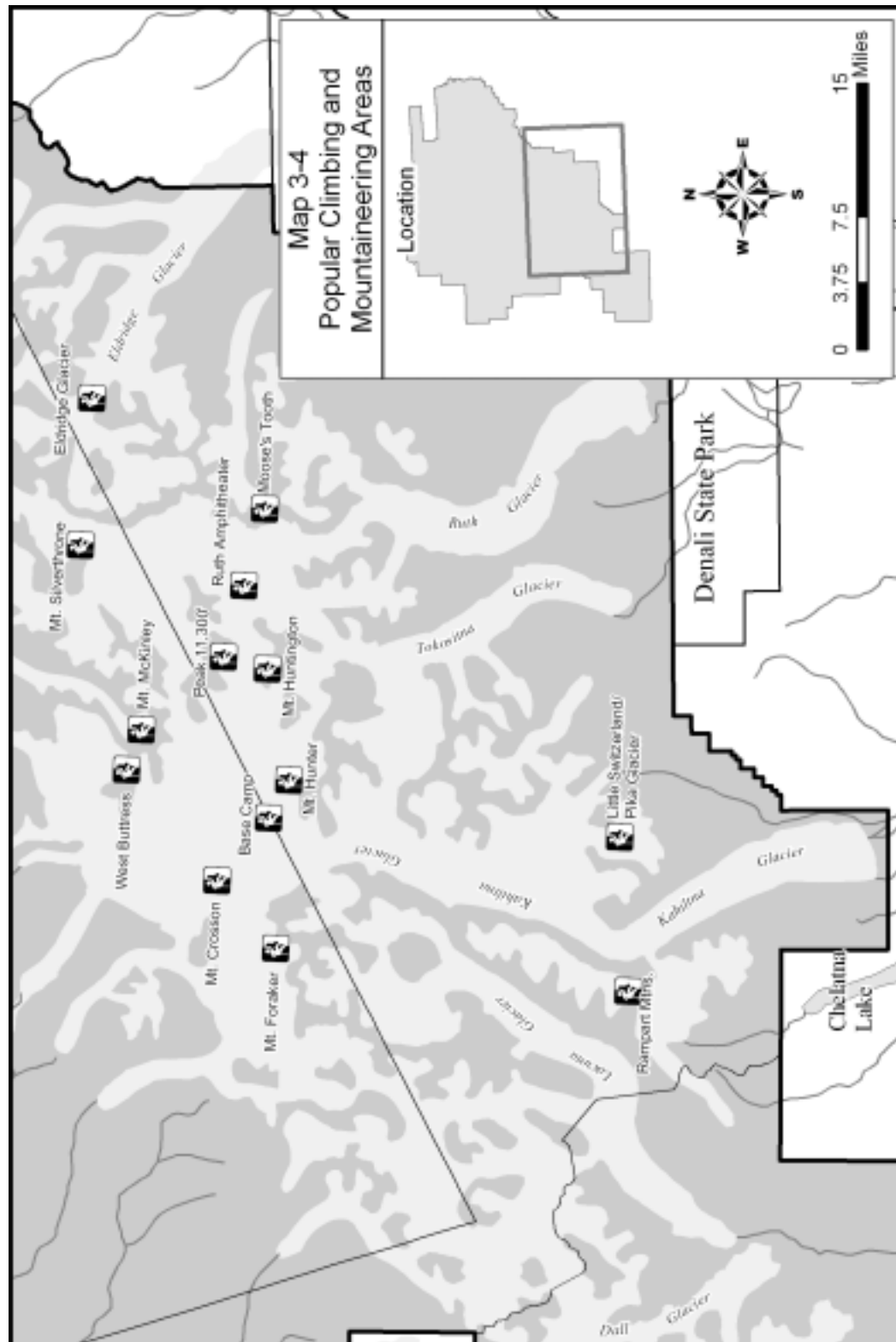
Very little bicycling occurs in Denali except on the park road. The little backcountry cycling that occurs is in the Kantishna Hills area on former mining access routes such as Moose Creek and Skyline. VTS camper buses can transport bicycles to any point along the park road. Three of the Kantishna operations provide mountain bikes and associated equipment, such as helmets, water bottles, and fanny packs, for overnight guests. Bicycling activity recorded by the lodges ranged from 92 to 169 people between 1996 and 1998, representing an annual average of 125 people, although much of this activity occurred on the park road and not in the backcountry. NPS rangers counted 432 bicycle riders in the Wonder Lake area in 1997 (NPS 1999c, NPS 2000d).

Climbing and Mountaineering

Climbing and mountaineering are prominent recreational activities in Denali National Park and Preserve. Each year approximately 2,000 people participate in independent and guided expeditions on peaks in the Alaska Range in the park. Various glaciers in the park and preserve are also used for skiing, ice climbing, rock climbing and alpine recreation courses. (See Map 3-4, Popular Climbing and Mountaineering Areas.)

- Mountaineering Logistics

The climbing season for Mount McKinley and the other peaks in the Alaska Range typically lasts from late April through the end of July. Severe winter weather with high winds typifies the



start of the season. Snow conditions on the glaciers, where air taxi services land, deteriorate as summer progresses (after July). Weather and mountain conditions limit climbing during the rest of the year, although a few ascents are attempted in other seasons (Jones and Stokes 2000).

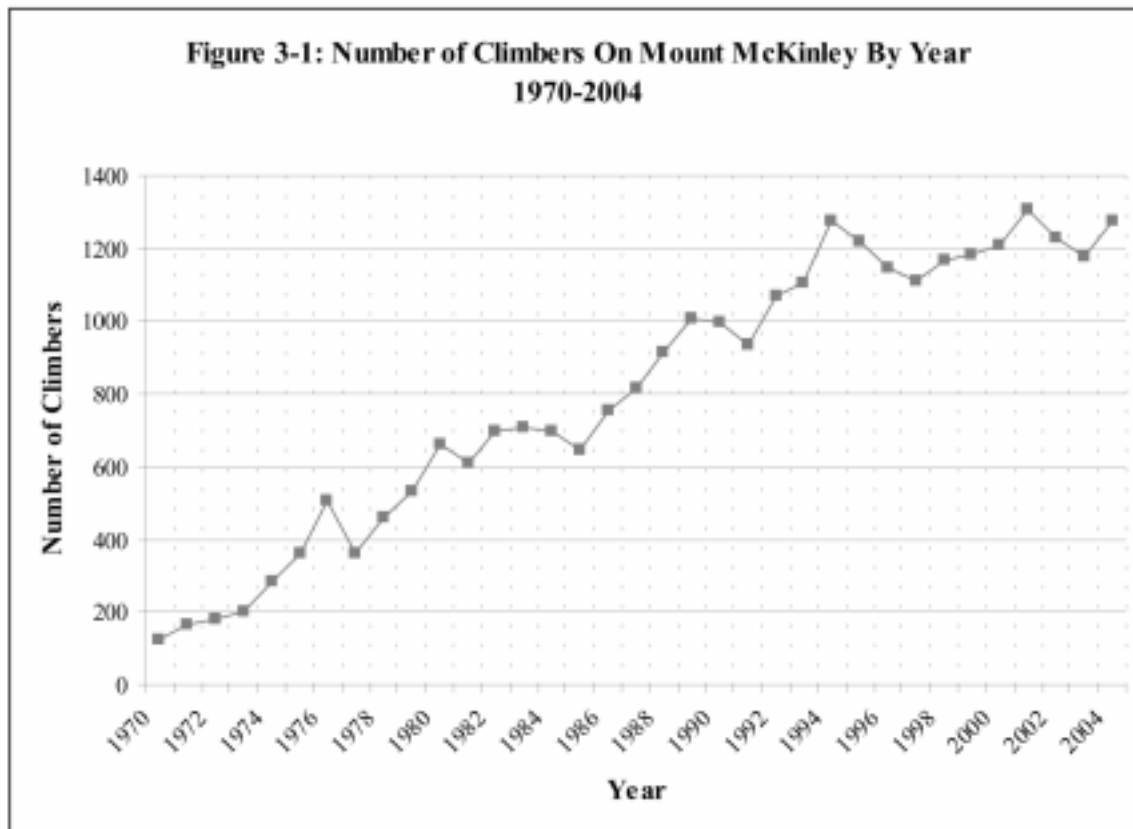
Most mountaineering expeditions and climbers use the town of Talkeetna, located on the south side of the Alaska Range, as a staging area before entering the park or preserve. Air taxi services are available to transport equipment and supplies to glacier landing areas near desired peaks. For routes that involve a north side approach, mountaineers may use dog sled freight hauling services to cache equipment and supplies during winter for the upcoming climbing season (see below under Caches). Although foot access to the Alaska Range in Denali National Park and Preserve is possible, the difficulty of the terrain and distance from roads to prime mountaineering areas present a significant challenge (Jones and Stokes 2000).

Since 1995, mountaineers attempting ascents on Mount McKinley or Mount Foraker have been required to register with the National Park Service 60 days before their expedition start date. The registration and fee process were instituted in response to an increase in the total number of mountaineers and an increase in search and rescue activity in 1992. Climbers and mountaineers are not restricted based on experience levels or other subjective factors. Anyone who legally registers is entitled to a permit.

Before entering the park or preserve, registered mountaineers are required to sign in at the Talkeetna Ranger Station, where they receive a briefing by NPS rangers on current route information, safety, environmental concerns, and waste disposal methods. On returning to Talkeetna, mountaineers must sign back in at the ranger station. Registration is voluntary for ascents on all other peaks in Denali National Park and Preserve.

- Mount McKinley

Mount McKinley is significant to the worldwide mountaineering community. Numerous peaks in the Alaska Range are climbed each year, but none has the appeal and drawing power of Mount McKinley, the highest peak (20,320 feet) on the North American continent. Compared to other peaks that are international destinations, accessing Mount McKinley is relatively easy and logistically simple using air transport. The mountain offers significant challenges with glacier travel, severe temperatures, and extreme environmental conditions. The number of mountaineers attempting the peak has increased substantially in the last three decades, from 124 in 1970 to 1,275 in 2004, with a peak of 1,305 in 2001 (see Figure 3-1).



The south summit is the highest point on Mount McKinley and, therefore, is the goal for most mountaineers. The most popular route to the south summit is the West Buttress. More than 90% of all successful ascents of Mount McKinley are attained via this route. Because the expeditions are lengthy, typically lasting 2-3 weeks, a relatively small number of mountaineers accounts for a lot of user nights and associated impacts, averaging 17 user nights per climber on the West Buttress. Despite the lengthy investment of time by most expeditions, success rates still hover in the 50% range.

Table 3-10: Denali National Park & Preserve Registered Mountaineering Activities on Mount McKinley, 2000–2004

	Expeditions	Climbers		User Nights
	#	#	% Summiting	
West Buttress (including Muldrow traverse)				
2000	287	1,083	53%	18,367
2001	300	1,154	61%	19,471
2002	284	1,111	53%	18,233
2003	269	1,005	60%	16,703
2004	290	1,176	54%	19,126
Other Routes				
2000	44	122	43%	2,309
2001	58	151	46%	2,860
2002	44	121	48%	2,391
2003	56	174	49%	3,088
2004	33	99	28%	1,689
Total McKinley				
2000	331	1,205	52%	20,676
2001	358	1,305	59%	22,331
2002	328	1,232	53%	20,624
2003	325	1,179	58%	19,791
2004	323	1,275	52%	20,815

Source: Denali National Park and Preserve Climber Database

- Mount Foraker and Other Mountaineering Destinations

Mount Foraker (17,400 feet) is the second highest mountain in the Alaska Range and the sixth highest in North America. It is accessed by the Kahiltna Glacier, which is also the starting point for West Buttress climbs on Mount McKinley. Mount Foraker is the only other mountain that requires registration by mountaineers and climbers.

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 is likely incomplete. However, table 3-18 still shows a rapid increase in visitor use of Alaska Range destinations.

Table 3-11: Number of Climbers and Mountaineers Registering for Backcountry Use Besides Mount McKinley 1997-2004

	1997	1998	1999	2000	2001	2002	2003	2004	Average
Mount Foraker*	27	11	22	52	40	36	34	16	30
Mount Crosson	26	5	12	42	46	0	12	2	18
Mount Hunter	55	37	52	59	39	35	26	21	41
Mount Huntington	7	8	13	20	14	19	14	30	16
Mooses Tooth	30	24	14	23	52	47	77	53	40
Peak 11,300	2	2	4	4	19	9	10	25	9
Silverthrone	0	0	0	5	3	4	0	0	2
Other Destinations	107	104	146	199	361	442	363	367	261
Total Mountaineering Use except McKinley	254	191	263	404	574	592	536	514	417

* Mount Foraker is the only one of these peaks where registration is required. Numbers for other destinations are based on voluntary registrations.

Source: Denali National Park and Preserve Climber Database

Popular glacier destinations have seen substantial growth over the past decade. Registered visitor nights on the Ruth Glacier increased from 1,262 in 1990 to 1,672 in 2000, before retreating to 1,435 in 2004. On the Pika Glacier user nights climbed from 68 in 1990 to 550 in 2004 (NPS Climber Database).

Visitors flown to the Ruth Amphitheater often trek or ski on the Ruth Glacier or in the Great Gorge area and have numerous opportunities for moderate to difficult mountaineering. Since 1976, visitors have also been able to purchase overnight lodging at the privately-owned Don Sheldon Mountain House, a six-sided cabin located near the Ruth Amphitheater Airstrip.

- Guided Mountaineering

Part of the total mountaineering activity includes guided mountaineering. In 2004, there were six National Park Service permitted mountaineering concessioners that could offer expeditions on Mount McKinley and other peaks in the Old Park. Additionally, 13 businesses had Incidental Business Permits to climb peaks outside the Old Park.

Table 3-12 summarizes data for Mount McKinley submitted by permitted mountaineering concessioners to the NPS. The amount of guided activity on peaks and glaciers besides Mount McKinley (Table 3-13) has risen rapidly from an average of 96 climbers per season during 1997-1999 to an average of 242 climbers per season during 2000-2004.

Table 3-12: Guided Mountaineering by Concessioners on Mount McKinley, 2000-2004

	Expeditions	Climbers		User Nights
	#	#	% Summiting	
West Buttress (including Muldrow traverse)				
2000	33	288	55%	5,330
2001	36	322	69%	5,668
2002	40	338	48%	5,656
2003	34	305	67%	5,432
2004	49	400	57%	6,572
Annual Avg	38	331	59%	5,732
Other Routes				
2000	2	21	71%	553
2001	1	7	100%	112
2002	2	20	15%	543
2003	5	33	76%	764
2004	1	3	100%	39
Annual Avg	2	17	72%	402
Total McKinley				
2000	35	309	56%	5,883
2001	37	329	69%	5,780
2002	42	358	63%	6,199
2003	39	338	77%	6,196
2004	50	403	57%	6,611
Annual Avg	41	347	64%	6,134

Source: Denali National Park and Preserve Climber Database

Table 3-13: Guided Mountaineering for Destinations besides Mount McKinley and Mount Foraker, 1997-2004

	# Expeditions	# Climbers	User Nights
Eldridge Glacier			
1997	1	12	120
1998	1	8	88
1999	8	59	494
2000	5	43	370
2001	4	15	120
2002	7	48	393
2003	3	16	134
2004	3	14	85
Kahiltna Glacier			
1997	2	10	85
1998	0	0	0
1999	1	13	117
2000	16	117	921
2001	17	146	1,245
2002	12	84	476
2003	18	100	622
2004	22	107	670
Little Switzerland			
1997	4	43	580
1998	5	49	666
1999	0	0	0
2000	7	55	448
2001	6	36	294
2002	6	35	524
2003	3	23	226
2004	3	18	90
Ruth Glacier			
1997	4	29	174
1998	4	29	181
1999	3	20	240
2000	8	43	290
2001	10	62	329
2002	14	53	263
2003	12	66	377
2004	12	55	282

Other Peaks & Glaciers			
1997	0	0	0
1998	1	15	330
1999	0	0	0
2000	2	11	61
2001	1	12	132
2002	1	6	54
2003	1	2	11
2004	12	44	288
Total Peaks & Glaciers Other Than McKinley			
1997	11	94	959
1998	11	101	1,265
1999	12	92	851
2000	38	269	2,090
2001	38	271	2,120
2002	40	226	1,710
2003	37	207	1,370
2004	52	238	1,415

Source: Denali National Park and Preserve Climber Database

In addition to guided ascents on the various peaks of the Alaska Range within the boundaries of Denali National Park and Preserve, guide services also offer alpine recreation courses. Classes are typically conducted on the Brooks, Eldridge, Kahiltna, and Ruth Glaciers. Courses on the Brooks Glacier generally last between 23 and 25 days. Courses on the Kahiltna, Ruth, and Eldridge Glaciers typically are 12 days long (NPS 2000d).

- Human Waste Disposal

Human waste disposal is one of the most visible problems on Mount McKinley. Most climbers use pit latrines where provided and, where latrines are not available, biodegradable bags filled with human waste are tossed into crevasses. As snowpack and glaciers move, the area where pit latrines have been dug will become exposed. The high camps, particularly the ones at 16,000 feet and 17,200 feet, are littered with feces that freeze and remain exposed due to high winds that prevent snow from accumulating. Also, 27,000 user days per year account for many plastic bags that could some day become exposed in an icefall or at the toe of a glacier (NPS 1998).

In 2000, NPS staff assisted a plastic manufacturer with the design of the “Clean Mountain Can” (CMC). These two-gallon plastic cans come with biodegradable bags and are used as portable toilets for expeditions. Once used, climbers deposit the cans at Kahiltna Base Camp where the NPS transports them off the mountain via aircraft. A sewage disposal company discharges the waste in an approved landfill, cleans the containers, and returns them to the Talkeetna Ranger Station.

- Trash Disposal

At the 14,200-foot camp alone, approximately 700 pounds of abandoned caches and trash were recovered in 1997. In 1999, the end-of-season clean-up yielded six abandoned caches and an additional 150 pounds of trash on the route between base camp and the 11,200-foot camp. In 2000, there was a 20% non-compliance rate for returning fuel cans (NPS 2000g). The *Trash on Denali Summary Report for the 2000 Climbing Season* found that more than 37,000 pounds of food and potential trash are hauled onto Denali each year by climbing expeditions. In discussions with 136 individuals, 76 (56%) stated they saw garbage on Mount McKinley.

- 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 around 4,000 pounds (Jones and Stokes 2000).

- Visitor Experience

Experiences of mountaineering in Denali National Park and Preserve are, for the most part, highly satisfactory. Besides accidents or illness, high air traffic volumes and associated noise detract from the mountaineering experience for some climbers. Guides may possibly notice more noise from air traffic than visitors may because they have been in the park and preserve enough years to notice the increase (Jones and Stokes 2000). Also detracting from a quality experience is the evidence of human waste on the mountain (NPS 2000f). When climbs are not successful, wands and food caches are often left on the mountain.

Sport Hunting

The Alaska Board of Game regulates hunting and establishes harvest levels and season lengths for preserve lands in Denali. Hunting regulations are published annually. The Board of Game meets regularly and changes state hunting regulations as necessary, based on comments and proposals from the public, local fish and game advisory committees, and the National Park Service. The National Park Service will also submit comments on proposals that affect game management units encompassing land areas managed by the agency.

Animals subject to hunting on preserve lands are:

- moose
- Dall sheep
- black bears
- grizzly bears

- wolves
- wolverine
- spruce grouse
- ruffed grouse
- willow ptarmigan
- rock ptarmigan
- white-tailed ptarmigan
- snowshoe hare
- fur animals (coyote, red fox, lynx, and squirrel)

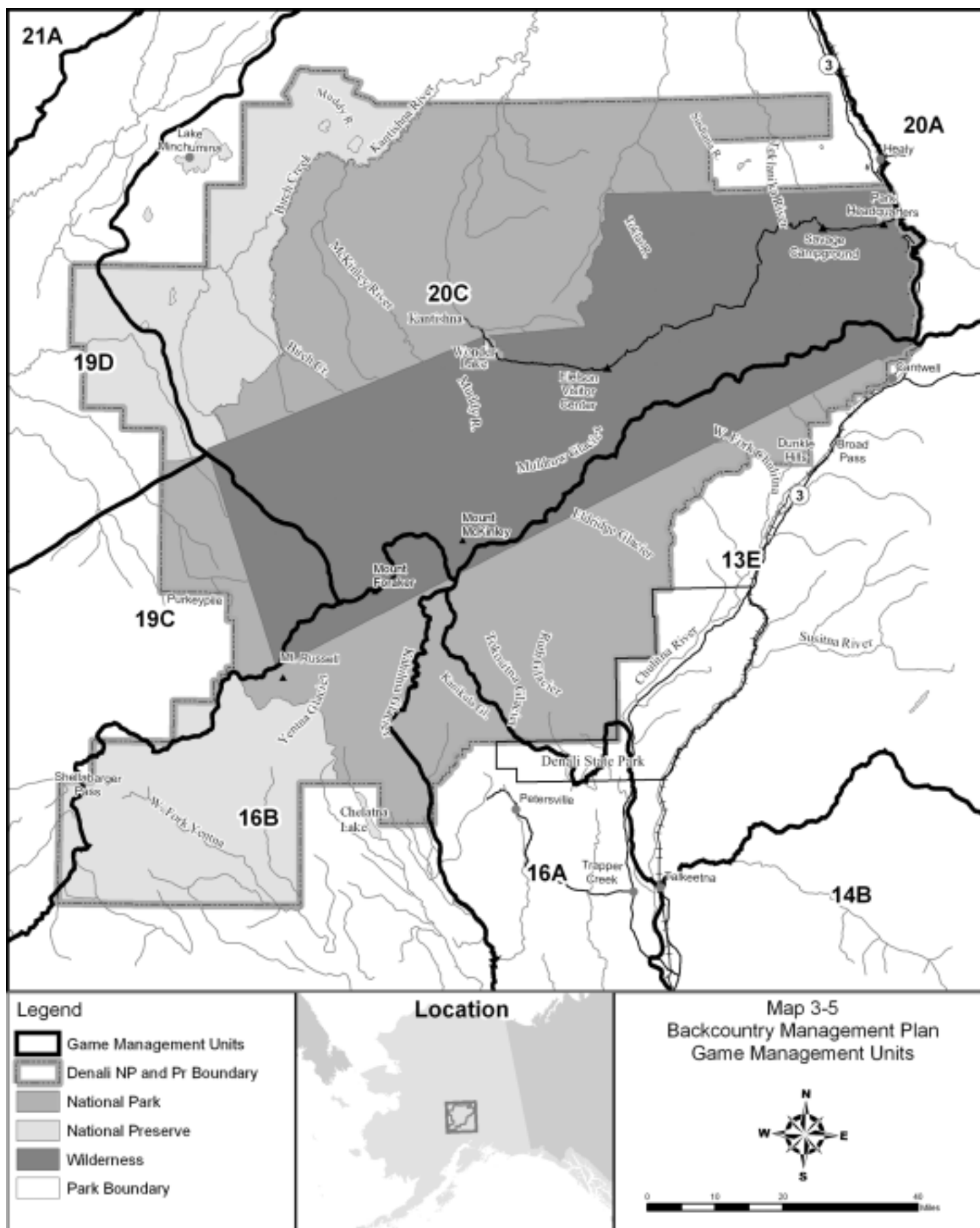
Most of these species are harvested under both subsistence and general hunting regulations. When wildlife resources are limited and not able to sustain both subsistence and sport harvest, ANILCA provides a preference for eligible subsistence users. The hunting seasons vary, depending on the open season for the game being hunted, but are typically during spring (late March through April) for bears and autumn (mid-August through early October) for Dall sheep, moose, and caribou (Jones and Stokes 2000).

The state of Alaska is divided into 26 game management units (GMUs). Hunting and trapping regulations, harvest reporting requirements, and game management practices are designed specifically to each GMU. GMUs are further divided into subunits and uniform coding units (UCUs) that represent major drainages. See Map 3-5 for a map of GMUs and UCUs that fall within the boundaries of Denali National Park and Preserve.

- Guided Hunting

There is no authorized guiding in the northwest preserve. In the southwest preserve unit of Denali, where much of the hunting activity is guided, two operators are authorized to provide sport hunting guide services. Each guide service is assigned a specific guide area. In 1989, three hunting areas were established and three permits were issued. In 1991, one permit was revoked because of a hunting violation and the area once authorized by this third permit has been divided and assigned to the two existing permits. Authorized guide areas are the East Fork Yentna area and the Kichatna Mountains area. The annual number of clients is limited to 13 for the East Fork Yentna and 7 for the Kichatna Mountains (see Map 3-6: Hunting Guide Areas).

Guided hunts are for legally hunted species as defined in state regulations, unless further restricted by permit or other closures. In addition to state harvest reporting requirements, these guides are required to report hunting and harvest activities directly to the park. Table 3-14 shows the number of trips, number of clients and the number of animals taken from preserve lands.



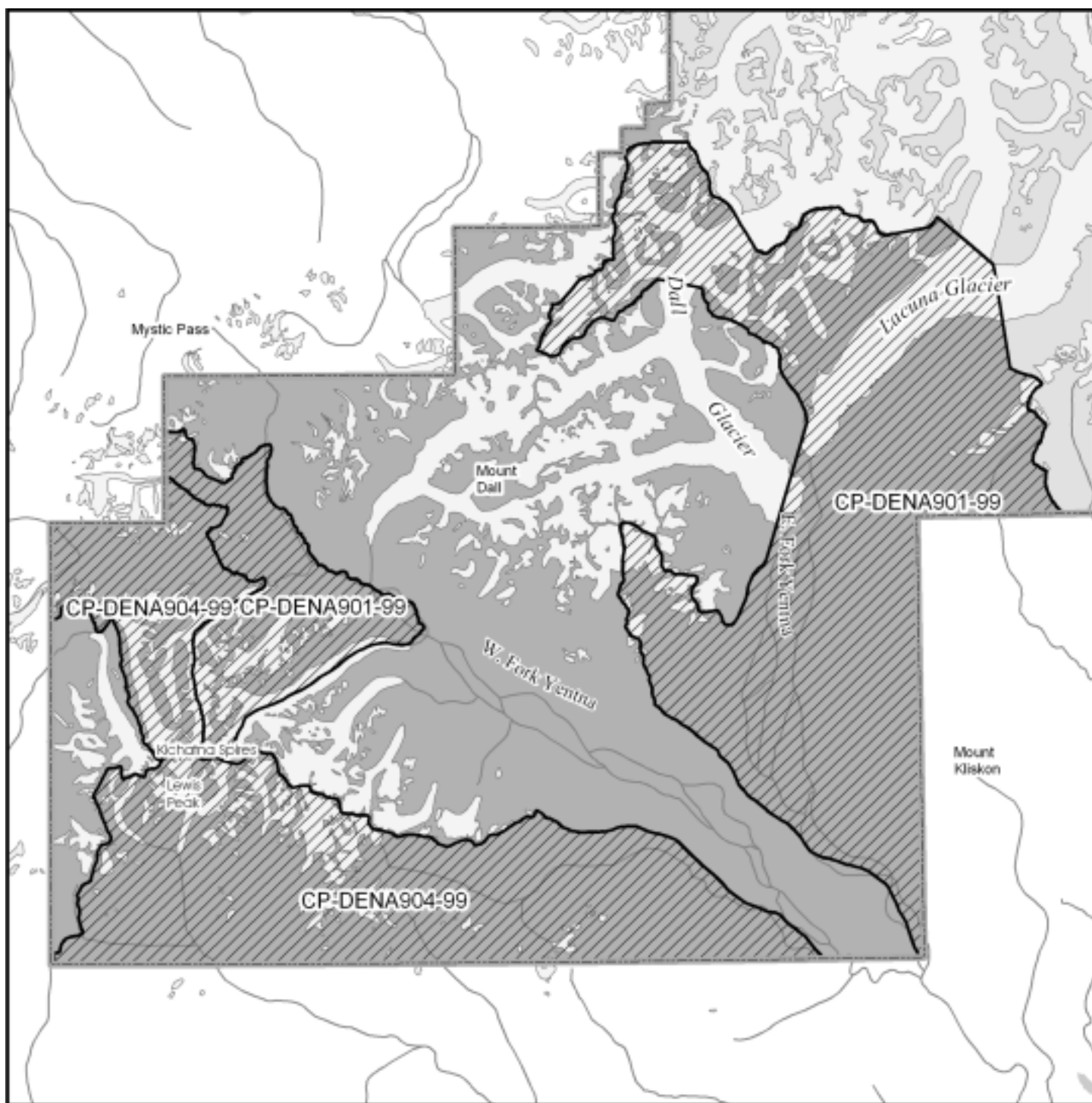


Table 3-14: Guided Hunting Statistics, 1990-2004

Year	# Trips	# Clients	# Animals Taken
1990	11	12	(no record)
1991	4	5	(no record)
1992	8	8	(no record)
1993	1	1	3
1994	10	10	3
1995	10	10	2
1996	8	9	1
1997	5	5	1
1998	3	3	1
1999	1	1	1
2000	(no trips)	--	--
2001	(no trips)	--	--
2002	(no trips)	--	--
2003	(no trips)	--	--
2004	(no trips)	--	--

Guided hunting on preserve lands occurs for a variety of game, including brown and grizzly bear, caribou, moose, and Dall sheep. Many expeditions also include fishing for salmon, grayling, rainbow trout, and Dolly Varden char. Guided hunting expeditions are typically backpack hunts, though canvas-walled tent base camps are used. One guide service has used packhorses occasionally. Hunting and fishing licenses and tags are required, though the guide services typically aid their guests in obtaining them.

Caches of food and gear are allowed for hunting activities in the southwest preserve. They must be transported and stored in a manner that will minimally affect the resource, and they must be removed within one year. Caches must be stored in a manner that wildlife is unable to access the contents per 35 CFR 13.22. Caches must be identified by party or expedition name, along with the dates they are intended for use. Food and gear are frequently cached for sheep hunters in parts of the southwest preserve, including Mystic Pass, Shellabarger Pass, and the Upper Yentna Airstrip.

Sport Fishing

While not many streams or lakes in Denali National Park and Preserve are prime sport fishing areas, there are fishing opportunities throughout the park and preserve. In the Kantishna area, Moose Creek and Wonder Lake offer opportunities for Arctic grayling and lake trout fishing. NPS employees estimate that recreational fishing on Moose Creek upstream of North Face Lodge is minimal, about one person or less per day, or fewer than 90 fishing days per year. About 10 to 15 fishers use Moose Creek below North Face Lodge each day of the season, or about 900 fishing days per season. No catch data are available. State of Alaska fishing licenses can be purchased in Kantishna, and some of the lodges have gear available for use by their guests (NPS 1999c). Fishing licenses are not required in the Old Park.

Anecdotal information indicates that sport fisheries use in the Moose Creek drainage and Wonder Lake by Kantishna lodge guests and other park visitors is increasing. Lake trout found in low-productivity, high-altitude, Alaska lakes, such as Wonder Lake, are generally very slow growing and prone to over harvest from even limited fishing pressure. All of these areas are within easy access to visitors as they are located along the Denali Park road corridor. Other popular fishing areas include the Triple Lakes, accessible from the Parks Highway near McKinley Village, and Caribou Creek, a tributary of the Savage River.

Recreational fishing activity in other areas of the park and preserve is not well known. However, fishing is popular on the south side of the Alaska Range near the park boundary. The numerous surface waters provide habitat for the migration, spawning, and rearing of a variety of fish species, such as salmon, rainbow trout, Arctic grayling, northern pike, burbot, and whitefish.

Winter Recreation

Denali National Park and Preserve offers many opportunities for winter recreation, although the park presently offers few facilities to support winter use. The park road is generally not plowed past park headquarters at Mile 3 from October through March, and skiers, dog mushers, skijorers, and snowshoers regularly use it for recreation throughout the winter. NPS staff and dog teams put in an unmarked winter trail from park headquarters to Wonder Lake that is used by adventurous, long-distance winter travelers. Other use along the trails and creek beds of the park entrance area is also common. It is the south slope of the Alaska Range, however, that often provides the most reliable snow for winter recreational opportunities for visitors.

Winter use in the park entrance area has been increasing in recent years. NPS dog sled patrols encountered 55 visitors along the road between November 1, 1999, and March 15, 2000. During the winter months of 2003-2004, NPS kennels staff encountered 134 visitors in the park, an estimated 121 (90%) of which were along the road or Aufeis Trail within 5 miles of Headquarters. In addition, 248 visitors were contacted at the kennel between October 1, 2003 and April 1, 2004 (Fortier, pers. comm.).

- Dog Mushing

Dog mushing is a winter activity that occurs throughout Denali National Park and Preserve and is perhaps Denali's most emblematic backcountry activity because of the long and colorful history of ranger dog-team patrols in the park. There is perhaps more private dog mushing on the south side of the Alaska Range than the north, although the significant distance between park boundaries and accessible winter staging areas limits the amount of activity that occurs on national park land; most occurs on adjacent state or other lands (NPS 1997).

NPS-permitted concessioners operate passenger services on the north side of the Alaska Range. In 1998, new concession contracts were awarded to three businesses for operating dog sled passenger services within the boundaries of the park and preserve. One concessioner offered day trips only, while the other two offered overnight trips. After the winter of 2000-2001, the day-trip concessioner ceased operations in the park. The typical season for dog mushing in Denali

National Park and Preserve is between December and April, with March being the busiest month. During that period, snow conditions are best for dog mushing (Jones and Stokes 2000).

Day trips were generally between 4 and 6 hours, while overnight trips presently last from 2 to 7 days. Dog mushing trips into the park and preserve range from 2 to 5 guests per trip, with 1-2 guides. Concessioners operate between 2 and 15 trips per year. In the winter of 2003-2004, 8 overnight trips took 16 people on passenger dog sled tours in Denali National Park and Preserve (NPS concessions data). The number of trips and the number of clients have gradually been increasing since the concessioners started business.

NPS-permitted concessioners sometimes use trails leading from the Stampede Road or the park headquarters west along the park road to the lower Toklat River and Wonder Lake areas. The dog sled operations often use snowmachines outside the Old Park for laying trails.

For visitors participating in guided passenger dog mushing, experiences can be highly satisfactory. The solitude, quiet, and historic Alaska means of transportation are often unique experiences for visitors to Denali (Jones and Stokes 2000).

Educational Programs

A number of educational programs for park visitors are offered in the Denali backcountry. Although many concession-guided activities are also educational, these programs are distinguished as having education as a primary purpose and being offered by the Murie Science and Learning Center, non-profit organizations operating in the park under a cooperative agreement, accredited institutions, or the National Park Service itself.

The National Park Service offers Discovery Hikes daily, roughly between mid-June and the end of August. These hikes are designed to provide natural history interpretation and to teach visitors how to hike safely and without damaging resources in Denali's backcountry. Visitors catch a designated bus at the visitor center and meet a ranger at a specified location on the park road to begin the hike. There is a limit of 15 visitors allowed on each hike, and visitors must sign up in advance to participate. To avoid overusing an area and causing social trail formation, Discovery Hikes are only allowed two times per year in any one location, except on gravel riverbeds or similar durable ground. In 1996, 124 hikes were offered with a total number of 1,212 participants. In 2003, 163 hikes were offered and 1,764 visitors participated.

Access

Like much of Alaska, the remote location of Denali National Park and Preserve has meant that the availability of access to the park has been the most important determining factor for the level of and type of visitor use, both in the backcountry and the frontcountry. The availability of surface transportation both to and into the park developed slowly through the twentieth century, and direct, all-weather access to the park entrance was not available until the fall of 1971. Much of the park remains accessible primarily by air transport.

The transportation systems and access considerations described briefly below are treated in more depth in the *General Management Plan* (NPS 1986), the *Alternative Transportation Modes Feasibility Study, Volume II* (NPS 1994a) and the *Entrance Area and Road Corridor Development Concept Plan and Environmental Impact Statement* (NPS 1997a). In addition, an entrance area transportation planning effort is underway.

Access to the park and preserve lands was redefined by the Alaska National Interest Lands Conservation Act of 1980. ANILCA Title VIII guarantees access for subsistence activities via traditionally-employed means of access, and Title XI guarantees access for traditional activities and travel to and from villages and homesites.

Surface Transportation

- Railroad and Highways

The Alaska Railroad was the first mode of mechanized transportation to the original Mount McKinley National Park after the park was established in 1917. The railroad was completed in 1922, and that year there were seven visitors to the park. The railroad passes through the Alaska Range via Broad Pass and the Nenana River canyon along the eastern edge of the Old Park. Until the Denali Highway was completed in 1957, the railroad was the only easy means of access to the park. Automobiles were carried on flat cars for use on the park road before 1957.

The park was linked to the statewide road system in 1957 with completion of the Denali Highway, a 135-mile gravel road extending northwest from Paxson on the Richardson Highway to Cantwell, near the Parks Highway and south of the park entrance. Road access to the park via this route involved a long, circuitous drive from Anchorage via the Glenn and Richardson Highways or from Fairbanks and Valdez via the Richardson Highway. Road access did encourage more visits, however, and by 1962 the park was receiving more than 16,000 visits annually (NPS 1997).

Access to the park improved further in the fall of 1971 with the completion of the George Parks Highway. The highway linked Alaska's two major population centers, Anchorage and Fairbanks. It provided a more direct route for buses and private vehicles to travel between the two cities. The highway follows the eastern edge of the park and enters it for a 7-mile section near the park's main entrance, which is approximately 240 miles north of Anchorage and 120 miles south of Fairbanks. Visitation to the park and preserve increased dramatically from that point forward – a record 88,615 recreational visits in 1972 alone (NPS 1997). Many visitors arrive by this route, either by commercial bus, rental vehicle, or their own vehicle. However, in recent years the proportion of visitors using the railroad, particularly those on packaged commercial tours, has been increasing.

**Table 3-15: Visitor Arrivals by Transportation Mode, 1995,
Denali National Park and Preserve – Entrance Area**

Transportation Mode	Numbers
Automobile	373,569
Railroad	128,221
Bus *	28,832
Air	5,053
*Estimated	

- Park Road

The 92-mile park road, completed to Kantishna in 1938, serves as the major access route to the interior of the Old Park and the existing backcountry units, as well as to the historical mining district at Kantishna. The road was designed as a low speed route for wildlife viewing. Restriction on use of the park road began in 1972 after the completion of the George Parks Highway. The first 15 miles of the road are paved and open to all traffic. Beyond Mile 15, the road is gravel and travel is restricted to tour and shuttle buses, vehicles used to access private inholdings (including businesses in Kantishna), administrative traffic, campers driving to Teklanika Campground (minimum 3-night stay), limited numbers of professional photographers, and occasional specially permitted uses.

The NPS initiated the shuttle bus service to provide visitor transportation into the interior of the park while minimizing wildlife disturbance. The Visitor Transportation System (VTS) is intended to promote a leisurely park experience, with visitors getting off the bus to explore an area and then return on a later bus. Most visitors tend to remain aboard a bus until it reaches the Eielson Visitor Center, the primary destination in the park interior.

There is also a seasonal limit of 10,512 vehicles allowed to travel the restricted part of the park road during the core visitor use period (Saturday before Memorial Day to the Thursday after Labor Day) established by the 1986 *General Management Plan* and codified in NPS regulations that were published in the *Federal Register* in June 2000 (36 CFR 13.63(d)(2)). The quota is allocated between tour buses, shuttle buses, private vehicles, and administrative traffic. The restrictions and quotas are in place to protect both wildlife viewing opportunities and the wilderness character of the road itself.

For overnight campers, there are designated shuttle buses called “camper buses” that provide transportation to campgrounds or starting points for an overnight backcountry expedition. These buses have fewer seats than standard shuttle buses so there is room to store backpacks and other camping gear. Individuals must have either a backcountry permit or a campground permit to obtain a ticket for a camper bus.

Except for daily bus limits, no limits have been established for road use during the two shoulder seasons (before and after the core visitor use period) when private vehicles and tour buses are permitted to drive as far as the Teklanika rest stop (mile 30), if weather and road conditions allow. In September, after the shuttle bus system ceases operation, a lottery system offers the public an opportunity to drive their private vehicles on the park road. During the second weekend after Labor Day (Friday-Monday), up to 1,600 lottery winners (400 per day) are permitted to drive their vehicles as far as Kantishna. Although there is no restriction on vehicle use of the paved road section, NPS traffic statistics indicate that this use is also increasing steadily from spring through fall with as many as 500 vehicles per day driving to the Savage River Bridge during peak season.

Other Surface Access

In addition to vehicular access by way of the park road, highway, or railroad, a variety of other modes of surface transportation is used for access into the park and preserve and its backcountry, including snowmobiles, motorboats, pack animals, and dog teams. ANILCA specifically allows these modes of access for some activities, although all of them are subject to regulation to protect resource values.

Non-motorized access into the backcountry portions of the park and preserve principally consists of hiking into designated backcountry units in the Old Park and northern additions from the park road. Less use is made of the backcountry on the south side of the park by hikers (the notable exception being climbers attempting Mount McKinley and surrounding peaks) because of the greater difficulty and expense of access. This access typically relies on some form of motorized transport, usually an airplane, to reach the point from which the visitors hike, mush, or ski. A small number of winter backcountry visitors ski into the park from the highway and railroad corridor.

- Snowmachines

In terms of the number of park visitors using off-road surface transportation, snowmachines (snowmobiles) top the list. Before 1980, Mount McKinley National Park was closed to snowmobile use. The passage of ANILCA in 1980 authorized snowmachine use throughout the entirety of Denali National Park and Preserve for “traditional activities.” However, ANILCA did not define which activities are included in “traditional activities.”

On June 19, 2000, final special regulations for Denali National Park and Preserve were published in the *Federal Register* (65 FR 37863). The regulation established a definition of “traditional activity” that applied only to the former Mount McKinley National Park area of Denali National Park and Preserve. The rule also determined that before the enactment of ANILCA, no traditional activities took place for which snowmachines may now be used. In addition, the rule implements the June 2000 Statement of Finding, *Permanent Closure of the Former Mt. McKinley National Park Area of Denali National Park and Preserve to the Use of Snowmachines (Snowmobiles)* (NPS 2000) and determines that any snowmachine use in the Old

Park would be detrimental to the resource values of the area. The preamble to the regulation provided that the NPS intends to define traditional activities and apply such definitions to other park areas, including the remainder of Denali in subsequent processes, such as future rulemakings to implement backcountry management plans. The preamble noted that the use of the Old Park might be distinct as compared to the additions created by ANILCA because of the different administrative history.

Winter access to the park additions and preserve by snowmachines is allowed for traditional activities, provided sufficient snow cover is present to protect vegetation and soils. ANILCA also allows access to homesites and between-village travel (for example, between Minchumina and Telida). Most snowmachine users who enter the park and preserve do so from the Parks Highway on the south side of the Alaska Range (See Map 3-7). Denali National Park and Preserve is presently not open to snowmachine access for uses other than traditional activities (36 CFR 2.18).

- Off-road Vehicles (ORVs)

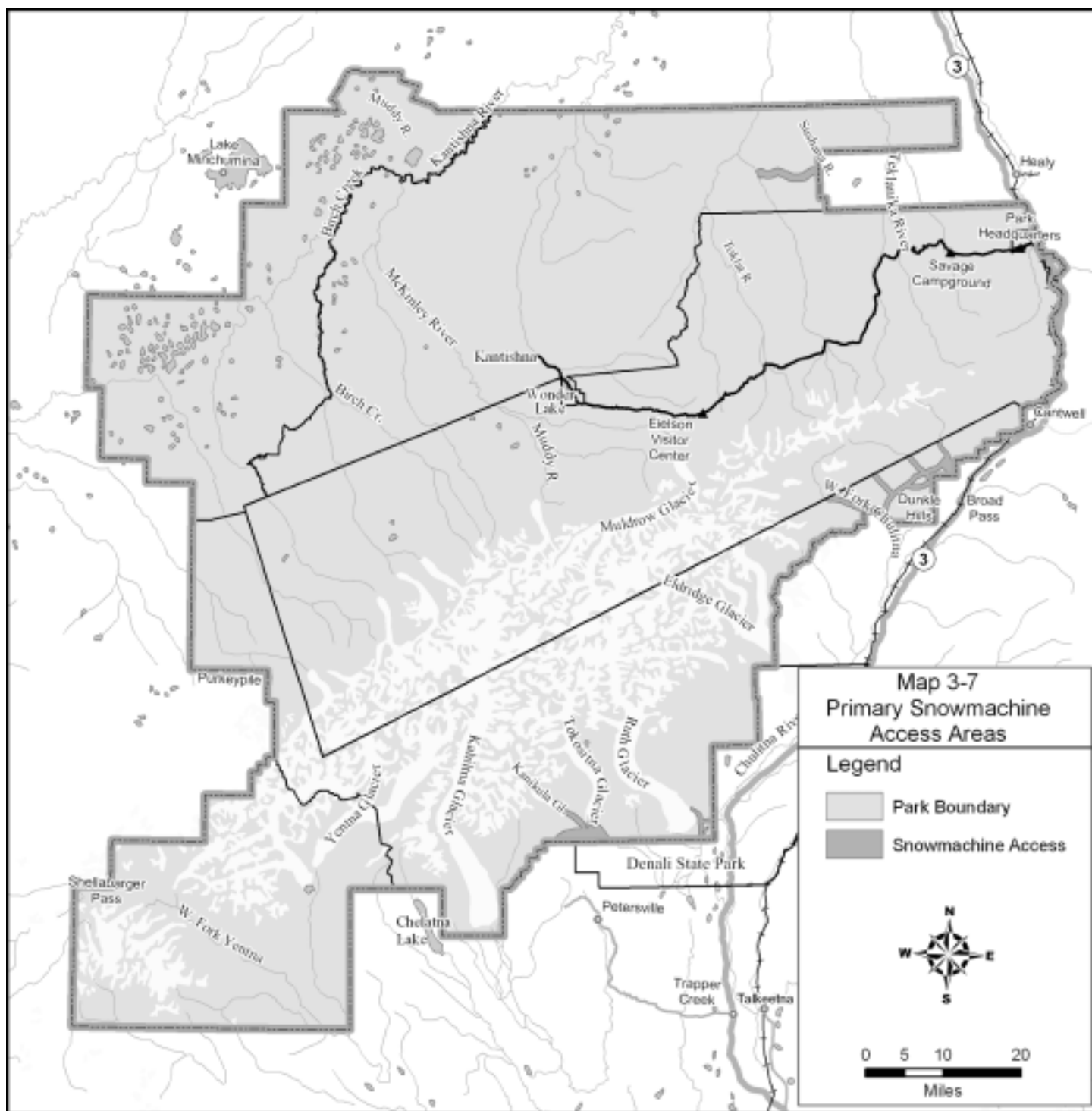
The use of ORVs in the backcountry is prohibited throughout the national park and preserve consistent with existing regulations. The only exceptions are for specific permitted access to some inholdings in the Kantishna Hills to meet the requirement of ANILCA 1110(b) and subsistence access on constructed mining access routes in the Kantishna Hills. There is also access along the state right-of-way in the Dunkle Hills. In addition, NPS is evaluating ORV use on two short sections of trail in the Cantwell area for subsistence purposes, but no determination has yet been made and these trail sections are presently not open to ORV use.

One commercial business transports visitors along a state right-of-way to locations in park additions in the Dunkle Hills, about 60 miles south of the park entrance. Visitors ride in a 14,000-pound (7-ton) truck with 64-inch tires and a very low gear ratio. The vehicle makes a 30-mile roundtrip tour along a former mining access route and provides drop-offs and pick-ups for day hikers and mountain bikers, but not for overnight use.

A 2003 report on ORV use in Alaska Region national park units noted that there are 10 ORV routes in Denali National Park and Preserve (NPS 2003). These routes are a mixture of the routes used for inholder access in Kantishna, the state right-of-way, the sections of trail near Cantwell that are being considered for subsistence use, and trespass trails that are a current concern for enforcement.

- Motorboats

Limited use of motorboats for access occurs in some parts of the park and preserve, particularly along the Tokositna River in the southern additions and the Muddy and Kantishna Rivers in the northern additions.



- Pack Animals

Horses and other pack animals are allowed for access to subsistence and traditional activities in the park additions and preserve. They are allowed for other uses subject to permit conditions. One hunting outfitter with a history of packhorse use that predated ANILCA is allowed to continue that use in the southwestern preserve unit. Between 1970 and 1980, a concessionaire was permitted to offer freight hauling services to McGonagall Pass and for pleasure trips. However, significant vegetation damage occurred. When the concessionaire reapplied for the permit in 1980, the park could not complete a Finding of No Significant Impact in an Environmental Assessment and concluded an Environmental Impact Statement would be required. The concessionaire chose not to continue the permit application. The only other commercial use of horses allowed in the park and preserve is for lodge-based trail rides in the Kantishna vicinity.

- Sled Dogs

There is a history of dog mushing in the park, and ranger patrols still rely on sled dogs for transportation in the Old Park wilderness. Several concessioners offer winter trips of varying length by dog sled, primarily on the north side of the park. Day trips by dog sled are common during the winter between the entrance area and Savage River.

- Future Access

Improved access on the southern side of the Alaska Range is likely to occur in the near future as part of the proposal for a new visitor center in the Petersville area that was evaluated in the *South Side Development Concept Plan EIS* (NPS 1997). That proposed project – currently the subject of a continuing cooperative planning effort by the NPS, State of Alaska, and the Matanuska-Susitna Borough – would provide a new means of access for visitors to the south side of the park and preserve.

Potential future access in the northeastern portion of the park has been discussed under the concept of a proposed North Access route, which would consist of a road or rail link to Kantishna from the Healy area (NPS 1997). That proposal, which would involve a significant new means of access into the park, would require a separate EIS and is not considered reasonably foreseeable at this time.

- Access Easements and Right-of Ways

Access to park lands includes Alaska Native Claims Settlement Act (ANCSA) Section 17(b) public access easements. These easements are intended to provide connecting access for public lands or waters across native corporation land conveyed by ANCSA. The National Park Service at Denali is responsible for managing three 17(b) easements:

1. The former cat-trail (EIN 7a C5, DI. L) from near the Cantwell Airstrip to the park boundary (it is 25 feet wide and allows travel by foot, dogsleds, animals, snowmachine, two- and three-wheeled vehicles, and small all-terrain vehicles);

2. A 5-mile easement (EIN 21C5) from near the junction of Highpower Creek and Swift Fork River to the preserve boundary (it is 25 feet wide and allows travel by foot, dogsleds, animals, snowmachine, two- and three-wheeled vehicles, and small all-terrain vehicles); and
3. A one-acre overnight camping site (EIN 4 D1) on an unnamed lake north of the Muddy River.

For the Cantwell-area 17(b) easement, there is no identified public access on the Cantwell side; legal access is blocked by several parcels of private property north of the Alaska Railroad crossing. It appears that this obstacle was known at the time the easement was reserved, but access was never resolved. Members of the local community and landowners are increasingly concerned about park visitors crossing private land to reach the easement (see Map 2-7).

The State of Alaska has asserted R.S. 2477 right-of-ways across Denali National Park and Preserve; these were listed in the 1986 *General Management Plan* (NPS 1986). The validity and limitations of any R.S. 2477 rights-of-way asserted by the State of Alaska across Denali National Park and Preserve lands would be determined on a case-by-case basis.

There is an existing state right-of-way along a former mining road that extends into the Dunkle Hills.

Air Transportation

Airplanes provide the principal means of access to most of the park and preserve. The more remote southern side and much of the northern and western portions of the 1980 additions can only be reached by air or long, difficult overland travel.

A large volume of air taxi and scenic tour traffic originates from Talkeetna, and the traffic is growing rapidly. While the number of airport advisories given at the airport remained relatively flat from 1991 to 1996, from 1996 through 2001 the number of advisories rose 44%, from 13,619 to 20,046. The Alaska Department of Transportation and Public Facilities is planning to upgrade the airport in a phased program of improvements (NPS 1997). Other flights originate from the McKinley Park Airstrip in the park entrance area, Healy, Kantishna, and even more distant points such as Anchorage and Fairbanks. Most developed airstrips in the park and preserve were originally constructed to support mining operations, especially in the Kantishna Hills and Peters Hills.

- Landings

The National Park Service has regulatory authority over aircraft landings within the management boundaries of Denali National Park and Preserve. Commercial airplane landings require a permit, with private airplane landings allowed by regulation (43 Code of Federal Regulations). Helicopter landings are not allowed anywhere in the park or preserve except for administrative purposes and emergencies.

Backcountry Landing Areas. While the only maintained landing strips in the park and preserve are the McKinley Airstrip at the park entrance and the Kantishna airstrip at the west end of the park road, there are formerly-constructed airstrips and other undeveloped areas, such as gravel bars on braided rivers and dry ridgetops, that provided suitable landing sites for small aircraft equipped with large tundra tires. Ski-equipped airplanes can land throughout much of the park and preserve during the winter and on glaciers during the summer when snow conditions allow. Relatively few private airplanes land in the backcountry of the park and preserve because of weather, topography, glacier and snow conditions, the low number of adequate landing strips, and the need for special equipment and pilot proficiency for landing everywhere but on the maintained landing strips.

Designated backcountry landing strips may be maintained as needed with non-motorized hand tools by people using the areas. Any other maintenance requires a permit from the superintendent. Outside of the designated landing area, no alteration of vegetation or terrain is authorized for landings and takeoffs except in emergencies (NPS 1986).

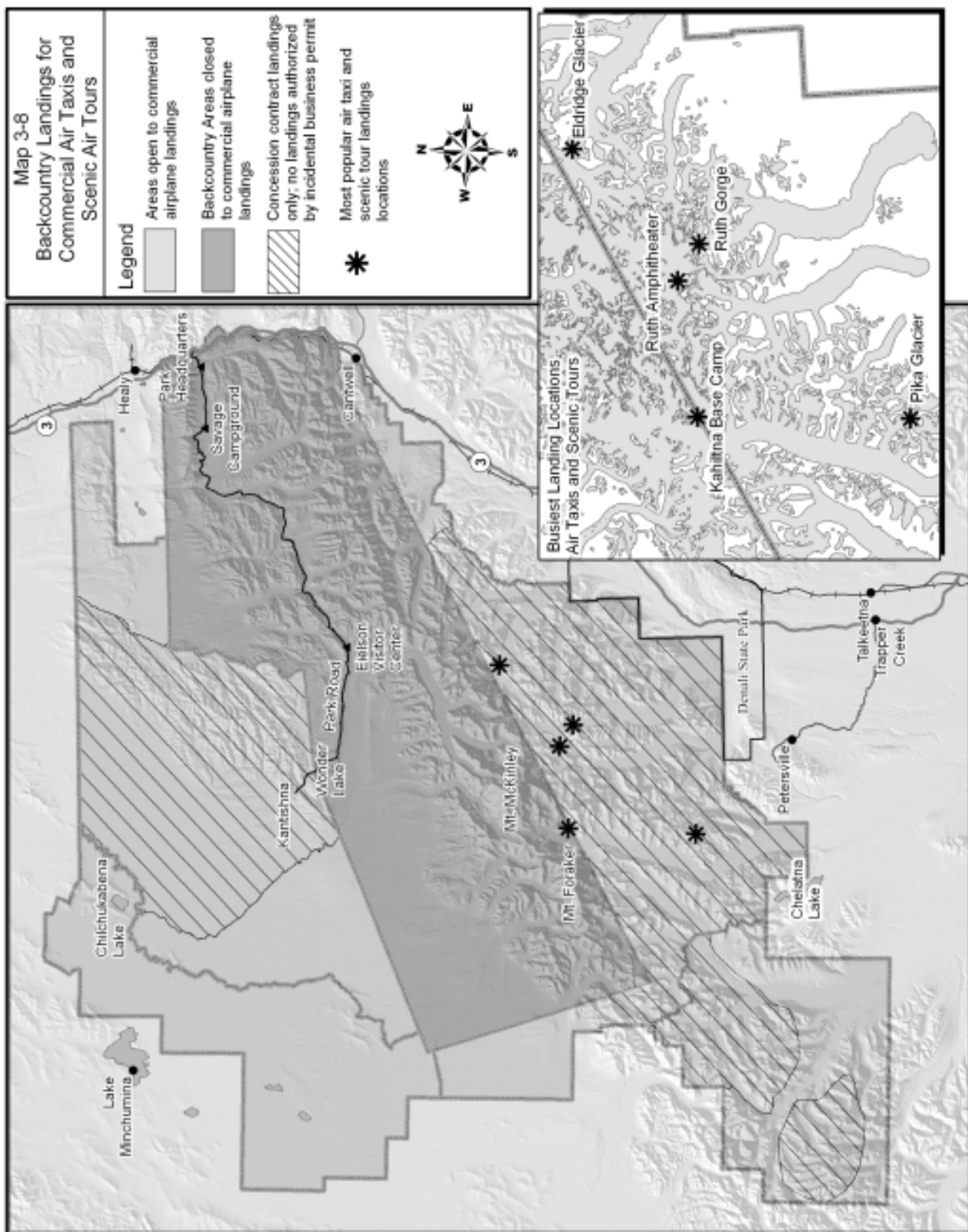
General Aviation. The airspace over the park and preserve is unrestricted for general aviation (non-commercial) pilots. While air traffic is generally lighter in the winter, use occurs year-round. Most pilots land for a few hours or spend one night on the ground.

Commercial Services: Air Taxi and Scenic Air Tour Landings. Much of the aircraft activity in the park and preserve is generated by businesses that provide air taxi and scenic air tour services to visitors wanting to access or see the remote parts of Denali. An *air taxi* is a commercial flight in which visitors and/or their equipment are taken to a location and left or picked up. A *scenic tour* (flightseeing) is a flight in which passengers remain with their aircraft for the entire trip, although authorized concessioners may offer their passengers the opportunity to land briefly on a glacier as part of the tour. There are six businesses with concession contracts authorized to land on glaciers in the southern park additions and 14 holders of incidental business permits (IBPs) to land elsewhere within the IBP area (see Map 3-8: Backcountry Landing Areas for Commercial Air Taxis and Scenic Air Tours). No commercial landings are permitted in the backcountry of the Old Park. The IBP holders make few landings in the park; in fact, many of them do not land at all.

Air taxi services transport visitors for a variety of backcountry recreational uses, including mountaineering, hunting, fishing, boating (kayaking and rafting), hiking, and camping. Mountaineering constitutes the majority of the air taxi trips for the services operating within the park and preserve; mountaineers are landed on glaciers on the south side of the Alaska Range to begin their expeditions.

The same companies that provide air taxi services make scenic tour landings, and they land in the same areas as air taxi flights. However, scenic tour flights concentrate their landings in just a few locations, with the Ruth Glacier as the primary landing area.

Air taxi flights and air scenic tours vary in duration. Because of the nature of the service provided, air taxi flights vary in length depending on drop-off/pick-up location, air traffic, and



weather. The length of time between drop-off and pick-up also varies depending upon the recreational activity and volume of business being handled by the service. For mountaineers, the duration is typically between drop-off and pick-up is typically between 15 and 25 days (Jones and Stokes 2000). The duration of scenic tours depend on the flight path, weather conditions, and if glacier landings are included. Flights typically range between one and two hours, with most of that time over the park. Glacier landings are short-term – typically 15-30 minutes – allowing enough time to step out of the airplane, walk around, and take a few photographs (Jones and Stokes 2000).

Table 3-16 shows the number of commercial air taxi and scenic tour landings on glaciers and the number of passengers from 1999 through 2004. The number of flights with landings increased rapidly up through 2001 before declining and stabilizing at about 3,000 per year, still reflecting an 11% increase over the six-year period. However, passenger volume has continued to increase reflecting the use of larger planes and greater capacity utilization on the part of the operators generally. The number of passengers landing on glaciers has increased 38% from 1999 through 2004. Air access now accounts for a substantial number of backcountry visitors, both those participating in extended expeditions and short duration visits.

Table 3-16: Total Flights with Landings and Passengers by Year, 1999-2004

Year	Air Taxi Flights		Scenic Tour Flights		Total	
	Flights	Passengers*	Flights	Passengers	Flights	Passengers
1999	935	2,914	1,666	6,517	2,601	9,431
2000	999	3,422	2,118	8,266	3,117	11,688
2001	1,088	3,875	2,284	9,436	3,372	13,311
2002	978	3,665	2,028	8,380	3,006	12,045
2003	977	3,669	2,024	9,817	3,001	13,486
2004	874	3,419	2,006	9,578	2,880	12,997

* Air taxi passengers are counted both when they are dropped and picked up, so many are double-counted.

Source: NPS Concessions Data

The number of air taxi landings peak in May and June, and most occur at Kahiltna Base Camp. There is significant traffic to other locations that attract climbers and mountaineers, particularly the Ruth Glacier Amphitheater. The Pika and Eldridge Glaciers have also seen substantial numbers of landings over the period 1999-2004. By contrast, the peak months for scenic tour landings is June and July, and almost all of the traffic lands in the Ruth Amphitheater. Base Camp may receive between 100 and 200 scenic tour landings a year, the Pika Glacier has had two seasons where it received about 170 landings, and the Eldridge Glacier saw 565 scenic air tour landings in 2004.

Table 3-17: Busiest Landing Locations, Air Taxis and Scenic Tours

Landing Location	Total Reported Landings 1999-2004		
	Air Taxi	Scenic Tour	Total
Ruth Amphitheater	1,064	9,815	10,879
Kahiltna Base Camp	4,276	659	4,935
Eldridge Glacier	123	737	860
Pika Glacier (Little Switzerland)	323	444	767
Ruth Gorge	128	40	168

Source: NPS Concessions Data

The Ruth Amphitheater is by far the busiest landing location in the park – during June there is usually an average of 20-30 landings per day, and there have been up to 62 landings in a single day. By comparison, peak season average for landings at Kahiltna Base Camp – the next busiest landing location – is usually between 12 and 13 landings per day and only rarely are there more than 40 landings in a single day. (See Table 3-18)

Table 3-18: Average, Maximum, and Total Concession Airplane Landings, Kahiltna Base Camp and Ruth Amphitheater

		Kahiltna Base Camp					Ruth Amphitheater				
		1999	2000	2001	2002	2003	1999	2000	2001	2002	2003
Average Daily Landings	May	10.5	11.2	13.1	14.0	12.3	9.2	10.9	10.6	14.0	8.0
	June	13.0	11.0	12.0	9.1	12.4	23.8	25.2	35.4	23.3	17.5
	July	1.9	1.8	2.5	1.9	1.5	11.8	14.9	13.1	16.2	18.8
	August	0.0	0.4	3.5	0.1	0.0	0.0	7.0	6.1	4.1	13.5
Maximum Daily Landings	May	38	31	51	28	36	24	31	27	31	38
	June	43	23	24	30	35	42	51	55	61	57
	July	11	11	20	13	9	47	49	47	49	62
	August	0	5	21	1	0	0	29	28	19	35
Number Days with 20+ Landings		9	6	14	11	10	36	39	39	42	36
Total Landings		805	802	995	790	854	1,422	1,924	2,107	1,929	2,036

Source: NPS Concessions Data

Concern has been expressed about air safety at current levels of flight activity, particularly in the Ruth Amphitheater on the south side of the Alaska Range near Mount McKinley. In the past, air taxi and flightseeing services operating out of Talkeetna have voluntarily met with each other and the National Park Service to improve safety in Denali National Park and Preserve. Specific radio frequencies have been designated for safety in all aircraft flying throughout the park and preserve, with reporting of aircraft location occurring on a regular basis. The Federal Aviation Administration, NPS, and air tour operators have cooperatively developed a Denali flight advisory map showing geographic reporting points, Common Traffic Advisory Frequencies, and geographic-based in-flight communication frequencies.

- **Overflights**

The National Park Service does not have control over fixed-wing airplane or helicopter flights in the air space above Denali National Park and Preserve, since air space is regulated by the Federal Aviation Administration (FAA). The FAA has complete regulatory authority over airspace classification and use within the territorial limits of the United States.

All aircraft are requested to maintain a minimum altitude of at least 2,000 feet above ground surface within the park boundaries. FAA Advisory Circular 91-36C (“VFR Flight near Noise-Sensitive Area”) defines the surface as the highest terrain within 2,000 feet laterally of the route or uppermost rim of a canyon or valley. More-specific guidelines are in effect in other parts of Alaska. Togiak National Wildlife Refuge has been identified as a “Wildlife Sensitive Zone,” where pilots are requested to fly above 2,000 AGL (above ground level) from April 1 through October 1 because of heavy concentrations of migratory waterfowl, sea birds, and marine mammals. Except in an emergency, the landing of aircraft is restricted to lakes, streams, and other bodies of water on the refuge and adjacent established village airstrips that are available. In the Walrus Islands State Game Sanctuary, pilots are advised to maintain a minimum altitude of 5,000 feet above ground level within a three-mile radius of Round Island (U.S. Department of Transportation 2000a). At the Kupreanof Peninsula Area, pilots are advised to fly above 1,000 feet within two nautical miles of Kupreanof Wilderness Retreat from March 1 through June 30.

Scenic Air Tours. Approximately 36 aviation companies based along the George Parks Highway corridor from Anchorage to Fairbanks advertise air tours in portions of the park and preserve. Air tours can be either by helicopter or airplane, although helicopters are not permitted to land. They occur throughout the park, but the majority of flights are concentrated on the south side of the Alaska Range, centered on Mount McKinley. The majority of the tours follow a flight path along the Kahiltna, Tokositna, and Ruth Glaciers, possibly circling Mount McKinley or Mount Foraker, depending on flight duration (Jones and Stokes 2000). Flights leaving from the park entrance generally follow the spine of the Alaska Range to Mount McKinley (R.D. Rosso, pers. comm). In recent years, specialty tours have developed, such as Lear jet tours and a 1940’s-themed DC-3 tour.

One flightseeing concession is based in Kantishna and serves primarily guests of the lodges. The concession operator is presently allowed to take 290 flightseeing trips from the Kantishna airstrip and 150 flights between the Kantishna airstrip and the McKinley Park airstrip at the park entrance.

General Aviation. The airspace over the park and preserve is unrestricted for general aviation pilots. A 2000-01 Alaskan Aviations Safety Foundation survey found the following areas to be most popular for general aviation (non-commercial use):

- Kantishna and McKinley Airstrip to Healy
- Most north and east parts of the park
- Broad Pass
- East and West Forks of the Yentna River

- Foraker River
- Herron River
- Windy Pass via Cantwell
- Toklat and Sushana Rivers
- Petersville
- North boundary
- Mount McKinley, Mount Hunter, and Mount Foraker

Commercial Overflights. In addition to the air tour companies, commercial aircraft en route between destinations often fly over the park. The Federal Aviation Administration has established high and low altitude IFR (instrument flight rules) routes that pass over and near the park. Traffic between Anchorage and Fairbanks uses the IFR routes alongside and over the park's eastern boundary. When conditions permit, commercial flights may request a "McKinley Tour" and be permitted to fly more directly over the park. The Kahiltna Pass between Mount Foraker and Mount McKinley is a popular route for commercial traffic during favorable weather conditions and good visibility. By regulation this "McKinley Tour" traffic must remain above 23,000 feet.

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).

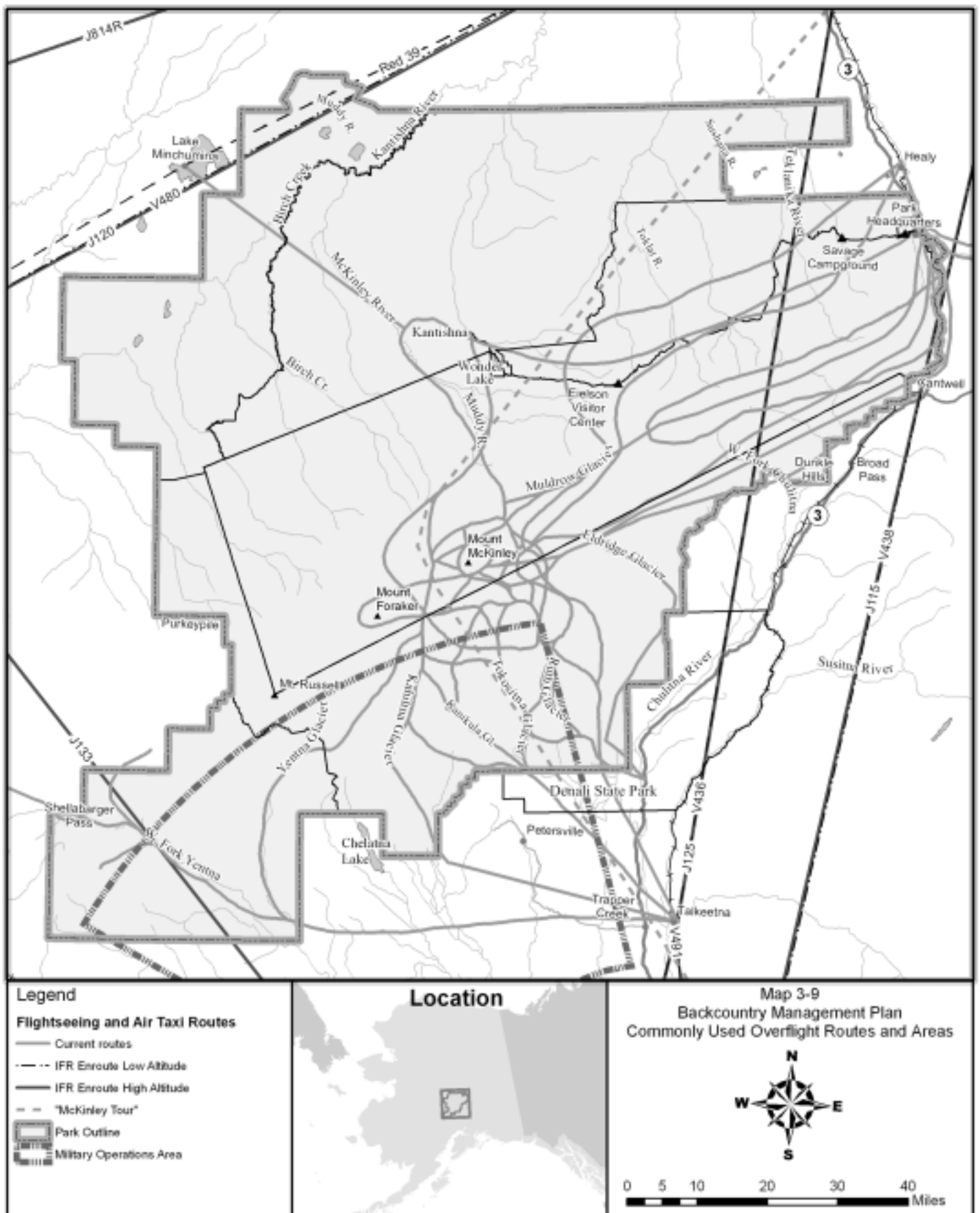
Map 3-9 depicts common flight routes and areas over Denali National Park and Preserve.

Backcountry Facilities

Relative to its size, Denali National Park and Preserve has very few facilities. There are no maintained trails, designated campsites, or 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.

Information Facilities

Backcountry information, overnight camping permits, and camper bus tickets are available during the summer at the park Wilderness Access Center (formerly called the "Visitor Access Center"). During winter months, information and permits are available at the Murie Science and Learning Center. Information and registration for mountaineers and other backcountry users is available year-round at the Talkeetna Ranger Station.



An important role of the information facilities is to provide a mandatory safety and resource protection orientation. For overnight backpackers, this orientation covers such topics as minimum impact camping, bear encounters, and river crossing technique. For mountaineers, the orientation covers topics such as waste and trash disposal, route logistics, and climbing safety.

The 1997 *South Side DCP and EIS* called for a visitor center to be constructed in an alpine saddle between the Peters and Dutch Hills in Denali State Park overlooking the Tokositna River and Glacier. The *DCP* also indicated that additional visitor information facilities could be built along the Parks Highway on the south side of the Alaska Range. An implementation plan presently in preparation is considering alternatives for either option.

Shelters and Cabins

Denali has no backcountry public use cabins or other shelters. The 1997 *South Side DCP and EIS* calls for building up to six public use cabins on state land in cooperation with Alaska State Parks in the Tokositna and Chelatna Lake areas.

Campsites

Denali has no designated campsites in the backcountry. There are six frontcountry campgrounds along the park road corridor offering varying levels of amenities and access. Backcountry trips can be seamlessly coupled with stays at the park campgrounds. The 1997 *South Side DCP and EIS* calls for the development of five primitive campsites at Chelatna Lake.

Park Road

During summer months, the 92-mile park road is Denali's primary frontcountry transportation facility and outside the scope of this plan. However, during winter months the park road has traditionally been left unplowed past Park Headquarters at mile 3, effectively becoming a part of the park backcountry. The first few miles from Headquarters to treeline become an important trail for skiers, snowshoers, and dog mushers on day-trips or beginning a longer expedition. There is a transition period usually beginning in late March when road crews begin plowing the road in preparation for the summer season. As conditions allow, the road is then opened to vehicle traffic as far as the Teklanika Rest Area at mile 30.

Trails

The backcountry of Denali National Park and Preserve has few maintained trails, the result of a management philosophy articulated in the 1986 General Management Plan for the Wilderness and the northern additions. The "trail-less" management philosophy promotes exploration, self-reliance and solitude in the backcountry.

Existing maintained trails in the Old Park generally either date to a period prior to the opening of the Parks Highway or were recently constructed to address specific resource management concerns. The trails are located in a few specific areas where visitor use is concentrated along the park road. Many of the trails are short and do not extend more than a quarter mile from the park road. Others are longer and several cross the wilderness boundary. These trails and their lengths are shown in Table 3-19.

Table 3-19: Trails

Trail	Distance (miles)	Distance (feet)	Width	Type
Blueberry Hill	0.2	1,056	2	unpaved hand
Eielson Alpine	0.8	4,118	1.5	unpaved hand
Eielson Tundra Loop	0.4	1,954	4	crush stone
Eielson tundra spur	0.2	950	4	crush stone
Gorge Creek	0.2	1,056	1.5	unpaved hand
Horseshoe Lake	0.8	3,975	6	crush stone
Jonesville	0.4	2,186	4	crush stone
McKinley Bar	2.2	11,563	2	unpaved hand
Mount Healy Overlook	2.2	11,838	2.5	unpaved hand
Polychrome	0.5	2,746	5	crush stone
Primrose	0.2	792	7	crush stone
Roadside	2.2	11,828	5	crush stone
Rock Creek	2.4	12,425	3	crush stone
Savage Cabin	0.3	1,531	8	crush stone
Savage River	1.7	8,870	2	unpaved hand
Savage River Bar	0.2	1,162	5	unpaved hand
Spring dog/ski trail	4.3	22,440	8	unpaved hand
Taiga	1.5	8,089	3	unpaved hand
Triple Lakes	7.6	39,970	2	unpaved hand
Total Length	28.1	148,548		

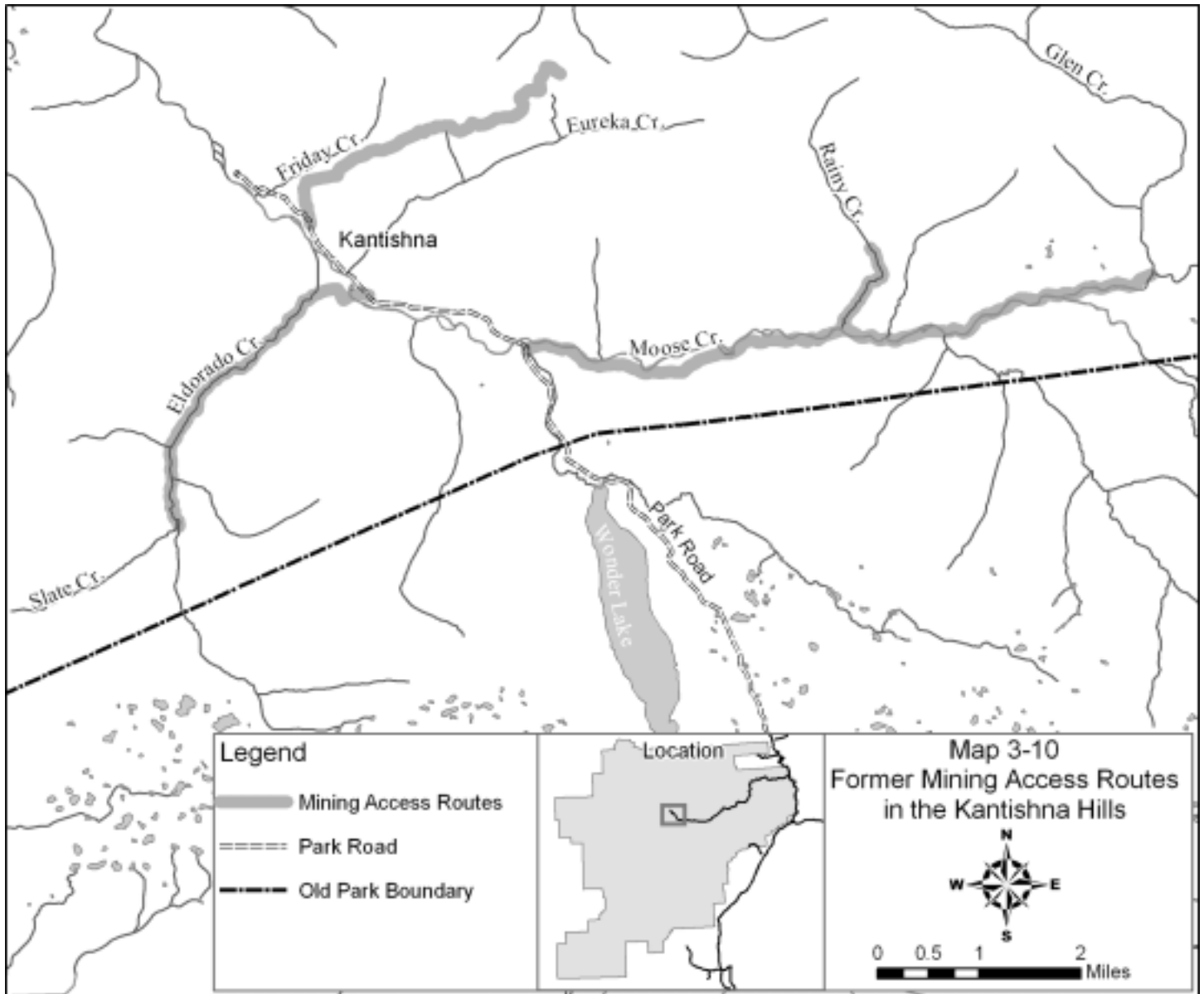
In addition, the 1997 *Entrance Area and Road Corridor DCP and EIS* and the 1997 *South Side DCP and EIS* authorized several trails that have not yet been constructed. These include:

- Foot trail along the Nenana River from McKinley village to the park entrance area
- A trail to the top of the ridge above Savage River that extends to the Savage River Campground
- A system of short hiking/interpretive trails in the Tokositna area in conjunction with the new visitor facility
- A hiking trail through the brush at Chelatna Lake, leading to the alpine terrain in Denali National Park and Preserve
- A trailhead with unspecified trails in the Broad Pass/Dunkle Hills area from the state right-of-way along the West Fork of the Chulitna River

Finally, there are formerly constructed mining access routes that serve as informal and unmaintained trails in several places, particularly in the Kantishna Hills. The most visible and utilized of these trails are the following (see Map 3-10):

- Moose Creek, extending upstream from the park road to former mining claims as far east as Glen Creek
- Skyline, extending from the park road to a ridgeline in the Kantishna Hills
- Eldorado Creek

The Kantishna Hills also has a large network of social trails that have developed both historically and relatively recently. Several of these trails have had some maintenance provided by the users, either miners or lodge operators depending on the era and the location.



Visitor Safety

While there are inherent risks in backcountry use, several decades of park management experience in Denali demonstrates the value of education to the safety of park visitors. The park has seen considerable benefits from educating backcountry visitors about hazards and proper behavior prior to trips. A good example is the instruction given on how to avoid bear encounters and prevent the habituation of bears to human food. The educational message is delivered at the backcountry desk at the main park visitor center, and it is required as a condition of obtaining a backcountry permit in the park. Along with bear-resistant food and garbage storage, education is one of the most significant parts of Denali's bear-human conflict management program. This program was successful in reducing the number of backcountry incidents between bears and people at Denali from 26 in 1982 – when Denali had more such backcountry incidents than any

national park in the country – to 3 in 1987, which was the first year that bears obtained no human food in the park (Dalle-Molle and Van Horn, 1989).¹ Altogether, visitor education greatly enhanced visitor safety in the backcountry.

Excellent success has also been reported from the increased level of information provided to climbers on Mount McKinley and Mount Foraker. Information provided during the advanced reservation process and at the Talkeetna Ranger Station prior to climbers traveling to the mountain has had a significant impact in reducing climber injuries and fatalities (NPS 2000f). Mountaineering rangers believe the present educational and rescue services could accommodate up to 1,500 climbers on Mount McKinley (Daryl Miller, South District Ranger, pers. comm.).

¹ Methodology for collecting information on bear-human encounters and incidents changed in the 1990s, so recent reported figures are now higher than in the 1980s but the numbers are not comparable.

PARK MANAGEMENT AND OPERATIONS

The Denali National Park and Preserve backcountry is currently managed according to the 1986 *General Management Plan* and the 1998 *Resource Management Plan*. The 1976 Backcountry Management Plan for the former Mount McKinley National Park also provides some specific direction that was not changed by the General Management Plan. An updated backcountry management plan was drafted in 1983 but was not finalized. Summer backcountry operations for the Old Park have evolved to meet visitor and resource protection needs, and several changes have been made in recent years in the south district mainly affecting mountaineering operations.

Current backcountry management activities and responsible divisions include:

Ranger Division:	Operations, including mountaineering Wilderness management
Division of Research and Resource Protection:	Research and resource management
Cultural Resources and Subsistence Management Team:	Cultural resources management Subsistence management
Concessions Division:	Commercial activities
Planning and Compliance Team:	Long-term planning and compliance for projects and studies
Maintenance Division:	Construction and maintenance of facilities such as trails, cabins, and bridges

Backcountry Operations

The rangers and volunteers working at the backcountry desk in Denali National Park and Preserve follow a standard set of operating procedures in order to assist and educate visitors who are seeking a wilderness experience and access into the backcountry. The backcountry desk staff issues overnight camping permits where they are required (see appendix D), which are available for free but must be issued in person at the Wilderness Access Center or, in the winter, at the Murie Science and Learning Center. No reservations are accepted and permits can be issued no sooner than one day in advance. However, just as important as issuing the permit is the opportunity for backcountry staff to give visitors critical safety and resource protection information.

At the backcountry desk, visitors are informed of the careful planning necessary for a successful trip. To receive a backcountry permit, visitors must watch a 25-minute video, which gives information on bear safety, minimum impact camping, river crossings, safety and emergencies, wildlife ethics, and pre-trip preparations. Along with the backcountry permit, a Bear Resistant Food Container (BRFC) is issued to the campers to ensure that they follow correct food storage procedures. The BRFC must be returned to the visitor center at the end of the backcountry trip.

The organizational structure and personnel requirements for park operations and the backcountry desk are as follows:

- 1 Chief Ranger
- 1 Wilderness Program Coordinator

Backcountry Desk Staff

- 1 Seasonal Supervisor
- 5 Seasonal employees

Along with issuing permits, backcountry rangers patrol the backcountry. A patrol is an assignment to range across a particular area of the park for specific purposes or objectives. Reasons for a patrol may be to increase orientation and knowledge of the park, initiate visitor contacts to provide assistance and education on wilderness ethics and park regulations, document resource damage and human impact, prevent violations in the park rules and regulations, study wildlife, and effect search and rescue. All patrols are documented with a detailed patrol report.

The south side of the Alaska Range, particularly the town of Talkeetna, is the staging area for most mountaineering expeditions on Mount McKinley and other peaks in the Alaska Range. Since 1995, all expeditions attempting ascents on Mount McKinley or Mount Foraker have been required to preregister with the NPS and pay \$25 per person (of the total \$200 per person registration fee) 60 days prior to the expedition. Upon arriving in Talkeetna, prior to being transported into the park and preserve, all mountaineers are required to sign in at the Talkeetna Ranger Station, provide an expedition itinerary, pay the remainder of the fee, and receive a briefing by NPS rangers on safety, environmental concerns, and waste disposal methods. Upon returning to Talkeetna, climbers must sign back in at the ranger station. Registration is voluntary for ascents on all other peaks within the park and to the backcountry accessible from the south (NPS 2000c). Many backcountry users use the resource library at the Talkeetna Mountaineering Center to inquire about current resource and weather conditions before heading into the backcountry. However, registration is sporadic, so use data are limited for areas where registration is not required.

The registration and fee process was established as the number of climbers and those needing rescue increased, thus requiring greater NPS staff management and increasing costs. The National Park Service currently maintains ranger camps at Mount McKinley's base camp, at the 7,200-foot level, and at the 14,200-foot level. These camps are staffed from the end of April through early July. The air-taxi concessions have personnel at the 7,200 foot base camp to coordinate flights in and out of the base camp for the duration of the climbing season. The NPS mountaineering rangers, along with climbing volunteers, staff the 7,200-foot and the 14,200-foot camps.

Staffing at the Talkeetna Mountaineering Center consists of:

- 4 Permanent full time employees
- 4 Permanent subject-to-furlough employees, typically Feb-Sept.
- 5 Seasonal employees (3 mountaineering rangers, 2 visitor use assistants)
- 1 Permanent detailed helicopter manager

Backcountry Management During Winter

Backcountry permits are required in winter in the same portions of the park as in the summer. In winter, this permit allows campers to build fires if they obtain firewood only from down and dead timber. Dog mushers are encouraged to camp several hundred yards from patrol cabins to help disperse impacts from concentrated use.

Rangers conduct winter patrols by dog sled. Outside the designated wilderness, snowmachines are also used. Rangers estimate visitor snowmachine use and wilderness boundary violations, establish an agency presence, make wildlife observations, and monitor aircraft overflights.

To enhance education and enjoyment of the park, the National Park Service has worked with partner organizations since 2001 to host “Winterfest,” a special event offering a variety of dog mushing workshops, skijoring clinics, interpretive ski tours, telemark clinics, and mammal tracking clinics. The event has been very successful and has become a local tradition.

During winter the park road is typically maintained for driving to mile 3. Beyond that point, park maintenance staff packs snow out to mile 7 in order to allow for equipment to prevent the buildup of ice on the road between miles 4 and 7, but a surface suitable for skiing and mushing is retained.

Closures

Approximately 32,100 acres in the old park are currently identified as critical wildlife habitat, where human presence is not compatible with wildlife activity (Jon Paynter, pers. comm.). These areas are closed to all uses, except for special projects conducted by researchers and park staff. Throughout the year, temporary or emergency closures are often designated to protect the resource and to enhance visitor safety. In the past, areas have been closed to protect moose rut sites; to protect visitors from activity around recent kill sites; or to protect visitors from unsafe conditions such as an aggressive bear, avalanche danger, fire, or flooding.

Emergency closures, which last no longer than 30 days, are usually initiated by a field ranger or wildlife technician. Temporary closures, which can last up to 12 months, are usually recommended by the resource management specialist or division chief. If a need for an emergency closure is identified, the communications center is notified, signs are posted to mark the closure boundary, and a written report is sent to the chief ranger. If a need for a temporary closure is identified, the initiating party writes a brief justification and location for the proposed closure. If the superintendent concurs, the signed report is forwarded to the communications center for dissemination and the area is posted as closed.

The decision to designate a closure is be guided by factors such as public health and safety, protection of natural or cultural resources, aid to scientific research (for example, to use as a control against areas with human impacts), subsistence, implementation of management responsibilities, equitable allocation and use of facilities, and the avoidance of conflict among visitor use activities (36 CFR 1.5 (a), 13.30(b)). Except in emergency situations, the superintendent prepares a written determination justifying the establishment or termination of a closure. This determination is available to the public upon request (36 CFR 1.5(c)).

Current closure information is distributed to the backcountry desk, park headquarters, law enforcement rangers, the superintendent's office, wildlife biologist, interpretation division, shuttle bus dispatcher, the concessions bus systems, and Kantishna businesses. It is also announced on the park's morning report. Emergency closures are opened after the area has been deemed safe, and temporary closures are opened upon the recommendation of the appropriate resource management employee. Closures in the old park are usually in effect only during the time the park road is open (typically from April through September). Once the road is closed for the season, the closures are removed.

Facilities

There are several administrative cabins in the Denali backcountry. Many of these are historic structures listed on the National Register of Historic Places. They are primarily located near the boundaries of the Old Park and in the Kantishna Hills, and are used during both summer and winter months to support NPS backcountry patrols including winter dog sled patrols.

Communications facilities in Denali National Park and Preserve include a radio station at Park Headquarters and relay stations at the Savage check station, Toklat road camp, Eielson Visitor Center, and the Wonder Lake ranger station. There are seven permanent repeaters: Wickersham Dome, Thorofare, Savage, Mount Healy, Cantwell, Tokosha, and Bald Mountain. In 1999 Denali Park Resorts began sharing the Mount Healy and Thorofare sites with the National Park Service (Diane Brown, pers. comm.). Occasionally, temporary or emergency repeaters are installed in the spring to service search and rescue operations around Mount McKinley (Chuck Holm, pers. comm.). Although there has been little pressure from private telecommunications companies to construct facilities in the park, use of cellular phones, laptop computers, and other forms of communications technology is increasing. As users demand wider coverage, private companies may want to build structures inside park boundaries.

Scientific Information

Given the clear preservation intent of Congress, and faced with a growing concern about the impacts of increasing visitor use and other activities, the National Park Service is continuously expanding its resource management program. The intent of the resource management program is to understand the natural forces that shape Denali's environment and to avoid or eliminate activities that significantly interfere with natural processes. Resource management plans are prepared to describe the scientific research, surveys, and management activities that will be conducted in each national park system unit. Information obtained from research described in

the resource management plan is used by park managers to better understand the unit's cultural and natural resources and is used in making resource-related decisions and funding requests.

The park's current research and resource preservation program is generally organized around the following categories:

Resource Inventory – Identify and develop understanding of the resources and processes that are essential to the park.

Monitoring – Establish and monitor baseline measurements of the resource conditions and processes so impacts can be detected before they cause damage and to provide a standard against which management performance can be measured.

Research – Identify and conduct quantitative investigations to answer questions about park resources and processes.

Mitigation, Interpretation, Protection – Implement various mitigation, interpretation, and protection actions to resolve resource related problems.

Prediction – Institute a system for predicting potential threats to natural or cultural resources early enough before their occurrence. Therefore, budgeting and programming are done to accomplish research and/or management actions to prevent or mitigate these threats. Information derived from inventory, research, and monitoring efforts is useful in forecasting the possible threats.

Administrative Programs and Planning – Identify all planning and administrative actions necessary to support a well developed resource preservation program.

Administrative Use of Aircraft and Airstrips

The park currently operates two small fixed-wing airplanes and routinely contracts for helicopter and fixed-wing services. The fixed wings are flown regularly on a year-round basis. Contract helicopter services are used primarily during the climbing season and the summer visitor season. Missions flown by these aircraft include boundary and hunting patrols; wildlife surveys and radio tracking; snow surveys; search and rescue; wildfire monitoring; hazardous waste and debris removal; point to point transportation of scientists, park rangers, maintenance personnel, smoke jumpers, and their equipment and supplies; and staff orientation. Frequently these flights are below 2000 feet and often involve highly specialized types of missions such as aerial wildlife capture.

Military helicopters and fixed-wing aircraft are routinely used during search and rescue missions. Military aircraft are also used each year to insert and extract a ranger station on Mount McKinley at 14,200 feet. Under the terms of a memorandum of understanding, military aircraft are permitted to practice limited landings and takeoffs at high altitudes for search and rescue operations.

Administrative use of aircraft is controlled by the U.S. Department of Interior Office of Aircraft Services (OAS). The OAS sets policies and procedures, with additional detail contained in park policies and the park's aviation management plan. These policies deal primarily with administrative concerns and do not provide much guidance on frequency of flights, avoidance of sensitive areas or time periods, or other issues that are related to visitor use and resource preservation. The park's Aviation Use Plan identifies the areas around Park Headquarters and Kantishna as noise-sensitive areas and recommends pilots avoid flying directly over lodges and other housing facilities and discourages landing at Wonder Lake.

Minimum Requirement

Section 4c of the 1964 Wilderness Act acknowledges that even though there are certain activities that are prohibited in order to protect wilderness there are also necessary exceptions in order to meet the minimum requirements for the administration of the area as wilderness. Therefore, a two-step process is used:

- 1) Determine whether or not the proposed management action is needed and necessary for the purpose of wilderness, and does not pose a threat to wilderness resources and character.
- 2) Determine the techniques and type of equipment needed to ensure that impact to wilderness resources and values is minimized.

The minimum requirement concept is used when making all decisions concerning management of wilderness, including administrative practices, proposed special uses, scientific activities and equipment use in wilderness. When the minimum requirement is determined, the potential disruption of wilderness character and the physical resource is considered and given more weight than economic efficiency and convenience. If a compromise of wilderness resource or character is unavoidable, only those actions that preserve wilderness character and/or have localized, short-term adverse impacts will be acceptable (NPS 2001).



CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

This chapter analyzes the probable impacts, by resource topic, for each alternative described in chapter 2. Impacts resulting from actions common to all alternatives are also discussed. Table 2-11 summarizes the impacts of each alternative; the table appears at the end of chapter 2.

The impact assessment evaluates the magnitude of impacts and how these impacts compare to current conditions and to the no-action alternative. 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

Varieties of 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.

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.

These impacts are assessed in relation to the baseline conditions existing before any actions are taken under the backcountry plan; in this case, pre-existing conditions are those described in the no-action alternative. Comparisons were made with the evaluations and predictions of previous NEPA documents and planning processes (referenced below) to ensure consistency with those approaches and to build on their analyses. Impacts are described in as specific a manner as possible, bearing in mind the programmatic, general nature of the management alternatives.

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 under each alternative. 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 actions proposed in the various alternatives 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 tour plane 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 would 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 (also referred to as regional 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 proposed action, other action alternatives, and the no-action 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 time 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. This cap regulation 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 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 and 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.
- The National Park Service is evaluating additional information about whether off-road vehicles (ORVs) were traditionally employed for subsistence purposes in portions of the park additions, particularly on two informal trails in the Cantwell area. This determination has not been made, so at present all of the park and preserve backcountry is closed to all ORV use as described in Chapter 1.

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 Kantishna, but include more than twice the authorized guided hikes offered by the historic concession operator within the Old Park.
- 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 pack animal freighting that had been issued originally in 1970. In the early 1980s a dog-mushing concession was authorized to provide this freighting service.
- 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 under development. This analysis will examine 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 treeline 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.

ALTERNATIVE 1 (NO ACTION)

The following analysis shows impacts to ice-rich permafrost soils under Alternative 1 would be moderate because this alternative allows for large 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 no-action alternative represents no change from current management as outlined by the General Management Plan (1986) and the Strategic Plan (1997). This alternative would allow for substantial increases in types and levels of use; without management area prescriptions, desired future conditions, and indicators and standards, 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 affect ice-rich permafrost soils because there would be more potential for degradation of these resources. Unless otherwise stated, all impacts would occur throughout the life of the plan.

Under this alternative, snowmachine use would increase substantially over current numbers, so localized impacts on ice-rich permafrost soils from snowmachine use would continue to 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 multiple passes are made.

While snowmachine use would continue to be prohibited in the Old Park (35% of the total park area), use could occur throughout the remaining 3,707,535 acres. As more people use snowmachines in the backcountry, and as technological advances allow riders to cover greater distances, more riders would travel over ice-rich permafrost soils. While the adequate snow cover requirement (see Chapter 3: Affected Environment) is intended to prevent these types of impacts, they are still possible 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. Some mushing also occurs in the northwest preserve and in the Windy/Riley drainages. 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.

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 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 Alternative 1 alone would have moderate adverse impacts on ice-rich permafrost soils. The cumulative adverse impact of this alternative plus the aforementioned past, present, and reasonably foreseeable actions would be major because additional acres of ice-rich permafrost soils would be affected.

Conclusion

Impacts to ice-rich permafrost soils under Alternative 1 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. The level of impacts to ice-rich permafrost soils 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.

ALTERNATIVE 2

The following analysis shows impacts to ice-rich permafrost soils under Alternative 2 would be negligible. Impacts would affect an important park resource over a long period but would be of low intensity. 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. Unless otherwise stated, all impacts would occur throughout the life of the plan.

Under this alternative, areas of the park that contain ice-rich permafrost soils would be zoned as Management Area OP1, OP2, or Management Area E. These management areas allow for very low to medium encounters, no landscape modifications, and low to medium trail and campsite disturbance (which includes 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. Only 60 linear miles would be zoned as a corridor, which would accommodate higher levels of use. Since these higher use areas are not located where ice-rich permafrost soils are abundant, impacts to ice-rich permafrost soils would be minimal.

Under this alternative, access by snowmachine to the park additions and preserves would only be allowed for traditional activities as defined for the Old Park. Damage to ice-rich permafrost soils from snowmachine use would be reduced since the number of riders engaged in traditional activities would be less than the current number of riders. Fewer snowmachine users in areas 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) equates to fewer impacts to ice-rich permafrost soils.

Most dog 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. 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 slightly above current numbers but impacts would be minimal because use would still be low and the Kantishna and Stampede areas would be zoned as Management Areas E and OP1, which accommodates low signs of human presence, and low trail and campsite disturbance. If impacts to 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 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 Alternative 2 alone would have negligible adverse impacts on ice-rich permafrost soils. Together—with the activities previously described, there would be moderate adverse cumulative impacts to physical resources, none of which are attributable to the actions in this alternative.

Conclusion

Impacts to ice-rich permafrost soils under Alternative 2 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. This alternative would have the least impact on ice-rich permafrost soils of all the alternatives because the levels of some activities, particularly snowmachine use, would be reduced in the park additions and preserve. Reducing use would reduce impacts on ice-rich permafrost soils. The cumulative impact of this alternative plus the aforementioned past, present, and reasonably foreseeable actions would be moderate. The level of impacts to ice-rich permafrost soils 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.

ALTERNATIVE 3

The following analysis shows impacts to ice-rich permafrost soils under Alternative 3 would be negligible. Impacts would affect an important park resource over a long period but would be of low intensity. 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.

Under this alternative, areas of the park that contain ice-rich permafrost soils would be zoned as Management Areas D, E, OP1, or OP2. These management areas allow for very low to medium encounters, no landscape modifications, and low to medium trail and campsite disturbance (which includes 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 these higher use areas are not located where ice-rich permafrost soils are abundant, impacts to ice-rich permafrost soils would be minimal. All impacts would persist for the duration of the plan unless otherwise stated.

Snowmachine use would increase over current numbers only in corridors (because the definition of traditional activities, as defined for the Old Park, would be applied to areas outside of corridors). Impacts would be confined to routes where multiple passes are made.

While the adequate snow cover requirement (see Chapter 3: Affected Environment) is intended to prevent these types of impacts, they are still possible 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 via either 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 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 accommodates low signs of human presence, and low trail and campsite disturbance. If impacts to 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 Alternative 3 alone would have negligible 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

There would be negligible adverse impacts to ice-rich permafrost soils under Alternative 3. 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. The level of impacts to ice-rich permafrost soils 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.

ALTERNATIVE 4 (PREFERRED ALTERNATIVE)

The following analysis shows that there would be minor adverse impacts to ice-rich permafrost soils under Alternative 4. 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 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 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 these higher use areas are not located where ice-rich permafrost soils are abundant, 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, 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 (see management area maps in Chapter 2). 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 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 Alternative 4 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 Alternative 4 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. 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.

ALTERNATIVE 5

Impacts to ice-rich permafrost soils under Alternative 5 would be moderate. Impacts would be of medium intensity, long term, 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. A corridor would be established in an area with abundant ice-rich permafrost soils, allowing for relatively high-use levels. However, use in the rest of the northern additions would be mitigated or restricted if standards outlined for Management Area B or D are approached or exceeded.

In this alternative, the old Mount McKinley National Park and the Denali additions north of the Alaska Range would be managed primarily 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.

Under this alternative, areas of the park that contain ice-rich permafrost soils would be zoned as Management Area B or D. These management areas allow for low to medium encounters, no landscape modifications, and low 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 would occur along 147 linear miles of summer corridors and 204 linear miles of winter corridors. The corridor designation would be applied to the area from Stampede to Kantishna, where ice-rich permafrost soils are abundant. Unless otherwise stated, all impacts would occur throughout the life of the plan.

Snowmachine use would increase greatly over current numbers, so 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. A winter season corridor for recreation-related snowmachine access would be established to Kantishna from the Sushana River. This high-use area is located where ice-rich permafrost soils are prevalent.

While the adequate snow cover requirement (see Chapter 3: Affected Environment) is intended to prevent these types of impacts, they are still possible 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 few encounters (visitors will occasionally encounter other parties). If impacts to ice-rich permafrost soils approach or exceed standards, use would be curtailed or mitigated to reduce impacts. Zoning in this alternative allows for more use than does the zoning in all other action alternatives (which zone the Kantishna and Stampede areas as Management Areas D and OP1).

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 Alternative 5 alone would have moderate adverse impacts on ice-rich permafrost soils because additional acres of ice-rich permafrost soils would be affected. The cumulative adverse impact of this alternative plus the aforementioned past, present, and reasonably foreseeable actions would be major.

Conclusion

Moderate adverse impacts to ice-rich permafrost soils would occur under Alternative 5. 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. 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 as a result 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).

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 *Chenopodium 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 riverbars 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).

ALTERNATIVE 1 (NO ACTION)

The following analysis shows that impacts to vegetation under Alternative 1 would be major because of loss of vegetation, trampling and, most importantly, introduction of exotic species from floatplane use and other vectors. While most of this resource is common, some impacts would be of high intensity and result in permanent change. This alternative would allow for substantial increases in types and levels of use; without management area prescriptions, desired future conditions, and indicators and standards, 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 of the potential for more physical trauma to sensitive plants and potential for more introduction of exotic and invasive species. Unless otherwise stated, all impacts would occur throughout the life of the plan.

Loss of Vegetation

In areas that are used commonly and repeatedly by visitors and large groups, such as along the park road and in the Kantishna area, repeated use would lead to loss of vegetation and social trail formation. Impacts would occur only in a localized area.

Trampling

Snowmachine use would cause trampling of vegetation in some areas with thin snow cover if use is heavy. As more users ride in popular snowmachine areas (Broad Pass and Tokositna areas, for example), more vegetation would be trampled. Both white spruce (*Picea glauca*) and willow (*Salix spp.*) up to 5 cm in diameter have been observed to have been run over (stems broken) by snowmachines on state lands west of Healy (Steve Carwile, pers. comm.).

The greatest potential for trampling and compacting vegetation would occur at the southern and eastern edges of the park where current snowmachine use is common and is expected to increase, and where sensitive peat communities exist. Sensitive peat communities exist south of the Alaska Range on older landscape surfaces, on elevations less than 3,000 feet, and in wetlands areas. They are generally clustered around the southern boundary of the park in the Yentna, Ruth, Tokositna, and Kahiltna lowlands.

Other communities that could be damaged by snowmachine use include restricted alpine communities, calcareous alpine sites, and sensitive areas north of the Stampede Road. Snowmachines can affect lowland vegetation by compacting snow, which changes temperature regimes and soil structure, thereby altering plant communities. Changes in relative abundance of species could occur, thereby changing the natural pattern of distribution. Snowmachine use would continue to be prohibited in the Old Park (35% of the total park area), but use would occur throughout the remaining 3,707,535 acres. As more users ride in popular snowmachine areas (Broad Pass and Tokositna areas, for example), more vegetation would be damaged, which could result in severe but localized impacts at some sites within those areas, especially in riparian areas where use is concentrated. The peat bogs along the southern boundary of the park would be especially susceptible, since these communities do not recover from disturbance very readily. These communities grow slowly because they exist in waterlogged soils in a nutrient-poor environment. Peat communities are rare in the park but occur elsewhere in the state. The adequate snow-cover requirement would be expected to mitigate most of these impacts.

Impacts to vegetation from snowmachine use are most likely to occur in high-use areas that can become snow-free during certain periods in the winter, or that have a thin snow cover that can be reduced further or compacted from snowmachine passes. Sensitive alpine plant communities and calcareous alpine sites are particularly vulnerable since these communities do not recover from disturbance very easily and because these alpine environments sometimes have lighter snow cover than surrounding areas. Areas of thin snow cover include mountain passes, exposed ridges, terraced edges, and areas with wind channeling. In addition, steep, south-facing slopes tend to become snow-free sooner than other areas in the spring. Also, because much of Denali National Park and Preserve has a continental climate, snow accumulation is highly variable from year to year. Low snow years are common, and vegetation that would normally be protected under snow may become exposed in areas with even light snowmachine traffic. 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.

Trampling of vegetation, including wetland vegetation, would also occur from increases in hiking and camping. There would continue to be no limit on the number of times guided hiking groups could visit a particular area, and the group size limit would not apply to non-commercial groups. Impacts would be concentrated in high-use areas and

backcountry access points along the park road (around Polychrome, Stony, and Eielson) and in the Kantishna area (localized areas within about 3% of the total park area). These areas would have increasing foot traffic associated with established campgrounds and rest areas along the park road, and lodges in Kantishna, resulting in a radiating network of social trails. Similar impacts would increase eventually at popular destinations in the south additions, especially in the upper Tokositna River area including the Bear and Wildhorse Creek drainages (impacts would occur in localized areas within about 1% of the total park area). Impacts in all of these areas would increase in time because of unregulated day use, and—in the case of the south additions—the lack of management area designations and registration for backcountry camping. Eventually, as use increases and remains unregulated in the additions, high-use areas could be found at localized areas within more than 25% of the park (based on current use trends and access points); impacts would be concentrated at several individual sites within this portion of the park. Severe damage to vegetation would occur in areas of varying sizes, ranging up to several acres.

Increased use of mountain bikes would affect vegetation; however, use levels are currently presumed to be low as off-trail riding is very difficult. Severe but localized damage would occur at and near common access points (such as along the park road corridor and Kantishna) from vegetation crushing and development of trails that channel drainage and promote erosion. The affected area would likely be only a small part of the park (such as within 84,000 acres in the Kantishna Hills).

Pack animal use would increase over time leading to the crushing of vegetation. Increases in pack animal use would likely occur in Kantishna, the southwest preserve in connection with hunting, and the Cantwell area. The effected area would likely be only a small part of the park (such as localized areas within the Kantishna Hills, which is about 5% of the total park area); however, impacts could occur throughout most vegetated park areas.

Most dog 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. Some mushing also occurs in the northwest preserve and in the Windy/Riley drainages. Impacts to vegetation from dog sleds are 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 they do not spin tracks. Stem breakage and abrasion are the most common impacts. Mushers tend to use established trails rather than break 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, so 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 very small area of the park.

Skiers generally use the park road and the Riley/Windy area. Levels of skier use would increase over current numbers, but impacts would be minimal because use of the park by skiers is generally low, and because skis by their very nature generally have negligible impacts on vegetation.

Introduction of Invasive Plant Species

The most severe adverse impact to vegetation would result from the introduction of exotic plant species from airplane landings, which would initially occur on the numerous lakes and ponds throughout the northern additions, and on tundra benches and along gravel bars in the southern additions. Exotics could be carried in by airplanes landing on dry ridges or at non-glaciated landing areas in the Dunkle, Yentna, Tokositna, Stampede, and Kantishna areas. Over time, invasive species could spread to most non-glaciated areas of the park. The introduction of invasive plant species would increase eventually and could displace native vegetation, alter the composition of plant communities, and disrupt ecological functions. Widespread plant invasions would be very difficult to control or reverse.

Pack animal use, hiking, mountain biking, and boat use would also increase over time leading to the introduction of invasive plant species. Likely locations of impacts resulting from introduction of exotics by pack animals would include the Kantishna Hills, parts of the southwest preserve, the Cantwell area, and areas of both the Old Park and park additions around the Stampede trail corridor. These are areas that have been used by pack animals in the past or would be easily accessed by pack animals in the future. The introduction of invasive plants from feeds that are not weed-free is one of the greatest impacts from use of pack animals. Without management area prescriptions, desired future conditions, and indicators and standards, the park would have no formal process to determine when impact levels become severe enough to warrant management action. The introduction of exotics from boat use would likely be localized to the streams where such use occurs.

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 Alternative 1 could result in major adverse impacts on vegetation. There would be major adverse cumulative impacts from this alternative plus the aforementioned past, present, and reasonably foreseeable actions, of which this alternative accounts for the majority of impacts.

Conclusion

Under Alternative 1, major adverse impacts to vegetation would result from substantial increases in types and levels of use; without management area prescriptions, desired future conditions, and indicators and standards, 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 (colonization of exotics could be very difficult to control or reverse). The cumulative adverse impact of this alternative plus 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.

ALTERNATIVE 2

The following analysis shows impacts to vegetation under Alternative 2 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. Impacts would be low in intensity, temporary, and would affect a resource that is considered common. Under this alternative, recreational and administrative activities would be reduced from current levels, and recreational users may be subject to additional conditions on use. This alternative would have the least impact to vegetation of all the alternatives because the levels of some activities, particularly snowmachine use, would be reduced in the park additions and preserve. Reducing use would reduce impacts on vegetation.

Under this alternative, 65% (3,920,360 acres) of the park would be zoned as Management Area D, OP2, or Management Area E. These management areas allow for low encounters, very little evidence of modern human use, no landscape modifications, and little, if any, trail and campsite disturbance (which includes 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. Only 60 linear miles would be zoned as a corridor, which would accommodate higher levels of use. Therefore, minimal adverse impacts to vegetation are likely to occur.

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

Loss of Vegetation

Adverse impacts from hiking and camping would be concentrated in high-use areas and backcountry access points along the park road (around Polychrome, Stony, and Eielson) and in the Kantishna area (impacts would occur at localized areas within about 3% of the park). Heavily used areas include places that are easily accessed from the park road like the Polychrome area, Stony, Eielson, and Wonder Lake/Kantishna areas. In these areas, some social trails would form; however, the impact would be mitigated by education and day-use registration in these areas. Registration would provide information that could be used to correlate visitation trends with impacts to vegetation and to help managers choose an appropriate access management tool if impacts exceed standards. Impacts would also be mitigated by the guided hiking requirement: the number of guided hikes to a particular location *for all guided groups together* would be strictly limited to two per season, except for hikes on gravel streambeds and in hiker areas (on constructed trails). This parkwide requirement would encourage use of hardened surfaces and dispersal of use. This requirement would substantially reduce the potential for social trail formation. The strategy to prevent social trail formation (see Chapter Two, Common to All Action Alternatives) would also help mitigate loss of vegetation by reducing the potential for social trail establishment.

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 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, airplane, or motorboat to the park additions and preserves would only be allowed for traditional activities, as defined for the Old Park, except for airplanes at Portals. Trampling of vegetation from snowmachine use would be reduced since the number of riders engaged in traditional activities would be less than the number of riders that currently use the park. That, in addition to management area zoning, would reduce current levels of snowmachine use throughout the park additions and preserve. Fewer machines equate to fewer impacts to vegetation.

Additionally, airplanes and motorboats would not be allowed for recreational access to the Old Park, except that airplane access to the McKinley and Kantishna airstrips for recreation would continue. Guided activities and commercial services would be limited to the same volume of use that occurred in 2001, and the number of guided hikes to a particular location *for all guided groups together* would be strictly limited to two per season, except hikes on gravel streambeds and in hiker areas (on constructed trails). This restriction would apply parkwide. Collectively, these actions would result in a reduction in use and an emphasis on dispersed use. Less use and dispersed use mean fewer instances of trampling and compacting vegetation than occur presently.

Registration would be required for day-hiking in the Old Park outside of hiker areas during summer months, for day use in the southern park additions east of and including the Kahiltna Glacier during winter months, and for all overnight camping in the park and preserve. The registration requirement would allow park staff to better educate the visitor about low-impact techniques, thereby mitigating adverse impacts to vegetation. Registration would also 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.

Climbers and mountaineers spend most of their time in un-vegetated, rocky, or glaciated terrain, thus their activities would minimally affect vegetation and wetlands. Only a small fraction of the mountaineering population starts their climbs in the shrub and forested zones. Indirect impacts, such as trampling, associated with these activities would result from the mode of access.

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 focus on a very 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 could increase slightly above current numbers but impacts would be minimal because the Kantishna and Stampede areas would be zoned as Management Area D, which accommodates low 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 probably not increase over current numbers, and impacts would be minimal because much of the park would be zoned as Management Area D, which accommodates low

encounters, and low trail and campsite disturbance. If impacts to vegetation approach or exceed standards, use would be curtailed or mitigated.

Introduction of Exotic Species

Because use of the park would be reduced from current levels, there would be less potential than currently exists for the introduction of exotic species. Under this alternative, the park would have a formal process to determine when impacts from the introduction of exotic species via pack animals become severe enough to warrant management action. Under this alternative, access by snowmachine, airplane, or motorboat to the park additions and preserves would only be allowed for traditional activities except for airplanes at portals, which are typically on glaciers where exotic species are less of a threat. Additionally, airplanes and motorboats would not be allowed for recreational access to the Old Park. These actions would reduce the potential for spread of exotics, especially introduction of aquatic exotics via float-plane landings.

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 Alternative 2 alone would have negligible adverse impacts on vegetation. There would still be a moderate adverse cumulative impact of this alternative along with the aforementioned past, present, and reasonably foreseeable actions, none of which is attributable to the actions in this alternative.

Conclusion

Under this alternative, 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. This alternative would have the least impact to vegetation of all the alternatives because the levels of some activities would be reduced in the park additions

and preserve. 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. 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.

ALTERNATIVE 3

The following analysis shows impacts to vegetation under Alternative 3 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. Impacts to this common resource would be low to medium in intensity, and, should exotic species become introduced, impacts could persist over a long duration. Under this alternative, higher use would be focused along the park road, in Kantishna near the park road, and around the Ruth Glacier (along with existing mountaineering activity on the Kahiltna Glacier).

Under this alternative, 57% (3,396,305 acres) of the park would be zoned as Management Areas D, E, or OP2. These management areas allow for low encounters, very little evidence of modern human use, no landscape modifications, and little, if any, trail and campsite disturbance (which includes signs of social trails, campsites, or cut or broken vegetation). In addition, under this alternative, 33% (1,940,685 acres) of the park 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. Higher use levels would be accommodated in 4% of the park (259,552 acres) which is zoned as Management Area A and along 147 linear miles of corridors in summer and 157 linear miles in winter.

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

Loss of Vegetation

Under this alternative, the NPS would designate summer season corridor management areas on Skyline Drive, Moose Creek, and Eldorado mining access routes within Management Area A in Kantishna and seasonal hiker areas on a number of existing Kantishna trails used by guided hiking concessions in the area. Management area zoning would allow for a slight increase in hiking and camping use above current levels, thus some trampling and social trail formation would be expected 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 result in additional losses to vegetation. While these impacts would be noticeable in the Kantishna area, the area of impact would be small on a parkwide scale.

Impacts would be mitigated by education and day-use registration in these areas. 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. Also, the strategy to prevent social trail formation (see Chapter Two, Common to All Action Alternatives) would help mitigate loss of vegetation by reducing the potential for social trail establishment.

Up to five designated campsites would be created in conjunction with the corridor areas in the Kantishna Hills. Where trails and campsites occur, vegetation would be lost. Increased incidents of human-caused fire are likely to occur near trails and campsites, resulting in burned vegetation. This loss would occur primarily in the Kantishna 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 season along these trails. Over time, plants may not be able to be as viable in these areas.

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 season along these trails. Over time, plants may not be in these areas.

Trampling

Under this alternative, access by snowmachine to the park additions and preserves would only be allowed for traditional activities, as defined for the Old Park, except on designated winter corridors. Trampling of vegetation from snowmachine use would be reduced throughout the park since the number of riders engaged in traditional activities would be less than the number of riders who currently use the park.

Establishing corridors would channel snowmachine use in the Broad Pass area; to the toes of the Ruth, Tokositna, and Kanikula glaciers from the Tokositna River; and along the Yentna, Tokositna, and Kantishna/Muddy Rivers. This would increase use in these areas and would lead to trampling of vegetation in areas that are very heavily used. The corridor designation allows for landscape modifications, very high encounter rate, and occasional social trails and cut or broken vegetation. Use of snowmachines along corridors would continue to increase and cause impacts until standards for these indicators are approached or exceeded.

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.

Airplanes and motorboats would not be allowed for recreational access to the Old Park, except that airplane access to the McKinley and Kantishna airstrips for recreation would continue. Guided activities and commercial services would be limited to the same volume of use that presently occurs. These actions prevent areas from becoming overly used. This translates into fewer instances of trampling and compacting vegetation than if no new management action were taken.

Registration would be required for day-hiking in the Old Park outside of hiker areas during summer months, for day use in the southern park additions east of and including the Kahiltna Glacier during winter months, and for all overnight camping in the park and preserve. 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 mitigating adverse impacts to vegetation. 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.

Climbers and mountaineers spend most of their time in un-vegetated, rocky, or glaciated terrain, so impacts to vegetation and wetlands from their activities would be minimal. Only a small fraction of the mountaineering population starts their climbs in the shrub and forested zones. Indirect impacts, such as trampling, associated with these activities would result from the mode of access.

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 limiting travel in windswept, snow-free areas (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 focus 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 the Kantishna and Stampede areas would be zoned as Management Area D, which accommodates low 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 could increase to slightly more than current numbers, but impacts would be minimal because much of the park would be zoned as Management Area D, which accommodates low encounters, and low 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 such as snowmachine use and dog mushing.

Introduction of Exotic Species

Through management area zoning, this alternative would allow increases in levels of use in most parts of the park additions and preserve. Increased use of pack animals, hikers, and airplanes would increase the potential for introduction of exotic species because there would be more vectors to transport exotics. In addition, trail construction would 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 areas and (if needed) improve some social trails presently used by guided hiking concessions within Management Area A in Kantishna. 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. The introduction of exotic plant species could displace native vegetation, alter the composition of plant communities, and disrupt ecological functions.

Under this alternative, airplane landings and motorboat access to the Old Park would not be allowed. This would decrease the potential for introduction of exotic species, especially aquatic species that could be introduced via motorboats or float planes. In addition, the park would have a formal process to determine when impacts from the introduction of exotic species via pack animals become severe enough to warrant management action.

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 Alternative 3 alone would have minor adverse impacts on vegetation. Taken together, there would be moderate adverse cumulative impacts of this alternative plus the aforementioned past, present, and reasonably foreseeable actions, of which this alternative would contribute only a small portion.

Conclusion

Under this alternative, 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. Snowmachine use would be reduced in the park additions and preserve, and guided hiking would remain at current levels. These actions 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. Disturbance would occur at access points (such as social trail formation in the Old Park from hikers) and along snowmachine corridors, but the affected area would be small when compared to the rest of the park. The cumulative impact of this alternative plus the aforementioned past, present, and reasonably foreseeable actions would be moderate. 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 are essential to the natural integrity of the park.

ALTERNATIVE 4 (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, assistance, or short time-commitments. The areas would be focused along the park road; in Kantishna near the park road; at the Ruth, Tokositna, and Kahiltna Glaciers; and in the Dunkle Hills/Broad Pass area.

Under this alternative, 55% of the park (3,313,878.5 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% of the park (1,738,804 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% of the total park area falls within one of the aforementioned management areas).

Under this alternative, 11% of the park (668,314 acres) would be designated as Management Area A, and 147 linear miles of summer corridors and 157 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 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 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 trail from the water tower above Wonder Lake Campground up to the bench west of Wonder Lake
- the Mount Healy trail extension
- 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, 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 result in additional losses to vegetation. While these impacts would be noticeable in the Kantishna area and along the park road corridor, 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 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 Two, Common to All Action Alternatives) would help mitigate loss of vegetation by reducing the potential for social trail establishment.

Up to five designated campsites would be created in conjunction with the corridor areas in the Kantishna Hills. Where trails and campsites occur, 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 primarily in the Kantishna area, along the park road corridor, and in the Wildhorse Creek drainage on the south side (impacts would occur at localized areas within about 16% 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 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 the southern park boundary to the Old Park boundary near the West Fork Chulitna and Cantwell Creek; to the toes of the Ruth, Tokositna, and Kanikula glaciers from the Tokositna River; along the Yentna, Tokositna, and Kantishna/Muddy Rivers. In a future wilderness proposal, accommodation would be made as necessary for recreational snowmachine access along winter 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 be 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 D, which accommodates low encounters, and low 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, 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 float plane 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 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 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 Alternative 4, 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 Alternative 4 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% of the park, and the potential for introduction of exotic species from new trail construction 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, assistance, or short time-commitments. These areas would be focused along the park road; in Kantishna near the park road; at the Ruth, Tokositna, and Kahiltna Glaciers; and in the Dunkle Hills/Broad Pass area. 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.

ALTERNATIVE 5

The following analysis shows that impacts to vegetation under this alternative would be major because some vegetation would be lost, trampling would occur in localized areas within roughly eighteen percent of the park, and the potential for introduction of exotic species from new trail construction and increased use is high. Impacts to this resource

would be of high intensity, and some changes would be permanent. In this alternative, the old Mount McKinley National 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.

Under this alternative, vegetation impacts would be greater than in the other action alternatives because of management area zoning and additional trail and campsite development. Under this alternative, only 16% of the park (941,624 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). Another 66% of the park (3,956,539 acres) would be zoned as Management Area B. This management area would 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. Under this alternative, 18% of the park (1,066,218 acres) would be zoned as Management Area A, and there would be 147 linear miles of summer corridors and 204 linear miles of winter corridors. 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.

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

Loss of Vegetation

Management area zoning would allow for increases in hiking and camping, consequently some trampling and social trail formation would be expected around Kantishna, 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 result in additional losses to vegetation. These impacts would be noticeable in the Kantishna area, along the park road corridor and in the southern portion of the park designated as Management Area A.

The National Park Service would designate hiker areas and (if necessary) construct or improve the following:

- some existing social trails within Management Area A in Kantishna
- a trail from Eielson Visitor Center to Gorge Creek

- a trail from the water tower above Wonder Lake Campground up to the bench west of Wonder Lake
- a trail from the west end of Thorofare Bluffs down to the Thorofare River bar
- the Mount Healy trail extension
- the area along Wildhorse Creek connecting to trails associated with the South Denali visitor facilities development.

If demand is sufficient, additional trails could be constructed and hiker or corridor management areas could be designated in the future within the designated Management Area A in the lowland areas surrounding the lower Kahiltna, Tokositna, and Ruth glaciers. The National Park Service would establish additional designated trails in other locations designated Management Area A only if necessary to prevent resource damage. The NPS would designate and brush ski trails in the entrance area (Riley Creek area) of the park. 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. These actions would result in the permanent removal of vegetation along the proposed trails. Trail development in some of these places would unavoidably go through wetlands (for example, near Wonder Lake and the Thorofare River).

The impacts from social trail formation would be somewhat mitigated by the requirement that all guided cross-country hikes would be subject to the group size limit of 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 Two, Common to All Action Alternatives) would help mitigate loss of vegetation by reducing the potential for social trail establishment.

Up to five designated campsites would be created in conjunction with the corridor areas in the Kantishna Hills and up to three sites would be created in conjunction with the corridor area in the Wildhorse Creek drainage. Where trails and campsites occur, vegetation would be lost. Increased incidences 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 primarily in the Kantishna area, along the park road corridor, and in the Wildhorse Creek drainage on the south side (impacts could be expected in localized areas within about 19% 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 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 the southern park boundary to the Old Park boundary near the West Fork Chulitna and Cantwell Creek; to the toes of the Ruth, Tokositna, and Kanikula glaciers from the Tokositna River; to Kantishna from the Sushana River; along the Yentna, Tokositna, and Kantishna/Muddy Rivers. In a future wilderness proposal, accommodation would be made as necessary for recreational snowmachine access along the winter season corridors and throughout those areas designated as Management Area A (18% of the total park area plus 204 linear miles of winter 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.

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 such as snowmachine use and dog mushing.

The NPS would designate summer season corridor management areas on Skyline Drive, Moose Creek, and Eldorado mining access routes within Management Area A in Kantishna, and along Wildhorse Creek connecting to trails associated with the South Denali visitor facilities development. Increases in use in these areas would lead to trampling of vegetation along these corridors.

Climbers and mountaineers spend most of their time in un-vegetated, rocky, or glaciated terrain, so impacts to vegetation and wetlands from their activities would be minimal. Only a small fraction of the mountaineering population starts their climbs in the shrub and forested zones. Indirect impacts associated with these activities would result from the mode of access.

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. The Windy/Riley area would be zoned as Management Area A, which would accommodate higher levels of use. 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 D, which accommodates low encounters, and low trail and campsite disturbance. If impacts to vegetation approach or exceed standards, use would be curtailed or mitigated.

Introduction of Invasive 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, boats, and airplanes would increase the potential for introduction of exotic species. Exotic species could displace natural native plant species and disrupt ecological functions. 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 and from trails. Introduction of aquatic exotic species could become especially problematic in the northern addition where increases in motorboat use and float-plane landings could increase the spread of exotics. Exotics could 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 contribute to the potential for introduction of exotics because materials used in trail construction could contain exotic species. Trail construction would occur primarily in areas zoned as Management Area A (about 18% of the park), primarily in the Kantishna area and in the lowland areas surrounding the lower Kahiltna, Tokositna, and Ruth glaciers. 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. Parklands along the southern boundary would be especially susceptible to invasion by non-native species if they were connected via a trail to a non-park area that harbors invasive species. Trails that originate along the road corridor (at Eielson, Thorofare, 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.

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 Alternative 5, 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 very difficult to monitor all areas that would be most susceptible to the spread of exotic species because there are many areas and trails, and many of the areas are very remote. Under this management scenario, high use levels and development of trails could lead to a situation whereby exotic species are introduced and become very difficult to eradicate. This could have severe implications for a park that until now has had only few problems with exotic species invasions.

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 Alternative 5 would have major 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 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. The most severe impacts would occur at access points and along snowmachine corridors. Increases in both winter and summer recreational activities across the entire park and preserve would cause adverse impacts to vegetation. Social trail formation would occur along the park road, around Kantishna, and along the Wildhorse Creek drainage. Snowmachine use would be widespread, with the greatest impacts occurring throughout large corridors. 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. 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 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 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 treeline willow habitats (Herman Griesse, pers. comm.). Dog-sled use and showshoeing 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 travelways 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 travelways 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-compact 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 travelways 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 snowpack 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.

Hiking, Backpacking and Camping

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.

ALTERNATIVE 1 (NO ACTION)

The no-action alternative represents no change from current management as outlined by the *General Management Plan* (1986) and the *Strategic Plan* (1997). Although this alternative provides a baseline for evaluating the changes and impacts of the other action alternatives, the overall environmental consequences to wildlife of this alternative would increase as visitor levels and recreational activities, and their associated disturbances of wildlife, increase in Denali National Park and Preserve.

Under Alternative 1, 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 Mt. McKinley, at landing sites, and at access points and routes and areas heavily used by snowmachines on the south side of the Alaska Range. The overall level of adverse impact would therefore be moderate. Other activities in the park would have negligible to minor impacts on wildlife populations.

General Impacts: Wildlife

Increasing levels of aircraft activity and additions of new airstrips or landing areas to the park under Alternative 1 would increase exposure of wildlife to noise and visual disturbances associated with aircraft, and increase the negative effects on wildlife (disturbance such as displacement, potential for mortality). Most disturbances are likely to be noise-related and short-term in duration, but some mortalities or injuries to individuals are possible if aircraft-wildlife collisions occur at airstrips. The effects would be short term under current numbers of landings, but could increase during the next 20 years at some specific locations in the park, such as along the West Fork of the Yentna River in the southwest preserve.

Under Alternative 1, snowmachine use would continue to increase and expand into more locations in the park additions and preserve. Heavy use would occur at some popular destinations, such as Broad Pass southwest of Cantwell, along the Upper and Lower Tokositna River, and along the Stampede Trail corridor (about 25% of the total park area). Use would expand in area (as 64% of the total park area would be open to snowmachine use) and in density. Several different impacts to wildlife populations and habitats could be expected. 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 could 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. Over the next 20 years there would be short-term changes in wildlife populations and habitat at several distinct localities in the park and preserve.

In the park additions and preserve, there would continue to be no management provisions for dispersing visitor use, and hiking and camping can be expected to increase in the next 20 years with concentration at popular destinations. Impacts to wildlife would be behavioral reactions of short duration and low intensity that would not have long-term impacts on wildlife populations. The greatest impacts are likely to occur in areas where human use is concentrated, such as access corridors, airplane landing sites, and popular camping locations, such as the base of the Tokositna Glacier and the Bear Creek/Wildhorse Creek area. This would mainly affect species such as caribou and grizzly bears that are particularly sensitive to human disturbance. Sensitive species and habitats are likely to be affected at several distinct locations in the park additions and preserve.

Ungulates: Caribou, Dall Sheep, Moose. Several different impacts to ungulate populations and habitats could be expected from the increase of snowmachine use. Encounters with wildlife in the backcountry would cause behavioral disturbance, increase stress levels, and temporarily displace wildlife, such as moose and caribou, from areas where snowmachines are regularly used. The snowmachine trails could also increase predation by wolves who take advantage of traveling along the hard-packed trails. Increased snowmachine use in late winter and early spring would be occurring when ungulates are in their worst health. 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. Over the next 20 years there would be short-term changes in wildlife populations and habitats at several distinct locations in the park and preserve.

Large Carnivores: Black Bear, Brown/Grizzly Bear, Wolf. Several different impacts to large carnivore populations and habitats could be expected from the increase in snowmachine use. Encounters with wildlife in the backcountry would cause behavioral disturbance, increase stress levels, and temporarily displace wildlife, such as moose and caribou (prey species), from areas where snowmachines are regularly used. In some cases, wildlife mortality or injury to species, such as wolves, would occur from wildlife-snowmachine collisions. Snowmachine trails would enhance or modify wolf movements by providing packed trails that make movements easier and that allow access to new areas. Snowmachines could also be used to illegally chase canid species (such as wolves) and grizzly bears emerging from their dens, which would increase stress levels and reduce fat stores. Snowmachine use could 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. Several different impacts to small and mid-sized carnivore populations and habitats could be expected from the increase in snowmachine use. Snowmachine trails would enhance or modify movements of wildlife, such as coyote, fox, and lynx, by providing packed trails that

make movements easier and that allow access to new areas. Snowmachines could also be used to illegally chase canid species (such as coyote and fox), which would increase stress levels and reduce fat stores. 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 over the next 20 years, but longer-term impacts to certain species, such as swans, could occur in certain locations, particularly along the Tokositna, Yentna and Kantishna/Muddy Rivers.

Fish. Increased snowmachine use under this alternative could affect fish and other aquatic species through the accumulative effects of contaminant fuel spills and unburned fuel deposited by two-stroke engines in the areas of highest use, such as near Broad Pass and on the upper Tokositna River.

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 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 reduction 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 near Denali National Park and Preserve. Under Alternative 1, increasing recreational activities are likely throughout the park as described above, and these would add to the cumulative effects of visitor activities on wildlife populations in the park and the surrounding region. The combination of impacts from activities in the park under Alternative 1 and the impacts of other activities, including those outside the park that directly affect park wildlife, would result in substantial impacts at several distinct locations. For example, wildlife in the Tokositna area could be affected by increased recreational use inside and outside the park, development of new visitor facilities such as a visitor center and campground, and development on private land outside the park. Similar effects could be expected from increased snowmachine use in the Broad Pass, Stampede, and Kantishna areas. Overall, cumulative impacts under Alternative 1 would be moderate because detectable disturbance to important wildlife resources would occur on an annual basis at many different locations, but sufficient habitat would remain functional to maintain viability of all native species. The types and levels of use proposed under Alternative 1 would contribute a moderate portion of the overall cumulative impacts to wildlife.

Conclusion

Under Alternative 1, 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. Other activities in the park would have negligible to minor impacts on wildlife populations.

The level of impacts to wildlife anticipated from Alternative 1 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. However, moderate impacts to wildlife species and wildlife habitat are likely as a result of cumulative impacts as described above.

ALTERNATIVE 2

The impacts to wildlife populations and habitats under Alternative 2 would generally be negligible because of limits on numbers and types of backcountry uses. Minor impacts are possible from activities, but even then would be limited to short-term effects that would be localized in scope.

General Impacts: Wildlife

Snowmachine use under Alternative 2 would be limited to subsistence and other traditional activities in the park additions and preserve. Therefore, there would be an immediate decrease in recreational snowmachine use at popular destinations such as the Broad Pass area southwest of Cantwell. Encounters with wildlife in the backcountry would decrease from current levels, resulting in fewer incidents of behavioral disturbance, increased stress levels, and temporary displacement of wildlife. Cases of wildlife mortality or injury would be extremely rare, except from subsistence. There would be few snowmachine trails to enhance or modify movements of wildlife.

Airplanes would not be allowed for recreation access to the Old Park, except that airplane access to the McKinley and Kantishna airstrips for recreation would continue. Under Alternative 2 there would be limits on airplane landings for scenic tours, and air taxi landings would continue to be allowed everywhere in the park additions and preserve, but not in the Old Park. Scenic tour landings would be allowed at Ruth Amphitheater (1,900 per season) and Kahiltna Base Camp (200 per season) from 9am to 9pm only, and noise standards would require overflights to diminish or disperse in some areas, such as over the Old Park. These limits would reduce the exposure of wildlife to noise and visual disturbances associated with aircraft and reduce the negative effects on wildlife (disturbance, potential for mortality). Disturbances would generally be noise-related and short-term (five minutes or less each time).

Motorboats would not be allowed for recreation access in the park and preserve. This would reduce the amount of noise and visual stimuli that result in behavioral disturbance and temporary displacement of some wildlife species, such as moose and caribou, on a seasonal basis.

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. These impacts would occur only occasionally at different locations throughout the life of the plan.

Ungulates: Caribou, Dall Sheep, Moose. With the decrease in recreational snowmachine use at popular destinations such as the Broad Pass area southwest of Cantwell, encounters with moose and caribou in the backcountry would decrease from current levels, resulting in fewer incidents of behavioral disturbance, increased stress levels, and temporary displacement of wildlife. There would be few snowmachine trails either to detract from natural movements of ungulates or to enhance or modify movements of predators of ungulates (such as wolves). 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.

Under Alternative 2 there would be limits on airplane landings for scenic tours and noise standards would require overflights to diminish or disperse in some areas, such as over

the Old Park. These limits would reduce the exposure of wildlife to noise and visual disturbances associated with aircraft and reduce the negative effects on wildlife (disturbance, potential for mortality). Disturbances from airplane landings and aircraft overflights would generally be noise-related and short-term (five minutes or less each time).

Because of existing regulations, wildlife populations would not be adversely affected by harvest from guided hunts.

Large Carnivores: Black Bear, Brown/Grizzly Bear, Wolf. Under Alternative 2, snowmachine use would be limited to subsistence and other traditional activities. Therefore, there would be an immediate decrease in recreational snowmachine use at popular destinations such as the Broad Pass area southwest of Cantwell. Encounters with wolves and bears in the backcountry would decrease from current levels, resulting in fewer incidents of behavioral disturbance, increased stress levels, and temporary displacement. Denning bears would be at less risk from disturbance from snowmachines. Because of existing regulations, wildlife populations would not be adversely affected by harvest from guided hunts.

Small and Mid-sized Carnivores: Lynx, Coyote, Fox, Mustelids. The decrease in recreational snowmachine use would result in few snowmachine trails to enhance or modify movements of wildlife such as coyotes, foxes, and lynx by providing packed trails. Encounters with small and mid-sized carnivores would decrease from current levels, resulting in fewer incidents of behavioral disturbance, increased stress levels, and temporary displacement of wildlife.

Birds. Motorboats would not be allowed for recreation access in the park and preserve. This would reduce the disturbance and displacement of waterfowl.

Fish. Significantly decreased snowmachine use under this alternative would benefit fish and other aquatic species by removing potential contaminant fuel spills and unburned fuel deposited by two-stroke engines, especially in the areas of highest use, such as near Broad Pass and on the upper Tokositna River.

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 motorboat use for guaranteed access on some park rivers and lakes would generate noise and cause temporary displacement of wildlife along the riparian zone, resulting in minor impacts.

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. The use of motor vehicles 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.) Under Alternative 2, the growth in recreational activities would be managed throughout the park and preserve as described above, and these limitations would help mitigate the impacts from other activities on wildlife populations. At the regional level, this mitigation may not be as large as expected if limitations on activities such as snowmachine use inside the park simply displace users to adjacent non-park lands, increasing disturbance and negative impacts to wildlife in those areas.

The combination of impacts from other activities, including those outside the park that directly affect park wildlife, and the management provisions under Alternative 2, 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 Alternative 2 would contribute a negligible portion of the overall cumulative impacts to wildlife.

Conclusion

The impacts to wildlife populations and habitats under Alternative 2 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.

The level of impacts to wildlife anticipated from Alternative 2 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.

ALTERNATIVE 3

There would be minor adverse impacts to wildlife populations and habitats under Alternative 3 because limits on numbers and types of backcountry uses would result in only low-intensity, non-permanent disturbances to wildlife.

General Impacts: Wildlife

Snowmachine use, under Alternative 3, would be limited to subsistence and other traditional activities in the park additions and preserve, and to established winter corridors for recreational use. Therefore, there would be an immediate decrease in dispersed recreational snowmachine use throughout the park and preserve, but the winter corridors would result in areas of more concentrated 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 3, there would be limits on airplane landings for scenic tours, and air taxi landings would continue to be allowed everywhere in the park additions and preserve, but not in the Old Park. Scenic tour landings would be allowed at Ruth Amphitheater, Ruth Gorge, and Kahiltna Base Camp from 9am to 9pm only and noise standards would require overflights to diminish or disperse in some areas, such as over the Old Park. These limits would reduce the exposure of wildlife to noise and visual disturbances associated with aircraft and reduce the negative effects on wildlife (disturbance, potential for mortality). 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 (4% 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. The increased density of visitors in these areas could result in increased wildlife disturbance, habituation, and food-conditioning. These impacts would occur only occasionally at localized areas.

Ungulates: Caribou, Dall Sheep, Moose. Winter corridors would be established for recreation-related snowmachine access to the Old Park boundary in the Broad Pass area and to the toes of the Ruth, Tokositna, and Kanikula glaciers from Tokositna River. Snowmachine use along the winter corridors 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. 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. 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.

Large Carnivores: Black Bear, Brown/Grizzly Bear, Wolf. Snowmachine use along the winter corridors 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 along the corridors could displace bears denning along or near the winter corridors 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 along the winter corridors 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. Motorboats would not be allowed for recreation access in the Old Park, but existing use in the park additions and preserve would continue and likely increase. This increased use 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 over the next 20 years, but longer-term impacts to certain species, such as swans, could occur in certain locations, particularly along the Tokositna, Yentna and Kantishna/Muddy Rivers.

Fish. Decreased snowmachine use under this alternative would benefit fish and other aquatic species by removing potential contaminant fuel spills and unburned fuel deposited by two-stroke engines. Continued 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.

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.) Under Alternative 3, the growth in recreational activities would be managed throughout the park and preserve as described previously, and these limitations would help mitigate the impacts from other activities on fish and wildlife populations. At the regional level, this mitigation may not be as large as expected if limitations on activities such as snowmachine use inside the park simply displace users to adjacent non-park lands, increasing disturbance and negative impacts to wildlife and fish in those areas.

The combination of impacts from other activities, including those outside the park that directly affect park wildlife, and the management provisions under Alternative 3, 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 Alternative 3 would contribute a minor portion of the overall cumulative impacts to wildlife and other aquatic species.

Conclusion

There would be minor adverse impacts to wildlife populations and habitats under Alternative 3 because limits on numbers and types of backcountry uses would result in only low-intensity, non-permanent disturbances to wildlife. The level of impacts to

wildlife anticipated from Alternative 3 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.

ALTERNATIVE 4 (PREFERRED ALTERNATIVE)

There would generally be minor to moderate adverse impacts to wildlife populations and habitats under Alternative 4 because of the impacts of increased snowmachine and motorboat use on various wildlife species.

General Impacts: Wildlife

Under Alternative 4, 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 be established from the southern park boundary to the Old Park boundary near the West Fork Chulitna, Bull River, and Cantwell Creek. If demand is sufficient, Alternative 4 also allows for the establishment of winter corridors to the toes of the Ruth, Tokositna, and Kanikula glaciers from the Tokositna River. Winter corridors would result in areas of more concentrated snowmachine use and areas designated as Management Area A (11% 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%) 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% 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. The increased density of visitors in these 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.

Ungulates: Caribou, Dall Sheep, Moose. Snowmachine use under Alternative 4 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 Alternative 4 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 Alternative 4 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 Alternative 4, 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 Alternative 4 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 Alternative 4 because of increased snowmachine and motorboat use on various wildlife species. The level of impacts to wildlife anticipated from Alternative 4 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.

ALTERNATIVE 5

There would be moderate adverse impacts to wildlife populations and habitats under Alternative 5 because of the impacts of increased snowmachine and motorboat use on various wildlife species.

General Impacts: Wildlife

Under Alternative 5, 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 be established from the southern park boundary to the Old Park boundary near the West Fork Chulitna, Bull River, and Cantwell Creek. If demand is sufficient, Alternative 5 allows for the establishment of winter corridors to the toes of the Ruth, Tokositna, and Kanikula glaciers from the Tokositna River and to Kantishna from the Sushana River. Winter corridors would result in areas of more concentrated snowmachine use and areas designated as Management Area A (18% 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 (66%) 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 increase in numbers and density of snowmachine use throughout the park additions and preserve. 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 5, scenic air tour landings would be allowed on all glaciers in areas designated as Management Area A, with no daily time restrictions. Natural sound disturbance standards would generally allow the same amount or increases in aircraft

overflights parkwide. 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 (18% of the park and preserve) would allow for encounter rates of up to five parties per day, with two parties of six people. The increased density of visitors in these areas could result in increased wildlife habituation and food conditioning. These impacts would occur only occasionally at very localized areas throughout the life of the plan.

Ungulates: Caribou, Dall Sheep, Moose. Snowmachine use under Alternative 5 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. 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. 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.

Large Carnivores: Black Bear, Brown/Grizzly Bear, Wolf. Snowmachine use under Alternative 5 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 Alternative 5 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. 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 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 Alternative 5, 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 Alternative 5 would contribute a moderate portion of the overall cumulative impacts to wildlife.

Conclusion

There would generally be moderate adverse impacts to wildlife populations and habitats under Alternative 5 because of increased snowmachine and motorboat use on various wildlife species. 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.

The level of impacts to wildlife anticipated from Alternative 5 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 four 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 in Alternatives 2–5, 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 that Measured Condition Exceeds Standard, by Location and Management Area

Desired Noise Condition Management Areas	Low			Medium			High			Very High		
	D, E, OP1, OP2			B, C			A, Portal, Corridor West Buttruss SUA			Ruth Glacier SUA Portal – Major Landing Area		
	% 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
Location/Sample Size												
Kahilna 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%

¹The 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.

²The 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.

³The 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% were 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.

ALTERNATIVE 1 (NO ACTION)

This alternative would result in major adverse impacts to the natural soundscape of Denali and could result in impairment of the soundscape resource because of cumulative adverse impacts, primarily from airplane and snowmachine noise.

In this alternative, there would be no standards set for natural sound disturbance for any part of the national park and preserve. The NPS would not have clear goals for different areas of the park and preserve, or a tool for communicating desired conditions to visitors, concessioners, aircraft operators, contractors and NPS staff, or others whose activities affect the natural soundscape of the park and preserve.

Motorized noise would increase roughly in parallel with the growth in motorized access, proceeding from the predictions in the Assumptions section of this chapter. As detailed in the table below, natural sound conditions would deteriorate from existing conditions in all areas of the park and preserve where the proposed standards can be compared to available data, with the possible exception of the Stampede mine.

Location	Natural Sound Disturbance Standard	Comparison of Existing Conditions to Standard
Eastern portion of Old Park	No standard	The amount of air traffic and related noise over the eastern portion of the Old Park would at least double in the life of the plan. Data from backcountry ranger patrols and the backcountry visitor survey demonstrate that on average visitors in 2000 were hearing 5-10 airplanes per day in this area, and more than 11% were hearing more than 10. With an average duration of 4.8 minutes per overflight event and an hourly average of 1.4 overflights, simple math shows an "average" hour has audible motorized noise 11% of the time. In reality, many hours measure lower than 11% but many also measure above. The eastern portion of the Old Park is presently at or above the "Medium" standard for natural sound disturbance described in the plan. Projected increases in scenic air tour traffic would likely push the level of disturbance into the range covered by the "High" standard for natural sound disturbance.
Stampede Airstrip	No standard	The area around the Stampede Airstrip generally meets the standards for Medium natural sound disturbance. Increases in air traffic, particularly from the Healy airstrip could move this area into the range covered by the High standard for natural sound disturbance, although that is less likely than in the Old Park.
Dunkle Hills	No standard	Samples from the Dunkle Hills area presently show the percentage time motorized noise is audible, exceeding the standards for a High level of natural sound disturbance, particularly during winter months when samples even exceeded Very High standards. During summer months, much of the noise is faint, but samples from February/March show enough noise events more than natural ambient to exceed Medium standards, in large part because of snowmachine use inside the park. Under this alternative, unmanaged snowmachine access is likely to continue to increase, exceeding the Very High standards more regularly and over broad area.
Ruth Amphitheater	No standard	Measurements at the airstrip at the Ruth Amphitheater show that the Very High standards for natural sound disturbance are exceeded in a substantial number of samples (up to 57%). While conditions at the airstrip are noisier

		than is likely elsewhere in the Ruth Amphitheater region, these measurements demonstrate the potential for the Very High standards to be exceeded throughout the Ruth Amphitheater on days when flying is possible during the summer visitor season.
Kahiltna Base Camp	No standard	Samples from Kahiltna Base Camp already show signs of exceeding the High standards suggested by the draft plan, and 6% of sampled hours had motorized noise heard more than 50% of the time – exceeding even the Very High threshold. While conditions at the airstrip are noisier than is likely elsewhere around the upper Kahiltna Glacier, these measurements demonstrate the potential for the Very High standards to be exceeded throughout the region on days when flying is possible during the summer visitor season.
Pika Glacier	No standard	Samples near the airplane landing area on the Pika Glacier demonstrate that conditions sometimes meet Medium standards (except for the maximum sound level) but sometimes exceed High standards for natural sound disturbance. The Pika landing area is presently used for air taxis delivering climbers to Little Switzerland and as a backup scenic tour landing location when conditions at the Ruth Amphitheater or Kahiltna Base Camp do not allow for landings. However, during the year when samples were taken very few scenic landings occurred. As scenic air tour traffic increases and the Ruth Amphitheater becomes more crowded, the expectation would be for the backup landing areas such as the Pika to be used with increasing frequency, resulting in High standards for natural sound disturbance being regularly exceeded.

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 ongoing infrequent noise intrusions and higher sound levels in localized areas where take-offs and landings occur (lakes and other backcountry landing areas).

There would be no restrictions on landing locations for scenic air tours. As a result, scenic tour landings would continue to occur throughout the Alaska Range glaciers in the park additions, although most would occur between the Kahiltna and Eldridge Glaciers. Proceeding from the Assumptions at the start of this chapter, scenic air tour landing would be expected to double over the life of the plan. As scenic tour traffic expands, the number of landings at existing locations would increase and as crowding and landing area availability become issues, the traffic would expand to other locations such as the Eldridge and Pika Glaciers, which presently serve as backup when glacier or weather conditions make landing at the Ruth Amphitheater or Kahiltna Glaciers impossible. There would be no restriction or guidance for scenic air tours that do not land, which would also be expected to double over the life of the plan including over the designated wilderness of the Old Park. Increases in scenic air tour traffic would result in high intensity, long-term adverse impacts to this portion of the park additions during the summer season.

There would be no new limitations on overnight camping in the park and preserve. As a result, the number of overnight users would continue to increase, particularly in the southern park additions. Since access to this area is primarily by airplane, the amount of motorized noise would also increase although gradually, resulting in long-term, low-intensity natural sound disturbances.

There would be no limit on the number of climbers on Mount McKinley during the primary climbing season. As a result, at present growth rates the number of climbers would gradually increase by 8-13% over the life of the plan, or 130-195 additional climbers above the number that climbed in 2004. Assuming the same passenger capacity on airplanes as today, this would imply 75-115 flights with landings per year or a 2.5-3.8% increase in flights over 2003 with accompanying concentrated noise that represents only a medium intensity impact because it is relatively localized.

Snowmachine access would continue to increase, particularly along the south side of the Alaska Range in areas accessible in day trips from the Parks Highway such as the Dunkle Hills and Tokositna River valley, during late winter months, although there would be use during other winter months too. Based on increases in winter visitation to Alaska and on snowmachine ownership, an estimated growth rate of 5% per year is reasonable, leading to a doubling of snowmachine access and accompanying noise in 16 years. Although snow cover and short daylight hours limit riding opportunities in early and mid-winter, increasing winter visitation to Alaska will likely result in much more snowmachine access during weekdays than presently occurs.

There would continue to be noise from motorboats on major park rivers. On the Kantishna and Muddy Rivers, much of the noise occurs during subsistence and sport hunting seasons. These rivers are remote except for local use from Lake Minchumina, and are unlikely to see large increases in noise. The Tokositna River may see large increases in recreational traffic associated with access to private visitor facilities on inholdings. This increased activity would be during the summer visitor season along the lower stretch of this river, and could involve substantial increases in recurring seasonal motorized noise of low or medium intensity.

In this alternative, the park road would be maintained to Mile 7 as needed to remove ice from the roadway, but the road would not be plowed and opened until necessary to prepare the road for the summer visitor season. Continuing this policy would result in ongoing low intensity noise in backcountry areas near the road during the winter season, generally before 10am on weekdays.

There would be no backcountry trail or campsite construction in this alternative, so there would be no associated construction or maintenance noise.

There would be no new criteria attached to NPS administrative activities that would minimize noise. As a result, NPS administrative and research use of aircraft and other motorized equipment would likely increase, driven entirely by project needs. A minimum requirement/minimum tool determination would be required within the Denali Wilderness and areas determined suitable for wilderness designation.

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 that are responsible for much of the existing motorized noise over the eastern portion of the Old Park, around Mount McKinley, and 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 parkwide. 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, the levels of natural sound disturbance could increase dramatically during the late winter season in the southern Kantishna Hills and between Kantishna and the park boundary at Sushana.

Likewise, if a trail were cleared from Nenana to Lake Minchumina and services were offered to support snowmachine access, noise levels could be considerably higher in the northwestern part of the park and preserve along trails that run south almost to the Old Park boundary.

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 south side glaciers. Most of the impacts are the result of past actions, so that areas like the Ruth Amphitheater, other glaciers on the south side of the Alaska Range, and even portions of the Old Park have high intensity, long-term changes in the natural sound environment caused by motorized noise. However, additional motorized noise likely to occur under this alternative could double the impacts, since more than double the use of snowmachines and aircraft is expected within the life of the plan. This alternative therefore results in major adverse cumulative impacts to the natural soundscape of the park and preserve.

Conclusion

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. In locations

such as the Old Park and the southern park additions between the Kahiltna and the Eldridge Glacier, the amount of summer season noise from airplane traffic could double over the life of the plan. The same is true of snowmachine noise in the Dunkle Hills and Tokositna River areas, which would also likely expand in impact beyond weekends in late winter. These areas are already severely impacted by long-term, medium to high intensity changes in the natural sound environment. As a result, 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.

ALTERNATIVE 2

This alternative would provide a major benefit to the natural sound resource at Denali by mitigating the adverse impacts caused by past increases in motorized noise; however, ongoing low to medium intensity airplane noise would still cause minor adverse cumulative impacts.

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	0%
High	0%
Medium	12%
Low	88%

In addition, there would be year-round corridors designated on the Kantishna, Muddy, and lower Tokositna Rivers. These 62 miles of corridor management area 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 the following table demonstrates, these standards would likely represent a substantial improvement over existing conditions in all areas of the park and preserve where the standards can be compared to available data—except at Kahiltna Base Camp. These results are particularly important for the Old Park and Stampede airstrip areas, where data is relatively plentiful and aircraft overflights are the primary motorized noise source, so the results indicate broad areas rather than just airplane landing strips. For the Dunkle Hills, a larger portion of noise is snowmachine-related in winter months, and a substantial reduction in motorized noise is indicated but based on a very small sample size. In all areas, access management tools would be applied to bring conditions into standard.

Region Identifier	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 up to 56% of the motorized noise may reach that level. In addition, 10.5% may exceed the maximum sound level of 40 dBA.
Stampede Airstrip	Low	Data from the Stampede Mine airstrip, which is very near the Toklat Basin region, showed the number of motorized noises louder than natural ambient exceeded the Low standard between 13% and 62% of days every month for which comparative data exists. Because the motorized noise at Stampede resulted from aircraft overflights, it is likely that surrounding areas had similar amounts of natural sound disturbance.
Dunkle Hills	Medium	Data from the Dunkle Hills during winter months showed that a Medium level of natural sound disturbance is exceeded at times. In those samples, standards for the percent of time motorized noise was audible were exceeded between 30% and 60% of all hours measured.
Ruth Amphitheater landing area	Very High	Data from the Ruth Amphitheater showed that the Very High standard for the Ruth Glacier Special Use Area is 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	High	Measurements taken near the airplane landing area on the Pika Glacier – within the Portal area – show that all standards for a High 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.

Airplane landings would be prohibited parkwide in this alternative for all except at Portals and frontcountry airstrips, or when used for access to traditional activities as presently defined for snowmachines in the Old Park. Many of the existing and future airplane landings in the park and preserve would be for purposes consistent with the “traditional activities” definition – hunting, fishing, and berry gathering being examples. This action would eliminate a small but unquantifiable amount of noise associated with landings for other non-traditional purposes, although the associated overflights above the park could still occur, resulting in a low intensity, long-term benefit to the natural soundscape.

Scenic air tour landings would be restricted to the Kahiltna Base Camp after July 1 and to the Ruth Amphitheater, and landings would be limited to 2001 numbers. Between 1999 and 2004, there were an average of 206 landings per year that took place outside of these

areas, primarily on the Pika and Eldridge Glaciers, amounting to 11% of total scenic air tour landings. However, scenic tour landings comprised 73% of all landings in these two locations, so the amount of motorized noise on the Pika and Eldridge Glaciers could be expected to decline substantially. Landings for 2001 were higher than in any succeeding year, so the limit to 2001 numbers would affect only growth, not current conditions. This action would benefit not only the natural soundscape of the Portals but also the areas surrounding the Portals and areas that the scenic tours travel over on their way to these landing locations.

Sound data for the Ruth Amphitheater in 2002 shows that all three sound standards for a Medium level of sound disturbance were exceeded between 31% and 100% of the sample hours, days, or events. For the High level of sound disturbance in Portal areas, the percent time audible per hour standard and the number of motorized noises per day standard would have been exceeded between 24% and 89% of the hours or days. Since concessions data show that 2001 landings in the Ruth Amphitheater were roughly 8% higher than 2002 (2,107 compared to 1,929), it could be anticipated that by themselves, these restrictions would not bring sound conditions into standard, so other tools would have to be employed.

Commercial air taxi landings would be restricted to designated Portals and frontcountry landing strips. Based on 1999-2003 concession reports, this would eliminate about 66 backcountry landings per year and associated motorized noise, primarily at other glacier landing areas. Some of these landings would be displaced to areas just outside of park boundaries while the associated overflights would still occur (e.g., around the southwest preserve). This action would have a negligible impact on natural soundscape.

Limiting the number of climbers on Mount McKinley to 1,300 per season would restrict growth in air taxi access to Kahiltna Base Camp. However, that limit would allow the same number of climbers as in 2001. Some noise reduction might occur as concession operators achieve more efficiency in passengers per flight, reducing the number of flights necessary to transport the same number of climbers. This action would also have a negligible impact on the natural soundscape.

This set of rules would eliminate most snowmachine access to parklands in popular areas around the Tokositna River valley and in the Dunkle Hills/Broad Pass area. Based on the small sample of motorized noise from the Dunkle Hills area above, this action would eliminate a substantial portion of the motorized noise during late winter months when snowmachine activity is normally high.

The prohibition on motorboat use except for access to traditional activities would have limited effect, primarily on potential future use. Much of the existing motorboat use in the park and preserve is to access activities such as hunting that would meet the Old Park definition of traditional activities. An exception is the Tokositna River, where some recreational access presently occurs and is expected to increase in association with access to private visitor facilities on inholdings. This action would only have an affect on future

non-traditional, recreational uses, and would have no immediate effect on the amount of natural sound disturbance in the park and preserve.

In this alternative, the park road would remain unplowed until necessary for summer season use. As a result, there would be no ground-based motorized intrusion west of Park Headquarters during the early and mid-winter months, roughly October through March, eliminating a temporary, low-intensity source of noise that presently occurs in the area between mile 3 and mile 7 of the park road.

There would be no backcountry trail or campsite construction in this alternative, so there would be no associated construction or maintenance noise.

The National Park Service would discontinue use of the temporary administrative camp at 14,000 feet on Mount McKinley. This would reduce the requirement for use of Army helicopters to install and remove the camp each year, although they would still be needed to install and remove the Kahiltna Base Camp. The noise associated with installing the 14,000-foot camp is substantial within a small area of the park during set up and removal, but the impact is confined to a relatively brief period.

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 on the south side of the Alaska Range between the Kahiltna and Eldridge Glaciers. The National Park Service has contributed by authorizing concessioner 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 parkwide. 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, this alternative would prohibit use of snowmachines for recreational touring. Thus, there would only be additional natural sound-related impacts associated with activities that meet the “traditional activities” definition or potentially impacts associated with access to or from the private establishments. If a trail were cleared from Nenana to Lake Minchumina and services were offered to support snowmachine access, this alternative would prohibit recreational snowmachine access within park and preserve boundaries, so there would be no additional noise-related impacts except by users accessing “traditional activities.”

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 south side glaciers. This alternative provides a major benefit to the natural sound resource by mitigating the impacts of some of these actions, providing a distinct reduction in sound levels in several locations over the life of the plan. As a result, there would be cumulative minor adverse impacts under this alternative because of ongoing low levels of motorized noise over the eastern and southern portions of the park and preserve with some high intensity, long-term motorized noise intrusions in localized areas, particularly at Kahiltna Base Camp and the Ruth Amphitheater landing area. The amount of motorized noise would be lower than current conditions in regions such as the eastern part of the Old Park, the Dunkle Hills, and glaciers on the south side of the Alaska Range. The actions proposed under this alternative would be responsible for none of the adverse impacts to natural soundscapes, but would primarily mitigate the affects of past actions.

Conclusion

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 in the Tokositna and Dunkle Hills/Broad Pass areas, the noise from scenic air tour landings other than at the Ruth Amphitheater and Kahiltna Base Camp, and reducing 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.

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.

ALTERNATIVE 3

This alternative would provide a moderate benefit to the natural sound resource at Denali by mitigating the adverse impacts caused by past increases in motorized noise; however,

moderate adverse cumulative impacts would occur because of ongoing high intensity noise in a few specified locations and medium intensity, dispersed noise across large parts 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	<1%
High	4%
Medium	15%
Low	81%

In addition, there would be year-round corridors designated on the Kantishna, Muddy, and east and west fork of the Yentna Rivers; and winter corridors in the Dunkle Hills/ Broad Pass area. While other corridor designations in the Tokositna valley and Kantishna Hills areas would not differ in allowed natural sound disturbance from the surrounding area, these 109 miles of year-round corridors and additional 13 miles of winter season corridor 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 the table below demonstrates, these standards would likely represent a substantial improvement over existing conditions in all areas of the park and preserve where the standards can be compared to available data except at Kahiltna Base Camp. These results are particularly important for the Old Park and Stampede airstrip areas, where data are relatively plentiful and aircraft overflights are the primary motorized noise source, thus the results are indicative of broad areas instead of just airplane landing strips. For the Dunkle Hills a larger portion of noise is snowmachine-related in winter months, and a substantial reduction in motorized noise is indicated but based on a very small sample size. In all areas, access management tools would be applied to bring conditions into standard.

Region Identifier	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 with a higher sound level 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 be louder than the natural ambient threshold, but from the sound level rating system used by the ranger patrols up to 56% of the motorized noise may reach that level. In addition, 10.5% may exceed the maximum sound level of 40 dBA.
Stampede Airstrip	Low	Data from the Stampede Mine airstrip, which is very near the Toklat Basin region, show the number of motorized noises louder than natural ambient exceeded the Low standard between 13% and 62% of days every month for which comparative data exists. Because the motorized noise at Stampede resulted from aircraft overflights, it is likely that surrounding areas had similar amounts of natural sound disturbance.
Dunkle Hills	Medium	Data from the Dunkle Hills during winter months show that a Medium level of natural sound disturbance is exceeded at times. In those samples, standards for the percent time motorized noise was audible were exceeded between 30% and 60% of all hours measured.
Ruth Amphitheater landing area	Very High	Data from the Ruth Amphitheater show that the Very High standard for the Ruth Glacier Special Use Area is 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	High	Measurements taken near the airplane landing area on the Pika Glacier – within the Portal area – show that all standards for a High 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 standards in an August sampling period.

Airplane landings would not be allowed in the Old Park. This would eliminate a small but unknown amount of present and future noise associated with general aviation use year-round in about one-third of the park and preserve, although the associated overflights could still occur. There would be no change in the noise associated with general aviation landings elsewhere in the park and preserve.

Scenic air tour landings would be restricted to Kahiltna Base Camp after July 1, the Ruth Amphitheater, and the Ruth Gorge. Between 1999 and 2004, there were an average of 199 scenic air tour landings per year that took place outside of these areas, primarily on the Pika and Eldridge Glaciers, amounting to 10% of total scenic air tour landings. However, in these two locations the scenic tour landings accounted for 73% of all landings, so the amount of noise disturbance in these specific locations could be expected to decline substantially. Standards would constrain high-volume scenic air-tour overflights to the Ruth Glacier valley and lower Tokositna Glacier with more dispersed

use elsewhere, detectably reducing sound levels over parts of the Old Park and other portions of the southern park additions between the Kahiltna and Eldridge glaciers. However, airplane noise would be the most distinctive part of the sound environment over the Ruth Glacier 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 growth in climber demand is not likely 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 restricted parkwide to traditional activities as defined for the Old Park in 2000, but recreational snowmachine access would be provided along winter season corridors in the Tokositna River valley and the Broad Pass/Dunkle Hills area. A High level of noise would be allowed along each of these corridors and that level would likely be reached during late winter months. However, the amount of snowmachine noise in locations other than the corridors in the Dunkle Hills would likely be substantially less than recorded in the small sample described above.

Rivers that support existing use of motorboats (Kantishna, Muddy, Tokositna, Yentna) are designated corridors under this alternative and so have a High standard for natural sound disturbance. For the Kantishna, Muddy, and Yentna Rivers most motorboat noise occurs during the general and/or subsistence hunting seasons and would likely remain under the standard by itself. Along the Yentna, it would be a contributing factor near the river, although most noise in the area would be associated with aircraft.

The Tokositna River is likely to have growth in recreational motorboat traffic particularly accessing private visitor facilities along the lower section of the river. Increased motorboat traffic would result in increased noise; however, 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.

In 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 be left for winter recreation. This action would result in heavy road equipment traveling up 4 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.

The National Park Service would designate trails and campsites within Management Area A in Kantishna and improve existing social trails if needed. Trail and campsite construction in the Kantishna 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 to the places near where construction or maintenance was occurring, and could temporarily exceed standards for the duration of the project (usually less than a single season in any one location).

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. However, plan implementation would require additional levels of administrative and research presence for monitoring in the backcountry, and some of these plan-related activities would meet the minimum tool requirement for use of aircraft, snowmachines, or other equipment that produces motorized noise.

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 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 parkwide. 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, this alternative would prohibit use of snowmachines for recreational touring, so there would only be additional natural sound-related impacts associated with activities that meet the “traditional activities” definition or potentially with access to or from the private establishments. If a trail were cleared from Nenana to Lake Minchumina and services were offered to support snowmachine access, this alternative would prohibit recreational snowmachine use from this park boundary, so there would be no additional noise-related impacts except by users accessing “traditional activities.”

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 proposed in this alternative would provide a moderate benefit to the natural sound environment by mitigating some of these adverse impacts, although increases in motorized noise could still occur in many areas of the park. Cumulatively, the natural soundscape resource of the national park and preserve would still have moderate adverse impacts because of noise that approaches the Very High standards for natural sound disturbance in the Ruth Amphitheater, and High standards elsewhere on the Ruth Glacier and along corridors in the Dunkle Hills and Tokositna River areas. Standards for a Medium level of natural sound disturbance would be reached in other locations on the southern glaciers and in the Dunkle Hills/Broad Pass area. However, the actions proposed in this alternative would contribute very little to the adverse impacts that generally already exist.

Conclusion

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.

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.

ALTERNATIVE 4 (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 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%
High	9%
Medium	9%
Low	79%

In addition, there would be year-round corridors designated on the Kantishna, Muddy, and east and west fork of the Yentna Rivers. While other corridor designation in the Dunkle Hills, Kantishna Hills, and Tokositna valley areas would not differ in allowed natural sound disturbance from the surrounding area, these 109 miles of year-round corridors 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	High	Measurements taken near the airplane landing area on the Pika Glacier – within the Portal area – show that all standards for a High 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.

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. 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 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, 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 and on the Kantishna and Muddy Rivers during subsistence and sport hunting seasons.

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 Alternative 4, 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, and Wildhorse Creek. 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 the south side of the Alaska Range between the Kahiltna and Eldridge Glaciers. The National Park Service has contributed by authorizing concessioner 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 parkwide. 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 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

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, 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.

ALTERNATIVE 5

This alternative would result in moderate adverse impacts to the natural soundscape of the park and preserve because it would allow increasing motorized noise in the southern additions. Because the actions in this alternative would not mitigate the adverse impacts of previous noise intrusions, there would continue to be major adverse cumulative impacts from existing sources of noise, but the standards presented in the plan would establish limits that would prevent impairment of the natural sound resource.

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%
High	15%
Medium	66%
Low	16%

In addition, there would be year-round corridors designated on the Kantishna, Muddy, and east and west fork of the Yentna Rivers and potentially a winter season corridor from the Sushana River to Kantishna. While other corridor designation in Dunkle Hills/Broad Pass, Kantishna, and Tokositna valley areas would not differ in allowed natural sound disturbance from the surrounding area, these 109 miles of year-round corridors and additional 48 miles of winter season corridor 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 the standards can be compared to available data they would maintain existing conditions or allow some additional noise in the Old Park and Stampede airstrip areas, while requiring some improvement in localized areas such as the Ruth Amphitheater landing area and Kahiltna Base Camp. Late winter use in the Dunkle Hills might require some reduction in noise on weekends.

Location	Natural Sound Disturbance Standard	Comparison of Existing Conditions to Standard
Eastern portion of Old Park	Medium	Both the NPS patrol observations and the report from the 2000 backpacker survey demonstrate on average the eastern portion of the Old Park receives an amount of airplane noise that would meet the Medium standard. The standard would allow 10 motorized noises 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. The only standard that might be exceeded is maximum sound level, for which 10.5% of motorized noises likely exceed 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 were 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	High	Measurements taken near the airplane landing area on the Pika Glacier – within the Portal area – show that all standards for a High 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 standards in an August sampling period.

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. Between 1999 and 2004, only two scenic air tour landings took place outside of this area, thus there would be little impact on existing airplane landings. As landing areas become crowded and noise thresholds are reached in the Ruth Amphitheater and at Kahiltna Base Camp, scenic tour landings would expand to the Eldridge and Pika Glaciers to a greater degree, and possibly to other locations as well. Scenic air tour overflights would maximize use of glaciated areas that allow a High level of natural sound disturbance. Scenic air tour overflights above the Old Park could continue with as much noise as at present. Much of the area between the Kahiltna and Eldridge Glaciers could have sound levels that reach the High or Very High thresholds allowed in this area.

There would be no limit on the number of climbers on Mount McKinley during the primary climbing season. As a result, air-taxi traffic could increase to accommodate demand, which is likely to increase gradually. However, since noise standards were exceeded in 2002 when only 1,232 climbers attempted the summit, it is likely that other actions would be taken to reduce noise from present levels, and slightly increasing climber numbers would have no affect.

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, 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 during subsistence and sport hunting seasons along the Kantishna and Muddy Rivers.

Under Alternative 5, the Tokositna River also falls into the Ruth Glacier Special Use Area, which allows a Very High standard for natural sound disturbance. Growth in recreational motorboat traffic is likely, particularly for access to private visitor facilities along lower sections 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.

In this alternative, the park road would be kept open to Savage Campground throughout the winter, the parking lot would be plowed at the campground, and a warming hut would

be provided to serve as a base for winter activities in the eastern portion of the Old Park. This action would result in additional motorized noise from both maintenance vehicles and visitor traffic along 9 miles of park road and through Savage Campground, areas which are now typically undisturbed from October through March. The frequency of maintenance traffic would be predicated on snow and ice conditions. Winter visitors have been increasing and current figures indicate that several hundred visitors could be expected each month (375-1,000 per month based on winter 2003-2004 data). This number is expected to increase during the life of the plan, particularly in late winter months such as February and March.

Several additional trails would be constructed in Kantishna along with designated campsites, two trails at Eielson Visitor Center, and single trails at Wonder Lake and Wildhorse Creek, the latter also having designated campsites. Additional trails could be constructed in Management Area A in the lowland areas surrounding the lower Kahiltna, Tokositna, and Ruth Glaciers. 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 the south side of the Alaska Range between the Kahiltna and Eldridge Glaciers. The National Park Service has contributed by authorizing concessioner 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 parkwide. 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. Along a corridor from the Sushana River to Kantishna and in the southern Kantishna Hills, there would be a High standard for motorized noise, and depending on the scale of service provided by the lodges this threshold could be reached in some parts of the southern Kantishna Hills during the life of the plan. Much of the noise impact would occur during late winter months. Adjacent areas would have a 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 a Medium 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. Actions in this alternative would result in moderate adverse impacts because of medium intensity, long-term increases in motorized noise particularly in the southern park additions from the Kahiltina Glacier east to Cantwell. This alternative does little to mitigate the adverse impacts of previous actions. All together, there would continue to be a major adverse cumulative impact from the actions in this alternative combined with past and possible future actions. This alternative would be responsible for a substantial portion of the cumulative impacts.

Conclusion

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 Kahiltina 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, long-term airplane and snowmachine access in the southern park additions and airplane overflights above the Old Park. The actions in this alternative do little to mitigate the increased motorized noise from previous actions, but do prevent impairment of the natural sound resource by setting standards that would limit the extent to which noise could increase.

As a result of these actions, 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.

ALTERNATIVE 1 (NO ACTION)

The actions in this alternative would result in major adverse impacts to the wilderness resource of the Denali backcountry because of ongoing increases in motorized access in accessible regions that would compromise wilderness qualities including absence of motorized noise, privacy and isolation, and absence of evidence of modern human use. These adverse impacts could result in the impairment of a park resource specified in legislation.

Absence of Permanent Structures

No additional facilities would be constructed under this alternative. Consequently, there would be no change in wilderness character either in the designated wilderness of the Old Park or areas determined suitable for wilderness designation.

Opportunities for Solitude

In this alternative, there would be no new management areas or standards for such indicators of wilderness solitude as encounters with other people, encounters with large groups, or camping density. While the existing encounter rate standard of two parties per day in the Old Park – implemented in part by overnight camping quotas – help ensure the opportunity for solitude in designated wilderness, the same is not true for areas in the park additions and preserve. In the Old Park, there is also no uniform group size limit or limit on the number of large groups that could be encountered.

As visitation to the park's backcountry increases, opportunities for solitude would decline in some areas of the park additions, particularly in those areas that are easily accessible by air or road, such as the Dunkle Hills in summer along the state right of way, areas near the Petersville Road, and alpine areas between the Kahiltna and Ruth Glaciers.

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. This section concluded that under Alternative 1, there would be major adverse impacts to the natural soundscape because of increasing airplane access over the eastern portions of the Old Park and the southern glaciers (Kahiltna Glacier to Eldridge Glacier) and snowmachine access in the southern additions. Because noise levels are likely at

least to double over the life of the plan, particularly in areas that already have high intensity, long-term changes in the natural sound environment, there is the likelihood of impairment of the natural sound resource. This in turn would constitute a long-term, consistent decline in the wilderness character of those locations in the park and the potential for visitors to have a wilderness experience. This conclusion is true both for the designated wilderness of the Old Park as well as for areas in the southern park additions that have been determined suitable for wilderness designation.

Opportunities for Primitive and Unconfined Recreation

Under this alternative, no additional registration requirements would be immediately imposed. Thus, visitors would have no further restrictions prior to entering the backcountry. While airplanes and motorboats could continue to be used parkwide for access to recreational activities, and snowmachines could continue to be used in the park additions and preserve for undefined “traditional activities,” visitors would still have the opportunity to travel throughout the backcountry without assistance from motorized transportation.

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 is 17 days on average and the primary climbing season is only 2-3 months long, there is a large concentration of visitors 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 are 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 under this alternative would also have major adverse impacts on the wilderness resources of the park because of additional long-term, high-intensity increases in motorized access that lead to losses in opportunities for solitude. Therefore, there would be major adverse cumulative impacts to wilderness resources under this alternative, half of which could be attributed to the actions in this alternative.

Conclusion

Under this alternative, 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 no longer suitable for wilderness designation. This condition would constitute impairment of a park resource that fulfills a specific purpose identified in legislation.

ALTERNATIVE 2

The actions in this alternative would result in moderate benefits to the wilderness resource of the Denali backcountry because limitations on motorized access would

restore opportunities for solitude. However, there would still be minor adverse cumulative impacts because of ongoing airplane access and the absence of opportunities for solitude on the West Buttress route on Mount McKinley during the primary climbing season.

Absence of Permanent Structures

No additional facilities would be constructed under this alternative, thus there would be no change in wilderness character either in the designated wilderness of the Old Park or areas determined suitable for wilderness designation.

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 emphasize high levels of privacy and isolation, as demonstrated in the following table.

Number of Encounters with Other Parties					
Descriptor	Very Low	Low	Medium	High	Very High
Standard	0	3/week	2/day	5/day	10/day
% of Park & Preserve	57%	8%	27%	8%	62 miles summer & winter corridors, West Buttress SUA
At 9 Portals and in the West Buttress Special Use Area there is no standard for the number of encounters with other parties					

Standards for encounters with large groups limit associated 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	Yes - 2/day
Standard	0 groups	1 group per day	2 groups per day
% of Park & Preserve	64%	28%	8%

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%	62 miles summer & winter corridors, 5 Portals	3 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 be relatively free of reminders of society. 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	92%	8% + 5 Portals	3 Portals, BC Hiker Areas, West Buttress SUA, 62 miles summer & winter corridors

As visitation to the park increases, these standards protect opportunities for solitude by triggering management action to disperse or limit the density of visitors in locations where problems arise. While hiker areas, corridors, Portals, and the West Buttress Special Use area allow higher-intensity 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 levels.

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, 88% of the park and preserve is designated within a management area that only allows Low levels of natural sound disturbance and the other 12% of the park and preserve would allow a Medium level of natural sound disturbance. This alternative also has actions that would exclude airplane landings except from Portals and frontcountry airstrips, and snowmachines and motorboats from the entire park and preserve. Although the level of noise on 62 miles of corridors and at nine Portals could reach the High standard, together, these actions would generally allow very little noise or motorized transport in the park backcountry, which would protect wilderness character and the wilderness experience of visitors.

The 14,000-foot camp on Mount McKinley would be discontinued. This action would reduce signs of human presence, noise associated with helicopter deliveries and retrieval of materials, and the need for Lama helicopter support for rescue operations and resource management activities. Climbers would be forced to be more self-sufficient, since rescue services would not be as available. However, without the camp there would likely be increased signs of human presence in the form of litter and human waste.

Opportunities for Primitive and Unconfined Recreation

There would be a limit of 1,300 climbers per season on Mount McKinley. At present visitation levels, this limit would not exclude any climbers. However, within the 20-year life of the plan demand would grow to an estimated 1,405-1,470 climbers per year, thus between 105 and 170 climbers per year would have their ability to climb Mount McKinley restricted. This is a very small proportion of overall park backcountry visitation, and affects only one destination within the 6 million acre park and preserve.

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

Day-use registration would be required in the Old Park during summer months and in portions of the southern park additions east of and including the Kahiltna Glacier during winter months. All overnight camping in the park and preserve would require registration.

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. These requirements would constitute a long-term, low-to-medium intensity adverse impact.

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, there is a large concentration of visitors 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 altogether total fewer than 20 miles within the 1.9-million-acre Denali Wilderness, and therefore are 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. This alternative would provide a minor benefit to wilderness resources by mitigating the impacts of past actions and future growth. Combined with previous actions protecting the wilderness character of the Old Park, there would be only minor adverse cumulative impacts from the actions in this alternative combined with the past, present, and reasonably foreseeable future actions. The actions in this alternative would be responsible for none of the adverse impacts.

Conclusion

Under this alternative, 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 but would generally still allow increases in visitor use across most of the western portion of the Old Park, park additions, and preserve. There is

a long-term but low-intensity loss of unconfined recreation opportunities because of new registration requirements and climbing limits on Mount McKinley, but these either are minimal or affect a small percentage of backcountry visitors. 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.

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.

ALTERNATIVE 3

The actions in this alternative would result in a moderate benefit to wilderness resource values in the Denali backcountry by increasing opportunities for solitude while only minimally adding new structures or constraining freedom of movement. There would still be moderate adverse impacts to the wilderness resource of the Denali backcountry because of the loss of opportunity for solitude on the West Buttress of Mount McKinley and the noise and equipment associated with aircraft use on and around the Ruth Glacier and in corridors in the southern park additions.

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 areas determined suitable for wilderness designation.

None of these would affect the designated wilderness of the Old Park.

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 for 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	Very Low	Low	Medium	High	Very High
Standard	0	3/week	2/day	5/day	10/day
% of Park & Preserve	44%	13%	32%	11%	128 miles summer corridors , 135 miles winter corridors, West Buttress SUA
At 9 Portals and in the West Buttress Special Use Area no standard exists for the number of encounters with other parties					

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	Yes - 2/day
Standard	0 groups	1 group per day	2 groups per day
% of Park & Preserve	58%	32%	10%

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 miles summer corridors, 135 miles winter corridors, 5 Portals	3 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	89%	11% + 5 Portals	3 Portals, BC Hiker Areas, West Buttress SUA, 128 miles summer corridors, 135 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. 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 would primarily affect the park additions and preserve, since the Denali Wilderness was already managed to achieve similar standards. However, for the Old Park these standards would provide more definition for qualities such as evidence of modern human use, and they would distinguish the western portion of the Old Park (OP2) as an area that should protect current conditions of very low use levels.

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, 81% of the park and preserve would be designated within a management area that only allows Low levels of natural sound disturbance, 15% in areas that allow Medium sound disturbance, and only 4% in areas that allow a High level of sound disturbance. In addition, there are 128 miles of corridor in the summer and 135 miles in winter along with 5 Portals that would allow a High level of sound disturbance, and 3 Major Landing Areas plus less than 1% 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, there would be a moderate benefit to the natural soundscape in this alternative, primarily because conditions in the southern park additions and the designated wilderness of the Old Park should improve.

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 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 could grow to an estimated 1,405-1,470 climbers per year, thus the expectation is that the limit would not be reached and the limit would exist 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 14,000 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.

Day-use registration would be required in the Old Park during summer months and in portions of the southern park additions east of and including the Kahiltna Glacier during winter months. All overnight camping in the park and preserve would require registration.

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 an average of 17 days 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 altogether total fewer than 20 miles within the 1.9-million-acre Denali Wilderness, and therefore are 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 mitigate the impacts of cumulative past actions and restrict impacts from further growth in these kinds of uses. There is still a moderate adverse impact to the wilderness resource because the Ruth Glacier and Amphitheater would have a substantial amount of scenic air tours and other aircraft use and some corridors would have a substantial amount of recreational access by snowmachine. The actions in this alternative would not be responsible for any substantial adverse impacts, although they would be responsible for small, isolated impacts such as new structures (trails) and new registration requirements.

Conclusion

Under this alternative, 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, but would generally still allow increases in visitor use across most of the western portion of the Old Park, park additions, and preserve. There is a long-term but low-intensity loss of unconfined recreation opportunities because of new registration requirements and climbing limits on Mount McKinley, but these either are minimal or would be unlikely to trigger during the life of the plan. 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 associated with some corridors in the southern additions during winter months.

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.

ALTERNATIVE 4 (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, 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	Very Low	Low	Medium	High	Very High
Standard	0	3/week	2/day	5/day	10/day
% of Park & Preserve	11%	44%	29%	15%	128 miles summer corridors, 135 miles winter corridors, 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	Yes - 2/day
Standard	0 groups	1 group per day	2 groups per day
% of Park & Preserve	56%	29%	15%

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 miles summer corridors, 135 miles winter corridors, 5 Portals	3 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%	15% + 5 Portals	3 Portals, BC Hiker Areas, West Buttress SUA, 128 miles summer corridors, 135 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. 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 levels.

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% of the park and preserve would be designated within a management area that allows Low levels of natural sound disturbance, 9% in areas that allow Medium sound disturbance, and 9% in areas that allow a High level of sound disturbance. In addition, there are 128 miles of corridor in the summer and 135 miles in winter along with 5 Portals that would allow a High level of sound disturbance, and 3 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 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 14,000 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 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.

ALTERNATIVE 5

The actions in this alternative would result in moderate adverse impacts to the wilderness resource of Denali because the alternative allows ongoing decline in opportunities for solitude in large portions of the park additions and preserve while not mitigating existing impacts on the designated wilderness of the Old Park. There would be a major adverse cumulative impact because of the long-term decline in opportunities for solitude that would continue under this alternative and aggravated by increased motorized access and crowding in some areas, as well as new trails and other low-intensity impacts.

Absence of 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 and three sites in the Wildhorse Creek 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, Eielson Visitor Center, and Eielson Bluffs, but they would replace existing obvious social trails and fall partly within the Backcountry Day Use area, outside designated wilderness areas.

Most immediately affected would be the Wildhorse Creek area, where an area determined suitable for wilderness designation would have new trail and campsite construction in an area that presently has no signs of human structures or ongoing human presence. Particularly with the possible addition of sanitation or food storage facilities, the impact would be substantial, but only on a single creek valley.

Additionally, more trails could be established in the lowland areas between the Kahiltna and Ruth glaciers. A trail system in this area would add substantial permanent additional structures that are a reminder of human presence and that mildly reduce the required level of self-sufficiency in this broad area.

Up to five public use cabins could be constructed along the park's southern boundary, but these would not affect the park's wilderness resources.

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 emphasize areas that allow a substantial amount of use while still protecting wilderness qualities, as the table below demonstrates.

Number of Encounters with Other Parties					
Descriptor	Very Low	Low	Medium	High	Very High
Standard	0	3/week	2/day	5/day	10/day
% of Park & Preserve	0%	16%	66%	18%	128 miles summer corridors, 183 miles winter corridors
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 mitigating the impacts of adding group educational and guided activities in areas where allowed.

Possible to Encounter Large Groups?			
Descriptor	No	Yes	Yes - 2/day
Standard	0 groups	1 group per day	2 groups per day
% of Park & Preserve	16%	66%	18%

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 miles summer corridors, 183 miles winter corridors, 5 Portals	3 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	82%	18% + 5 Portals	3 Portals, BC Hiker Areas, West Buttress SUA, 128 miles summer corridors, 183 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. 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. They also distinguish the western portion of the Old Park as an area that should have less use than the road-accessible areas, although it could still accommodate considerably more use than it has at present.

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, 16% of the park and preserve would be designated within a management area that allows Low levels of natural sound disturbance, 66% in areas that allow Medium sound disturbance, and 16% in areas that allow a High level of sound disturbance. In addition, there are 128 miles of corridor in the summer and 183 miles in winter, along with 5 Portals that would allow a High level of sound disturbance, and 3 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, there would be major adverse impacts to natural sound at Denali, primarily over the southern additions, that would affect the wilderness character of the park and wilderness experience of visitors. Conditions over the Old Park would not be expected to improve from current conditions.

There would be up to 183 miles of marked corridors in winter, which would provide more guidance and add more signs of management and human presence than is typical of the wilderness experience at Denali. None of these would affect the designated wilderness of the Old Park.

The park road would be plowed to Savage Campground during winter months and a parking area and warming hut provided at the campground. The direct action would not affect designated wilderness; however, indirectly this action would add a substantial amount of activity to the surrounding wilderness area compared to existing conditions, particularly during late winter months. However, management area standards would keep these impacts on wilderness resources at a level no greater than what presently occurs in the same area during summer months.

Opportunities for Primitive and Unconfined Recreation

There would be no restriction on the number of climbers on Mount McKinley during the course of a season, although a limit could be revisited in five years once more information is gathered. As a result, there would be no immediate constraint on climbers.

Mountaineers would be required to carry out human waste from the West Buttress above 14,000 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 be no additional registration requirements immediately imposed under this alternative, thus visitors would have no further restrictions prior to entering the backcountry. Registration or other restrictions could be required in the future if it is a necessary tool for achieving desired future conditions.

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, there is a large concentration of visitors 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 altogether total fewer than 20 miles within the 1.9-million-acre Denali Wilderness, and therefore are 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 would have a moderate adverse impact because they would allow further loss of opportunities for solitude in the southern park additions and to a lesser degree in the northern additions without mitigating existing impacts. As a result, there would continue to be major adverse cumulative impacts to wilderness resources. The actions in this alternative would be responsible for less than a majority of the impacts related to the expansion of motorized access, but would be primarily responsible for numerous, more localized impacts from the plowing of the park road to Savage Campground, construction of several new trails including in some undisturbed areas, and enabling the construction of further trails in the future.

Conclusion

Under Alternative 5 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.

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 outlines the impact thresholds used to determine the magnitude of effects on subsistence and presents an analysis of the impacts likely to occur under each 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.

ALTERNATIVE 1 (NO ACTION)

There could be major adverse impacts to subsistence resources and opportunities from Alternative 1 because of the potential for high levels of widespread recreation that could

create unfavorable conditions for subsistence wildlife populations and could result in the displacement of traditional subsistence activities. Information from the Denali Subsistence Resource Commission suggests that impacts would result from snowmachine use in the Cantwell area; however, no scientific data are currently available to support this conclusion. Impacts on subsistence resources and opportunities in the park and preserve additions would persist beyond the life of this plan. Unless otherwise stated, all impacts would occur throughout the life of this plan.

This alternative would allow for substantial increases in types and levels of use; without management area prescriptions, desired future conditions, and indicators and standards, 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 subsistence resources and opportunities. Non-subsistence snowmachine use would continue to increase and expand into more locations in both the north and south park and preserve additions. Heavy use would occur at some popular destinations, such as Broad Pass southwest of Cantwell and along the Upper and Lower Tokositna River (heavy use would occur at locations within about 25% of the total park area). Use would expand throughout 64.4% of the park (3,881,906 acres) and the intensity and duration of use would increase.

Cantwell

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 could 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 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 along the Alaska Range in the vicinity of Windy Pass 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 snowpack 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 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 either would displace caribou from the Windy and Cantwell 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

During the peak summer season there are approximately 300 overnight visitors to the Kantishna area. Increasing numbers of visitors could necessitate an expansion of the

firearms discharge closure 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 by severely restricting opportunities to hunt moose in those areas because they would not be permitted to use firearms.

Minchumina

Lake Minchumina area residents also mentioned concerns about the impacts of increasing non-subsistence uses during public scoping (see also Letter from Collins, 3/3/01).

Increases in non-subsistence uses through the northwest preserve could increase the risk of theft and vandalism at subsistence cabins. 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 snowmobiling have come dramatic improvements in snowmachine technology. Because of the increased reliability, power and flotation ability of the newer snowmachines, snowmachiners 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 snowmachiners 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 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 impact of these actions would be major in Cantwell where conflicts between recreation and subsistence already exist and are predicted to increase, moderate in Kantishna where a high level of recreation and infrastructure exists, and minor in Minchumina where low levels of visitation are expected due to its remote location. Implementing this alternative alone would have major adverse impacts on subsistence resources and opportunities. The cumulative impact of this alternative plus the aforementioned past, present, and reasonably foreseeable actions would be major.

Conclusion

There could be major adverse impacts to subsistence resources and opportunities from Alternative 1 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 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.

ALTERNATIVE 2

The impacts to subsistence resources and opportunities under Alternative 2 would be negligible because there would be no observable or measurable reduction of opportunities for subsistence activities or important subsistence fish and wildlife populations or distributions due to human-caused factors, and there would be no observable or measurable increase in angler or hunter competition for subsistence resources by other consumptive users. Unless otherwise stated, all impacts would occur throughout the life of this plan.

Under this alternative, recreational and administrative activities would be reduced from current levels, and recreational users may be subject to additional conditions on use. This alternative would have the least impact on subsistence resources and opportunities of all the alternatives because the levels of some activities, particularly non-subsistence snowmachine use, would be reduced in the park additions and preserve. Reducing use would reduce overlap between non-subsistence use and subsistence use areas to very small areas, thereby reducing user conflicts.

Under this alternative, all areas of the park used for subsistence activities would be zoned as Management Area B or E. These management areas allow for very 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

Snowmobile use under Alternative 2 would be limited to subsistence and other traditional activities in the park and preserve additions. Therefore, there would be an

immediate decrease in recreational snowmachine use at popular destinations such as the Broad Pass area southwest of Cantwell, an area of particular concern to subsistence users. While difficult to quantify, the potential for conflict between these user groups would be expected to decrease. Displacement of furbearers, moose, and caribou from the Broad Pass/Cantwell area that is described in the other alternatives would not occur under this alternative because non-subsistence snowmachine use would decrease.

Kantishna

Under Alternative 2, the Kantishna area would be designated as Management Area B, which would allow for encounters of up to two parties per day and a medium level of natural sound disturbance. This encounter rate is similar to current conditions in the Kantishna Hills in backcountry areas, thus no change to subsistence would be anticipated under this alternative.

Minchumina

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, which could be impacted by non-subsistence motorboat use on these rivers. Vandalism and theft could occur by non-subsistence users who encounter these cabins. 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 (pers. comm. Hollis Twitchell, 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 snowmobiling have come dramatic improvements in snowmachine technology. Because of the increased reliability, power and flotation ability of the newer snowmachines, snowmachiners 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 snowmachiners 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 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 impact of these actions would be major in Cantwell where conflicts between recreation and subsistence already exist and are predicted to increase, moderate in Kantishna where a high level of recreation and infrastructure exists, and minor in Minchumina where low levels of visitation are expected due to its remote location. Implementing this alternative alone would have negligible adverse impacts on subsistence resources and opportunities. The cumulative impact of this alternative plus the aforementioned past, present, and reasonably foreseeable actions would be major.

Conclusion

The impacts to subsistence resources under Alternative 2 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. 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.

ALTERNATIVE 3

While the decrease in non-subsistence snowmachine use would benefit subsistence, Alternative 3 would have minor adverse impacts on subsistence resources and opportunities due to the potential for conflicts along the winter snowmachine corridors and the year-round river corridors, and the increased backcountry use in the Kantishna area. Unless otherwise stated, all impacts would occur throughout the life of the plan.

Under Alternative 3, snowmachine use would be limited to subsistence and other traditional activities in the park and preserve additions, and to established winter corridors for recreational use. Therefore, there would be an immediate decrease in non-subsistence snowmachine use throughout the park and preserve, but the winter corridors would result in areas of more concentrated snowmachine use.

Establishing corridors would channel snowmachine use along the West Fork, Bull River, and Cantwell Creek; to the toes of the Ruth, Tokositna, and Kanikula glaciers from the Tokositna River; and along the Yentna, Tokositna, and Kantishna/Muddy Rivers (135 linear miles of winter corridors). Many of these higher use areas overlap areas currently or traditionally used for subsistence activities. Encounters with wildlife along these corridors could cause behavioral disturbance, increase stress levels, and temporarily displace wildlife. In some cases, wildlife mortality or injury to species could occur from wildlife-snowmachine collisions.

Cantwell

The Cantwell subsistence area would be zoned as Management Area B. This management area allows for medium encounters with other people, very little evidence of modern human use, and 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.

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).

Non-subsistence snowmachine users would interfere with subsistence traplines along Cantwell Creek, 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 Creek corridor 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.

Non-subsistence snowmachine use could displace moose and caribou from critical wintering areas on park lands in the Cantwell Creek and Bull River 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 snowpack 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 induce stress on moose and caribou in the Cantwell Creek and Bull River 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 either could displace caribou from the Cantwell Creek and Bull River 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 Alternative 3, the Kantishna area 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. Up to five designated campsites would be created in conjunction with the summer corridor areas in the Kantishna Hills. Increased recreational use in the Kantishna Hills 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 and increased recreational opportunities could necessitate an expansion of the firearms discharge closure 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 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), inviting more use along these corridors and potentially increasing user conflicts and the risk of theft and vandalism at subsistence cabins along these corridors. There are at least five usable subsistence cabins along the corridor on the Muddy and Kantishna Rivers. 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). 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).

The Minchumina subsistence area would be zoned as Management Area D and E. These management areas allow for very low to low encounters with other people, very little evidence of modern human use, and little 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.

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 snowmobiling have come dramatic improvements in snowmachine technology. Because of the increased reliability, power and flotation ability of the newer snowmachines, snowmachiners 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 snowmachiners 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 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 impact of these actions would be major in Cantwell where conflicts between recreation and subsistence already exist and are predicted to increase, moderate in Kantishna where a high level of recreation and infrastructure exists, and minor in Minchumina where low levels of visitation are expected due to its remote location. Implementing this alternative alone would have minor adverse impacts on subsistence resources and opportunities. The cumulative impact of this alternative plus the aforementioned past, present, and reasonably foreseeable actions would be major.

Conclusion

There would be minor adverse impacts to subsistence resources and opportunities under Alternative 3 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. 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 are essential to the integrity of the park.

ALTERNATIVE 4 (PREFERRED ALTERNATIVE)

Alternative 4 would have 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 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. In a future wilderness proposal, accommodation would be made as necessary for recreational snowmachine access along 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 of up to six people. Nearly all of the winter corridors overlap with areas currently or traditionally used for subsistence activities.

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 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

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 snowpack 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, 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 Alternative 4, the Kantishna area 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. Up to five designated campsites would be created in conjunction with the summer corridor areas in the Kantishna Hills. Increased recreational use in the Kantishna area 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 could necessitate an expansion of the firearms discharge closure 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 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), inviting more use along these corridors 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 snowmobiling have come dramatic improvements in snowmachine technology. Because of the increased reliability, power and flotation ability of the newer snowmachines, snowmachiners 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 snowmachiners 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 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 impact of these actions would be major in Cantwell where conflicts between recreation and subsistence already exist and are predicted to increase, moderate

in Kantishna where a high level of recreation and infrastructure exists, and minor in Minchumina where low levels of visitation are expected due to its remote location. Implementing this alternative alone would have moderate adverse impacts on subsistence resources and opportunities. The cumulative impact of this alternative plus the aforementioned past, present, and reasonably foreseeable actions would be major.

Conclusion

Alternative 4 would have 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, both of which would create unfavorable conditions for subsistence wildlife populations and increase conflicts between recreational and subsistence users. The cumulative 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.

ALTERNATIVE 5

Alternative 5 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.

Under this alternative, access by snowmachine to the park additions and preserves would continue and grow. Designating corridors for winter use would focus snowmachine use in the following places: from the southern park boundary to the Old Park boundary near the West Fork Chulitna, Bull River, and Cantwell Creek; to the toes of the Ruth, Tokositna, and Kanikula glaciers from the Tokositna River; to Kantishna from the Sushana River; along the Yentna, Tokositna, and Kantishna/Muddy Rivers. In a future wilderness proposal, accommodation would be made as necessary for recreational snowmachine access along corridors and throughout those areas designated as Management Area A (18% of the total park area plus 183 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 of up to six people. Nearly all of the winter corridors overlap with areas currently or traditionally used for subsistence activities. If standards in these categories were 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

Under Alternative 5, the Cantwell/Broad Pass area 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 and trappers 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 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 along the Alaska Range in the vicinity of Windy Pass 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 snowpack 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 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 and Cantwell 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 Alternative 5, the Kantishna area 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. Up to five designated campsites would be created in conjunction with the summer corridor areas in the Kantishna Hills. Increased recreational use in the Kantishna area could negatively affect subsistence hunters who rely on this area for subsistence purposes. In this alternative, snowmachine access via the Sushana-Kantishna corridor combined with high allowable levels of natural sound disturbance and high encounter rates could mean extensive snowmachine disruption to subsistence resources, although not during a time of year when subsistence users are currently present.

During the peak summer season there are approximately 300 overnight visitors to the Kantishna area. Increasing numbers of visitors could necessitate an expansion of the firearms discharge closure 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 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), inviting more use along these corridors 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).

Guided sport hunting would increase under Alternative 5, allowing three guides to cover the entire southwest preserve and one guide in the southern portion of the northwest preserve. The increase in guided hunting would increase competition with subsistence users, particularly in the northwest preserve where guided hunting would be a new activity. However, the main subsistence use in the southern portion of the northwest preserve is trapping, which occurs in winter. Therefore, commercial hunting in fall is not likely to conflict with trapping in winter.

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 snowmobiling have come dramatic improvements in snowmachine technology. Because of the increased reliability, power and flotation ability of the newer snowmachines, snowmachiners 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 snowmachiners 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 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 impact of these actions would be major in Cantwell where conflicts between recreation and subsistence already exist and are predicted to increase, moderate in Kantishna where a high level of recreation and infrastructure exists, and minor in Minchumina where low levels of visitation are expected due to its remote location. Implementing this alternative alone would have major adverse impacts on subsistence resources and opportunities. The cumulative impact of this alternative plus the aforementioned past, present, and reasonably foreseeable actions would be major.

Conclusion

Alternative 5 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. 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").

ALTERNATIVE 1 (NO ACTION)

As recreational use continues to increase under Alternative 1, visitors are more likely to encounter cultural resource sites and investigate them. As popular areas get crowded (such as the day-use areas around Wonder Lake and Kantishna), use would disperse into places with lower levels of use, such as the Kantishna Hills. Increasing numbers of visitors without concomitant management action have the potential for increased pressure on cultural resources and the types of adverse impacts described under the Methodology section.

Cumulative Effects

Adverse impacts to cultural resources could be expected from land development in the Kantishna Hills and increases in regional recreational activities. These impacts would occur mainly because of increasing numbers of visitors without concomitant management actions. Impacts from activities addressed in the no-action alternative of the backcountry management plan would not appreciably add to effects from other past, present, and reasonably foreseeable future actions.

Conclusion

Under Alternative 1, 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.

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.

ALTERNATIVE 2

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.

Under Alternative 2, the backcountry would be managed for low visitor density throughout most of the park and preserve. Although a year-round recreational corridor would be designated in the northwest part of the park (Muddy/Kantishna Rivers), because snowmobile and motorboat use would be limited to subsistence and other traditional activities in the park and preserve the amount of visitor use on this corridor would likely remain small. The Kantishna area would be designated as Management Area B, allowing for an encounter rate of generally no more than two parties per day. Management Area E designation, encompassing 46% of the backcountry, would allow for an encounter rate of zero parties per day, including at 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. For these reasons, 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, particularly in the backcountry. Instances of damage to cultural resources by visitors, such as vandalism and theft, would continue to be rare. Overall impacts on cultural resources from this alternative would be negligible for the entire time in which the plan is in effect.

Cumulative Effects

As described under Alternative 1, adverse impacts to cultural resources could be expected from land development in the Kantishna Hills and increases in regional recreational activities. As described in the analysis for Alternative 2, impacts to cultural resources under Alternative 2 would be negligible and therefore would not add to overall effects from other past, present, and reasonably foreseeable future actions.

Conclusion

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. This would continue as long as the plan is in effect.

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

ALTERNATIVE 3

Actions proposed under Alternative 3 have the potential to increase pressure on cultural resources because of the expected increase in use in some areas where cultural sites are found.

Under Alternative 3, the Kantishna area would be designated as Management Area A, allowing for an encounter rate of up to five parties per day, including two parties of six people. Several historic sites in the Kantishna Hills could experience an increase in visitation, potentially increasing the pressure on these sites because of increased recreational use. The Stampede Mine site 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. The area around the Stampede Mine would be designated Management Area D, allowing a low amount of visitor use with an encounter rate limitation of 3 parties per week. Year-round recreational corridors would be designated in the northwest part of the park (Muddy/Kantishna Rivers) and the southwest (Yentna and Tokositna Rivers), 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.

The increased recreation use would facilitate or encourage more people to visit areas where cultural resources exist, particularly in the backcountry, potentially increasing the pressure on those resources. Overall impacts on cultural resources from this alternative would be minor for the entire time in which the plan is in effect.

Cumulative Effects

As described under Alternative 1, adverse impacts to cultural resources could be expected from land development in the Kantishna Hills and increases in regional recreational activities. As outlined in the above analysis, Alternative 3 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 Alternative 3 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. 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.

ALTERNATIVE 4 (PREFERRED ALTERNATIVE)

Actions proposed under Alternative 4 would result in increased pressure on cultural resources because of the likelihood of increased visitation to cultural resource sites in the backcountry.

Snowmobile use under Alternative 4 would allow dispersed use throughout the park additions and preserve and on established winter corridors. Snowmobile use would continue to increase and cultural sites would be more prone to increased visitation throughout the winter months. Under Alternative 4, the Kantishna area would be designated as Management Area A, allowing for an encounter rate of up to five parties per day, including two parties of 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. The Stampede Mine site 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. Year-round recreational corridors would be designated in the northwest part of the park (Muddy/Kantishna Rivers) and the southwest (Yentna and Tokositna Rivers), 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

As described under Alternative 1, 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, Alternative 4 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 Alternative 4 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.

ALTERNATIVE 5

Actions proposed under Alternative 5 would result in the potential to increase pressure on cultural resources because of the likelihood of increased visitation to cultural resource sites in the backcountry.

Snowmobile use under Alternative 5 would allow dispersed use throughout the park additions and preserve and on established winter corridors. Snowmobile use would continue to increase and cultural sites would be more prone to increased visitation throughout the winter months. Under Alternative 5, the Kantishna area would be designated as Management Area A, allowing for an encounter rate of up to five parties per day, including two parties of six people. A large portion of the park and preserve (66%), 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. A high use Corridor zone between Sushana River and Kantishna could pass near the mine, allowing a very high level of use particularly during winter months. The Stampede Mine site 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 and throughout the backcountry could experience an increase in visitation as a result of increased recreational use. Year-round recreational corridors would be designated in the northwest part of the park (Muddy/Kantishna Rivers) and the southwest (Yentna and Tokositna Rivers), inviting more use along these corridors and potentially increasing the risk of impacts to 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

As described under Alternative 1, 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, Alternative 5 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 Alternative 5 could result in minor 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 alternative.

GENERAL IMPACTS BASED ON LITERATURE REVIEW

The impacts of each alternative 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.

ALTERNATIVE 1 (NO ACTION)

Economic Impacts

Summer Season

The lack of restrictions on airplane landings and overflights in the Old Park under Alternative 1 would result in continued increases in business opportunities for air taxi and scenic air tour operators in the short term. These increases would likely result in increased employment opportunities to operate and maintain additional airplanes and increases in purchases of aviation fuel, parts, and other materials for operation. This would result in continued gradually increasing income to communities in which air taxi and scenic air tour operations are based, such as Talkeetna and the Healy-McKinley Village area, in the next several years. The level of benefit would be attributed to the fact that air taxi and scenic air tour operations are a major part of the overall business climate in these communities, especially Talkeetna. Over the 20 years in which the plan is to be in effect, however, there could be some reduction of economic benefits from one year to the next. This could result from the possibility that higher levels of activity would begin to compromise the overall visitor experience and keep some customers away.

Economic benefits from other summer backcountry activities such as hiking, camping, and mountaineering, would continue under Alternative 1 with steady increases over the next 20 years. These benefits would include increased retail sales and services with related growth in employment and income for the providers of these services. The lack of limits on these activities in the park additions and preserve would not likely cause a reduction in economic benefits to providers, since the natural trend would be toward dispersed use patterns and the demand for the services would continue to grow. Because current levels of use are generally low outside the Old Park, there is considerable opportunity for such growth. Economic benefits, especially business income, would continue to be realized in area communities, with a higher level of benefit in Talkeetna, a primary staging area for mountaineering activities. This would continue to be the case throughout the next 20 years.

Winter Season

Snowmachine use would likely continue to increase in portions of the north and south additions of the park and in the preserve areas under Alternative 1. This increased use would increase employment opportunities and income levels in the winter, when economic activity is lower in the vicinity of the park, because of the demand for services such as fuel, food, lodging, and some retail sales. Businesses in the park area, especially Healy, Cantwell, and Trapper Creek, would continue to benefit directly, since providers of these services would be located there. Economic benefits such as employment and income would continue to increase steadily for lodges, hotels, restaurants, gas stations, and retail businesses. Communities along the highway and near the park would benefit from at least a portion of the up to \$583 spent in Alaska annually by current residents and \$303 spent per day in Alaska by nonresidents estimated by Fletcher, et al. (2000). In addition, the state economy, particularly those elements related directly to providing snowmachine goods and services, could benefit from the sale of additional snowmachines, accessories, insurance, and other sales if increased access to the park encourages residents to purchase more machines to take advantage of this opportunity. Benefits could be expected to increase during the next several years, after which some use could be directed toward other lands in the region in search of less heavily used areas.

The benefits to local retail sales and service providers, including employment opportunities and income, would likely be less from other winter uses, such as skiing and dog mushing. These visitors would tend to be fewer in number than snowmachine users and would generally spend less in the immediate areas visited. This would be the case throughout the next 20 years.

Population and Housing Impacts

Summer Season

Increased backcountry recreational use and associated employment would likely lead to at least some seasonal influx of people to provide the needed retail services, such as lodging, restaurants, gas stations, and retail stores. Potential increases in backcountry 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. However, increases would be somewhat gradual, and backcountry use would still be a small percentage of total park visitor use throughout the next 20 years. Most impacts to population and housing during the summer season would result from actions described under the cumulative impacts section.

Winter Season

Although there would be increased recreational uses during the winter, which might provide additional employment opportunities and result in more permanent residents in the areas near the park, it would likely be small and would not result in measurable increases in winter population levels. The increasing levels of visitor use during winter would result in corresponding increases in the 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 over the next several years by requiring slight increases in their capacity.

Other Economic Values

Changes to the wilderness character of Denali National Park and Preserve over the next several years, especially the increased impacts of human use in new places not currently affected, could result in a reduction 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 managed recreational types and use levels that prevent or minimize human impacts on the landscape. Ecosystem services for which values have not yet been determined could be compromised by allowing current recreational use patterns to continue to develop, since these use patterns include concentrated use at popular destinations with resource degradation at those locations. Essentially, any detrimental effect on nutrient cycling, water supply, climate regulation, erosion control or sediment retention could affect the value of ecosystem services. The level of impact would increase with the amount of area affected, and this would continue to be the case throughout the next 20 years.

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 over the next several years. Effects would likely increase to moderate levels over the next 20 years.

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 general 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 next several years. 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

Existence value could be expected to increase eventually as the commodity—a large, undisturbed ecosystem—becomes more rare in the world. Alternative 1 would result in an emphasis of recreational opportunities over and above ecosystem protection because of the lack of limits or visitor capacity determination in the park additions and preserve. This would reduce existence value eventually since this value is determined in large part by the pristine condition of the park and the level of resource protection. Increased impacts of human use in new places not currently affected would result in measurable impacts to existence value over the next several years. Measurement of such reduction would depend upon communicating information on level of impact and desired conditions to the public and determining preferences. A before and after comparison of a specific location, with changes from rarely visited to visibly affected, would likely decrease the amount of existence value placed on the site. This is a likely outcome for several different areas within the park and preserve under Alternative 1.

By contrast, use values would tend to increase in the next several years, exacerbating an existing trend in which some visitors have been seeking other destinations because of crowding at popular use areas in Denali. An increase in this trend could be expected during the next 20 years, since there is already increasing avoidance of popular south side destinations such as the Ruth Amphitheater because of rapidly growing levels of use.

Cumulative Impacts

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. This growth would lead to minor to moderate development of additional lodging, campgrounds, and supporting retail businesses, such as recreational tours and equipment rentals, restaurants, clothing and souvenir stores, and gas stations. This increase in economic activity would provide increased employment opportunities, resulting in an increase in seasonal and permanent population levels and the need for additional housing and public services.

At least a part of these services would support the increased backcountry recreational activities anticipated under Alternative 1, which could increase at a faster rate than overall visitation because of the lack of limits or capacity determinations. Still, most additional services would be directly related to frontcountry recreational uses, because of the much larger numbers of visitors, and uses outside of the park. Therefore, Alternative 1 for backcountry management would account for only a part of overall cumulative impacts.

Increased development along the Petersville Road, Trapper Creek, Talkeetna, in the Healy area, and on private inholdings and Native allotments would result in an increased need for housing and public services, as well as a loss in the current rural to wilderness quality of life in these areas. Overall, there would be moderate 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

While summer backcountry use is expected to increase at about the same rate as general park visitor use, the fastest growing sectors are in air tours and winter use, which are counted as part of overall backcountry use. This would result in parallel growth in income for existing businesses geared toward these particular user groups over the next several years under Alternative 1. There would also be more opportunities for new businesses to be initiated as a result of anticipated minor to moderate increases in recreational use levels. Alternative 1 would contribute to increased employment opportunities and income levels, commensurate with the levels of increases of recreational use, for concessioners and other recreation-oriented businesses near Denali National Park and Preserve. Increasing backcountry use under Alternative 1 would also contribute to the overall increase in economic activity, a slight increase in population and the need for additional housing and public services. Overall impacts to economic values of the park and preserve would be minor over the next several years. Effects would likely increase to moderate levels 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 eventually, 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 over the next several years as higher levels of use occur at popular destinations. Overall impacts on social and economic values from the management actions under Alternative 1 would be moderate.

ALTERNATIVE 2

Economic Impacts

Summer Season

Changes in air traffic patterns to reduce aircraft noise, especially over the Old Park, would be voluntary under Alternative 2; therefore, businesses would retain control over the degree to which these measures affect their enterprise. At the same time, agreements by the Aircraft Overflights Working Group and the adoption of technology resulting in fewer resource impacts by commercial scenic tour operators would set new standards for how these types of businesses are operated. The potential of increased trip length required by rerouting scenic air tours to reduce aircraft noise over extensive areas of the

park and preserve could result in a loss of visitors and income for those businesses and increased fuel and labor costs. Operators would have to either decrease their profit goals or increase fees to make up for the loss in net revenues. Increased costs for each trip could further reduce the number of visitors taking scenic air tours because of their resistance to paying the higher fees. To meet the standards for desired conditions under Alternative 2, air tour operators would most likely make changes to operations such as adopting new technology (for example, quieter aircraft). A temporary (five years or less) increase in operating costs would result.

Limiting the numbers of commercial airplane landings in the park and preserve to current levels would not negatively affect air taxi and scenic air tour operations in the next several years since such operations would be able to continue to operate as in recent years. However, over the long term they would not realize the economic benefits of increased visitor use of the backcountry unless they invested in larger airplanes capable of meeting desired conditions for the natural soundscape. Rates of business growth could be reduced throughout the life of the plan if air taxi and scenic air tour operators landing in the park served about the same number of visitors from one year to the next.

Alternative 2 includes several management actions to protect the overall quality of the wilderness experience while providing for lower use levels than would occur under other alternatives, including the no action alternative. This would particularly benefit visitors seeking wilderness recreation characterized by high levels of solitude, especially in the more remote areas of the park and preserve. Growth in overall use would gradually occur at a steady and sustainable rate.

This steady, sustainable growth would mean that economic benefits—specifically for business operators serving backcountry users with goods and services—from other summer backcountry activities such as hiking, camping, and mountaineering, would continue. Steady increases in business could be expected over the next 20 years commensurate with increased numbers of visitors.

Providers of services to these users would benefit from steadily increasing business throughout the life of the plan. Economic benefits, especially business income, would continue to be realized in area communities, particularly in Talkeetna, a primary staging area for mountaineering activities.

Winter Season

Snowmachine use in the park additions and preserve would be limited to subsistence uses and other traditional activities under Alternative 2, with substantial reductions in use levels in some areas such as the Bull River Unit southwest of Cantwell. Lower use levels in the park would result in snowmachine users going to other destinations in the immediate vicinity, the region, and the state, and there could be a slight reduction in overall numbers passing through Denali area communities. If this were to occur, there would be a slight reduction in profits to businesses currently serving these users (lodges, hotels, restaurants, gas stations, and retail businesses), and the economic benefits

possible under other alternatives (employment opportunities and increased income) would not be realized.

The benefits to retail activity and profits, employment, and income from other winter uses, such as skiing and dog mushing, would gradually increase because of park management to protect the quality of these experiences and the growing numbers of users. There would be a gradual but steadily increasing business income.

Population and Housing Impacts

Summer Season

The overall slightly increasing recreational use and associated employment over the next several years in which the plan would be in effect would likely lead to at least some seasonal influx of people to provide the needed retail services, such as lodging, restaurants, gas stations, and retail stores. Potential 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. However, increases would be gradual and most visitor use would be related to activities in the frontcountry of the park throughout the life of the plan. Most impacts to population and housing during the summer season would result from actions described under the cumulative impacts section.

Winter Season

The mix of slight increases in winter recreational uses in some parts of the park and preserve (mainly non-motorized destinations such as the Old Park) and the noticeable decreases in other areas, such as the Broad Pass area, would result in little detectable change in employment opportunities, income, and population in nearby communities. There would be little change in demand for emergency services, such as responses to incidents involving injuries and the need for search and rescue. This would not affect emergency service providers in area communities for the next several years.

Other Economic Values

Alternative 2 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 Alternative 2 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 over the life of the plan.

Quality of Life

The quality of life in the Denali region would continue to be similar to existing conditions in terms of the opportunity to lead a rural lifestyle, the availability of schools, libraries, and other basic community amenities, and personal safety (particularly a low incidence of crime). This would occur because summer and winter backcountry recreational uses would increase slowly, with little change in population and community structure. Area residents would continue to enjoy the rural and wilderness nature of their lifestyles.

Existence and Use Values

Alternative 2 would emphasize 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 would be protected and 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 would tend to increase throughout the life of the plan. Because most backcountry users value opportunities for travel into remote areas, use values for most recreational activities in the park and preserve would continue to increase throughout the life of the plan.

Cumulative Impacts

The gradual increase in backcountry recreational uses up to visitor capacity limits under Alternative 2 would be a negligible to minor 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, and at popular destinations outside the park boundary the increasing levels of use could be significant. This would result in some 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 an increased loss in the current rural to wilderness quality of life in these areas. As a result, 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, with backcountry uses under Alternative 2 only a minor contributor.

Conclusion

Despite some potential reductions in recreational use at some locations within the park, Alternative 2 would contribute slightly to increases in income for most existing businesses throughout the life of the plan. The overall number of backcountry users would increase, although it would be a smaller percentage of total park visitation. There would be some potential opportunities for new businesses to be initiated because of anticipated minor increases 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 backcountry recreational use, for concessioners and other recreation-oriented businesses near Denali National Park and Preserve. The contributions of Alternative 2 to increased economic activity in the park vicinity would result in negligible increases in population and the need for additional housing and public services. Overall 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 under Alternative 2 would be minor.

ALTERNATIVE 3

Economic Impacts

Summer Season

Changes in air traffic patterns to reduce aircraft noise, especially over the Old Park, would be voluntary under Alternative 3; therefore, businesses would retain control over the degree to which these measures affect their enterprise. At the same time, agreements by the Aircraft Overflights Working Group and the adoption of technology resulting in less resource impacts by commercial scenic tour operators would set new standards for how these types of businesses are operated. The potential of increased trip length required to reroute scenic air tours to reduce aircraft noise over the Old Park could result in a loss of visitors and income for those businesses and increased fuel and labor costs. Operators would have to either decrease their profit goals or increase fees to make up for the loss in net revenues. Increased costs for each trip could further reduce the number of visitors taking scenic air tours because of their resistance to paying the higher fees. To meet the standards for desired conditions under Alternative 3, air tour operators would most likely make changes to operations such as adopting new technology (for example, quieter aircraft). A temporary (five years or less) increase in operating costs would result.

Management actions proposed as part of Alternative 3 would limit the locations for scenic tour airplane landings in the park and preserve to the Kahiltna and Ruth Glaciers, and landings would be restricted to the hours of 9 am to 9 pm. However, based on data from 1999 through 2004, only 10% of all scenic tour airplane landings would have been affected by these restrictions, and much of this percentage could have been accommodated on the Kahiltna and Ruth Glaciers. Therefore, there would generally not be any overall impacts in the near future to businesses providing scenic flights. Toward the latter part of the time in which the plan is to be in effect, 20 years in the future, these business operations would tend to reach full capacity for park use and would have limited opportunities for growth.

Economic benefits—specifically for business operators serving backcountry users—from other summer backcountry activities such as hiking, camping, and mountaineering, would continue under Alternative 3. Steady increases in business could be expected over the next 20 years commensurate with increased numbers of visitors. Visitor capacity determinations and management actions 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 throughout 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 increasing numbers of users. A higher level of benefit would be likely in Talkeetna, a primary staging area for mountaineering activities.

Minor increases in employment in Talkeetna (between two to five seasonal jobs) would be likely as the National Park Service registered and managed overnight use for backcountry hiking, mountaineering, and camping.

Winter Season

Snowmachine use in the park additions and preserve would likely change in character and possibly decline slightly or substantially under Alternative 3, depending on how the corridor-based opportunities for access are received and utilized. Some types of existing snowmachine users would go to other destinations in the immediate vicinity, the region, and the state, and there could be a slight reduction in overall numbers passing through Denali area communities. This could result in a slight reduction in profits to businesses currently serving these users (lodges, hotels, restaurants, gas stations, and retail businesses), which also could be substituted for different types of park users.

The benefits to retail activity and profits, employment, and income from other winter uses, such as skiing and dog mushing, would gradually increase because of park management to protect the quality of these experiences and provide for the growing numbers of users. There would be gradually but steadily increasing income in area communities throughout the life of the plan. These 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. Potential 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. However, increases would be gradual and most visitor use would be related to activities in the frontcountry of the park throughout the life of the plan. Most impacts to population and housing during the summer season would result from actions described under the cumulative impacts section.

Winter Season

The steady increases in winter recreational uses in the park and preserve would result in steady 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 slight increases in their capacity.

Other Economic Values

While providing for expanded opportunities for wilderness recreation, Alternative 3 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 Alternative 3 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 over the life of the plan.

Quality of Life

The quality of life in the Denali region would continue to be similar to existing conditions in terms of the opportunity to lead a rural lifestyle, availability of schools, libraries, and other basic community amenities, and personal safety (particularly a low incidence of crime). This would occur because summer and winter backcountry recreational uses would increase slowly, with little change in population and community structure. Area residents would continue to enjoy the rural and wilderness nature of their lifestyles.

Existence and Use Values

Actions proposed under Alternative 3 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 would 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, would increase throughout the life of the plan.

Cumulative Impacts

The steady increase in recreational uses up to visitor capacity limits under Alternative 3 would be a minor 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, 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 an increased loss in the current rural to wilderness quality of life in these areas. As a result, 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, with backcountry uses under Alternative 3 a minor contributor.

Conclusion

Because of steady increases in a wide variety of recreational uses throughout the park and preserve, Alternative 3 would result in minor increases in income for many existing businesses over the next several years. There would be potential opportunities for new businesses to be initiated because of anticipated increases 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 concessioners and other recreation-oriented businesses near Denali National Park and Preserve. The contributions of Alternative 3 to increased economic activity in the park vicinity would result in minor increases in population and the need for additional housing and public services. Overall 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 under Alternative 3 would be minor.

ALTERNATIVE 4 (PREFERRED ALTERNATIVE)

Economic Impacts

Summer Season

Under Alternative 4 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 Alternative 4 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 Alternative 4. 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 Alternative 4, especially in the Bull River Unit southwest of Cantwell 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. Alternative 4 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, Alternative 4 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 Alternative 4 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 Alternative 4 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 Alternative 4 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 Alternative 4 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, Alternative 4 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 concessioners 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 Alternative 4 would be minor over the short term (next several years) and moderate over the life of the plan.

ALTERNATIVE 5

Economic Impacts

Summer Season

Application of management areas under Alternative 5 allows for considerable growth in levels of use and access to much of the park and preserve, so there would be limited restrictions on airplane landings and overflights. This would result in continued increases in business opportunities for air taxi and scenic air tour operators in the short term. Those increases would likely result in increased employment opportunities to operate and

maintain additional airplanes and increases in purchases of aviation fuel, parts, and other materials for operation. This would result in continued growth in business income in communities in which air taxi and scenic air tour operations are based, such as Talkeetna and the Healy-McKinley Village area, over the next several years. Air taxi and scenic air tour operations would continue to be a major part of the overall business climate in those communities, especially Talkeetna.

In the long term, managing the growth in numbers of commercial airplane landings in the park and preserve to protect desired conditions, including natural soundscapes, would allow for the beneficial impacts to air taxi and scenic air tour operators described above to continue, since it would allow for growth in the businesses and would also guarantee the quality of the visitor experience. The high quality of the scenic air tour experience would result in high demand for the activity throughout the life of the plan.

Economic benefits—specifically for business operators serving backcountry users—from other summer backcountry activities such as hiking, camping, and mountaineering, would continue under Alternative 5. Steady increases in business could be expected over the next 20 years commensurate with increased numbers of visitors. Plan provisions to manage the growth of these activities in the park additions and preserve would allow for continued economic benefits to providers, since the quality of the experience would be protected as numbers of users increased. Economic benefits to area communities from these types of park uses would continue to increase, especially in Talkeetna, a primary staging area for mountaineering activities.

Winter Season

Snowmachine use would increase significantly in portions of the north additions closest to Healy and Kantishna and in much of the south additions, especially in the lower elevations such as along major rivers, under Alternative 5. The combination of the management zoning under Alternative 5 and proposed facilities such as a visitor contact station south of Cantwell would likely bring more users to the areas mentioned above. This increased use would create employment opportunities and contribute to higher income levels in the winter, when tourism-related economic activity is otherwise low near the park. Businesses in the park area, especially Healy, Cantwell, and Trapper Creek, would continue to benefit directly since providers of these services would continue to be located there. Economic benefits such as employment and income would continue to increase steadily for lodges, hotels, restaurants, gas stations, and retail businesses. Communities along the highway and near the park would benefit from at least a portion of the up to \$583 spent in Alaska annually by current residents and \$303 spent per day in Alaska by nonresidents estimated by Fletcher, et al. (2000). In addition, the state economy, particularly those elements related directly to providing snowmachine goods and services, could benefit from the sale of additional snowmachines, accessories, insurance, and other sales if increased access to the park encourages residents to purchase more machines to take advantage of this opportunity. Benefits could be expected to increase during the first several years of plan implementation, after which capacity levels would be reached and additional use would tend to spread out to other lands in the region.

The benefits to retail activity and profits, employment, and income from other winter uses, such as skiing and dog mushing, would steadily increase. Alternative 5 includes provisions to protect the quality of these experiences as well as specific actions to provide for winter use, such as plowing the park road to Savage all year long and operating a visitor contact center south of Cantwell. Because of the variety of provisions in the plan to increase these visitor uses, economic benefits would be likely in nearby communities such as Healy, Cantwell, Trapper Creek, and Talkeetna throughout the life of the plan, resulting in overall moderate economic benefits.

Population and Housing Impacts

Summer Season

The overall increasing recreational use and associated employment for the next several years in the life of the plan would likely lead to a moderate seasonal influx of people to provide the needed retail services, such as lodging, restaurants, gas stations, and retail stores. Moderate to major increases in recreational use levels and the 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 growing backcountry use, in addition to frontcountry use. Overall impacts from backcountry use would be most noticeable in the later years in which the plan is in effect, as new backcountry destinations develop throughout the park additions and preserve, in turn affecting other communities in the region beyond existing “gateway” communities. For example, small settlements near the western parts of the park and preserve could develop into staging areas for backcountry recreation.

Winter Season

The steady increases in winter recreational uses in the park and preserve would result in increases in employment opportunities, income, and population in communities near the park throughout the life of the plan. There would be a related 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 as they would have to substantially increase winter response capability over the next 20 years.

Other Economic Values

Alternative 5 emphasizes providing for expanded opportunities for wilderness recreation in Denali National Park and Preserve over the long term, with management tools set up to protect resources. These mitigation measures would generally protect 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 provided management tools are affected under Alternative 5 to 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 moderate over the life of the plan.

Quality of Life

Summer Season

Increasing numbers of recreational users in the backcountry of Denali for the next several years would likely result in corresponding increases in traffic, demands for parking, and general 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

Moderate changes are likely to occur in the quality of life for permanent residents near the park, and the impacts could be substantial in some communities, such as Cantwell and Trapper Creek, where growth to date has been slower than in other communities, such as Healy and Talkeetna. Increased use of snowmachines in the area and the increasing numbers of visitors from other areas would result in greater noise levels for local residents and current users, as well as signs of greater human presence overall. In the communities most affected, such as Cantwell and Trapper Creek, this would likely result in noticeable changes to the rural and wilderness quality of life currently experienced by residents, with similar effects in other communities throughout the life of the plan. It would also result in a noticeable decrease in the overall quality of the remote lifestyle valued by owners of second homes or 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 Alternative 5 would result in increased recreational use values over the short term with some decrease in the long term because of relatively heavy use at popular destinations. Existence values could decrease slightly over the long term because of higher levels of use in major portions of the park additions and preserve, such as those areas designated as Management Area A, (18% of the total area) where encounter rates would be higher and impacts more likely to be noticed.

Cumulative Impacts

The steady increase in recreational uses up to visitor capacity limits under Alternative 5 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, most likely at a similar rate as backcountry use inside the park and preserve. At popular destinations outside the park boundary, the increasing levels of use could be significant, resulting in greater 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 noticeable loss in the current rural to wilderness quality of life in those areas. As a result, 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, with backcountry uses under Alternative 5 a significant contributor.

Conclusion

Because of continued increases in a wide variety of recreational uses throughout the park and preserve, Alternative 5 would result in moderate increases in income for many existing businesses throughout the life of the plan and major increases in some cases. There would be numerous opportunities for starting new businesses 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 increased recreational use, for concessioners and other recreation-oriented businesses near Denali National Park and Preserve. The increase in economic activity would result in moderate increases in population and the need for additional housing and public services.

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 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 Alternative 5 would be moderate over the life of the plan.

RECREATIONAL OPPORTUNITY & VISITOR SAFETY

The actions presented in the alternatives could affect the type, amount, and diversity of recreational opportunities in the Denali backcountry and the Denali region, and could also 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.

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.

ALTERNATIVE 1 (NO ACTION)

Recreational Opportunity

This alternative would have a major adverse impact on recreational opportunities because opportunities for wilderness-dependent recreation would decline. There would be no impact on visitor safety.

Under this alternative, there would be no new management areas or accompanying standards, so no way of sorting out user conflicts or protecting wilderness-dependent activities. There would be no part of the park and preserve backcountry specifically designated to accommodate visitors who require facilities or services, although these might evolve in an *ad hoc*, unplanned fashion much as scenic air tours have evolved to the present. Access modes such as horses and bicycles that could potentially damage park resources would be addressed on an *ad hoc* basis. The Old Park, about 35% of the park and preserve backcountry, would preserve an experience similar to that presently available along the park road with opportunities for dispersed exploration and few encounters with other parties, but noise from scenic air tour overflights would continue to increase. There would be no area of the park that would preserve the experience of visitors who do not wish to encounter any other people during their exploration, although some areas in the northwest part of the park and preserve might incidentally retain that characteristic.

Summer recreational access in the Old Park would continue to 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 parkwide and commercial air taxis in the park additions and preserve to reach remote areas. The use of snowmachines for “traditional activities” would continue to be authorized and would continue to grow. However, if in the future the term “traditional activities” were defined to exclude recreational use, such recreational use would be prohibited by existing NPS regulations.

Ongoing, unrestricted motorized access would reduce opportunities for non-motorized, wilderness-dependent visitors. This would be particularly true in accessible areas of the park additions on the south side of the Alaska Range. During climbing season (April to July), the popular, accessible climbing and mountaineering areas are becoming less

desirable because of aircraft noise primarily from scenic air tours. During winter months, the most accessible areas with abundant snow are in the Broad Pass and Tokositna River areas, which are the most popular areas for snowmachine access. Anecdotal evidence from public comment indicates that skiers and other non-motorized winter recreationists have already been displaced from these areas by heavy snowmachine use. There would be no new opportunities created for those users to return to these areas of the park, while the accessible parts of the Old Park north of the Alaska Range – where snowmachine use is not allowed – often has poor snow conditions. Areas that are closed to snowmachines in the Old Park south of the range are relatively inaccessible except at Windy Creek.

The variety of guided backcountry activities would remain the same as at present as described in chapter 3 in the Visitor Use section. Incidental business permits could continue to be awarded in the park additions and preserve (excluding the area between the Toklat and McKinley Rivers) for air taxi operator, mountaineering, guided day-hiking, guided backpacking, and winter backcountry trips. Additional guided activities could be allowed on an *ad hoc* basis if they meet the “necessary and appropriate” criteria. Guided sport hunting opportunities would continue to be rare because the hunting guide areas are insufficiently large to accommodate regular activity.

There would be no new facilities under this alternative, so the backcountry of the park and preserve would remain suitable primarily for those comfortable with cross-country backcountry travel.

Lack of access access to the 17(b) easement connecting Cantwell and the park boundary in the Windy Creek area would result in the loss of opportunities for winter and summer visitors to access this very scenic corner of the park if private landowners stop allowing the public to cross their properties. Although informal arrangements have allowed some access to continue, the community is sensitive to the number of non-local visitors parking on and crossing private property. It is assumed that at some point access to the public would be severely limited. Because this is one of the few parts of the park and preserve that can be easily reached from the road system without traveling the park road, the loss of this entry point is important for future park visitors, including all categories of recreational users.

Visitor Safety

There would be no limit established for the number of climbers on Mount McKinley. As a result, numbers could increase to more than 1,500, which would exceed the educational and rescue capabilities of park mountaineering staff as currently configured. However, it is not expected that climber numbers would reach this level during the life of the plan.

There would be no new registration requirements under this alternative. As a result, there would be no associated opportunity to provide education to visitors related to 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).

This particularly impacts day-hikers in the Old Park, overnight users on glaciers on the south side of the Alaska Range other than McKinley and Foraker, and winter day-users on the south side of the Alaska Range because these are the visitors who missed by present systems. The numbers of visitors affected are generally unknown, but there are about 500 mountaineers who presently register voluntarily.

Continued increases in climbers attempting Mount McKinley and neighboring peaks would lead to an increase in unconfined human waste on the West Buttress of Mount McKinley, Kahiltna Base Camp, 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 severe health problems for climbers and other visitors in areas drained by these glaciers and could persist for the duration of the plan.

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 combined with these other actions would have major adverse impacts on recreational opportunities at Denali. The actions under this alternative would fail to stop the erosion of wilderness-dependent opportunities, but are not as important a contributor as the expansion of scenic air tours and snowmachine access.

Conclusion

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.

The level of impacts on 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.

ALTERNATIVE 2

Recreational Opportunity

This alternative would have a moderate adverse impact on recreational opportunities because it would severely constrain opportunities for visitors seeking appropriate activities that might not be wilderness-dependent, but would also constrain options for some users seeking wilderness-dependent activities. There would be an improvement in visitor safety because of better backcountry education associated with registration for some common activities.

The application of management areas and accompanying standards throughout the park and preserve would emphasize wilderness-dependent activities and provide little opportunity for those whose activities are not wilderness-dependent.

There would be few opportunities in the Denali backcountry to accommodate those visitors that need additional facilities or assistance with access to wilderness recreational activities, although some limited commercial services would still be available and a level of scenic air tour landings provided at two Portals. About 28% of the park and preserve backcountry would be available for those visitors seeking an experience similar to what is presently available along the Old Park Road corridor in terms of the amount of crowding and signs of human presence; another 8% would preserve an opportunity to have a remote experience at Denali. About 57% would seek to preserve the experience of visitors who do not wish to encounter any other people during their exploration. In the area between the Kahiltna and Eldridge Glaciers, management area designations would protect all of it – about 8% of the park and preserve – as high use but medium noise, providing an area primarily for the climbing and mountaineering experience.

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 becomes likely.

Options for recreational access in summer and winter would be limited under this alternative. No ground-based motorized access by boat or snowmachine would be allowed, and airplane landings would only be allowed at eight designated landing areas (Portals), so most of the park could only be reached by lengthy travel by foot. This action

would limit recreational opportunities in areas of the park remote from Portals, the park road, or the Parks Highway to those individuals capable of mounting extended overland expeditions.

The reduction of motorized access in this alternative would restore and protect opportunities for wilderness-dependent, non-motorized recreation in areas that are accessible from Portals or roads, such as the mountaineering areas between the Kahiltna and Eldridge Glaciers during the climbing season (April to July) the Broad Pass/Dunkle Hills area and the Tokositna River valley during winter months.

The opportunities for guided backcountry activities would be limited to current conditions or reduced under this alternative. There would be an extensive area where guiding is not allowed that includes the Old Park unit OP2 and all of the park additions and preserve west of the Toklat River and north of the Alaska Range, providing a large area that requires visitors to be entirely self-reliant. This prescription would not affect existing opportunities except to eliminate the guided dog tours from Lake Minchumina. The only guided activities that could take place in the Old Park management area OP1 would be dog mushing and guided mountaineering. The amount of guided day-hiking in the Kantishna Hills would be frozen at existing levels. Guided sport hunting opportunities would continue to be rare because the hunting guide areas are insufficiently large to accommodate regular, wilderness-enhanced activity.

Scenic air tour landings would be constrained to only two locations and limited to the number of landings in 2001 (1,900 in the Ruth Amphitheater and 200 at Kahiltna Base Camp), so landings at other locations that sometimes have a hundreds of landings a season (such as the Pika and Eldridge Glaciers) would no longer be allowed, eliminating a small portion of existing appropriate, but not wilderness-dependent, recreational activities.

In addition, educational programs would be phased out of the Old Park, although opportunities for such programs would continue to be available throughout the park additions and preserve.

There would be no new facilities under this alternative, so the backcountry of the park and preserve would remain suitable primarily for those comfortable with cross-country 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 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, and this alternative would limit climbers to that level.

New registration requirements for overnight camping and day-use 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). Requirements in this alternative would apply to the majority of park backcountry users who do not already register, with the exception of those landing briefly during scenic air tours.

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. However, limitations on scenic air tour landings and limiting the number of climbers on Mount McKinley to 1,300 per season would keep use levels near current levels. 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. Registration requirements would allow NPS staff to further educate visitors about proper disposal of human waste. These actions would decrease from current levels the amount of unconfined human waste and the potential for degrading drinking water quality on the West Buttress, Kahiltna Base Camp, Pika, Ruth, and Eldridge Glaciers. Remaining water quality impacts would be negligible.

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 previous actions, but would introduce new adverse impacts by limiting the types of recreational opportunities available. Overall, the actions in this alternative combined with these other actions would have a moderate adverse impact on the recreational opportunities in the Denali backcountry. The actions proposed would be responsible for most of the adverse impact.

Conclusion

This alternative would have a moderate adverse impact on recreational opportunities at Denali. Although it would protect the wilderness-dependent activities that Denali is

legislatively mandated to provide, 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, particularly those not able to mount extended expeditions. 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 required registration for some common activities.

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.

ALTERNATIVE 3

Recreational Opportunity

This alternative would have a moderate beneficial impact on the recreational opportunities and visitor experience available in the Denali backcountry and the region. The actions proposed would maintain the existing diversity of appropriate and wilderness-dependent activities but would emphasize protection of the wilderness dependent activities, which would have room to grow. There would be an improvement in visitor safety because of better backcountry education associated with 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 that would emphasize wilderness-dependent activities.

Approximately 4% of the park and preserve plus areas near the park road would accommodate those visitors that need additional facilities or assistance with access to wilderness recreational activities. About 33% would serve those visitors seeking an experience similar to what is presently available in the Denali Wilderness in terms of the amount of crowding and signs of human presence; another 13% would preserve an opportunity to have a remote experience at Denali. About 44% 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 11% 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, the Ruth Amphitheater and Ruth Glacier would continue to have multiple use and 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 be limited to travel by foot from the park road, roads, or airstrips outside of park boundaries, preserving some areas that require sometimes-lengthy overland travel to reach (about 11% of the park and preserve). 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.

Winter recreational access would be facilitated by ongoing opportunities to use ski-equipped airplanes, including commercial air taxis, to reach remote areas in the park additions and preserve. Recreational visitors would also have the opportunity to use snowmachines on 135 miles of Corridors to reach remote areas in the park additions and preserve and the Old Park boundary in the Dunkle Hills between Cantwell Creek and the West Fork of the Chulitna.

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 restore and protect opportunities for wilderness-dependent, non-motorized recreation particularly in accessible mountaineering areas between the Kahiltina and Eldridge Glaciers – excluding the Ruth Amphitheater and Glacier – during the climbing season (April to July) and in accessible south side areas such as Broad Pass/Dunkle Hills.

Opportunities for guided backcountry activities would be similar to what is presently available. Some additional limitations would constrain future expansion. Guided day-hiking in the Old Park would be restricted to existing levels and locations. Scenic air tour landings – an appropriate but not wilderness-dependent activity – could continue to expand in volume, but would be limited to locations in the Ruth Amphitheater, Ruth Gorge, and Kahiltina Base Camp. 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 and Ruth Glacier areas designated as Management Area A, about 4% 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*.

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 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.

New registration requirements for overnight camping and day-use 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). Requirements in this alternative would apply to the majority of park backcountry users who do not already register with the exception of those landing briefly on scenic air tours.

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; however, 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. Registration requirements 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, the increasing snowmachine access to the southern park additions and expansion of aircraft overflights on the south side of the Alaska Range and eastern portion of the Old Park associated with increasing scenic air tour traffic and 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 moderate beneficial impact on the recreational opportunities in the Denali backcountry. The actions proposed would be responsible 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 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.

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.

ALTERNATIVE 4 (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% 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. About 29% 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; another 44% 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 4% 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 parkwide 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 use, such recreational use 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 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.

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; 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 Management Area A 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 area designated as Management Area A, about 11% 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 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 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; however, 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 are 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.

ALTERNATIVE 5

Recreational Opportunity

This alternative would have a moderate adverse impact on recreational opportunities because some wilderness-dependent users groups would be displaced, although not from the entire park and preserve. There would be no impact on visitor safety.

The application of management areas and accompanying standards throughout the park and preserve would lead to a reduction in opportunities to participate in some wilderness recreational activities, particularly extended expeditions in remote locations, but also accessible climbing and mountaineering opportunities that are not adversely affected by scenic air tour traffic.

Approximately 18% 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. About 66% would serve those visitors seeking an experience similar to what is presently available in the Denali Wilderness in terms of the amount of crowding and signs of human presence; another 16% would preserve an opportunity to have a remote experience at Denali. There would be no area of the park that would preserve the experience of visitors who do not wish to encounter any other people during their exploration, although some areas in the northwest part of the park and preserve might incidentally retain that characteristic.

In the busy area between the Kahiltna and Eldridge Glacier, the opportunities for climbing and mountaineering in a wilderness setting would diminish with ongoing increases in scenic air tour traffic. This area is the most important climbing and mountaineering area in the park and preserve because of its accessibility and terrain.

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 those activities being prohibited in the future if such damage becomes 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 areas that would require lengthy overland travel to reach.

Winter recreational access would be facilitated by ongoing opportunities to use ski-equipped airplanes parkwide and commercial air taxis in the park additions and preserve to reach remote areas. There would be the 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 use, such recreational use 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 generally not protect opportunities for wilderness-dependent, non-motorized recreation on the south side of the Alaska Range during mountaineering season or during the winter recreation season.

This alternative would allow the development of a greater variety of guided opportunities than are presently available at Denali. Guided day-hiking could expand throughout the Old Park including entrance area trails. Guided overnight backpacking in the Old Park would be an additional opportunity not presently available. Scenic air tour landings could occur on glaciers anywhere east of the Lacuna Glacier in the park additions. Guided sport hunting opportunities would be added in the southern portion of the northwest preserve; however, these opportunities could remain static in the southwest preserve because the division into three guide areas would likely mean that none of them would be large enough to support regular guided hunts.

There would also be the opportunity to offer additional types of guided activities in the Kantishna Hills and in the park additions south of the Alaska Range in the area designated as Management Area A, about 18% 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.

Although this alternative would allow for a greater variety of guided opportunities, it is possible that some existing operators, particularly guided mountaineering concessions utilizing areas other than Mount McKinley, would move their operations to less accessible areas or other Alaska locations because of incompatible uses in the area between the Kahiltna and Eldridge Glaciers.

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*.

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.

Designated campsites in the Kantishna Hills and along the Wildhorse Creek trail 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.

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 that is road accessible.

Visitor Safety

There would be no limit established for the number of climbers on Mount McKinley, although there would be the possibility of establishing such a limit after five years depending on the results of resource and social carrying capacity studies. As a result, numbers could increase to more than 1,500, which would exceed the educational and rescue capabilities of park mountaineering staff as currently configured. However, it is not expected that climber numbers would reach this level during the life of the plan.

There would be no new registration requirements under this alternative, although they could be imposed in the future if necessary to achieving desired conditions in particular areas of the park or for particular activities. As a result, there would be no associated opportunity to provide education to visitors related to 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). This particularly affects day-hikers in the Old Park, overnight users on glaciers on the south side of the Alaska Range, and winter day-users on the south side of the Alaska Range. The numbers of visitors affected are generally unknown, but about 500 mountaineers presently register voluntarily.

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. Adverse impacts to water quality would persist for several years.

In this management scenario, all of the park's popular climbing areas (West Buttress, Kahiltna Base Camp, Pika, Ruth, and Eldridge Glaciers) are zoned as Management Area A, Portals, or Special Use Areas which allow for higher levels of encounters with people and with evidence of modern human use. There would be no limit on the number of visitors attempting to climb Mount McKinley. There would also be no registration requirements for overnight use. Without those registration requirements, it would be more difficult for NPS staff to educate visitors.

However, management action would be taken if standards in these areas are approached or exceeded. NPS staff would continue to educate climbers as they contact them in the field and at the Talkeetna Ranger Station 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.

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. These actions would be expected to mitigate some of the potential negative impacts that increased use, and subsequently, increased human waste, could have on water quality in these high use areas.

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 allow increases in appropriate recreational activities and would inhibit the erosion of wilderness-dependent opportunities in some locations. Overall, the actions in this alternative combined with past, present, and future actions would have a moderate adverse impact on the recreational opportunities in the Denali backcountry, primarily because of the lack of protection for accessible mountaineering opportunities. The actions proposed would be responsible for a substantial portion of the adverse impact, although the independent actions by scenic air tour operators are the most important contributor.

Conclusion

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

in inaccessible areas. There would be minimal adverse impacts on visitor safety from declining drinking water quality.

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 the impacts of the various alternatives 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.

ACTIONS COMMON TO ALL ACTION ALTERNATIVES

The National Park Service would continue to manage the growth of recreational uses of the park. This would require additional staff time and funding to provide for research, monitoring, education, cooperative planning, and regulatory enforcement. These requirements and other impacts to park operations and management will vary depending on the alternative selected. The consequences that are common to all alternatives are described in the following paragraphs. The consequences for specific alternatives are described in the discussions for each 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. In general, the need for timely and effective information will increase with the amount, extent, and type of the use that is allowed to occur under each alternative. For example, higher levels of recreational snowmachine use will trigger a greater need for research and monitoring than other forms of backcountry recreation because of the larger number of potential users and the greater spatial impact of a single user per unit of time. However, regardless of the alternative selected, an increase of approximately 10% to the total resource management and research staffing and funding for the park would be required to implement this adaptive management approach for the nearly 6-million acres of the

backcountry. It would require some alteration of monitoring and research priorities or expanding the scope of the existing research and resource management program over the full life of the plan (next 15 years). One permanent position to direct a soundscape monitoring would be required, in addition to the funding for equipment and logistics. Two additional seasonal positions would be required to assist with vegetation and wildlife monitoring. Additional funding would be required for contracted research to shift between physical, biological, and sociological topics as needed, as well as provide for long-term implementation of monitoring. This level of change could be absorbed into existing infrastructure and would be a minor impact to park operations and management.

An increase of six staff would be needed to supervise and adequately operate the existing backcountry registration and education programs to the level of service described to be common for all alternatives. At existing visitor use levels, an additional two backcountry law enforcement rangers would be required to protect park resources values to the standard described as common to all alternatives. This staff would be absorbed into existing infrastructure and represent only a minor impact to park operations.

An increase of 200 hours of flight time for law enforcement would be required to provide the level resource protection described as common to all alternatives, and to provide the monitoring information necessary to implement the adaptive management approach. This increased activity would be absorbed into existing infrastructure and represent only a minor impact to park operations.

Additional staff would be needed to work with the Federal Aviation Administration, pilots, and air taxi and scenic air tour operators to develop solutions and mitigation measures to protect the park's soundscape and to follow through with the commitment to pursue land exchanges. This would be a long-term commitment, requiring the equivalent of about 25% total time annually of an outdoor-recreation planner or management assistant, and would be a minor impact to park operations and management.

Management of commercial services to the standards common in all alternatives would require an additional 25% total time annually of an outdoor-recreation planner or management assistant, and would be a minor impact to park operations and management.

The management provisions included in the action alternatives would result in backcountry visitors' being more prepared for their experience and in improved awareness and understanding of regulations. The reduced need for enforcement and search and rescue would generally be a minor impact to park operations and management, depending on the alternative selected.

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.

ALTERNATIVE 1 (NO ACTION)

Alternative 1 differs from the action alternatives in that the backcountry would continue to be administered according to previous plans that contain limited direction for backcountry management. This would result in several impacts to park operations and management.

Under Alternative 1 the park would continue to respond to backcountry resource concerns and user conflicts as they arise. This would continue to result in less efficient management than would be possible under the action alternatives. Responding to crises is more costly than are routine operations because the problems are usually more extensive than if dealt with before a crisis is reached. In addition, employee overtime is often necessary in crises, but is the exception rather than the rule for routine operations.

The frequency and subsequent cost of search and rescue emergencies would increase because more people would use the backcountry. Routine operations require occasional, scheduled flight time, rather than the nearly continuous flight time required during emergency response. However, because emergency response is only a part of overall park operations and management, the overall impacts would be minor.

Under the no-action alternative, there would be no expansion of the backcountry registration system. As a result, use in almost two thirds of the total park and preserve area would continue to be unregulated and the type and extent of use unknown. Park managers would lack information on impacts to resources since monitoring programs would not be expanded to track backcountry use. Management decisions would not be fully informed and managers would not be able to meet legal and policy goals for the park. Lack of information would lead to reactive rather than proactive management. This would lead to drastic and disruptive responses rather than planned actions. These impacts would be felt throughout the park operation, not just within operations directly related to backcountry management. As a result there would be major impacts over the life of the plan that would severely diminish the park's overall capability to prevent impairment.

The no-action alternative does not include provisions for determining visitor capacity as the plan is implemented over the next several years. Managers would also lack information on whether or not visitors are satisfied with their experiences since there would not be additional visitor capacity studies specific to backcountry use. This would make it very difficult to determine carrying capacity and subsequently make wise management decisions to meet legal and policy goals for protecting resources and visitor experiences. This would be a major impact on park management throughout the life of the plan, since many of these goals are not discretionary (see chapter 1 for description of legal and policy requirements). This condition would leave open the possibility for legal challenges with a required response that would divert staff time away from other critical park operation needs.

Cumulative Effects

Past, present, and reasonably foreseeable future actions such as private and commercial development in and near the park and regional increases in recreational uses will require substantial additional time and effort from park management in 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. This, combined with the specific changes described under the no-action alternative in the backcountry management plan, would result in major impacts to park management because a variety of topics, such as commercial uses of the park, climbing and mountaineering, and snowmachine use, are not addressed at a general management planning level.

Conclusion

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 in the 20 years that the backcountry management plan is expected to be in effect and creates a situation where park management could not prevent impairment of park resource values.

ALTERNATIVE 2

Impacts to park management under Alternative 2 are generally the same as those described in Actions Common to All Action Alternatives with a few exceptions as described.

A lower level of administrative presence would be required to manage the lower level of use, particularly motorized use that is envisioned by this alternative. Even though registration is required for all overnight backcountry users and some summer and winter day users under Alternative 2, this can be accomplished within the staffing levels described under Actions Common to All Alternatives because recreational snowmachine use as well as other forms of motorized access would be limited. Typical access under this alternative to the backcountry would generally be through locations where there are existing NPS facilities and staff such as Talkeetna that can be used adaptively used to implement the registration program envisioned. Implementing the program would have a negligible impact on park operations.

No additional law enforcement staff or aviation patrol time would be required to manage recreational backcountry use beyond the levels described in Actions Common to All Action Alternatives. The reduction of recreational snowmachine use from current levels,

and limitations on other motorized forms of access for recreation would actually allow the redistribution of some staff time to accomplish resource monitoring. As a result, there would be a minor positive impact to park operations.

The funding and staffing additions describe in Actions Common to All Action Alternatives for research and monitoring would be adequate to implement Alternative 2. Development of baseline inventories, monitoring protocols, and monitoring programs could progress at a predictable pace that would be a minor additional impact to park operations under this alternative because much of the urgency for immediate answers regarding threats to park resource values would be diminished due to the absence of motorized recreational access into the backcountry.

Reducing the amount of other basic research activities that are not directly related to the adaptive management provisions of the backcountry plan may serve to restrict impacts to resources and visitors, but the actual park operations may be negatively affected due to a lack of necessary information for future decisions. There would be a greater number of areas where researchers would have less flexibility in their activities. On balance, this would be a minor impact to park operations within the life of the plan.

The elimination of the 14,000-foot administrative camp on Mount McKinley would imply also the elimination of the high altitude helicopter and some patrol staff, since all work together as a system that requires acclimatized patrol staff to base out of the 14,000-foot camp. This action would create the opportunity for a redistribution of a significant amount of park funds to other park priorities. This would be a moderate beneficial impact to other park operations but could result in higher rescue costs, fewer successful rescues, and more periodic cleanup time and cost for garbage and waste. Mountaineering management would focus on initial contact at Talkeetna rather than a continuous presence on Mount McKinley to provide an immediate rescue response.

Cumulative Effects

Past, present, and reasonably foreseeable future actions, such as private and commercial development in and near the park and regional increases in recreational uses would require additional time and effort from park management over 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

There would be some requirements for additional staff, but most proposals under Alternative 2 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 under actions from Alternative 2 would be minor.

ALTERNATIVE 3

The establishment of a limited number of recreational snowmachine corridors and the continuation of recreational access by airplane and motorboat would cause a minor increase in the complexity of a registration program that could be absorbed within the staff level increases already described as necessary in the Actions Common to All Alternatives section. This alternative also calls for the establishment of a new visitor contact station in the Broad Pass area that would require an additional permanent and 2 seasonal staff. The increased snowmachine use levels would require three permanent backcountry patrol rangers. These staffing additions would require additional operating funds to provide the yearly training, equipment, and supplies necessary for them to conduct their work. Overall, these increases would represent an expansion on existing services and activities and a minor impact on park operations and management.

Higher levels of use in the backcountry would require 300 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.

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.

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 trail development and maintenance envisioned by this alternative would require an additional trail crew for the north side of the park. The impacts to park operations and management of facilities would be minor over the period of plan implementation given the scale of existing maintenance operations.

There would be no additional staffing requirements for research and monitoring activities beyond those describe in the Actions Common to All Alternatives section which were considered to be a minor impact.

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

While there would be increases in park staff and funding to manage greater use and additional facilities, proactive management would negate the need for a reactive (and thus, a more costly and effort-intensive) approach to management. Implementing actions under Alternative 3 would cause moderate impacts to park operations and management in some areas during 5-10 years of plan implementation, but other actions include mitigation and even beneficial effects that would occur throughout the life of the plan. Therefore, overall impacts to park management under Alternative 3 would still be minor.

ALTERNATIVE 4 (PREFERRED ALTERNATIVE)

The continuation of snowmachine, airplane, and motorboat use throughout the park and preserve additions as well as continued use of airplanes, motorboats, stock, 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.

Three additional permanent positions and 12 additional seasonal positions distributed between visitor contact stations at Park Headquarters, Broad Pass, Talkeetna, and perhaps along the Peterville 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.

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.

The addition of one permanent park planner or management assistant would be required to coordinate the implementation of proposals in Alternative 4 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.

Approximately a 25 % increase in research and monitoring staffing and funding would need 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 in these disciplines would be needed to help meet the obligations in this alternative for adaptive management. 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. These additions would exceed the capabilities 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, 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.

ALTERNATIVE 5

Under this alternative the National Park Service would provide for a high level of recreational use. The allowance for higher levels of snowmachine, airplane, and motorboat use throughout the park and preserve additions as well as continued use of airplanes, motorboats, stock, and bicycles in the Old Park implies major management responsibilities and operational impacts. 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 describe in this plan.

The increased level of motorized access, commercial services, trails, and access corridors anticipated by this alternative would require a proactive program of visitor information, even without a registration requirement. Three additional permanent positions and twelve additional seasonal positions distributed between visitor contact stations at Park Headquarters, Broad Pass, Talkeetna, and perhaps along the Peterville Road or at Trapper Creek would still eventually be necessary to provide visitor information. An additional supervisory Park Ranger would be needed to oversee a backcountry district, which would include six 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. Additional field staff would be necessary because the lack of a registration system would require more field patrols and contacts to gather the information that is still necessary to meet the adaptive management requirements of this plan. The establishment of this comprehensive program would be a major impact on park operations.

Higher levels of use in the backcountry and the lack of the capability to gather information via a registration system, particularly during the winter from snowmachine use on the south side of the park, would require 400 flight hours of aerial patrols with NPS aircraft to enforce regulations and gather resource monitoring information. An additional 50 hours of contracted flight time would be necessary from the Talkeetna area because some of the most extensive use concerns are on the south side of the park and NPS aircraft would likely remain stationed on the north side of the park. Still, the infrastructure and staffing exist to absorb this increase with only minor impacts on park operations.

South District operations would need to be expanded to accommodate increases in visitation and scenic air tours as well as the lack of registration system. This would require two additional full-time positions to gather the information in the field rather than gathering it from visitors before they enter the backcountry, which could largely be done within the staffing levels described in Actions Common to All Alternatives. For example, staff would be needed to conduct visitor capacity studies and evaluate limits on climber numbers. These actions and staffing requirements would result in a moderate impact to mountaineering and glacier landing management during the 5-10 years of plan implementation.

The addition of one permanent park planner or management assistant would be required to coordinate the implementation of proposals in Alternative 5 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 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 park road maintenance crew would need to be available to keep the park road to the Savage River Campground open all winter. Park staff would need to be available to deal with road closures and stranded visitors during unexpected winter storms. An additional position would be required to patrol the road and provide for visitor safety during adverse winter weather conditions.

Two additional seasonal trail crews, one on the north side of the park and one on the south side, would be required to construct and maintain trails in areas designated as Backcountry Hiker areas. National Park Service staff would be required to oversee the construction of campsites the Wildhorse Creek area and public use cabins along the south side boundary in cooperation with the State of Alaska. An additional crew would need to be available for the construction work. The establishment of a trail maintenance program on the south side of the park, combined with these other actions constitutes a major change to park operations and would result in major impacts to park management throughout the life of the plan.

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.

Park kennel operations would need to change methods of conditioning dogs, training staff, and orienting visitors. Additional kennel staff time would be required to load and transport dogs for short, early season conditioning runs (letter from K. Fortier, Kennels Manager, 8/20/98). Starting runs from the Savage River Campground area would necessitate crossing the Savage River, which is generally not frozen until late November to early December (letter from K. Fortier, Kennels Manager, 7/25/00). This would be more difficult for park staff, so it would require additional time.

A 35% increase in research and monitoring staffing and funding would need 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 in these disciplines would be needed to help meet the obligations in this alternative for adaptive management. Another permanent data management and GIS oriented position would be needed to assist in these efforts. Four new seasonal positions to assist in monitoring implementation would be required. Additional funding beyond the level projected for Alternative 4 would be required to conduct concurrent contracted research studies on soundscape, vegetation, wildlife, and sociological topics given the further increases in use levels and the more immediate need for information that these increases trigger. These additions would exceed the capabilities 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. To work effectively on these and other projects, more funding would be necessary and/or existing staff would have to shift priorities.

Conclusion

Implementing Alternative 5 would require a substantial increase in staffing to provide for a major increase in visitor use and visitor services while also preventing impairment of

park resources and values. In some cases, proactive management would negate the need for a reactive (and thus, a more costly and effort-intensive) 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. Other actions would include mitigation and even beneficial effects that would occur throughout the life of the plan. Despite the balancing effect and the fact that some impacts would be reduced once the plan was implemented fully, other major impacts would persist throughout the life of the plan as described above. These changes would be of a degree that cannot be simply 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, 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.

SUSTAINABILITY

ALTERNATIVE 1 (NO ACTION)

Relationship Between Short-Term Uses and Long-Term Productivity

The short-term use of the park additions and preserve for unlimited access for hiking, camping, and snowmachine use would lead to long-term decline in the productivity of park lands for wildlife habitat, subsistence, and recreation. Extensive use of places such as the Bull River/Broad Pass area, the Tokositna River valley, and the Stampede Trail corridor in either summer or winter could cause wildlife to move away from habitat that would otherwise be utilized, and thus compromise Denali's purpose as a wildlife sanctuary and an unaltered ecosystem as well as reducing subsistence opportunities. Extensive vegetation damage could result from hiking, camping, or snowmachine use.

The unlimited use of snowmachines, airplanes, and motorboats would lead to a decline in natural soundscape and wilderness resources, since much of the southern park additions and portions of the Old Park would not allow visitors to avoid signs of human presence, unnatural sounds, and other reminders of civilization. The scale of use would also create crowding in a few popular areas (such as the Ruth Amphitheater, Kahiltna Glacier, Bull River/Broad Pass, and Tokositna) that would make it impossible for the park resource to provide wilderness 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

As documented in other sections of this chapter, this alternative would have unavoidable adverse impacts to many park resources including natural soundscapes, wilderness resources, vegetation, ice-rich permafrost soils, and wildlife. These adverse impacts could be mitigated or avoided through future actions similar to those proposed in other alternatives of this plan.

ALTERNATIVE 2

Relationship Between Short-Term Uses and Long-Term Productivity

The short-term uses allowed under this plan would not significantly compromise any part of the long-term productivity of park resources, including wilderness recreational opportunities, wildlife habitat, and intact ecosystems. There are no future management options foreclosed through this action.

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 impacts to the natural soundscape associated with ongoing commercial airplane landing activity at Portals on south-side glaciers including scenic air tour landings at Kahiltna Base Camp and in the Ruth Amphitheater and ongoing aircraft overflight activity within the parameters allowed by standards.

ALTERNATIVE 3

Relationship Between Short-Term Uses and Long-Term Productivity

The short-term uses allowed under this plan would not significantly compromise any part of the long-term productivity of park resources, including wilderness recreational opportunities, wildlife habitat, and intact ecosystems. There are no future management options foreclosed through this action.

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 as the southern glaciers (particularly the Ruth Glacier and at Portals) because of airplane access and the Corridors in the Broad Pass/Dunkle Hills and Tokositna River areas which could be used for recreational snowmachine access. There could also be damage to vegetation and ice-rich permafrost soils along Corridors. All of these impacts would be mitigated by the standards provided by management areas.

ALTERNATIVE 4 (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.

ALTERNATIVE 5

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 are 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 Kahiltna and Eldridge 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 and the revised draft. 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. In total, there were 9,370 comments received. These comments are summarized and responses to substantive comments provided in Appendix A. 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.

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 park backcountry. 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* (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 of the park and preserve. Presentations have occurred at the April and October meetings in 2001, February meeting in 2002, and

March meeting in 2004. The Commission passed two formal motions regarding subsistence and park planning: 1) The Commission strongly recommended that the National Park Service make traditional subsistence use a priority over other uses (particularly over new recreational uses); and 2) The Commission recommended that the area from Windy Creek to the Bull River be designated as an area primarily for traditional subsistence use and classified as a Natural Area in order to limit conflicts between recreational use and traditional subsistence use.

Consultation With State And Local Governments

State Of Alaska

The planning team shared a draft copy of the affected environment section of the Environmental Impact Statement 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, and the National Park Service responded to the comments in the draft plan.

During the comment period for the draft plan, the State submitted extensive comments that are published in Appendix A 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.

Alaska State Historic Preservation Office

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.

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 Original
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 Federation of Natives
Alaska Village Initiatives
Cook Inlet Region, Inc.
Copper River Native Association
Doyon, Limited
Subsistence Resource Commissions
Native Village of Cantwell
Native Village of Tanana
Nenana Native Council
Nikolai Edzeno' Village Council
Tanana Chiefs Conference
Telida Native Village Council

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
Division of Governmental Coordination
State Representative Jeannette James
State Senator Mike Miller

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
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 Committee
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
Sierra Club, Denali Group
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 Draft Plan 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



Appendix A: Public Comments and Response

Characterization of Comments Received

National Park Service staff at Denali National Park and Preserve received 9,370 comments on the *Draft Backcountry Management Plan*. This total includes both written comments and verbal comments made during seven public hearings held in Anchorage, Wasilla, upper Susitna valley, Cantwell, Healy, Fairbanks, and Minchumina.

Comments were received from agencies, organizations, and individuals. Comments from individuals included verbal testimony, personally written letters or e-mail messages, and form letters originated by organizations and signed by members or supporters. The number of comments received from each source is as follows:

Agencies	2
Organizations	27
Individuals	9,341
<i>Public Hearing Testimony</i>	<i>17</i>
<i>Non-Form Comments</i>	<i>1,023</i>
<i>Form Letters</i>	<i>8,301</i>
TOTAL Comments	9,370

Although 43 individuals and organizations provided some form of testimony at the public hearings, all but 17 of those individuals also submitted written comments. Some individuals also submitted more than one written comment. In these instances, park staff consolidated multiple comments from one source to preserve the entire substance of the comments, but counted each individual only once for tallying purposes.

Individual Comments

The location of residence addresses provided by individuals who commented on the plan are recorded in the table below.

Local	52
Alaska	251
United States	8,821
International	13
Unknown	204

“Local” includes residence addresses between Willow and Nenana along the Parks Highway and its spur roads as well as the Bush communities of Lake Minchumina, Telida, Nikolai, and Skwentna. “Alaska” includes all other addresses in the state of Alaska excluding those covered under “Local.” “United States” includes all residence addresses within the US and its territories excluding Alaska. “International” includes all

residence addresses outside the US. “Unknown” identifies those letters for which an address is not known, generally because the individuals sent an e-mail message and did not include address information.

Most individuals expressed a preference for one of the alternatives although there were a substantial number that commented only on specific issues or requested a modification even in the alternative they preferred. General preferences by the location of residence address are indicated on the table below.

	No Alt Selected	A	B	C	D	E
Local	18 35%	1 2%	29 56%		2 4%	2 4%
Alaska	96 38%	5 2%	138 55%	1 0%	7 3%	4 2%
United States	232 3%	1 0%	8,525 97%	2 0%	59 1%	2 0%
International	3 23%		10 77%			
Unknown	142 70%	2 1%	31 15%		29 14%	
TOTAL INDIV	491	9	8733	3	97	8
COMMENTS	5%	0%	93%	0%	1%	0%

Of those 491 comments that did not indicate a preference for a particular alternative, approximately 300 addressed only aircraft issues. While most of these comments asked specifically for the Old Park to remain open for landings or for general aviation to remain unrestricted in general, many asked the NPS variously not to prohibit general aviation overflights, not to close the McKinley or other airstrips, or not to close the entire park to airplane landings, none of which were proposed in any of the alternatives. There were also approximately 50 comments (not included in the 300) that specifically asked for restrictions on aircraft use in the park.

Of the comments that did not indicate an alternative preference, only 27 opposed restrictions on snowmachine use in the park and preserve while 104 supported restrictions or a complete ban on recreational snowmachine use. Since most individuals who selected Alternative A did so specifically because of opposition to restrictions on snowmachine use, it is reasonable to state that about 36 individuals took this position in response to the draft plan. By contrast, most of the individuals who sent in form letters or selected Alternative B specifically expressed opposition to recreational use snowmachines at Denali in addition to the 104 mentioned above who supported restrictions or a ban.

Organizations

Twenty-seven organizations submitted detailed comments covering the entire range of issues covered in the plan. Most indicated an alternative preferred by that organization, although almost all suggested considerable modifications. The organizations and these general preferences are indicated below.

	Organization	Preferred Alternative
1	Access Fund	No general preference – addressed specific actions
2	Aircraft Owners and Pilots Association	A or E for aircraft landings
3	Alaska Airmen's Association	A for general aviation
4	Alaskan Aviation Safety Foundation	No general preference – addressed specific aviation-related actions
5	Alaska Center for the Environment	B
6	Alaska Professional Hunters Association	Oppose D and the application of management zoning in the plan
7	Alaska Quiet Rights Coalition	B
8	Alaska State Snowmobile Association	A
9	Alaska Travel Industry Association	D
10	American Alpine Club	Mixture of C and D
11	American Recreation Coalition	D with modification by E
12	Bluewater Network	B
13	Denali Citizens Council	No general preference – addressed specific actions
14	Greater Fairbanks Chamber of Commerce	A
15	International Snowmobile Manufacturer's Association	Oppose D and the application of management zoning in the plan
16	Mat-Su State Parks Citizens Advisory Board	No general preference – addressed specific actions
17	National Parks and Conservation Association	B
18	Northern Alaska Environmental Center	B, oppose C,D,E
19	Off-Road Business Association	D
20	Quiet Use Coalition	B
21	Seaplane Pilots Association	No general preference – addressed specific aviation-related actions
22	Sierra Club	A and B, until GMP updated and park zoned for subsistence
23	Trustees for Alaska	Oppose snowmachine framework in D
24	Wilderness Society	Oppose A,C,D,E
25	Wilderness Watch – Alaska	B
26	Wilderness Watch	B, oppose D
27	Winter Wildlands Alliance	B, oppose D

Agencies

In addition to the comments from individuals and organizations, the National Park Service received comments from the State of Alaska and the US Environmental Protection Agency.

The State of Alaska provided detailed comments on various issues, but the thrust of its letter was to raise some questions about the basis upon which the National Park Service proposed to manage access into Denali. The State commented that the management area zoning described in the plan would broadly restrict or close access to portions of the park and preserve. The state also commented that under ANILCA 1110(a) the National Park Service must show detriment to park resources in order to restrict access and the resource affected must be a physical resource, not an intangible or aesthetic resource.

The US EPA suggested that the National Park Service examine adopting Alternative B management prescriptions for snowmachines because it would be the most responsible form of management consistent with the intent of wilderness recommendations for the park additions and would minimize risk of damage to environmental resources until wilderness designation occurs.

Both letters appear in their entirety at the conclusion of the appendix. Extracts of substantive comments appear below accompanied by the National Park Service response.

AGENCY COMMENTS

U.S. Environmental Protection Agency

NPS has concluded that most snowmachine impacts are to soundscapes and wilderness human values such as solitude, and that these values can be quickly restored once a wilderness designation is made and snowmachines are excluded (Adrian Hall, NPS staff, pers. comm.). However as we have discussed above, the EIS describes predicted physical resource impacts from snowmobiles to wetlands, soil, fish and wildlife which might prove to be long-term and not easy to repair, such as alterations to hydrologic functions in wetlands; wildlife ranges and survival rates; and water quality in surface waterways. Resulting impacts could be widespread in the Park Addition, not easy to control, and highly dependent on enforcement.

EPA suggests that the NPS examine adopting the Alternative B management area snowmobile prescriptions, or a hybrid form of them into the preferred plan. We believe that an alternative which restricts or excludes snowmobiles from all but the most limited high-use areas of the Park Addition would be the most responsible form of management consistent with the intent of the wilderness recommendation for this area. It would involve less risk of damage to environmental resources until designation occurs.

NPS Response:

The solutions proposed in the alternatives for managing snowmachine access have been altered considerably in the revised draft. In the preferred alternative, there is no longer a proposal to allow snowmachine use for recreational access, although the absence of a definition for “traditional activities” also means that the National Park Service would not immediately provide any distinction among the activities for which snowmachines are used for access. Instead, the NPS preferred alternative would establish a set of standards to maintain in various assigned management areas within the park and preserve. If conditions threaten to exceed standards, the National Park Service would then act to manage access, which could include defining the term “traditional activities” as part of a rulemaking.

The impacts to wetlands, soil, fish, wildlife, and water of concern to the EPA are different under the revised alternatives. For most of these resources, park experts believed that impacts were likely to be negligible for the life of the plan because limiting conditions by using management area standards would result in management action before use would grow to a level that soil, water, or wildlife would be harmed. There are exceptions identified in chapter 4 under Environmental Consequences; however, while adverse impacts would occur none of them would impair park resources or values. As explained in NPS Management Policies 1.4, the NPS Organic Act, and the General Authorities Act, as amended, “allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, so long as the impact does not constitute impairment of the affected resources and values.” The actions proposed in the four action alternatives of this plan meet these criteria.

State of Alaska

The proposed use of management areas, defined, in part, by types and levels of visitor uses constitutes an inappropriate de facto closure of allowable access provided under ANILCA. Congress established a high bar for federal agencies to clear before restricting public access in Alaska park units. The access provisions of ANILCA were a key component to the compromises that were necessary to pass the legislation. The zoning concepts in the draft plan – based on subjective aesthetic values – is a significant deviation from Congressional intent to limit manager’s discretionary authority to restrict access.

NPS Response: While the National Park Service does not agree with all of the opinions stated or implied in the above comments, the opinions have been considered in developing the revised draft. Management areas are now described in terms of goals for desired future social and resource conditions, not in terms of a particular set of management actions. The revised draft presents a list of 10 access management tools and the National Park Service intends to use the least restrictive tool necessary to achieve desired conditions. As in the previous draft, any closures or restrictions would require following applicable law, including ANILCA 1110(a) and implementing regulations.

State of Alaska: While the draft plan acknowledges (page 1) that implementation may require promulgation of special regulations, Section 1110(a) clearly states “*the Secretary shall permit*” such uses, and “*such use shall not be prohibited unless . . . the Secretary finds such use would be detrimental to the resource values of the unit or area.*” Such resource values do not include immeasurable, intangible aesthetic values and experiences. Unlike lower 48 parks, Alaska park units are considered “*open until closed*” to public activities not otherwise prohibited by law. Restrictions and closures require a factual determination of impact on tangible, measurable resources of the unit as part of the rulemaking process (43 CFR Part 36)

NPS Response: Like the previous draft plan, the revised draft follows the language of ANILCA Title I – “...intent of Congress...to preserve wilderness resource values...” and Title II – “The [Denali] park additions and preserve shall be managed...to provide continued opportunities...for...wilderness recreation activities.” Based on this legislative direction, the National Park Service believes that intangible values inherent in wilderness character are among the resource values of Denali intended by ANILCA to be protected. The revised draft quantifies desired conditions in terms of indicators and standards.

State of Alaska: A stated purpose of the draft plan is to serve as “*Soundscape Preservation and Noise Management Plan as required by Director’s Order #47*” (excerpt on page 15). Further, the draft plan heavily emphasizes noise reduction and soundscape management. The Director’s Order was among a number of recent national orders and policies, including the Management Policies of 2001, which fail to recognize the statutory protections under ANILCA for Alaska park units. Consequently, the State of

Alaska objected to these management documents and their application in Alaska. Even though these policies are now final, the Service may not use administrative policy to override statutory intent (as implied in the draft plan on page 20.) Any motorized access or mechanized equipment may cause sounds that wilderness enthusiasts find disruptive, and we recognize that natural sound is a legitimate value shared by many park visitors. However, ANILCA-mandated access and use may not be subjectively curtailed by noise concerns. The Service has the responsibility to insure that soundscape management is properly implemented within the framework of ANILCA, including quantifiable findings of damage to resource values.

NPS Response: The revised draft clarifies the hierarchy of guidance for management of the backcountry of Denali National Park and Preserve, in response to the concern that NPS Management Policies would be used to override statutory intent. The National Park Service believes that the Alaska National Interest Lands Conservation Act provides overall direction for managing the backcountry of the park additions and preserve lands in Titles I and II, and the revised draft puts this language into a context above and separate from NPS Management Policies.

The National Park Service disagrees with the stated responsibility to include “quantifiable findings of damage to resource values,” noting that Section 1110(a) of ANILCA uses the phrase “would be detrimental to the resource values” of the park.

The service’s authority to set restrictions and limits to the use of motorized equipment for traditional activities is provided for in the language of ANILCA Section 1110(a) and in regulations at 43 CFR 36.11(h)(6). The revised draft presents quantified standards for the protection of natural soundscapes in the backcountry. The NPS acknowledges the State’s ongoing concerns about the adequacy of baseline data and the methodologies used to determine soundscape standards and measure impacts. The plan therefore commits to a comprehensive review and, as necessary, revisions to the standards in five years after further research. The initial standards will assist the NPS and partners in identifying areas where improvement in soundscape conditions would be a goal, where there are developing concerns for protection, and where we can make progress by working with the Aircraft Overflights Working Group and others even while additional information is being collected.

State of Alaska: The State believes that the draft plan wilderness management intent does not properly respond to ANILCA, nor the Wilderness Act itself. Unlike wilderness management in other states, ANILCA amends application of the Wilderness Act to allow motorized transportation, cabins (sections 1303 and 1315), and other uses in designated wilderness in Alaska. In addition to the often-recognized sections 811 and 1110 access provisions, ANILCA Section 1316 also protects the pre-ANILCA use of mechanized equipment necessary for the taking of fish and wildlife (operation of camps, such as water pumps and generators) in wilderness.

Where wilderness is considered, we request the plan broaden or replace the single-minded focus on “solitude” to reflect the entire concept included in Section 2(c) of the Wilderness Act: “... outstanding opportunities for solitude or a primitive and unconfined type of recreation.” The ANILCA purposes for Denali include “wilderness recreational activities,” but do not include “solitude.” The characterization of “solitude” in the draft plan implies an extremely low tolerance for the very types of uses that ANILCA allows. Incorporating the extended Wilderness Act concept to include *primitive recreation* would empower the Service to more effectively marry the Wilderness Act and ANILCA. This approach would also better reflect Section 1133(a) of the Wilderness Act, which states that use of wilderness areas “in National Parks are hereby declared to be within and supplemental to the purposes for which units of the National Park system were established.”

NPS Response: The protection of “wilderness resource values” is a fundamental purpose of conservation system units found in Title I, section 101(b) of ANILCA. The term “wilderness” is defined the same as in the Wilderness Act by Title 1, section 102(13) of ANILCA. Both opportunities for “solitude” and “primitive recreation” are characteristics of wilderness identified in the Wilderness Act. The Senate Report on ANILCA specifies on page 171 that management of the 1980 Denali additions shall recognize the desire of the users for “solitude.” The revised draft plan provides additional guidance for the meaning of both “solitude” and “primitive recreation” in Chapter 2, under the heading “Wilderness Management.” The revised draft acknowledges the exceptions to Wilderness Act management for Alaska conservation system units, as specified by ANILCA. These exceptions are described in chapter 1 and mentioned again in the Wilderness Management section of chapter 2.

State of Alaska: We are still concerned, however, that mandatory registration requirements proposed in the park additions for overnight camping, motorboat use, horses, and – in alternative B – hiking and airplane landings, constitute a restriction under ANILCA and places undue burden on the public. Since the voluntary registration system for mountain climbers on the south side of the Alaska Range has proven successful, we request implementation of a similar voluntary system for the remainder of the park additions to gather user data and disseminate park information.

We believe that mandatory registration and permit requirements are a form of closure requiring new regulation. Moreover, we note it could be difficult to show the required detriment to resource values based on intangible user experience attributes.

NPS Response: The service’s authority to set restrictions and limits to the use of motorized equipment for traditional activities is provided for in the language of 1110(a) and in 43 CFR 36.11(h)(6). In seeking to use the least amount of restriction necessary to achieve management objectives, the NPS scaled back the registration requirement for the preferred alternative of the revised draft plan. Instead of immediately instituting new mandatory registration requirements, the revised draft establishes criteria for when such requirements might be needed. These criteria are: 1) use levels are large enough that

user conflict and/or resource damage is occurring or is expected to occur; and 2) other methods for obtaining accurate information on visitor use and conveying essential visitor safety and resource protection information are unlikely to be successful. The revised draft further indicates that in the near future these conditions are likely to be met in the park additions south of the Alaska Range and east of and including the Kahiltna Glacier.

State of Alaska: During scoping, the state requested the Service to re-evaluate the quotas for backcountry units in the Old Park and consider advance reservation for some backcountry units or for a certain percentage of users. The Service responded that a recent survey of backcountry users investigated visitor satisfaction with the quota system in the Old Park and determined that there is a high rate of satisfaction with this system (Swanson 2002).

The survey, however, was flawed since it did not question displaced users, i.e., those that were turned away because there were no desirable units available, or those that gave up coming to the park to camp overnight in the backcountry. The draft plan states that park managers will continue to adjust unit quotas either up or down, yet the draft plan includes no commitment to do this nor explanation of how it will be done. Finally, the response to comments (page 393) states that potential use of an advance reservation system is proposed as part of the alternatives though we found no discussion regarding this. We request reconsideration of this issue.

NPS Response: The backcountry management plan establishes standards for management areas, including the Old Park where there are backcountry camping quotas presently in place. However, evaluating the specific quotas is an implementation activity that would take place separately from the plan. The standards for crowding in the backcountry are not expected to change in the Old Park, and visitor survey data show that these conditions are generally being met. As a result, changes to the existing quota system after plan completion are unlikely to be necessary. The monitoring goals outlined in Table 2-6 include a component for reaching displaced visitors in future surveys.

The preferred alternative in the plan calls for the establishment of an advance registration system for overnight camping in the Kantishna Hills. This system would be experimental, to test how or whether such a system could be implemented at Denali. The revised draft reiterates the commitment made in the original draft to “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.” This investigation would specifically include advance registration as a topic.

State of Alaska: The State strongly disagrees with application of the old Denali park definition of “traditional activities” (defined on page 421) to any ANILCA designated unit and unit additions. Access in Alaska park units by snowmobiles, airplanes, and motorboats is protected under ANILCA Section 811 for subsistence by “traditional methods” and under Section 1110(a) for “traditional activities.” Pre-ANILCA “traditional activities” include subsistence and recreation. While subsistence uses may

only occur in the Denali park/preserve additions, “*traditional activities*” such as mountain climbing, wildlife viewing, sightseeing, camping, occur throughout the entire park and preserve unit. These have been undeniably traditional activities throughout the park since its creation in 1917. It is not appropriate to arbitrarily exclude recreation from the definition simply because it is more difficult to manage.

NPS Response: We have invited the State and others to provide examples from the legislative history of ANILCA that show Congressional intent to include sightseeing, wildlife viewing, and picnicking within the meaning of the phrase “traditional activities” as used in Section 1110(a). The Senate Report on ANILCA states that: “The Committee amendment guarantees access subject to reasonable regulation by the Secretary...for traditional or customary activities, such as subsistence and sport hunting, fishing, berry picking, and travel between villages.”

State of Alaska: We agree that plan implementation, as proposed, could cause cumulative impacts to visitor use on non-park adjacent lands. Visitors to the region desire to go to Denali National Park and Preserve because it is a premier visitor attraction. To minimize these regional impacts, we urge the Service to reevaluate its management and provide more diverse opportunities for park users throughout the unit.

NPS Response: The National Park Service believes that the Revised Draft Backcountry Plan calls for a wide range of user opportunities within the boundaries of the park and preserve, consistent with the purposes for which the area was designated. In addition, the revised draft plan and accompanying Environmental Impact Statement acknowledge that there are diverse recreational opportunities available on general State land, BLM land, and private lands adjacent to Denali National Park and Preserve. Overall, this provides for a broad range of user opportunities in the Denali region consistent with the purposes of each respective land designation.

State of Alaska: We also request the plan address the possibility of an extended hiking trail from the park road north along the Savage River to state land. The south end on park land has already been constructed.

NPS Response: The National Park Service intends to continue its policy first articulated in the 1976 Backcountry Management Plan and reemphasized in the 1986 General Management Plan of not constructing trails in backcountry areas, particularly in the Denali Wilderness and northern park additions. This policy is necessary to preserve the unique wilderness character and wilderness recreational experience available at Denali. Exceptions have been made in previous plans such as the 1997 Entrance Area and Road Corridor Development Concept Plan, and in some alternatives of the original and revised drafts of this plan. These exceptions provide for visitor opportunities at popular destinations along the road corridor and address resource damage where use has become concentrated. Exceptions also provide for access to some areas on the south side of the Alaska Range where thick vegetation makes cross-country travel very difficult. A connector trail to state land through the Savage River Canyon would not fit these

criteria. The existing trail at the south end of the Canyon was constructed to provide for day use from the parking area on the east side of the Savage River and is suitable for that common visitor activity. Longer trips through the canyon are possible following existing backcountry management policies.

State of Alaska: The draft plan appears to be responsive to accommodating some of the expected increase in park visitation, as evident by the proposals to construct a wall tent for winter use at Mile 7 of Park Road and campsites in Little Switzerland. However, the draft plan falls short in addressing public use cabins on a park wide basis. Such cabins are proposed to be placed only on state lands outside the park boundary and only under Alternative E (page 64). We request the Service re-evaluate this position and consider placement of public use cabins on park lands, such as those public use cabins in other federal areas managed by the U.S. Fish and Wildlife Service, U.S. Forest Service and the Bureau of Land Management. In addition we request the Service consider including possibilities for a system of huts that would provide a new and unique way for people to experience the park.

pages 187-188: ANILCA Section 1302 provides for cabins for uses other than subsistence. In addition, ANILCA Section 1315 allows for existing cabins and provides for the construction of new cabins for public use in ANILCA Wilderness Areas. We request these specific ANILCA provisions be addressed in the plan with management options included among the alternatives.

NPS Response: ANILCA Section 1302 addresses land acquisition within conservation system units and is not relevant to the issue of public use cabins. ANILCA Section 1303 addresses improved property claimed or constructed by private individuals on National Park system lands and is not relevant to the issue of public use cabins.

ANILCA Section 1315(d) reads in part, “Within wilderness areas designated by this Act, the Secretary (of the Interior) or the Secretary of Agriculture as appropriate, is authorized to construct and maintain a limited number of new public use cabins and shelters if such cabins and shelters are necessary for the protection of public health and safety” (emphasis added). The National Park Service did not receive any comments indicating a public health or safety need for public use cabins during either public scoping or during public comment on the draft plan. Because cabins and permanent shelters do not fit the plan’s vision or legal mandates for the Denali Wilderness or lands suitable for wilderness designation in the park additions and preserve (see Chapter 2, Wilderness Management), public use cabins have not been included in the revised draft except as cooperative projects on adjacent lands. The NPS supported, in the 1997 South Side Development Concept Plan/EIS, construction of six public use cabins in the Tokositna and the Chelatna Lake areas at significant entry points into the park.

INDIVIDUAL AND ORGANIZATION COMMENTS

Individuals and organizations provided a wide variety of comments and perspectives on the draft plan. The pages that follow provide the National Park Service responses to the substantive comments raised in letters and public testimony by individuals and organizations. If a comment was addressed in response to an agency comment, it is not addressed again in this section. Most substantive points were raised by more than one comment. For the responses below, a single representative version of the comment is reproduced. In a few cases in which several comments can be addressed by the same response, the concept is summarized and prefaced by the phrase: “Summary Comment.” Comments and responses are organized by topic.

Overall Vision

Comment: Don’t adversely affect the hope that the Park can someday become a practical place for the family, for people who are not on tour company trips, for people who don’t have a lot of money and/or time and other common people to experience the Park. The Park seems not accessible to those types of visitors; it needs more access points, more trails, more efficient transportation, and family-friendly accommodations.

NPS Response: The National Park Service is committed to providing a diversity of opportunities for visitors of all interests and abilities consistent with park purposes. The National Park Service believes that the Entrance Area and Road Corridor Development Concept Plan and the South Side Denali Development Concept Plan provide a sufficient development program to meet needs for interpretive facilities, trails, and visitor services. Several of the alternatives in the Revised Draft Backcountry Management Plan provide additional trails in selected areas as well as additional opportunities for guided services and access to assist visitors who need more assistance in the way of facilities, access, or guidance. The National Park Service believes that the areas identified for providing additional facilities and access in the preferred alternative of the revised draft will meet the needs of these visitors for the 20-year life of the plan. Facilities and services are limited to those that are consistent with the purposes for which the national park and preserve was established.

Comment: Programmatic plans such as Soundscape, Wilderness and Subsistence should be done before activity plans such as the BCMP. The Northern Alaska Environmental Center (NAEC) is concerned that by implementing an action plan prior to the finalization of the aforementioned programmatic ones that the programmatic plans will be constrained by the latter...The NAEC recommends that the National Park Service approach planning for recreational use in Denali’s Backcountry after it has finalized the resource protection plans and not the other way around.

NPS Response: General management plans (GMPs) are the fundamental document for national park planning. Other planning documents are derived from the overall guidance provided in the GMP. The Backcountry Management Plan (BCMP) is an amendment to

the 1986 General Management Plan, including the 1997 amendments contained in the Entrance Area and Road Corridor Development Concept Plan and the South Side Denali Development Concept Plan. For items not in the scope of the Backcountry Management Plan, the 1986 General Management Plan and other amendments are the appropriate documents to consult. The Backcountry Management Plan contains components necessary to meet the requirements of the Wilderness Management Plan (see appendix B) and Soundscape Preservation and Noise Management Plan. The Denali National Park and Preserve Subsistence Management Plan was completed in 2001 and is available for review at Park Headquarters.

Comment: Denali National Park is two parks: the North Park, which is wildlife, tundra, backpackers, and tour buses, and the South Park, which is mountains, glaciers, climbers and aircraft. The two sides have different climates, different geography, different ecosystems, different users, and different needs.... One plan does not fit both sides of the park. In addition, the needs of the users and visitors are different North and South. The new Backcountry Plan should address the needs of the different visitors and users and not lump them into one plan.

NPS Response: The National Park Service agrees with this assessment, but would add that there are other types of topography and experience available besides the two mentioned. For example, visitors to the northwestern part of the park and preserve primarily travel by boat along rivers and by floatplane to lakes; summer travel is very difficult otherwise. Other areas are similar to the Old Park in topography but are far from the road system and accessible generally by airplane at remote landing strips. In the revised draft, the National Park Service has broadened the range of management areas to allow greater diversity in management. These management areas are applied differently in each alternative, so some alternatives seek to preserve a greater diversity of backcountry conditions than others do.

Comment: Had the agency chosen to revise the existing general management plan as the necessary prelude to its backcountry plan, it would have been obliged to address an issue that it ignores in the draft backcountry plan. That issue is Congress's directive in ANILCA that the agency identify traditional subsistence use areas in the 1980 park additions. Traditional use areas are to be managed under the subsistence provisions of ANILCA, while areas that were not traditionally used are to be managed in the same manner as the "old park," i.e. as traditional national park areas closed to the consumptive use of wildlife.

NPS Response: With the backcountry management plan, the National Park Service will have completed three general management plan amendments for Denali since 1997, which together address the entire national park and preserve and comprise an essentially new General Management Plan. Regulations at 36 CFR 13.41 authorize subsistence uses by local rural residents "where such uses are traditional," and indicate that the National Park Service may further designate areas but does not require the agency to do so.

Management Area Descriptions

Comment: The plan lacks specific analytical information or rationale to justify or explain how decisions were made to identify proposed management areas as reflected in each of the alternatives....A clear and concise explanation detailing how these units were determined under each alternative would have provided the public (and perhaps the NPS) with more meaningful information with which to make substantive comments (sound management decisions) on the proposed management areas...

NPS Response: An introduction to each alternative of the revised draft explains in summary the management vision for the alternative. Management area allocation follows from the vision.

Comment: Allocation of management areas is a prescriptive process that describes the desired conditions rather than existing conditions.... A map depicting, or a description of, the present uses in the park and where they are occurring would have assisted the public with a means of comparison from which to draw its own conclusions. As it stands now, the reader and presumably the National Park Service is uninformed about present uses and use levels that are occurring in the Park Additions.

NPS Response: The revised draft includes additional information and maps under the "Visitor Use" section of Chapter 3 to assist the public in understanding present levels and types of use in the park and preserve. These maps include Map 3-4: Popular Climbing and Mountaineering Areas, Map 3-6: Guided Hunting Areas, Map 3-7: Primary Snowmachine Access Areas, and Map 3-8: Commonly Used Overflight Routes and Areas.

Comment: The Access Fund opposes the use of the "human encounter" methodology as the singular measure by which the NPS would manage wilderness and non-wilderness areas in alpine zones such as exist within Denali NPP ...an inflexible focus on the number of human encounter in a given area may unnecessarily limit the number of climbers who have the opportunity to climb a given route or peak, but will do nothing to protect the mountain resource.

Comment: The American Alpine Club is concerned that Park management has already selected human encounters as an indicator of solitude for management of Park visitors...The BMP should be amended to reflect that other indicators and standards may be developed in the future that possess greater relevance to managing some wilderness recreational pursuits, specifically climbing and mountaineering, and that these will be incorporated into the BMP.

NPS Response: The National Park Service recognizes that mountaineering and climbing involve a different style of travel and different expectations than is true for other activities in the Denali backcountry. However, the agency is responsible for protecting the "wilderness resource values" of the area in addition to providing for the

mountaineering activity. In the revised draft, there is a new management area (“C”) that allows a higher number of encounters in some mountaineering areas to maximize mountaineering opportunities and account for some of the differences in the activity (restricted routes, longer sight distances). The National Park Service is also using a broader set of indicators that are of concern to climbers, particularly those related to the amount of motorized noise. Finally, there is flexibility built into the system of indicators and standards so that they can be refined as additional information is obtained. See Tables 2-2 to 2-9.

Comment: One aspect of the draft BMP that the AAC fundamentally opposes is the comment in endnote 1 for Table 2-2 on page 35 (also located on page 73) that “user” does not include “aircraft in flight.” This comment implies that there are effectively no “encounters” with aircraft in flight, precisely the visitor group that is growing fastest and that poses the greatest intrusion on the wilderness experience for mountaineers and other primitive recreation visitors to the backcountry. Such a comment runs counter to social science research, which concludes that encounters with like visitors cause less disruption than those with dissimilar visitors (Manning, *Journal of Leisure Research*, 1985).

NPS Response: Indicators must be considered collectively. In the revised draft, impacts of encounters with aircraft in flight are captured as part of the “Natural Sound Disturbance” indicator rather than as part of the encounter rate indicator. This solution is appropriate since it is the noise of the aircraft that has the greatest effect on resource conditions and visitor experience on the ground. In addition, the use of encounter rate is meant to serve as an indirect indicator for related resource qualities such as opportunities to view wildlife, which do not correlate to aircraft in flight.

Comment: The encounter rates have to be tailored to the user; a skier or musher who meets two groups, of up to 11 snowmachiners each (22 snowmachines!), on a day’s trip will hardly consider it to be a “high quality wilderness experience” in a primitive area, whereas that number of individuals encountered may well be fine with a snowmachiner. If you rely on questionnaires to ascertain the successes of your encounter rates, you will miss the non-motorized user will have long since been displaced.

NPS Response: In the revised draft, there will be no distinction in the encounter rate standards between motorized and non-motorized users, but snowmachine use must respond to standards for three distinct indicators: Encounters with People, Natural Sound Disturbance, and Evidence of Modern Human Use. The application of multiple standards helps to balance the greater resource impacts of snowmachine access as compared to non-motorized access.

Comment: Backcountry Zone – The conditions that you describe for this zone should not be encountered in any national park backcountry. The encounter rate of 10 parties (of up to 12 people) per day is too great...Such high levels of use will very likely damage the soundscape in the case of snowmachines and could be damaging to the landscape in the

case of hikers. There should be no area in the park except perhaps the entrance area where there are more than five encounters with another hiking party.

NPS Response: The revised draft significantly revises management areas. Standards for Management Area A, which is most comparable to the “Backcountry” area in the original draft, allow five encounters per day. No more than two of those groups could have more than six people. Corridor and Special Use Management Areas provide for higher encounter rates to meet specific needs, but these areas are generally very limited in geographic scope.

Summary Comment: Desired conditions for Natural, Primitive, or Backcountry areas should not include any motorized access. Desired conditions for soundscape in Natural or Primitive areas should be 100% natural sounds.

NPS Response: ANILCA 811(b) and 1110(a) provide for various types of motorized access into Denali, including for “traditional activities” and subsistence. For this reason, the National Park Service cannot conclude that Congress intended for there to be a complete absence of motorized noise within the park and preserve. In the revised draft, the National Park Service has proposed management areas with a range of acceptable conditions for natural soundscapes, all of which include at least some motorized noise per legislative direction.

Comment: A maximum encounter level of 250 to 300 per day may provide a more realistic margin (for Mountaineering Special Use Area). In any event, we certainly would not want to see a limited use permit system implemented to control where on the West Buttress teams may camp at any given time so that the 200 encounters per day limit is not exceeded.

NPS Response: There is no longer an encounter rate standard for the West Buttress Special Use Area. The season limit for the number of climbers would control use levels.

Comment: In table 2-2, Portal, Visitor Use column, 10 encounters per day is too low. A portal is a portal, not a section of trail. If you restrict the numbers at portals too much, you take away their capacity to serve as a portal for entry and exit. Portals should be described as having higher encounter rates than adjoining management areas.

NPS Response: There would be no encounter rate standard for Portals in the revised draft. However, standards in the surrounding area will indirectly influence the numbers of visitors who are able to occupy a Portal.

Comment: The AAC strongly recommends that the MSA designation also be used as a way for climbers, who make a long-term investment in experiencing the unique mountain environment, not have their experience degraded by larger numbers of people having a two-hour-long entertainment flight. Climber commitment in time and expense to experience the Park in its natural state for a primary purpose of the Park should take

precedence over tourists engaging in a use that degrades the overall wilderness character of the area.

NPS Response: Mountaineering Study Areas (MSAs) were eliminated in the revised draft. Instead, management area “C” was added, which is intended to capture the conditions desired by the mountaineering community. To reduce user conflict in these areas, scenic air tour landings would be restricted or not allowed in any location designated as management area “C.”

Comment: The wording for the Backcountry Management Area is not quantifiable at all, and needs to be replaced with words that measurably define acceptable landscapes and soundscapes for the purpose of effective monitoring.

NPS Response: The revised draft plan includes indicators and standards to accompany all narrative descriptions of desired conditions for management areas, as well as a rough description of how monitoring is to be accomplished.

Comment: The indicators and standards listed on pages 68-72 similarly do not include references to mountaineering and primitive recreation...Potential indicators and standards that could be included in the BMP to protect mountaineering include:

- Percentage of time aircraft or snowmachines are audible during the course of a mountain climb.
- Number of times during a climb that climbers are unable to communicate belay commands—which are vital to climber safety—due to noise intrusions from aircraft and/or snowmachines.
- Percentage of time climbers are prevented from attempting their primary climbing objective due to the permitting process or the presence of other climbing parties on their intended route.
- Percentage of times climbers are displaced from their intended climbing objective due to noise conflicts with other users.

NPS Response: The revised draft plan includes more diverse and specific indicators and standards than the original draft. Indicators were selected using several criteria, including the ability of the National Park Service to monitor them over time. All of the concerns expressed in the examples given above are intended to be captured with the Natural Sound Disturbance indicator and the Encounters indicator. Note that the monitoring strategy for Encounters provided in Table 2-6 includes a commitment to include displaced users in visitor surveys to determine the effectiveness of the backcountry management.

Comment: ...the NPS does not describe a clear program for how they will monitor the affects of certain uses, with emphasis on recreational snowmobiling, on the park’s resources or non-motorized visitor experiences.

Comment: ...there is no allocated funding expressly for monitoring the impacts of the use of snowmobiles in the backcountry. As this 'on the ground use' has many known negative impacts to resources and social conditions, the NAEC suggests that a gradation of funding resources {by alternative} ...be added to the budget specifically for this purpose.

NPS Response: The revised draft plan includes a budget for sufficient enforcement and monitoring. A narrative description is found under Park Operations and Management in Chapter 4: Environmental Consequences, and a specific cost analysis is provided in appendix F.

Management Area Designations

Comment: Congress annexed the Northern Additions to the Park in 1980 via ANILCA because of their importance for ensuring an intact ecosystem for the greater Denali region, acting as a buffer for the Old Park, and to provide critical winter habitat for wolves and caribou...Dispersed use of snowmobiles in the region would run the risk of intentional or unintentional harassment and/or destruction of the natural and cultural resources within the region. The Northern Additions receive relatively low visitor use at the present time....the NAEC recommends that the entire Northern Additions be zoned for the most restrictive protection possible under the management area schematic, Natural Area, to ensure that this region retains the highest quality wildlife habitat and wilderness recreation opportunities possible.

NPS Response: The National Park Service agrees that the northern additions were added to the park for their ecological values and should receive a high degree of protection. Three alternatives of the revised draft plan – including the preferred alternative – propose a management area designation for the northern additions that would be comparable to the Natural Area designation in the original draft. Only the four backcountry units near the park road in the Kantishna Hills and the northeastern spur of the park would be designated as higher-use areas in the preferred alternative. See Maps 2-2, 2-3, and 2-4.

Comment: It sounded like you (the Park) were not aware of the current level of use of the Muddy River, which during open-water time probably exceeds three parties per week. Certainly Denali West Lodge goes down there frequently, perhaps several times a week. Other residents go down occasionally during the summer, especially when taking visitors boating. The float trip from Minchumina to Manley also brings one or two parties almost every year to the area as well. During moose hunting, especially the State season, there are often over three parties per day, including locals, previous residents and their descendents (Bishops, Blackburn's etc.), and non-locals....Even after September 20 it is not uncommon to see one or two or more boats on the river each day.

NPS Response: In all alternatives of the revised draft plan the Muddy River is designated a Corridor area. The National Park Service developed this new management area to

address conditions on rivers and other travel routes where use is concentrated. The standards for Corridor areas allow encounters of up to 10 parties per day. This action is appropriate where rivers, constructed trails, or other logical travel corridors provide the only reasonable means of access because dense vegetation or other significant obstacles discourage dispersed use. Corridor areas are also applied to designate high-use backcountry routes that can be used to access inholdings or provide a way for many visitors to pass through accessible areas of the backcountry before dispersing.

The NAEC opposes the “cherry-stemming” type management proposed for the West Fork of the Yentna River, in Alternative C and D. This method of dangling areas of high-use, with emphasis on the proposed corridors for snowmobiling, into a region that is proposed to be a Natural Area offsets any benefits that may be gained under the stricter management guidelines. The NAEC recommends that the entire southwest portion of the Preserve, inclusive of all of Units 81, 82, 83, 84, 85 and the West Fork of the Yentna River be managed as Natural Area.

NPS Response: Management areas in the revised draft differ from those in the original draft, and Alternative 2 explores the suggestion provided in the comment. However, in three of the four action alternatives, including the preferred alternative, both forks of the Yentna River are still designated as Corridor areas. Because these are logical travel routes that provide access through an area of Denali where cross-country travel is difficult, it is reasonable to allow a higher level of use.

Permits and Registration

Comment: When folks are accessing Alaska’s remote park’s including the remote portions of Denali via airplane, it is not reasonable to require them to come into a visitor center and obtain a backcountry permit. There have been many times in my travels across the state where a site we selected to fly into was inaccessible because of weather. Then we chose some other, safer place to camp. Having a backcountry permit system where you are required to camp in a specific location or zone on a given night is not wise in rural Alaska. For people traveling off the road system, there aren’t phones or Internet access to obtain backcountry permits. The new requirement seems unduly burdensome to me and certainly is not in the spirit of Alaska’s parks....The whole concept of quotas for specific areas of our remote Alaska park strikes me as totally unnecessary over management.

NPS Response: While some backcountry areas of Denali beyond the park road corridor remain remote and rarely visited, others are experiencing a significant rise in visitation and associated impacts. To make the most informed management decision possible, the National Park Service needs accurate information about the extent of use, and required registration is the most accurate and reliable mechanism to obtain such information, particularly in places where use and entry points are dispersed. In addition, the National Park Service has found that it can accommodate more visitors with less impact and greater visitor safety if everyone follows simple guidelines related to food storage, bear

encounters, and Leave-No-Trace. However, the National Park Service needs an effective way to communicate these guidelines and insure that visitors understand them. Requiring visitor contact via required registration also serves this function. For these reasons, two alternatives in the plan mandate actions to require permits for some activities in some areas. In the preferred alternative, however, there are criteria established for new registration requirements: 1) use levels must be sufficient that user conflicts and/or resource damage are occurring or are expected to occur, and 2) other methods for obtaining accurate information on visitor use and conveying essential visitor safety and resource protection information would be unlikely to succeed.

Neither the original draft plan nor the revised draft suggests the imposition of quotas in the park additions; the only new quota in either draft is a seasonal limit for the number of climbers on Mount McKinley. Limiting visitor numbers for activities or areas remains a tool that could be used in the future if necessary to protect park resources and values and if less restrictive mechanisms would be ineffective.

Comment: Minchumina residents do occasionally use the Park, including the Old Park, for recreational uses. Currently, there is no convenient, publicized way to get camping permits, regulations, etc., without going through Park Headquarters, which people just don't do... a local point of registering may work.

Comment: It should be possible to come to the Park and get into the backcountry for a day or a weekend, if that is all the time available, as is often the case for "local" residents who may live as far away as Fairbanks.... Obstacles to the backcountry include:

- same-day registration permitting process,
- separate bus ticket purchasing process,
- road conditions that force buses to travel slowly, and
- buses that stop so often to accommodate people who have no intention of walking that those who want to disembark must endure an extended, frustrating ride their destination.

NPS Response: As in the original draft plan, the revised draft contains a commitment by the National Park Service to conduct a thorough investigation of the most convenient and cost-effective ways to make backcountry permits available to visitors. The preferred alternative in the revised draft includes an experimental reservation system for backcountry permits in the Kantishna Hills. For the National Park Service a key feature of any such system is that it must insure that visitors receive the same essential visitor safety and resource protection information as they do in the present system.

Climbing Limits on Mount McKinley

Comment: The cap of 1,500 people on McKinley would be a problem if the cap was reached (in the future), and an experienced party wanted to climb a non-West Buttress route on short notice to take advantage of a nice weather window. Put the cap on the

West Buttress to minimize impacts, but recommend allowance for climbing a non-West Buttress route on late notice in good weather.

NPS Response: 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 in the preferred alternative of both the original and revised drafts was selected because that is the maximum number that mountaineering rangers believe they can 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.

Comment: We question the basis for selecting current use levels on Mt. McKinley as the appropriate level of use to allow....It is our understanding that crowding is already a problem on the mountain, often compounded by periods of bad weather. Simply adopting the current status quo as the acceptable level of use appears highly arbitrary...At a minimum, the plan should freeze use at the level that occurred in 2001 when this planning process was initiated until a fact-based assessment can be made regarding the social and resource carrying capacity of Mt. McKinley.

NPS Response: The capacity limit suggested in the preferred alternative of both the original and revised drafts is proposed because it represents the number of climbers that several years of recent experience has shown can be managed with the existing mountaineering program. Educational and patrol components of this program are important both for resource protection and climber safety. The success of the program is illustrated by the fact that the number of injuries and deaths has declined and the physical condition of the West Buttress route has improved. For example, the amount of abandoned material and litter and exposed human waste has decreased even as climber numbers have increased. Mountaineers on Mount McKinley have generally expressed a tolerance for conditions more crowded than generally expected in wilderness areas in return for having the opportunity to climb. The short climbing season, necessarily lengthy expeditions, and the popularity of Mount McKinley among climbers because it is the tallest mountain in North America make it a unique situation within U.S. wilderness areas.

Human Waste

Comment: The Access Fund encourages the NPS to require the use of Clean Mountain Cans on the entire West Buttress route of Denali.

NPS Response: The National Park Service acknowledges that human waste is an issue along the entire West Buttress route. However, below 14,000 feet there are options for waste management (such as crevasse disposal and latrines) that make use of Clean Mountain Cans less critical. 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.

Group Size

Summary Comment: A group size limit of 12 is too large; resource impacts would occur with groups of that size. Group size should be limited to 6 or 9.

NPS Response: NPS Discovery Hikes have had a cap of 15 people plus the ranger guide since the mid-1990s. Resource impacts from these hikes have been within an acceptable range during that period. However, resource experts and interpretive staff and partners agree that for interpretive purposes as well as to minimize resource impacts, a limit of 12 is usually appropriate. For that reason, the revised draft would limit both guided and unguided hikes to a group size of 12, including the guide. The original draft plan allowed a group size of 15 plus a guide in the preferred alternative.

Aircraft Overflights and Access

Comment: The Park Service should do whatever it takes to establish meaningful overflight regulations and limits on scenic tour landings. To achieve desired future resource conditions, NPS must adequately address both flight patterns and levels of use.

NPS Response: Alternatives in the revised draft plan establish specific indicators and standards for desired future resource conditions and identify a set of access management tools, which could include access regulations that would be used to achieve those conditions.

Comment: Our visits and camping trips to the Ruth amphitheater were impacted by the steady stream of commercial flight seeing planes landing just to let their clients stand on a glacier. This is also not access, and should be prohibited throughout the Park. Aircraft access should be clearly defined as dropping people off to experience the remote areas of the Park in the spirit of a wilderness experience.

Flightseeing is an inappropriate way to “experience” the Park, and I urge the agency to do whatever it can in this plan to discourage this growing menace. The constant drone of flightseeing aircraft over the Ruth during nearly all daylight hours degrades the experience of those who come seeking to experience its otherwise sublime character.

While Denali has many special characteristics, one of the most significant is the incredible magnitude of its mountains and the park itself. For visitors to fully appreciate the significance, viewing the park from the air and being able to explore some of its more remote corners is essential. This implies both the ability to over fly the park and land in a reasonable number of appropriate sites.

NPS Response: Much of Denali is difficult to access by traveling overland for almost all visitors because of the difficulty of terrain and/or the amount of time required. The National Park Service believes that air access is appropriate in the park and preserve as long as it does not impair park resources or create user conflicts. The actions suggested in the various alternatives of the revised plan are designed to prevent impairment and minimize user conflicts while still allowing this form of access to occur at reasonable levels.

Summary Comment: Wonder Lake should not be closed to landings because

- there is no substantiation of adverse impacts from landings
- the lake has traditionally been used for float- and ski-plane landings
- it is the only viable float-plane landing area in the Old Park
- denial of access is a safety issue as no other water landing area is nearby

NPS Response: Wonder Lake – and the rest of the Old Park except the McKinley Park Station Airport – was closed by regulation to all airplane landings prior to ANILCA. The NPS preferred alternative in the revised draft plan does not include a prohibition on airplane landings on Wonder Lake as long as desired resource conditions are met. However, this would not preclude future NPS action to protect park resources. Two of the alternatives in the revised draft plan contain actions that would prohibit airplane landings on Wonder Lake. In all alternatives the lake would remain available for emergency landings.

Summary Comment: The Old Park should not be closed to landings because

- terrain and weather already severely limit landing locations
- general aviation landings in the Old Park cause little impact compared to commercial aviation south of the range, overflights, or any form of surface access
- general aviation is not increasing, particularly not pilots or planes capable of landing off-airport
- existing regulations require a finding of detriment before such a closure can be instituted.

Comment: We support prohibiting all airplane landings in the Old Park, except for emergencies and essential administrative activities...(this closure is) a true reflection of the intent of ANILCA when Old Denali was designated a Wilderness area. Access for hiking in the Western part of the Old Park can be made from outside the park. Airplane landings...will detract from the solitude and Wilderness character known to exist in the area.... We advocate no airplane landings in the Old Park...The western Old Park, Units 21 and 22, will have access for backpacking mainly from airstrips outside the park in other areas marked as Natural.

NPS Response: The suggested prohibition on airplane landings in the preferred alternative of the original draft plan was intended to protect the wilderness character of the former Mount McKinley National Park to the degree that it had been prior to 1980, when ANILCA inadvertently changed the existing regulation that prohibited aircraft

landings. Regulations at 43 CFR 36.11(f) implementing 1110(a) of ANILCA provide that NPS can close an area to airplane landings only upon a finding by the agency that such use would be detrimental to the resource values of the area. The NPS preferred alternative in the revised draft would establish desired conditions for the Old Park management areas including indicators and standards. It would not prohibit landings, but sets up a framework for managing access that would include the possibility of restrictions or closures if necessary to achieve desired conditions. Two other alternatives in the revised draft do propose closing the Old Park to airplane landings through special regulations or legislation that would exempt the Old Park from 1110(a).

Comment: We strongly oppose any day-use landings anywhere in the park and preserve with the possible exception of the established tradition of sightseeing landings at the Ruth Amphitheater and Kahiltna Base Camp. The wilderness character of Denali should not be reduced by making motorized day trips possible into the remote reaches of the park. Denali should be managed to preserve its unique and wild qualities, not managed primarily as a motorized sight-seeing area.

NPS Response: Alternative 2 of the revised draft plan would limit all airplane landings except those for traditional activities to designated Portals and frontcountry airstrips. Alternative 3 would eliminate airplane landings in the Old Park except at frontcountry airstrips. In the preferred alternative of the revised draft plan, general aviation is addressed only through the standards assigned to various management areas; general aviation could continue as long as standards are met. For commercial scenic tour landings, Alternative 2 of the revised draft would implement the suggestion above by limiting these landings to two locations: Kahiltna Base Camp and the Ruth Amphitheater. Other alternatives would limit scenic tour landings to glaciers in Management Area A.

Comment: We urge NPS to include a provision in the plan that will prohibit airplane camping anywhere in the park...The continued presence of a plane on the ground not only offers a constant link with civilization from within the wilderness, but has visual and psychological impacts on other visitors' experience of the area as wilderness.

NPS Response: The National Park Service agrees that encountering airplanes or other mechanized equipment in the backcountry can detract from wilderness character and experience, and the revised draft plan seeks to minimize the degree of these encounters by including standards for Evidence of Modern Human Use as part of management area descriptions. Achieving the standard is the NPS objective rather than targeting any particular form of use, as in airplane camping, for example. ANILCA 1110(a) and implementing regulations do establish that some level of encounters with airplanes and snowmachines can occur in Alaska conservation system units, including wilderness areas. In addition, use of aircraft will sometimes meet the minimum tool requirement for administrative purposes.

Comment: Develop flight-free zones and flight corridors over the Park...A model would be the proposed Flightseeing and Air Taxi Routes map and proposals for Alternative B at

page 17 of the Special Winter 2001 Edition of the Denali Dispatch...Failing to even propose those actions in the BMP puts the interests of those commercial operators above the interests of the American public for whom the Park was established and fails to provide the public and the decision-maker with a reasonable range of alternatives to consider.

NPS Response: In the preferred alternative of the revised draft plan, the NPS seeks to manage the park to assure standards are met rather than suggesting specific prescriptive actions. In any case, at present the National Park Service lacks the statutory authority to establish flight-free zones or flight corridors. However, the revised draft 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.

Snowmachine Access

Summary Comment: The National Park Service should not authorize dispersed or concentrated recreational snowmachine access to the park additions and preserve because

- There is no legal authority for the proposed recreational access
- Recreational snowmachine use was not envisioned by the framers of ANILCA
- It is incompatible with the purposes of the park, such as maintaining habitat for fish and wildlife and protecting wilderness values such as solitude
- It is detrimental to resource values such as wildlife and natural soundscapes
- It conflicts with NPS policy mandates to protect lands suitable for designation as wilderness
- To meet the goal of planning in a “regional context” the NPS should emphasize non-motorized recreational opportunities since other public lands in the region are open to recreational snowmachining.
- Snowmachines displace other users such as skiers, snowshoers, and dog mushers
- Recreational snowmachine use disrupts subsistence use.

NPS Response: ANILCA directs that the National Park Service provide “reasonable access” to wilderness recreational activities (ANILCA Section 202(3)(a)). The NPS believes that managed snowmachine access is reasonable to consider among strategies to provide this access without causing substantial harm to resources or displacing other users. In the revised draft, Alternatives 3, 4, and 5 provide for varying levels of managed snowmachine use for access to wilderness recreational activities. These alternatives also contain provisions that illustrate how this form of access could be compatible with future wilderness designations. Alternative 2 does not provide for recreation-related snowmachine access. The NPS has the authority under the Organic Act to issue a special regulation to provide for the type of access indicated in each alternative.

Comment: The NPS has failed to define within the context of the BMCP the need to address the ANILCA term “traditional activities” for the Park Additions....as the “majority of commentators supported applying the NPS definition of the term “traditional activities” from the final rule to all the park additions and preserve,” [p.23]

the NPS should either act on behalf of the public's wishes or provide some rationale, beyond expressing that the challenge is too great, as to why they have chosen inaction on this issue.

NPS Response: Two alternatives in the revised draft plan suggest a definition for “traditional activities” to be implemented by future regulation. The definition plays an important role in fulfilling the vision of each of these alternatives. In the preferred alternative of the revised draft, the National Park Service emphasizes setting goals while retaining the flexibility to prioritize which tools would best assist in meeting those goals. If desired conditions are not achieved in some areas of the park, defining “traditional activities” to manage access would remain an option.

Summary Comment: Restricting snowmachine travel to corridors in the concentrated use areas is a poor idea because

- Encounter rates would be increased
- Visitor experience would decline because of the visual intrusion of signs and markers
- Environmental impacts would be greater
- If the corridor is not groomed, the trail would become rough and adversely affect visitor experience
- Restrictive corridors are contrary to the plan's stated goal of “provide for the public's maximum freedom of use and enjoyment of the park's backcountry and wilderness” and opportunities to explore remote areas would be diminished
- Repetitive use on the same marked route would lead to damage of vegetation and trail development.

NPS Response: Several alternatives in the revised draft plan include a “corridor” concept that differs from the corridors proposed in the original draft plan. First, the Corridor is described as a management area with its own standards. Second, the Corridor is not specifically a snowmachine area, but simply an area that provides many visitors the opportunity to travel deep into the backcountry along a designated route before dispersing, either in summer or in winter. Third, visitors would not be restricted to the Corridor, but the Corridor would allow for a higher level of activity than surrounding areas. Corridor areas could lead to damage of vegetation and trail development, but care would be taken during implementation to site the Corridors where surface damage would be minimized. In many cases the designated Corridors would be on waterways or existing trails. Visual intrusions of route markers are a concern that is documented in Chapter 4, Environmental Consequences, under the Wilderness section.

Comment: The prohibition on riding on glaciers contained in Alternatives B and C is necessary to protect visitor safety both due to the tremendous hazards involved, as well as to avoid conflicts with climbers in terrain that historically has been visited by mountaineers.

NPS Response: Although the activity is not specifically prohibited, the provisions of Alternatives 2 and 3 in the revised draft plan would still effectively prohibit riding snowmachines on glaciers. This provision is not included in the preferred alternative, which generally does not specify prescriptive actions for managing access but rather provides a set of tools that could be used to achieve the specified goals. These tools could include a future action to close glaciers to snowmachines.

Comment: Any allowed snowmobiling in support of traditional activities and subsistence cannot be permitted to occur without rules and guidelines...that limit speed, location, group size, number of groups per day in each management area, etc. and must be managed so as to limit encounters that impact other park users. These guidelines need to appear in regulation.

NPS Response: All use of snowmachines in the park and preserve would be subject to existing state and federal regulations, which include speed limits, as well as encounter rate standards and group size limits specified by the backcountry management plan. The plan would be implemented through regulation as necessary. Encounter rates are established in the management area definitions, as are limits on the number of encounters with large groups (more than six individuals). The maximum group size would be set at 12 in all alternatives.

Comment: The Tokositna Valley to the Kanikula glacier is a wonderful little stretch of wilderness, it should be closed to snow machines regardless of which alternative is chosen. There is no place upstream from Bunco Lake for either people or wildlife to get away from the snow machines. I think there should be some of this valley set aside for non-motorized forms of recreation. Accordingly, I urge you to close unit 79, in its entirety, to snowmachine use.

NPS Response: Alternative 2 of the revised draft plan would close the area described to snowmachine use except for access to subsistence activities and traditional activities as defined for the Old Park. Alternative 3 would do the same, but would allow snowmachine access for recreation along defined corridors to the toes of the Kanikula, Tokositna, and Ruth Glaciers.

Comment: The reason for excluding snowmobiles from subsistence areas does not seem justified. Certainly people taking photos should have a lower impact than people who are hunting. What subsistence activity is being impacted by snowmobiles? Is it possible that the snowmobiling and subsistence take place at different times or different seasons? The Park Service could do public education to resolve many of the perceived issues regarding snowmobiles.

NPS Response: The preferred alternative of the revised draft plan does not exclude snowmachine use from areas used for subsistence. Instead, it specifies that the National Park Service would use the access management tools described in chapter 2 to protect subsistence resources and opportunities, which could include future actions to close

areas seasonally or permanently to snowmachine use if necessary to accomplish this goal.

Comment: There may be millions of acres available for snow machines, but it's not Denali National Park {Old Park}. The problem that people with -- that do not have physical disabilities do not understand is that these people want to be able to see the same things that people that aren't disabled see. They want to be able to have access to the same lands, not just another pretty mountain. They want to be able to see Sable Pass, they want to see Highway Pass, and they'd love to be able to see Denali in the wintertime.

NPS Response: This issue was raised during public scoping and addressed in chapter 1 of the original and revised draft plans. 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 (65 FR 37871).

Motorboats

Comment: I personally feel the Tokositna should be a rafting type of no motor area in that short section that it's within the park. And I would expect the Park Service to do everything they can to reduce motorboat use in that area where there is very definitely a conflict with what is apparently not only an excellent experience, but one of the few good boating rivers in the park.

NPS Response: Alternative 2 of the revised draft plan would restrict motorboat use on the Tokositna River to traditional activities as defined for the Old Park. Other alternatives would allow motorboat use for all purposes, consistent with existing regulations, but such use would be constrained by management area standards, including those that provide minimally acceptable conditions for noise and encounters. These standards would protect the visitor experience along the river. Because of ANILCA's legal mandates allowing motorboat use for traditional activities and the presence of private inholdings – including commercial tourism properties – for which the river is the primary summer access, this river is not a good candidate for being a “no motor area.”

Comment: I can't see where your draft distinguishes among various types of motorboats, and the plan should do so. Airboats and jet skis are the antithesis of the purposes of the Park and Preserve and of the management goals.... Airboats should be categorically banned from all areas of Denali National Park and Preserve. Jet skis... should likewise be banned outright.

NPS Response: Motorboats are generally allowed in Alaska national parks by 43 CFR 36.11(d). However, while NPS has not issued a nationwide rule, regulations have tended to treat airboats as something other than a “motorboat.” Regulations for Big Cypress National Preserve at 36 CFR 7.86(a) define airboats as motorized vehicles along with swamp vehicles, air cushion vehicles, automobiles, and trucks, distinguished from motorboats that are driven by a propeller in water. Regulations for the Alaska National Wildlife Refuges at 50 CFR 36.2 define airboats as off-road vehicles, not as motorboats.

Use of personal watercraft (some of which are sold under the brand name “Jet Ski”) is prohibited in all units of the national park system except in designated areas by 36 CFR 3.24. Motorboats are defined in 36 CFR 13.1 to exclude personal watercraft. There are no designated areas in Alaska.

Off-Road Vehicles

Comment: In February 2003... the Park Service issued *Off-road Vehicle (ORV) Use in Alaska National Park Units....* In reviewing the BCMP and the ATV report, we have discovered alarming discrepancies between the two documents regarding the number of trails and types of use occurring in Denali National Park and Preserve. In light of this new information, we believe that Park Service must clarify NPS ATV policy and legal use in the BCMP.

*NPS Response: NPS policy regarding off-road vehicles (ORVs) in Denali is unchanged. The use of ORVs in the backcountry is generally prohibited throughout the national park and preserve consistent with existing regulations (36 CFR 4.1, 43 CFR 36.11). ORV use can occur on state right-of-ways and has 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 are not authorized for subsistence purposes under ANILCA 811 because they were not traditionally employed for subsistence purposes. The NPS is evaluating ORV use in the Cantwell area for subsistence purposes, but no determination has yet been made. The indication of trails in the report *Off-Road Vehicle (ORV) Use in Alaska National Park Units (February 2003)* did not include descriptive information so that readers would understand that these trails included those used for inholder access in Kantishna, a state right-of-way, sections of trail near Cantwell that are being considered for subsistence use, and trespass trails that are a current concern for enforcement.*

Non-Motorized Winter Activities

Comment: With little snowfall occurring over the past three years within the park, the south side portion of the range could be a viable alternative for cross-country skiers, snowshoers, dog mushers and others who wish to experience the beauty and majesty of this area. In fact, this would be a wonderful addition to the wilderness portion of the park. NPS would need to promote this area to the public to generate this type of interest, and perhaps consider snowcats to transport tourists, x-c skiers, snowshoers, etc. into this area, if it would not interfere with wilderness designation.

NPS Response: The Broad Pass visitor contact station proposed in alternatives 3, 4, and 5 of the revised draft plan could assist in promoting the south side of the Alaska Range for non-motorized winter recreation. Securing access to the 17(b) easement from Cantwell to Windy Creek would also be helpful. Finally, the marking of corridors to the Old Park boundary in the Dunkle Hills area would assist in steering skiers and other visitors to the park's southern additions. This additional information and guidance should assist visitors in recognizing and finding the beauty of the south side of the Alaska Range.

Commercial Services

Comment: Especially in Wilderness, the “test” for allowing specific commercial operations in the Park must be more restrictive. Any and all efforts to use Denali to pry into people’s wallets would meet the “e” criteria of providing some education.... , where recreational use needs to be limited, no one who comes to experience Wilderness as Wilderness, should be displaced by someone who merely buys the experience. Preference should be given to private parties... Small-scale operators should be given any preference possible over the big operators. And each alternative should have provision for some commercial-free zones, where money will not influence the place, where the experience cannot be bought, but must be earned.

NPS Response: NPS Management Policies 6.4.4 provide for 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 USC 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.

The National Park Service provides criteria for “necessary and appropriate” under the Commercial Services section of Actions Common to All Action Alternatives in the revised draft. Among the criteria are those mandating a strong educational component for commercial services for all areas of the backcountry, not just designated wilderness. This section also includes direction that the minimum requirement test as provided in appendix E would apply throughout the backcountry. Alternative 2 provides for substantial areas that do not allow for guided services. Alternatives 3 and 4 provide for very limited activities in some portions of the park.

Guided Hiking

Comment: AWA would like Denali National Park to consider adding a commercial guided hiking option in the wilderness area to the Backcountry Management Plan,

Alternative D. Our guests have a strong interest and desire to day hike from the park road within the wilderness boundary but when unguided they have a tendency to feel apprehensive about leaving the shuttle bus.

NPS Response: The preferred alternative (Alternative 4) of the revised draft would allow commercial guided hiking in the Old Park at the same level as at present. While there is one operator who is entitled by law (ANILCA Section 1307(a)) to offer guided hiking at the level offered in 1979, the extra increment added since 1979 by that concessioner would be subject to competition under NPS concessions law in the next contract period. Alternative 5 provides for an expansion in commercial guided hiking in the Old Park, including overnight backpacking opportunities.

Comment: I question whether limiting all group hikes to two per season for a particular non-gravel bar or trail route is reasonable. The major commercial operator now leading guided hikes in the old park has had no similar restrictions on the past and this might impose a hardship now.

Comment: We suggest a revised approach to this aspect of the overall plan. Just as a working group has been envisioned for overflights, we suggest such a task force be convened consisting of the most effective user groups identified in the plan, the NPS, the Denali Science and Learning Center, Denali National Park Wilderness Centers, Ltd., and individuals representing independent hikers.

NPS Response: In the revised draft, the limitation on guided hikes to two visits per season to a particular location is only found in Alternative 2. In Alternatives 3, 4, and 5 NPS relies on the strategy described under the Cross-Country Travel heading in the Access section of Actions Common to All Action Alternatives. This strategy provides for a flexible approach to managing both guided hiking and private hiking that responds to specific landscape conditions and formally coordinates the activities of the various groups leading guided hikes in the park or delivering hikers to the backcountry.

Guided Sport Hunting and Fishing

Summary Comment: Commenters variously asked for two guide areas covering the entire southwest preserve, three guide areas covering the entire southwest preserve, guide areas in the northwest preserve, and the explicit creation of a no-guide area in the southwest preserve.

NPS Response: The National Park Service believes all of these suggestions are reasonable, and the revised draft includes each of these options in one or more of the alternatives and hopes to receive additional comments during public review. The preferred alternative proposes two guide areas covering the entire southwest preserve because the lack of activity over several years from the existing concessions (see Chapter 3, Visitor Use section) indicates that the current areas may be too small. The preferred alternative does not include a guide area in the northwest preserve because NPS subsistence managers believe a guide area would have significant impacts on subsistence

resources and users. Alternative 5 proposes a guide area only in the southern portion of the northwest preserve where the conflict with subsistence could be minimized.

Comment: I would like to provide guided fishing trips in Denali National Preserve. The specific area would be in the mouth of the clearwater streams flowing into the East and West Forks of the Yentna River. I would like the National Park Service to create a guided fishing concession for the above-mentioned area.

NPS Response: The National Park Service has included guided fishing as an opportunity with the guided sport hunting concessions in the southwest preserve. The National Park Service intends to continue linking guided fishing opportunities in the southwest preserve to the sport hunting concession if all criteria for commercial services are otherwise met.

Commercial Airplane Landings

Comment: There is a segment of the population with various handicaps that preclude hiking, backpacking, tent camping and enjoying the beauty of the park and the mountain from surface transportation. These people can be readily accommodated in small airplane tours that leave no marks on the surface and create very little noise.

NPS Response: The revised draft alternatives include provisions for continued airplane scenic tour landings at Denali. The desired resource conditions for various management areas could mean that these tours and landings might be limited in the future, just as other kinds of access to Denali (such as use on the park road) are limited.

Comment: I might also ask that the Park Service analyze an alternative that would allow commercial aviation use in the area where aircraft first landed in the park, and that's the Muldrow Glacier where Joe Crossman {sic} Jerry Jones landed in 1932, and then subsequently aircraft were used to support climbing activities on the Muldrow Glacier, and the traditional route up McKinley until the early 50s at which time the West Buttress route was, I would say, pioneered by Thad {sic} Washburn. I'm just curious why the Park Service would want to restrict use in an area that had the first use, commercial use.

Comment: In the early spring climbing season, when no other general park visitors would be interrupted, I would like the Park Superintendent to be able to authorize landings in Units 44, 48, and 87 for support of climbing parties on the North side.

NPS Response: There is no need for airplane support to 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 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 is also 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.

Comment: I would develop a South Side Scenic Flight Plan that would separate climbers from the casual visitor.... The Southwest Fork of the Kahiltna could be developed for scenic flights, with NPS presence, for the entire May through September season.

NPS Response: The revised draft includes this concept within the alternatives. There is a division within southern glaciers between management areas "A" and "C" where scenic tour landings are allowed in "A" but are restricted or not allowed in "C." The amount allocated to each management area varies among alternatives. The Southwest Fork of the Kahiltna includes a designated Portal/Major Landing Area so that it could accommodate more use than the surrounding area; however, scenic tour operators rarely land there at present even though it is open for such landings.

Comment: Identify two or three specific locations (for scenic tour landings) and not allow any proliferation of scenic landing sites

NPS Response: This concept is included in Alternative 2 of the revised draft plan.

Comment: There should be no commercial scenic tour landings on the park's north side.

NPS Response: The preferred alternative of the original draft would have allowed scenic air tour landings in some locations in the northern park additions as a result of management area zoning. There was no evidence of demand for such landing locations. In the preferred alternative of the revised draft plan, the alternatives clarify that scenic air tour landings would be allowed only on glaciers in Management Area A, effectively restricting them to areas presently used on the south side of the Alaska Range.

Comment: Some areas should remain closed to all commercial airplane landings to provide wilderness areas that will only be accessible through self-reliant, non-motorized means. The sense of accomplishment that hikers get from traveling in remote areas that CANNOT be reached by motorized means is an integral part of the wilderness experience and opportunities for such experiences should always remain intact in Denali National Park.

NPS Response: In all alternatives, the Denali Wilderness remains closed to commercial airplane landings. Additionally, there are significant areas in the park and preserve that do not have landing strips or other areas suitable for airplane landings.

Comment: Carrying capacities must... be applied to airplane landings in the New Park.... Scenic flight seeing trips and glacier landings numbers should be capped.

NPS Response: The National Park Service is obligated by the National Parks and Recreation Act of 1978 to address carrying capacity in its general management plan documents. The Visitor Experience and Resource Protection (VERP) model is typically used by the National Park Service for carrying capacity planning. VERP defines capacity by a set of desired resource and social conditions, not by absolute numbers of

visitors. This revised draft plan was developed consistent with the VERP process; however, Alternative 2 of the revised draft does provide specific caps on the number of scenic air tour landings.

Summary Comment: The National Park Service should regulate commercial and/or all aircraft operators to achieve desired conditions by one or all of the following mechanisms:

- Technology requirements
- Temporal zoning (hours, days, months, or seasons when landings would not be allowed)
- Minimum altitude restrictions
- Flight-free zones

NPS Response: The revised draft plan sets desired conditions for the different management areas and provides a set of tools for managing access that will assist in meeting those conditions. All of the suggestions provided by the public are covered by this “toolkit.” The plan is primarily goal setting; the specific prescriptions would be developed during implementation under most alternatives. The National Park Service does not have the authority to issue regulations regarding flight-free zones or altitude because airspace is under the jurisdiction of the Federal Aviation Administration. However, utilizing the regulatory authority of other agencies is within the set of access management tools.

Administrative Use of Aircraft

Comment: The plan should specify that in Wilderness, the minimum requirement exception only provides for actions necessary for “the administration of the area for the purpose of this act.” That purpose is wilderness. Not research, not other things agencies sometimes like to do that are not necessary for protecting wilderness....Helicopters seldom really meet this requirement and should be prohibited except for emergency and law enforcement use. They should be prohibited for recreational access, flight seeing, and agency research.

Comment: Any changes which might come to be will require group cooperation. The Park Service must set a standard by truly controlling and restraining its own air operations.

NPS Response: As in the original draft plan, the National Park Service commits to meeting the minimum requirement/minimum tool mandates of the Wilderness Act even in backcountry areas that are not designated under that act. In addition, the plan pledges that the National Park Service would complete an implementation plan for administrative and research uses of aircraft that includes goals and specific objectives for minimizing helicopter and airplane use. The National Park Service retains its flexibility to use all forms of aircraft administratively if, in fact, the airplane or helicopter is the “minimum tool” for particular tasks. This includes scientific research,

which is a specified purpose for ANILCA conservation system units. “Scientific” purposes are also identified as purposes of wilderness areas under the Wilderness Act.

Trails

Comment: Of particular importance is the need for you and your staff to maintain open communications directly with MSB concerning design and management of trail systems in the Park that will connect to trails on Borough lands and other landowners.

Comment: Trail plans should be a cooperative agreement with the Alaska State Parks, Matanuska-Susitna Borough, and the National Park Service.

Comment: Mutual funding cooperation agreements between the National Park Service, Alaska State Parks, and the Matanuska-Susitna borough should be required to provide improvements such as trails and facilities that will mutually impact operations, maintenance, and visitor services on national, state and borough lands on the south-side of Denali.

NPS Response: In the preferred alternative of the revised draft plan, there is only one trail that would connect to borough and state lands, running along Wildhorse Creek and connecting to trails that were planned as part of the 1997 South Side Denali Development Concept Plan. Additionally, in Alternative 5 other trails could be planned within Management Area A in the lowlands surrounding the lower Kahiltna, Tokositna, and Ruth Glaciers. In alternatives 2 and 3, either no trails are proposed or short trails are proposed near the park road. The National Park Service has solicited extensive public comment and agency collaboration in the preparation of the Backcountry Management Plan, which is a concept-level document. For specific implementation plans for the trails described above, the National Park Service views cooperation with the Borough and the State as essential for success.

Comment: We’ve made many requests to the Service over the last decade to allow us to do mitigation on the Wonder Lake Backcountry Trail. It is a wildlife/social trail that begins on NFL land, then on the parkland (some of it formerly BLM land), and has been used for 30 years by CD/NFL guests as an alternative to the road to access the north end of Wonder Lake.... We would like to engage in a more creative, timely partnership with regard to this historic route.

NPS Response: The preferred alternative of the revised draft includes a commitment to formalize a trail system in the Kantishna area. The specific trails would be identified and constructed as part of implementation. This implementation phase could include consideration of the described “Wonder Lake Backcountry Trail.”

Comment: There is no alternative for new trails and that needs to be addressed. Suppose we found a new area that warranted a trail — (the “bubbling spring”) — there should be an alternative to establish new trails whether commercial guided or not.

NPS Response: Alternative 5 in the revised draft plan provides for the possibility of new trails in areas on the south side of the Alaska Range where future demand could be high enough to warrant them and where vegetation and topography make cross-country travel very difficult.

Comment: The Park Service needs to work with DOT and the RR to ensure there are safe parking areas and crossings to access the Park (by snowmachine).

Comment: We oppose the proposal under alternative D to plan for connecting statewide winter snowmobile trail systems and improving parking along the Parks Highway. Such trail systems and parking will bring unacceptable impacts to those who live along the routes on the lands adjacent to Denali National Park.... It is not essential that they connect and it is not essential that they cross or utilize national park land.

NPS Response: The revised draft plan does not address support for recreational snowmachine access through connecting trail systems or improved parking. Unlike the original draft, the revised draft does not provide for areas that are explicitly managed for recreational snowmachine access, thereby lowering NPS prioritization for such support facilities.

Park Road

Comment: I am adamantly against changing the traditional winter use of the park road to mile 7. Even though the park road is not official wilderness it IS de facto wilderness in the winter. Though it's not explained in the plan, it is known the proposal to plow the road to mile 7 is for the convenience of the road crew. The justifications for this proposal are unsubstantiated and do not justify changing the quiet reality of that section of the park. The presence and reminders (oil drips, tracks, plow marks) of heavy equipment ruin the pristine winter experience traditionally available to anyone within a stone's throw of headquarters. This is an example of a false need that will contribute to incremental degradation of the park.

NPS Response: The park road is not included within either legislatively designated wilderness or within areas determined suitable for wilderness designation. Nevertheless, the National Park Service recognizes that plowing the road in winter has effects on the wilderness experience of visitors on and near the park road, as well as both positive and adverse impacts on recreational experience. These impacts are identified in the environmental analysis of chapter 4 in this revised draft. The reason for plowing the park road is to enable equipment to control the build-up of overflow ice on the road surface between miles 4 and 7. The accumulation of this ice represents a safety hazard and a major obstacle to road maintenance crews when opening the park road in the spring for summer season use, resulting in more time and effort being required to open the road. Alternative 2 of the revised draft plan does not provide for road plowing until necessary for preparing the road for summer use.

Land Exchange

Comment: I'd like to see the Cantwell Creek be the boundary, if this is possible, for some land exchange for the subsistence hunting use, because the park boundary zigzags across the side of the mountain there. It's very hard to find. The creek would make a clear definite boundary.

NPS Response: Large sections of the 1980 park additions north of Cantwell Creek are the subject of unresolved land selections by Ahtna, Inc. Contemplation of land exchanges in this area would be premature until Ahtna's selections are completed.

NEPA Sufficiency

Comment: ... The Draft Plan fails to consider a sufficient range of reasonable alternatives to the proposed action.... In the Draft Plan, the Park Service fails to evaluate reasonable alternatives across the spectrum of uses. For instance, as applied to snowmachine use, the Draft Plan simply does not consider any alternatives that would not allow snowmachine use in the additions, yet this was clearly an issue raised in scoping comments. Also, the Draft Plan does not consider implementing snow coaches for access to the Park. Instead, the Plan relies on the status quo for access to Denali's backcountry — single user snow machines — despite the fact the snow coaches have been found elsewhere, in certain circumstances, to be appropriate and feasible.... Nor does the Draft Plan consider voluntary agreement with air tour or air taxi operators, even though the environmental benefit had been previously acknowledged. The Plan does not explain its omission of these reasonable alternatives.

NPS Response: Alternative 2 of the revised draft plan would limit snowmachine access to the park additions and preserve to the type of "traditional activities" described in the regulation that closed the Old Park to snowmachine access. The section Actions Considered but Rejected at the end of chapter 2 explains why the National Park Service did not include alternatives for closing the park additions to all snowmachine use or employing snow coaches for access.

The original draft plan included an Aircraft Overflights Working Group composed not only of commercial air taxi and scenic tour operators but representatives of private pilots, commercial transportation services, and others that overfly the national park as well as parties affected by overflights. This group would address "voluntary measures" for achieving management area standards at Denali. This concept is retained for the revised draft.

Comment: In the DEIS, the Park service sets the "no action" alternative up for failure by characterizing it as involving no management, rather than simply involving no changes in the management direction expressed in the Organic Act, NPS regulations, the 1986 *General Management Plan* for Denali, and other Denali-specific documents. For instance, the DEIS states that as to snowmachine use, under the "no action" alternative

such use in Denali “would be managed only through enforcement of existing laws and regulations.... otherwise, there would be no limits on the location or amount of snowmobile use in these areas.” This explanation ignores the fact that there is currently no regulatory authority for the cross-country, non-subsistence use of snow machines in Denali.

NPS Response: In general, the No Action alternative does describe a continuation of existing management direction. However, in some instances the existing management direction offers limited guidance, as in the case of snowmachine use in ANILCA units. The controlling regulation is 43 CFR § 36.11(c), which provides for the use of snowmachines for traditional activities where such activities are permitted by ANILCA or other law. Until the term “traditional activities” is defined, determining whether snowmachine use is for traditional activities is difficult. Consequently, the “no-action” alternative correctly describes the current circumstances.

Comment: The draft plan also looks at the impacts of specific activities on specific resources in isolation, despite NEPA’s mandate that the agency consider the cumulative impacts of the proposed action and the alternatives. For instance, the DBCMP does not evaluate the cumulative impacts of a year-round motorized activity (snow machines in winter, air tours in summer). Instead, it simply looks at the effects that each activity will have in isolation.... The Park Service should conduct a new environmental effects analysis, looking at the cumulative impacts of a year-round motorized activities, as well as other reasonably foreseeable actions impacting the park. Simple one-sentence conclusions about the effects do not suffice under NEPA; actual analysis must be evident in the EIS that is supported by the record. Such conclusory statements are arbitrary and do not explain to the public the impacts of the alternatives being considered.

NPS Response: In the revised draft plan and accompanying environmental impact statement, the significance of noise disturbances are evaluated in terms of the indicators and standards provided in the management area descriptions. The level of noise is considered year-round, and a conclusion is drawn for the resource under each alternative based on all the effects from plan actions. Cumulative impacts consider the combined effect of the actions in the plan and any other past, present, or future actions that would contribute to the benefit or harm of the same resource.

Comment: NPS application of impact levels is arbitrary and capricious. It is unclear how the Park Service has come to the conclusion that major impacts to these resources and values do not constitute impairment to the purposes and values for which the Park was established.

NPS Response: The general Methodology section in Chapter 4, Environmental Consequences, of the revised draft contains a description of the criteria used to define impact levels and impairment of particular resources; some individual topics have specialized criteria presented in their topic-specific Methodology sections. These criteria have been revised from the criteria that appeared in appendix E of the original draft plan.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 10

1200 Sixth Avenue
Seattle, Washington 98101

04 JUN 2003

Reply To
Attn Of: ECO-088

Ref: 99-077-AFS

Mike Tranel, Chief of Planning
Denali National Park and Preserve
Post Office Box 9
Denali Park, AK 99755

Dear Mr. Tranel:

The Environmental Protection Agency (EPA) has reviewed the draft Environmental Impact Statement (DEIS) for the proposed **Denali National Park and Preserve Backcountry Management Plan Amendment**, Council on Environmental Quality (CEQ) Reference # 030078) dated February 25, 2003 in accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. Section 309 of the Clean Air Act specifically directs EPA to review and comment in writing on the environmental impacts associated with all major federal actions. We have assigned a rating of EC-2 (Environmental Concerns, Insufficient Information) to the draft EIS. This rating and a summary of our comments will be published in the *Federal Register*. A copy of the rating system used in conducting our review is enclosed for your reference.

The four action alternatives all establish management areas for the entire park and contain a range of beneficial uses, with each alternative prioritizing and distributing the uses differently. Alternative B seeks to emphasize wilderness resource values and non-motorized recreation, managing almost 49% as natural areas, the management area category with the lowest intensity of human use. Alternatives C and D attempt to emphasize dispersed wilderness recreational uses but allow some motorized recreation, with Alternative D allowing more non-wilderness recreation and concentrated use in some areas. Alternative E would greatly expand visitor services, facilities, and increased motorized use, with only 17% of the park managed as natural areas. Snowmobile use would be completely forbidden in most areas in Alternative B, aside from subsistence activities such as hunting, fishing and gathering (see below).

We have focused our review on the potential impact of snowmobile use on the environment at Denali National Park because we believe that snow machine use, among all proposed uses under the Backcountry Management Plan, has the greatest potential to cause significant environmental impacts, and because snowmobile use is likely to grow rapidly at Denali National Park during the life of the proposed Plan, as Chapter 1 of the EIS states. We also focused on snowmobile use because it has become a major environmental issue in Park Management Plans in the continental United States.

The EIS states that snowmobile use will disturb wildlife and cause damage to wetlands, vegetation, fish, and water quality outside the Old Park Special Resource Protection Area (in the Park Addition) portions of Denali National Park, where



snowmobile use would take place under Alternatives C, D, and E. However, the impact analysis is largely a generic discussion of the risks of snowmobile use which does not tie these impacts to locations of concern in the Park Addition where the most valuable or sensitive resources might be. Thus, impacts remain largely undefined. The uncertainty raises concerns because this EIS will, for the first time at Denali National Park, result in the establishment of guidelines permitting widespread snowmobile use without a full understanding of the risk to environmental resources within the Park Addition.

Snowmobiles and Environmental Impacts:

Physical and Biological Resources:

1. Soils, Vegetation and Wetlands: Park areas incurring impacts from concentrated snowmobile use would increase from estimated 2% to 3.5%, to 20% in Alternative C, D and E. While impacts are characterized as minor overall, the EIS is clear that Alternative E would cause the most damage. Soils would be compacted, particularly in high use areas where repeated passes occur. In windy locations, soil erosion would occur. Vegetation would be damaged, particularly on more heavily used trails and paths where effects could be intense, both from direct compression and removal of snow normally acting as an insulator. Compaction from repeat snowmobile passes, leakage and discharge of fuel and unburned hydrocarbons onto the surface could also affect wetland processes such as toxicant retention and nutrient cycling. The EIS should estimate how many acres of soils, vegetation and wetlands might be adversely impacted, and displayed graphically if possible.

2. Wildlife, Fish and Water Quality: Under alternative B, snowmobile use would decrease in the park, resulting in fewer impacts to fish and wildlife. Under alternative C, 18% of the park area would be accessible to snowmobiles under dispersed use; and under Alternatives D and E, 46% and 42% of the park area would be accessible. Studies of wildlife behavior and hormonal changes cited in the EIS indicate that there is a high probability of inflicting additional stress on large mammals such as wolves, bears, elk, moose, bighorn sheep, lynx, and wolverines. If this occurs during winter, when animals are already under greater stress, this could result in displacement from traditional ranges and increased mortality of individuals and species populations. Affects on small mammals, and ungulates has also been associated with compaction and altering of trails. Under Alternatives C, D and E, effects could be widespread throughout the Park, and severe in major snowmobile corridors and other high use areas. The EIS should show where wildlife and fish populations and streams might be affected by snowmobile route placement and guidelines in each alternative.

Snowmobiles would affect fish by degrading water quality with runoff to streams carries deposited contaminants from engines such as hydrocarbons, carbon monoxide and particulates. Such affects would probably be more localized than wildlife impacts, under Alternative C, D and E, but the analysis suggests that these impacts would take much more time to repair. The EIS should confirm whether this is true, and if so, how long it may take to "fix" damaged resources, and how impacts might be mitigated.

Natural Soundscapes: Alternatives C, D, and E would allow varying levels of impacts from increased snowmobile access and increased density over the life of the Backcountry Management Plan. The EIS should include clearer information about what standards or thresholds will be used to measure impacts on the natural soundscape, how the natural soundscape will be monitored, and how and when exceedance of these standards might require a change in

soundscape management. The proposed use designations in the Plan should be designed so that if monitoring demonstrates that soundscape exceedances are occurring, the conditions of use can be adjusted without major amendments or revisions to the Plan. This is important particularly if the reasonably foreseeable road and facility improvements discussed in the EIS result in improved access and sharply increased snowmobile use in certain portions of the park.

Traditional Activities under Alaska National Interest Lands Conservation Act (ANILCA)

(94 Statute 2371) in Denali National Park: ANILCA allows snowmobile use for traditional activities related to subsistence as defined in the Act. However, the ANILCA definition of traditional activities from Section 11.10a of the Act only applies in 95% of the original Mount McKinley National Park, and does not apply in the Denali National Park Additions, which were added with the passage of ANILCA in 1980 (and referred to as the park additions in the DEIS). The NPS, in the alternatives to be analyzed in the DEIS, has developed management area zones under most of the alternatives to permit a broad range of diverse uses, from traditional subsistence to backcountry recreation, rather than interpreting how ANILCA meant to define traditional activities and subsistence for the Park additions. While these management zones accommodate a greater range of interests of current park users, they also allow a broader range of activities than the Act intended, as the EIS notes (DEIS, Appendix F).

EPA sees some difficulties with this approach. First, once the precedent for broader snowmobile use is established, it may be difficult to eliminate or even curtail it later, even if environmental impacts prove significant, conflicts between subsistence use and recreational use become more common (DEIS, pg. 402), or snowmobile use continues to increase in area and frequency. Second, we are concerned with the approach because under the proposed plan, protection of environmental resources in the Park Additions from snowmobiles would rely heavily on enforcement and monitoring.

Enforcement would have to be successful over a much broader area than at present to ensure exclusion of snowmobiles from prohibited zones and to prevent snowmobile practices prohibited by NPS inside the Park such as racing at high speed, jumping, or "high marking". According to the DEIS (Page 209, in Chapter 3), even information on existing snowmobile use levels and locations appears fairly sketchy. The effectiveness of an expanding enforcement responsibility would be highly reliant on an adequate budget for enforcement activities including regular monitoring, so that adjustments for snowmobile use permits can be adjusted as necessary. Enforcement and monitoring relies upon future fiscal commitments to work. The EIS and Record of Decision must therefore include commitments to improved monitoring of ongoing snowmobile use, the documenting of environmental effects from them, the assurance of adequate enforcement of routes and guidelines, and a commitment to employ contingencies such as mitigation or snowmobile exclusion if impacts prove unacceptably severe.

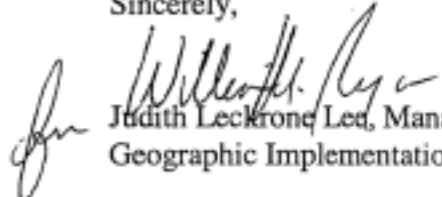
Consistency With the Wilderness Act: The DEIS States that the NPS completed an EIS in 1988 that recommended an additional 2.25 million acres be designated as wilderness. The Act states that until designation, the area should be managed as a wilderness, and wilderness values preserved. Snowmobiles would not be a permitted use in a designated wilderness. Alternative B would preclude snowmobile use in the Park Addition, while the other action alternatives would allow snowmobile access. NPS has concluded that most snow machine impacts are to soundscapes and wilderness human values such as solitude, and that these values can be quickly restored once a wilderness designation is made and snow machines are excluded (Adrian Hall, NPS staff, pers. comm.). However as we have discussed above, the EIS describes predicted

physical resource impacts from snowmobiles to wetland, soil, fish and wildlife which might prove to be long-term and not easy to repair, such as alterations to hydrologic functions in wetlands; wildlife ranges and survival rates; and water quality in surface waterways. Resulting impacts could be widespread in the Park Addition, not easy to control, and highly dependent on enforcement.

EPA suggests that the NPS examine adopting the Alternative B management area snowmobile prescriptions, or a hybrid form of them into the preferred plan. We believe that an alternative which restricts or excludes snowmobiles from all but the most limited high-use areas of the Park Addition would be the most responsible form of management consistent with the intent of the wilderness recommendation for this area. It would involve less risk of damage to environmental resources until designation occurs.

Thank you for the opportunity to review this Draft EIS. Should you have any questions, please feel free to contact Mr. Jonathan Freedman of my staff at (206) 553-0266.

Sincerely,


Judith Leckrone, Lead, Manager
Geographic Implementation Unit

cc: Alaska Department of Environmental Conservation

SUMMARY OF RATING DEFINITIONS AND FOLLOW-UP ACTION*

Environmental Impact of the Action

LO--Lack of Objections

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC--Environmental Concerns

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

EO--Environmental Objections

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU--Environmentally Unsatisfactory

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

Adequacy of the Impact Statement

Category 1--Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2--Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3--Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or

revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment.

STATE OF ALASKA

OFFICE OF THE GOVERNOR ANILCA IMPLEMENTATION PROGRAM

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May 30, 2003

Paul Anderson
Superintendent
Denali National Park and Preserve
P.O. Box 9
Denali Park, Alaska 99755

Dear Mr. Anderson:

The State of Alaska has reviewed the February 2003 Draft Backcountry Management Plan for Denali National Park and Preserve General Management Plan Amendment Environmental Impact Statement. This letter represents the consolidated views of state agencies. We appreciate the opportunity to submit these comments and hope they will assist the Service in developing a final plan that serves the public and meets the intent of the Alaska National Interest Lands Conservation Act.

Summary of Issues and Concerns

The State of Alaska's most significant concern is use of management area "zoning" to broadly close or restrict public access based on inadequately defined criteria or unquantified impacts. We recognize that Denali National Park and Preserve has a particularly large constituency advocating maximum protection of wilderness values with minimum human presence, especially in the form of motorized access. This public pressure, while understandable, does not excuse the National Park Service from following the letter and spirit of the Alaska National Interest Lands Conservation Act (ANILCA). In the compromise effort to gain passage of ANILCA, Congress chose to combine large acreage withdrawals with special accommodations for motorized access and other uses not commonly allowed in national parks and wilderness units elsewhere. ANILCA and its implementing regulations lay out detailed procedures that must be followed to manage (close or restrict) these uses. We find that the Denali Backcountry draft plan falls short of meeting the requirements of ANILCA, especially Section 1110(a).

The State has additional concerns with management intent addressing soundscapes and wilderness. In attempting to apply more recent *administrative* policy developed at the national level, the existing *statutory* guidance in ANILCA has been systematically overlooked. The proposed implementation of the subjective management intent is inconsistent with ANILCA's required finding of damage. We are also concerned that the original intent of the Wilderness Act is applied too narrowly. The current emphasis on opportunities for "*solitude*" appears to overshadow the Wilderness Act's equal emphasis on "*primitive and unconfined type of recreation*." In light of the constraints in ANILCA, we believe steering the wilderness management intent toward primitive recreation would be more appropriate.

These and other equally significant concerns are detailed in this letter by topic, followed in some cases by related page specific comments.

Management Area “Zoning”

The proposed use of management areas, defined, in part, by types and levels of visitor uses constitutes an inappropriate de facto closure of allowable access provided under ANILCA. Congress established a high bar for federal agencies to clear before restricting public access in Alaska park units. The access provisions of ANILCA were a key component to the compromises that were necessary to pass the legislation. The zoning concepts in the draft plan – based on subjective aesthetic values – is a significant deviation from Congressional intent to limit manager’s discretionary authority to restrict access.

We note that the purposes of the plan include to “*update and expand the 1976 Backcountry Management Plan.*” The 1976 plan was adopted for the original park before ANILCA expanded and re-designated the unit under significantly different management guidelines. So while the 1976 plan is, by definition, not in compliance with ANILCA, many of its pre-ANILCA features have not been modified to reflect the 1980 statutory guidance. This carry over of management intent may explain why some significant management decisions remain at odds with ANILCA provisions.

While the draft plan acknowledges (page 1) that implementation may require promulgation of special regulations, Section 1110(a) clearly states “*the Secretary shall permit*” such uses, and “*such use shall not be prohibited unless . . . the Secretary finds such use would be detrimental to the resource values of the unit or area.*” Such resource values do not include immeasurable, intangible aesthetic values and experiences. Unlike lower 48 parks, Alaska park units are considered “*open until closed*” to public activities not otherwise prohibited by law. Restrictions and closures require a factual determination of impact on tangible, measurable resources of the unit as part of the rulemaking process (43 CFR Part 36). Significantly more and accurate data are needed before the significant restrictions proposed by zoning (e.g., 3 encounters per week for Natural Areas – page 37) are considered.

Soundscape Management

A stated purpose of the draft plan is to serve as “*Soundscape Preservation and Noise Management Plan as required by Director’s Order #47*” (excerpt on page 15). Further, the draft plan heavily emphasizes noise reduction and soundscape management. The Director’s Order was among a number of recent national orders and policies, including the Management Policies of 2001, which fail to recognize the statutory protections under ANILCA for Alaska park units. Consequently, the State of Alaska objected to these management documents and their application in Alaska. Even though these policies are now final, the Service may not use administrative policy to override statutory intent (as implied in the draft plan on page 20.) Any motorized access or mechanized equipment may cause sounds that wilderness enthusiasts find disruptive, and we recognize that natural sound is a legitimate value shared by many park visitors. However, ANILCA-mandated access and use may not be subjectively curtailed by noise concerns. The Service has the responsibility to insure that soundscape management is properly

implemented within the framework of ANILCA, including quantifiable findings of damage to resource values.

We request the relationship between aircraft/airspace management and soundscape management be addressed in the soundscape management section (p.173). We also request the page 227 explanation of regulatory authority be referenced wherever soundscape management is addressed.

The data provided in citation for this section is exclusively from the National Park Service. We request that the Service include citations from independent researchers on quantification and impacts related to natural soundscapes. The information provided does not document research conducted on the influence of natural soundscapes on recreational satisfaction of visitors or on wildlife resources.

Wilderness

The State believes that the draft plan wilderness management intent does not properly respond to ANILCA, nor the Wilderness Act itself. Unlike wilderness management in other states, ANILCA amends application of the Wilderness Act to allow motorized transportation, cabins (sections 1303 and 1315), and other uses in designated wilderness in Alaska. In addition to the often-recognized sections 811 and 1110 access provisions, ANILCA Section 1316 also protects the pre-ANILCA use of mechanized equipment necessary for the taking of fish and wildlife (operation of camps, such as water pumps and generators) in wilderness. Service management activities to protect wilderness values under the Wilderness Act must accommodate these exceptions for Alaska. In addition, backcountry planning documents must make these exceptions clear to increase the applicability and relevance of public comment.

Where wilderness is considered, we request the plan broaden or replace the single-minded focus on “solitude” to reflect the entire concept included in Section 2(c) of the Wilderness Act: “... *outstanding opportunities for solitude or a primitive and unconfined type of recreation.*” The ANILCA purposes for Denali include “wilderness recreational activities,” but do not include “solitude.” The characterization of “solitude” in the draft plan implies an extremely low tolerance for the very types of uses that ANILCA allows. Incorporating the extended Wilderness Act concept to include *primitive recreation* would empower the Service to more effectively marry the Wilderness Act and ANILCA. This approach would also better reflect Section 1133(a) of the Wilderness Act, which states that use of wilderness areas “*in National Parks are hereby declared to be within and supplemental to the purposes for which units of the National Park system were established.*”

Primitive recreation implies a true backcountry experience, but does not necessarily imply an absolute “*absence of distractions such as large groups, mechanization, unnatural noise, signs, and other modern artifacts.*” (from bullets at top of page 30) We request the plan consider, for example, that even if a few planes a day fly overhead, a remote backcountry traveler can still appreciate a wilderness experience. Carrying this example another step, the Service could provide educational information about more highly used overflight areas so that those backcountry users who are particularly sensitive to aircraft sounds will know what areas to

avoid. The Service and backcountry users themselves share some responsibility for realistic accommodation of other uses; just as pedestrians and cyclists must accommodate each other on a multi-purpose city trail.

page 5, Denali Wilderness: The correct citation in the first sentence is Section 701.

page 5, Legislative Intent: The isolated quotes from the 4-year legislative history do little to clarify the Congressional directives for management of Wilderness areas in Alaska park units. We request this section include a more comprehensive range of legislative history (which we could assist in providing) or – preferably – just delete it.

page 176, Wilderness: Reword the first sentence in the second paragraph to specifically reflect the 1.9 million acres of Denali wilderness established by Section 701 of ANILCA. Also, we request that the last sentence in this paragraph more clearly explain that park additions created by ANILCA are “open until closed,” including wilderness designated areas.

page 347, Socioeconomics: As mentioned above, wilderness areas in Alaska have different management provisions than wilderness in other areas. This necessarily alters management criteria, thus decreasing the applicability of these wilderness valuation studies in Alaska park units.

Registration and Permit Requirements

The draft plan proposes to extend registration and permit requirements to the park additions on the basis that registration of overnight users is essential to gaining accurate information on which to base management decisions. We appreciate the response to our concerns regarding registration and permit requirements on page 393 of the draft plan. We are still concerned, however, that mandatory registration requirements proposed in the park additions for overnight camping, motorboat use, horses, and – in alternative B – hiking and airplane landings, constitute a restriction under ANILCA and places undue burden on the public. Since the voluntary registration system for mountain climbers on the south side of the Alaska Range has proven successful, we request implementation of a similar voluntary system for the remainder of the park additions to gather user data and disseminate park information.

We believe that mandatory registration and permit requirements are a form of closure requiring new regulation. Moreover, we note it could be difficult to show the required detriment to resource values based on intangible user experience attributes.

Quota System in Old Park and Use of Advance Reservation System

During scoping, the state requested the Service to re-evaluate the quotas for backcountry units in the Old Park and consider advance reservation for some backcountry units or for a certain percentage of users. The Service responded that a recent survey of backcountry users investigated visitor satisfaction with the quota system in the Old Park and determined that there is a high rate of satisfaction with this system (Swanson 2002).

The survey, however, was flawed since it did not question displaced users, i.e., those that were turned away because there were no desirable units available, or those that gave up coming to the park to camp overnight in the backcountry. The draft plan states that park managers will continue to adjust unit quotas either up or down, yet the draft plan includes no commitment to do this nor explanation of how it will be done. Finally, the response to comments (page 393) states that potential use of an advance reservation system is proposed as part of the alternatives though we found no discussion regarding this. We request reconsideration of this issue.

ANILCA 1301(b)(4) Access and Transportation Plan

The consultation section at the bottom of page 393 states that the Backcountry Plan meets the planning requirements of ANILCA Section 1301. This remains an issue because in the late 1980's it was generally recognized that the general management plans (GMPs) for all Alaska park units did not meet the specific requirement for an access and transportation plan under 1301(b)(4). When the Alaska Land Use Council, established by ANILCA in part to review such plans, recommended adoption of the GMPs, it did so with the understanding that access and transportation plans for all park units would be subsequently developed. We appreciate that the Service has kept this commitment in mind; however, the State does not believe that the intent of Section 1301(b)(4) requirement can be fully met until pre-ANILCA access methods and means have been identified.

We request the Service cooperate with the State of Alaska in a study to document pre-ANILCA traditional activities and methods of access prior to making assertions of what is "traditional." The Service and ADF&G completed such a cooperative study that documents pre-ANILCA access activities and methods for Wrangell-St. Elias Park and Preserve, which could be used as a template. This is baseline information necessary to effectively limit "traditional" uses protected by ANILCA Sections 811 and 1110(a). We believe documentation of such use is an essential component of Section 1301 that remains unfulfilled.

Without such a study it is inappropriate to categorically view ORV use, for example, as incompatible with the purposes and values of the unit.

Definition of Traditional

The State strongly disagrees with application of the old Denali park definition of "traditional activities" (defined on page 421) to any ANILCA designated unit and unit additions. Access in Alaska park units by snowmobiles, airplanes, and motorboats is protected under ANILCA Section 811 for subsistence by "*traditional methods*" and under Section 1110(a) for "*traditional activities*." Pre-ANILCA "*traditional activities*" include subsistence and recreation. While subsistence uses may only occur in the Denali park/preserve additions, "*traditional activities*" such as mountain climbing, wildlife viewing, sightseeing, camping, occur throughout the entire park and preserve unit. These have been undeniably traditional activities throughout the park since its creation in 1917. It is not appropriate to arbitrarily exclude recreation from the definition simply because it is more difficult to manage. We objected to this approach in our January 2000 review of the regulations for the "old Park," and we even more strenuously disagree with extending this narrow definition to the ANILCA additions.

Recognizing recreational activities as traditional does not mean that the Service must resign itself to, for example, unlimited snowmachine use. It does mean, however, that a rigorous process to identify measurable impacts must be followed. This was precisely the intent of Congress when Section 1110(a) was incorporated into the final ANILCA compromise.

We also object to the application of the national policy (articulated on page 16) that prohibits new forms of recreation or technological advances until the Service completes an environmental assessment. ANILCA legislative history reveals that Congress intended to allow new technology for access for traditional activities. Limitations to access are ONLY based on findings of damage to resources, not the technology used for traditional activities such as recreation, subsistence, and other public uses.

Aircraft Overflights

We appreciate that the Service is willing to work with the aviation community to explore voluntary methods of reducing aircraft noise over the park. However, we caution against approaches that too closely tie “voluntary” compliance with renewal of concession or other commercial use authorizations. We encourage discussions and eventual actions to fully consider possible impacts on safety in Alaska’s terrain and weather conditions, administration (including ADF&G research), as well as impacts on allowed activities such as hunting, fishing, and other traditional activities.

Denali National Park is centrally-located between the two most populated cities in Alaska, with significant commercial and small aircraft traffic between them and to other destinations in Alaska and beyond. Service commitments that natural sounds will “almost never” be interrupted by aircraft overflights, whether by Alaska Airlines at 20,000 feet or smaller aircraft flying the requisite 2000 feet above ground level within FAA-managed airspace are impractical and may create false expectations (e.g., page 37 – Natural Area; page 38 – Old Park). Much of the draft plan implies that a high degree of natural soundscapes can be achieved, when in fact sound management is not always within Service’s management control. Specifically, we request the document clarify that only the Federal Aviation Administration (FAA) has jurisdiction to control airspace above Denali National Park and Preserve.

Process

We appreciate the opportunity to participate in scoping meetings, to review the Affected Environment chapter and an internal review draft of the plan. However, during early phases of the planning process, the planning team committed to providing specific opportunities to review how data on fish and wildlife and related uses and access were being used to develop management proposals. This commitment was not fulfilled. Before the plan is finalized, we request opportunities to cooperatively evaluate how this information was used and how the resulting management proposals are expected to affect state fish and wildlife management.

Conduct of Research

It is not readily apparent if the intent under the headings “National Park Service Administration and Research” in each of the descriptions of the alternatives apply to non-Service entities. If it does apply to more than the Service, we disagree with the proposed management of, limits on, and criteria for conducting research under the various alternatives, e.g. must be necessary for park management (page 51), tied to the “*Inventory and Monitoring Program*” (page 60) or subject to the Minimum Requirement procedures (Appendix I). The Service may choose to adhere to these guidelines, but we request they not be automatically imposed on other government agencies that have different mandates and needs within park boundaries. The ADF&G manages fish and wildlife on all lands in Alaska, including those lands within CSUs. Research criteria and approval processes for entities other than the park managers and the state fish and wildlife managers were delineated in the Resource Management Plan for Denali National Park and Preserve and in the Master Memorandum of Understanding between the Service and ADF&G. These processes allow for development of appropriate stipulations that meet the needs of the Service and affected agencies. We request that the plan defer to these or similar processes under all alternatives.

State Fish and Wildlife Authorities

Section 1314 of ANILCA confirms that the State of Alaska retains authority to manage fish and wildlife on public lands. Clarification of this role and a commitment to cooperate in related matters is addressed in the Master Memorandum of Understanding between the Service and ADF&G. We request that the respective roles of the Service and State, and a Service commitment to cooperation, be fully recognized in the plan, ideally in the “*Actions Common to All Alternatives*.” Specifically, we request the plan and planning process more fully recognize the state’s authorities that overlay the Service’s land management responsibilities.

page 13, Boating (and throughout the draft plan). The state remains on record strongly objecting to existing national regulations that extend the Service’s jurisdiction over management of state waters. In addition to the inappropriate national precedent, ANILCA Section 103(c) precludes the application of regulations adopted for management of Alaska’s conservation system units to the non-federal public lands within those units, including navigable waterways.

pages 68-72, Indicators: We request that the Service’s use of indicators and monitoring of fish and wildlife be cooperatively designed and conducted with ADF&G. At a minimum, such evaluations necessitate consultation with ADF&G.

page 164 – Wildlife section: A wildlife table similar to the fish table (page 162) would be useful.

page 167-168, Moose: ADF&G does not consider moose densities of less than 1 per mile as abundant. Therefore, the average of 0.4 to 0.5 moose per mile would be considered low density. Abundance of 0.1 moose per mile is considered sparse.

pages 219-222, Sport Hunting: This section incorrectly implies that all hunting on the preserve regulated by the Board of Game is “sport” hunting. In fact, the state hunting regulations provide for general hunting (including subsistence) through resident and non-resident seasons. Further, rural and non-Alaska residents currently can hunt on preserve lands. We recommend use of the term “general hunting” when not specifically referring to subsistence.

page 276, Wildlife and Fish – Motorized Activities: The description of Alaska state statutes prohibiting the disturbance of fish spawning habitats incorrectly implies that motorized boat access on navigable waters may violate state laws if operated without a Title 16 permit. We request a revision to accurately reflect state laws with regard to disturbance of fish spawning habitats and motorized boat use.

page 438, Appendix J: Development of Alternatives, item #6: Under “Coordination ...”, we request expansion to confirm coordination with the State of Alaska on management of fish, wildlife, and navigable waters.

Subsistence and Cultural Resources

We request modifications to the various subsistence program references that accurately clarify the respective federal and state roles regarding subsistence. Although state subsistence harvest regulations exist for subsistence use on all lands, the Federal Subsistence Board regulations in some instances supercede these state regulations on federal public land. Regardless of who is regulating harvests, the state retains responsibility for overall management of fish and wildlife—regulation of harvests is only one tool of management.

page 2, Snowmobile use: We request revision of this paragraph to reflect the importance of snow machines for subsistence activities in winter.

page 20, Potential Effects on Cultural Resources: Consumptive uses, including subsistence activities, were established activities prior to enactment of the park and have been recognized by Congress in ANILCA. For thousands of years, humans have been, and will continue to be, a natural part of the ecosystem. We request the plan specifically consider that the cultural values of the local people are a living part of the unit’s cultural resources.

page 22, Subsistence Management: It is difficult to evaluate the relationship between the referenced Subsistence Management Plan and the Backcountry Plan, since no specific details are provided about the Subsistence Management Plan. We recommend language be added clarifying which plan takes precedence for protecting and providing for continued subsistence uses of the park and preserve.

page 181-187, Affected Environment – Subsistence: Although this section presents a useful overview of subsistence activities and harvest estimates involving park and preserve lands, no reference is made to research projects that will add more current information for the four resident zone communities, including an ethnographic overview and assessment report prepared for the Service by ADF&G’s Division of Subsistence. We recommend

recognition of these studies, as well as a geographic place names report prepared for the Service by James Kari.

page 183, middle of page: *"There is no known use of airplanes by local rural subsistence users . . ."* Aircraft have played an important role for local residents in accessing remote lands throughout Alaska, in some cases pre-dating overland motorized access. This unsubstantiated statement illustrates the need to conduct the previously recommended cooperative study of pre-ANILCA activities and access methods. We request a revision, such as "The SERVICE is not aware of current aircraft use by local subsistence users to access preserve lands."

page 341 Alternative B paragraph 1, and page 342, Alternative C, paragraph 1: The assumption with all the alternatives, especially B and C, is that visitor contact with cultural resources automatically has negative consequences. While we understand the point being made, we are concerned that the visitor attraction value of some cultural resources is an overlooked opportunity. With proper education, interpretation and monitoring, some cultural resources could be viewed as visitor assets deserving attention.

Appendix A: ANILCA 810 Analysis: The "Findings" section of this analysis concludes that increasing recreational use in parts of the park and preserve could impact subsistence uses. Even if the plan would not directly restrict subsistence uses, we are concerned that the Service could use the plan to manage user conflicts in ways that inappropriately favor recreational uses. Consistent with our January 2000 comments on the Kantishna firearm restrictions (part of the snowmobile regulation package), we request the Service to "guard against management decisions which treat legally-authorized subsistence uses secondarily to non-consumptive uses." We request assurances in the "Actions Common to All Alternatives" that subsistence use will remain a priority throughout implementation of the plan.

Cabins

The draft plan appears to be responsive to accommodating some of the expected increase in park visitation, as evident by the proposals to construct a wall tent for winter use at Mile 7 of Park Road and campsites in Little Switzerland. However, the draft plan falls short in addressing public use cabins on a park wide basis. Such cabins are proposed to be placed only on state lands outside the park boundary and only under Alternative E (page 64). We request the Service re-evaluate this position and consider placement of public use cabins on park lands, such as those public use cabins in other federal areas managed by the U.S. Fish and Wildlife Service, U.S. Forest Service and the Bureau of Land Management. In addition, we request the Service consider including possibilities for a system of huts that would provide a new and unique way for people to experience the park.

Currently, none of the alternatives provide for public use of administrative cabins. In response to the State's suggestion to offer use of these cabins to the public the draft plan states, "Agency regulations do not provide for opening existing administrative cabins in wilderness for public use" (page 393). It is our understanding that public use of administrative cabins is not prohibited

in Wilderness, in fact, the park in the past has allowed concessionaires and their clients to use these cabins in winter.

pages 187-188: ANILCA Section 1302 provides for cabins for uses other than subsistence. In addition, ANILCA Section 1315 allows for existing cabins and provides for the construction of new cabins for public use in ANILCA Wilderness Areas. We request these specific ANILCA provisions be addressed in the plan with management options included among the alternatives.

Temporary Facilities (Actions Common to All Alternatives, under Management Tools)

Blanket prohibitions of temporary facilities in ANILCA units (e.g., page 38, paragraph 4; and page 39, paragraph 1) is contrary to ANILCA Section 1316, which states: “*where the taking of fish and wildlife is permissible, the Secretary shall permit the continuance of existing use and future establishment of temporary campsites, tent platforms, shelters, and other temporary facilities.*” Prohibiting temporary facilities and equipment necessary to participate in hunting, fishing, and trapping where legal in the park additions and preserve would serve as a de facto closure of activities otherwise allowed under ANILCA. We urge the Service to work with ADF&G in identifying what those needs are and appropriate limitations to reduce impacts to the resources, consistent with Section 1316.

RS 2477 Rights of Way

The State has accepted numerous routes crossing Denali National Park and Preserve under the provisions of the RS 2477 grant (listed below). We request the Transportation and Access section beginning on page 222 include a cooperatively developed generic overview of RS 2477 rights of way. Among other things, this section should address that although the Federal Land Policy and Management Act of 1976 repealed Revised Statute 2477 (43 USC 932, or RS 2477), it preserved valid, existing rights that had already vested. RS 2477 rights of way clearly have implications for Denali National Park backcountry management, particularly in the park addition areas. We request the generic discussion list, or reference in the Appendix, the routes that have been asserted by the state to date and reference that both the state and the Service have respective rights and responsibilities concerning use of these routes. Assuming that most individual routes are not expected to be specifically addressed in the plan, we recommend such acknowledgement in the section “Issues and Impact Topics Considered But Not Addressed” section (page 21).

These trails appear in state statute (AS 19.30.400) as a state right-of-way, along with several other routes that affect Denali National Preserve. These include, but are not limited to:

- RST 340 - Lignite-Stampede,
- RST 341 - Roosevelt-Kantishna
- RST 343 - Roosevelt – Glacier
- RST 343 - Kobi-Kantishna
- RST 344 - Lignite-Kantishna
- RST 345 - Kobi-McGrath (via Nikolai & Big River)
- RST 346 - Nenana-Kantishna
- RST 348 - Spruce Creek Trail

RST 414 - El Dorado Sled Road
RST 491 - Rex-Roosevelt Trail
RST 492 - Glacier-Kantishna via Caribou Creek
RST 493 - Quigley Ridge Trail

On page 51 and in subsequent alternatives under the heading of “Trails,” the draft plan states that “no new trails or routes (either summer or winter) would be added besides those identified in the 1997 Entrance Area and Road Corridor Development Concept Plan and the 1997 “South Side Denali Development Concept Plan.” We request this section acknowledge valid existing rights (such as RS 2477 rights of way), or clarify that it only refers to Service construction of new recreational trails.

page 4, Regional Location Map. We request depiction and identification of the Stampede Road. As noted above, it was also identified as an RS 2477 right-of-way (RST 340, Lignite – Stampede and RST 344, Lignite-Kantishna) from the Healy area to Kantishna.

page 48, Easements. We request notation that the Windy Creek trail has also been asserted by the state as a valid RS 2477 right-of-way, thus affecting the private land over which the trail passes. A map of the route is enclosed for your information.

page 242, Transportation Modes. A potential northern transportation corridor “approximately follow[ing] the Stampede Trail alignment” is mentioned; we request that the text note this is just one of the possible alignments under investigation.

Kantishna Airport

We request that the plan note the completion of the Kantishna Airport Master Plan in 2002. We are enclosing a copy of the approved airport layout plan for your information. Because of its relevance to backcountry management at Denali, at a minimum, the basic findings would be relevant additions to the document. The airport and its role in bringing visitors and supplies to Kantishna could be specifically mentioned on page 205 under “Kantishna Area.”

North Denali Access

On page 21-22, the draft plan lists Denali North Access as a topic not addressed. We recognize that the substance of these studies are outside the scope of the backcountry plan; however, we request the plan address how north access developments could influence backcountry management if new access is developed in the future. Would a formal amendment to the backcountry management plan be expected? We also request the plan address the possibility of an extended hiking trail from the park road north along the Savage River to state land. The south end on park land has already been constructed. The North Denali recreation facility study will explore this possibility.

Other Access

page 14, Bicycles: We request this section clarify whether bicycles are allowed under the existing regulations.

page 14, Case Law: Since these cases apply to “lower 48” park units, we request the discussion clarify how these decisions are affected by ANILCA.

pages 45 and 226, pack animals: Contrary to statements made on these two pages, pack animals are allowed for uses other than subsistence in the park additions. The use of pack animals is protected as a traditional activity under ANILCA Section 1110(a) and the implementing regulations at 43 CFR Part 36.

page 233, Closures: We request this discussion be expanded to note that temporary closures require a public notice and hearing before a closing takes effect per 36 CFR §13.30 and 43 CFR Part 36.

page 259, pack animals: The general use of pack animals, other than dogs, is rare. We are unaware of data substantiating the increases projected under the No Action Alternative. We appreciate that the draft plan recognizes that regulations are necessary to limit the use of pack animals; however we question the need for such regulations at this time.

Adaptive Management

The “Plan Implementation” section on Page 67 indicates that *adaptive management* will be used when implementing the plan, and indicates that new information will trigger proposed management plan changes as needed on an annual basis. This open-ended approach appears to go beyond the typical level of fine-tuning that is common among such plans. Without additional guidance it is difficult to review the draft plan as a whole and predict long term planning outcomes. We recommend the plan elaborate on criteria and sideboards to clarify management intent for both the public and future managers.

Environmental Analysis

Many of the park management proposals, especially in Alternatives B and C, are based on the presumption that uses are rapidly increasing and that access technology will put additional pressure on the park. While the population of Alaska has indeed “*grown more than 50 percent since 1980*” (page 2), statewide trends in the last five years indicate that the number of non-resident recreational users has leveled off.

We agree that plan implementation, as proposed, could cause cumulative impacts to visitor use on non-park adjacent lands. Visitors to the region desire to go to Denali National Park and Preserve because it is a premier visitor attraction. To minimize these regional impacts, we urge the Service to reevaluate its management and provide more diverse opportunities for park users throughout the unit.

page 66. We disagree with the environmental analysis that this alternative “*fails to attain the widest range of beneficial uses*” because this alternative actually provides the widest range of beneficial uses for all park visitors. Though there could be additional impacts to wildlife, vegetation, natural soundscapes, and wilderness, the level of impact may be

acceptable given more opportunities for active management to reduce those impacts, and the resulting benefits to park users.

page 244. This page summarizes studies that document the negative effects of snowmobiles on air quality. Most, if not all, of these studies were conducted outside Alaska, and two are over 25 years old. We request the impact analysis address the applicability of these studies for currently used machines in Alaska.

page 256, Conclusion. We disagree with the statement that Alternative E provides the “greatest level of negative impacts on physical resources.” Granted, the *potential* for impacts is higher, but as the draft plan notes, active management options available in Alternative E, such as hardening well-used campsites, could reduce or eliminate many impacts and would allow substantially increased use with minimal added cumulative impacts.

page 258, Vegetation and Wetlands – Alternative A, last paragraph: Based on the 1974 and 1975 studies referenced on page 244 (which presumably are the basis for this discussion) it is not apparent how these studies were interpreted for Alaska.

page 346-360, Socioeconomics: The statements that Alternatives B and C would increase income in the local economy appear unsubstantiated. One could just as easily conclude that decreased access and commercial services combined with restrictive public use limits would create fewer area jobs and thus less local income.

Thank you for the opportunity to provide our views, analyses, and recommendations. We remain available to clarify any of our concerns and look forward to working with you, as appropriate, on revisions.

Sincerely,

/ss/

Sally Gibert
State ANILCA Coordinator

Enclosures

Appendix B: Wilderness Management Plan Requirements

The Denali National Park and Preserve Backcountry Management Plan is intended to serve as a Wilderness Management Plan for the park's designated wilderness and lands determined suitable for wilderness designation. This plan does not, however, follow the outline recommended in Appendix D of Reference Manual 41 for constructing Wilderness Management Plans since its primary purpose is to serve as a General Management Plan (GMP) amendment and several wilderness plan components are addressed in other park planning documents.

This appendix identifies the correspondence between the recommended wilderness plan structure and the relevant components covered by this plan or the existing GMP which together establish the wilderness planning framework for Denali National Park and Preserve.

I. Introduction

- A. **Goals and Objectives of the Plan.** This element is covered in Chapter 1 under Purpose, Need, and Management Goals.
- B. **Identification of the Wilderness Area.** Map 3-1 in Chapter 3 depicts the Denali Wilderness and areas determined suitable for wilderness designation.
- C. **Legislation and Pre-Existing Conditions Affecting Wilderness Management.** Legislation is covered in Chapter 1 under Applicable Laws, Regulations, and Case Law. Pre-Existing Conditions are discussed in Chapter 3.
- D. **Relationship of Wilderness Management Plan with Other Management Plans.** This element is explained in Chapter 1.

II. Wilderness Management Proposed Goals and Actions

- A. **Inventory of Administrative Facilities.** Chapter 3 identifies all backcountry administrative facilities. None of these facilities has been found to be incompatible with wilderness.
- B. **Establish Desired Future Conditions.** This element is covered in Chapter 2 under Management Area Descriptions under Actions Common to All Action Alternatives and through the management area designations provided in each alternative.
- C. **Establish Monitoring Indicators.** This element is addressed in Chapter 2 as part of the Management Area Descriptions.
- D. **Establish Standards for Indicators.** This element is also addressed in Chapter 2 as part of the Management Area Descriptions.
- E. **Establish Visitor Use Levels.** A numerical cap on the number of climbers on Mount McKinley during the prime climbing season is set in each alternative in Chapter 2. However, in general the plan relies the Visitor Experience and

Resource Protection (VERP) process to establish capacity, which uses indicators and standards to specify thresholds in terms of resource impacts rather than determining a set amount of allowable use.

- F. **Staff Organization and Accountability.** The existing administrative structure is described in Chapter 3. Changes to this structure are proposed in each alternative and Actions Common to All Action Alternatives in Chapter 2 and detail is also provided in the analysis of impacts to Park Operations and Management in Chapter 4.
- G. **Application of “Minimum Requirement” Concept.** Commitment to the minimum requirement process is broadened to the entire backcountry as identified in Actions Common to All Alternatives in Chapter 2. A minimum requirement procedure is included as Appendix D.
- H. **Access by Persons with Disabilities.** Various forms of backcountry access that are available to all visitors are also suitable for persons with disabilities under most alternatives, including airplane, motorboat, snowmachine, and dog team.
- I. **Stock Use.** Stock use is generally covered with other modes of surface transportation under the Access management framework provided in Chapter 2.
- J. **Fire Management.** A separate fire management plan was completed in 2004 (NPS 2004a).
- K. **Cultural Resources.** Cultural resources are addressed in the 1998 *Denali National Park and Preserve Resource Management Plan* (NPS 1998).
- L. **Climbing and Mountaineering.** This activity is managed to the wilderness standard throughout the backcountry. Waste management and the use of power drills and anchors are discussed under Actions Common to All Action Alternatives. Air access is discussed in each alternative under Access. General guidance for guided services is covered under the Guided Activities and Commercial Services portion of each alternative and Actions Common to All Action Alternatives.
- M. **Interpretation and Education.** There is a section for this topic under the Administration and Research sections of each alternative and Actions Common to All Action Alternatives.
- N. **Management of Valid Existing Rights and Congressionally Authorized Uses.** This element is covered under the 1986 *General Management Plan* in the following sections: the Special Use Zone subsection of Proposed Management Zoning, Potential RS2477 Rights-of-Way, and Access to Inholdings. Amendments were not required at this time.
- O. **Interaction with Other Federal Land Management Agencies.** This interaction is documented in Chapter 5, Consultation and Coordination.
- P. **Scientific Activities.** There is a section for this topic under the Administration and Research sections of each alternative and Actions Common to All Action Alternatives.

III. Environmental Compliance.

The entire Backcountry Management Plan and Environmental Impact Statement, including the environmental consequences analysis in Chapter 4, meets National Environmental Policy Act requirements.

Appendix C: ANILCA Section 810(a) Summary of Evaluations and Findings

I. Introduction

This evaluation and finding was prepared to comply with Title VIII, Section 810 of the Alaska National Interest Lands Conservation Act (ANILCA). It evaluates the potential restrictions to subsistence activities that could result from implementation of the backcountry management plan for Denali National Park and Preserve. The *Draft Backcountry Management Plan and Environmental Impact Statement* describes a range of alternatives for consideration.

II. The Evaluation Process

Section 810(a) of ANILCA states:

“In determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands . . . the head of the Federal agency . . . over such lands . . . shall evaluate the effect of such use, occupancy, or disposition on subsistence uses and needs, the availability of other lands for the purposes sought to be achieved, and other alternatives which would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes. No such withdrawal, reservation, lease, permit, or other use, occupancy or disposition of such lands which would significantly restrict subsistence uses shall be effected until the head of such Federal agency:

1. gives notice to the appropriate State agency and the appropriate local committees and regional councils established pursuant to Section 805;
2. gives notice of, and holds, a hearing in the vicinity of the area involved; and
3. determines that (A) such a significant restriction of subsistence uses is necessary, consistent with sound management principles for the utilization of the public lands, (B) the proposed activity would involve the minimal amount of public lands necessary to accomplish the purposes of such use, occupancy, or other disposition, and (C) reasonable steps would be taken to minimize adverse impacts upon subsistence uses and resources resulting from such actions.”

ANILCA created new units and additions to existing units of the national park system in Alaska. Denali National Park and Preserve additions were created by ANILCA Section 202(3)(a) for the purposes of:

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

reasonable access, for mountain climbing, mountaineering, and other wilderness recreational activities.”

Subsistence is an allowed use in the ANILCA additions to Denali National Park and Preserve (Sec. 202(3)(a)).

The potential for significant restriction must be evaluated for the proposed action’s effect upon

“ . . . subsistence uses and needs, the availability of other lands for the purposes sought to be achieved and other alternatives which would reduce or eliminate the use.” (Sec. 810(a))

III. Proposed Action on Federal Lands

The “Description of Alternatives” section of the *Draft Backcountry Management Plan and Environmental Impact Statement* describes in detail the alternatives for consideration. Following is a brief summary of each.

Alternative 1: No Action

The National Park Service would continue the present management direction, guided by the 1986 *General Management Plan*, the 1997 *Entrance Area and 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.

There would be no new management areas defined for the backcountry of Denali National Park and Preserve. The entire backcountry would continue to be defined as a “Natural Area” under the 1986 General Management Plan. The only distinctions between areas of the backcountry would be the legislative distinctions of the designated Wilderness in the former Mount McKinley National Park, the 1980 national park additions, and the national preserves. There would be no resource or social standards defined for any portion of the backcountry.

Alternative 2

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.

Alternative 3

This alternative would provide a variety of appropriate 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 Kantishna near the park road, and around the Ruth Glacier (along with existing mountaineering activity on the Kahiltina Glacier). The majority of the backcountry would be managed for dispersed, self-reliant travel and would include opportunities for extended expeditions in very remote locations. Growth in other uses would be accommodated on neighboring lands.

Alternative 4

This alternative would also 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, assistance, or short time-commitments. However, the areas would be of sufficient size to accommodate anticipated growth in the next 15-20 years and would be focused along the park road; in Kantishna near the park road; at the Ruth, Tokositna, and Kahiltina Glaciers; and in the Dunkle Hills/Broad Pass area. The remainder of the backcountry would be managed for dispersed, self-reliant travel and would include opportunities for extended expeditions in very remote locations.

Alternative 5

This alternative would create two distinct geographic areas that provide different kinds of visitor experiences in the Denali backcountry. The old Mount McKinley National 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.

IV. Affected Environment

Introduction

The backcountry of Denali National Park and Preserve includes the entire park except the development sub-zones delineated in the 1997 *Entrance Area and Road Corridor Development Concept Plan*. For some topics the backcountry management plan includes uses even in the development sub-zones, but proposed actions are consistent with the *Entrance Area and Road Corridor Development Concept Plan* and the *South Side Denali*

Development Concept Plan. The study area includes designated, proposed, potential, recommended, and suitable wilderness, but the plan does not make recommendations for federally-designated Wilderness.

Park Environment

Denali National Park and Preserve is located in the interior of Alaska and is dominated by an east to west line of towering, glaciated mountains known as the Alaska Range. The range rises abruptly from lowlands of 500 to 2,000 feet in elevation to the pinnacle of Mount McKinley, North America's highest mountain, at 20,320 feet. The range is perpetually snowclad above approximately 7,500 feet on the north and 6,000 feet on the south. Glaciers are numerous and tend to be larger and longer on the south side of the range than on the north.

Moisture from the Gulf of Alaska is blocked by the Alaska Range, causing a continental climate to the north of the range and more of a maritime climate to the south. Moisture-laden air from the south results in greater levels of precipitation on the southern flanks of the range. The average annual precipitation at park headquarters is 15 inches, while at some higher elevations in the park the total precipitation exceeds 80 inches and snowfall exceeds 400 inches. Normal snowpack throughout the region averages between 20 and 40 inches.

Vegetative cover in Denali is typical of interior Alaska taiga. Lowland floodplains are dominated by dense, deciduous or coniferous forest, or by a mixed forest of balsam poplar and white spruce. Upland forests tend to be more open with mixed or continuous stands of black spruce, white spruce, or aspen. Upland forests give way to shrub communities at elevations above approximately 2,400 feet. Glacial rivers flowing from the Alaska Range create broad floodplains that are sparsely vegetated. Tall shrub communities of willow and alder grow on moist slopes and along drainages, and low shrub communities of dwarf birch and willow grow at higher elevations or on dry slopes. Alpine tundra, composed of dryas and dwarf willow shrub, mat and cushion species, or grass and sedge mixes, grows on slopes and ridges to about 6,000 feet. More than 650 species of flowering plants inhabit the slopes and valleys of the park.

The original Mount McKinley National Park was established in 1917 primarily as a refuge for large mammals. In 1980, ANILCA enlarged the Old Park to more than 6 million acres and re-designated the area as Denali National Park and Preserve. The protected subarctic ecosystem of Denali provides habitat for 30 species of mammals, at least 152 species of breeding birds, 16 species of fish (twelve resident species and four anadromous Pacific salmon species), and 1 amphibian. The American peregrine falcon (*Falco peregrinus anatum*), the subspecies that nests in the Denali region, was formerly listed as an endangered species under the Endangered Species Act but was delisted as of August 25, 1999 (64 FR 46542). No federally designated threatened or endangered species are known to occur within Denali National Park and Preserve (see Appendix E of the original draft plan, consultation letter from the U.S. Fish and Wildlife Service, NPS 2003d).

About 100 archeological sites are recorded within Denali National Park and Preserve. Archeological investigations conducted within and immediately adjacent to the park strongly suggest that sites dating from the Paleoarctic tradition (10,000 years before present) through the Protohistoric period (200 years before present) exist within the park. Excavations at the Dry Creek site, situated near the northeastern boundary of the park, have yielded one of Alaska's earliest dates, 11,000 years before present (BP). The Carlo Creek site, situated along the Nenana River on the eastern boundary of the park, is dated at approximately 8,000 BP. These sites may depict tool technologies and subsistence patterns representing the earliest peopling of North America by means of the Bering Land Bridge.

The Denali area was used historically by several Athabaskan Indian groups. The Ahtna people of Cantwell arrived from the east, the Tanana people came into the area from the north traveling up the Nenana and Toklat Rivers, and the Koyukon people who lived at Lake Minchumina ascended the McKinley, Foraker, and Herron Rivers. The Upper Kuskokwim people who still live in Nikolai and Telida approached the park from the west, and the Dena'ina people approached the park from the south. Subsistence activities included large mammal hunting, fishing, and small game trapping.

A more comprehensive description of existing conditions can be found in the affected environment section of the *Draft Backcountry Management Plan and Environmental Impact Statement*.

V. Subsistence Uses and Needs Evaluation

Background Information

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 which 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.

Denali National Park and Preserve has a total of about 380 eligible local rural residents who qualify for subsistence use of park and preserve resources. Denali's subsistence users primarily reside in the communities of Cantwell, Minchumina, Nikolai, and Telida. Other local rural residents who do not live in these designated resident zone communities, but who have customarily and traditionally engaged in subsistence activities within the park, may continue to do so pursuant to a subsistence permit issued by the park superintendent. There are about 12 individuals from McKinley Village, Nenana, Healy, Tanana, and the community of Colorado south of Cantwell that have received subsistence use permits. Each year, between one and seven people engage in subsistence activities in the Kantishna area and about 50 households in Cantwell acquire moose permits.

Denali has two areas designated as National Preserves. Both federal subsistence and State of Alaska hunting and trapping are permitted in the national preserves. State harvests are regulated by State game laws passed by the Alaska Board of Game. Federal subsistence harvest is regulated by federal regulations passed by the Federal Subsistence Board.

ANILCA provides a preference for local rural residents over other consumptive users should a shortage of subsistence resources occur and allocation of harvest becomes necessary. This is particularly important for national preserves where state hunting and trapping is allowed. When the harvest must be limited, state hunting opportunities must be restricted first before any reduction in the harvest for federal subsistence users occurs.

Areas receiving the most extensive subsistence use activities are the northwestern park and preserve region near Lake Minchumina, and the southeastern park region near Cantwell, and the southern Kantishna Hills region near Kantishna. Cantwell area subsistence users primarily use park lands in the Windy Creek, lower Cantwell Creek, and Bull River drainages. In more recent years the Kantishna Hills region has seen increased utilization for subsistence resources. In the northwestern region, there is a long history of established traplines that extend throughout the ANILCA park and preserve additions up to the boundaries of the former Mt. McKinley National Park. Denali National Park and Preserve lands are responsible for only a portion of the estimated community subsistence harvests reported by these communities since a significant portion of the areas used by these communities for subsistence are beyond the park and preserve boundaries.

Overall, Denali's main subsistence species are moose, caribou, salmon, hare, rock and willow ptarmigan, spruce grouse, ducks and geese, and a few species of freshwater fish. Less frequently used large mammals include black bear, brown bear and Dall sheep. Fresh water fish include burbot, dolly varden, grayling, lake trout, northern pike, rainbow trout and whitefish. Important fur animals include marten, mink, red fox, wolf, lynx, weasel, wolverine, land otter, beaver, muskrat, and coyote.

The National Park Service recognizes that patterns of subsistence use vary from time to time and from place to place depending on the availability of wildlife and other renewable natural resources. A subsistence harvest in a given year may vary considerably from previous years because of such factors as weather, surface snow conditions for traveling, wildlife migration patterns, natural population cycles, and wildlife conservation practices of leaving a trapline fallow periodically.

Potential Impacts to Subsistence Users

Increases in types and levels of recreation have the potential to interfere with subsistence activities. 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.

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 snowmobiling have come dramatic improvements in snowmachine technology. Because of the increased reliability, power and flotation ability of the newer snowmachines, snowmachiners 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 snowmachiners 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.

As the range of non-subsistence snowmachiners overlaps with subsistence use areas, the potential for conflict between these user groups increases. Snowmachine users can interfere with subsistence traplines, displace furbearers, and create paths that encourage animals to travel farther from places where subsistence activities typically occur. 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). Concerns about the impacts of increasing non-subsistence uses were also mentioned by Lake Minchumina area residents during public scoping (see also Letter from Collins, 3/3/01).

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.

In the Preserves, sport hunting can also interfere with subsistence as subsistence users would have to compete with sport hunters for game.

Evaluation Criteria

To determine the potential impacts of the alternatives on existing subsistence activities, three evaluation criteria were analyzed relative to existing subsistence resources:

1. The potential to reduce important subsistence fish and wildlife populations by (a) reductions in number, (b) redistribution of subsistence resources, or (c) habitat losses;
2. What effect the action might have on subsistence fisher or hunter access;
3. The potential for the action to increase fisher or hunter competition for subsistence resources.

1. The potential to reduce populations

(a) Reduction in Numbers:

Alternatives 1-3

Actions in these alternatives are not expected to reduce numbers of wildlife.

Alternative 4 (Preferred Alternative)

Expanding the hunting guide area in the southwest preserve has the potential to reduce wildlife populations as animals in this area could be shot; however, geographic and temporal limitations would prevent a significant restriction to subsistence resources.

Alternative 5

Expanding the hunting guide area in the southwest and northwest preserves has the potential to reduce wildlife populations as animals in these areas could be shot; however, geographic and temporal limitations would prevent a significant restriction to subsistence resources.

(b) Redistribution of Resources:

Alternative 1 (no action)

Increases in recreational activities in subsistence use areas have the potential to redistribute wildlife populations. Use levels among a variety of activities are expected to increase, especially near access points and at destinations that are already popular. Visitors engaged in recreational activities have the potential to harass or frighten wildlife. In addition to the mere presence of people, human-generated noise, and noise from machines, such as airplanes and snowmachines, could cause wildlife to move away from

visitors. As popular areas become crowded, visitor use is expected to disperse to other areas of the park, which could force wildlife to vacate those areas.

For example, wildlife may be displaced by snowmachines in the Broad Pass area south of Cantwell, along the Stampede corridor, in the southwest preserve, and in the Tokositna and Lower Ruth areas, and may expend valuable energy fleeing from them. Potential adverse impacts on wildlife most likely would occur during mid-to-late winter, when wildlife is likely to be in a nutritionally-stressed condition. Some dispersion is also possible in the northwest preserve as wildlife could be frightened by non-subsistence motorboat and snowmachine use. This scenario would be likely in alternative 1 where park staff would have little ability to educate visitors about wildlife before visitors go into the backcountry.

Subsistence users in the Cantwell area have expressed concern about increasing snowmachine use in the Broad Pass area, as noted above. Subsistence users in the northwest preserve and adjacent park additions have also expressed concerns about motorized use. Additional non-subsistence use involving snowmachines and motorboats in subsistence use areas, such as along Birch Creek, could result in displacement of furbearers and moose, cabin vandalism and unauthorized use, disturbed traps, and conflicts between recreational and subsistence users (letters from Miki and Julie Collins, 7/16/00, 7/24/00 and 3/3/01). Introducing new or expanded recreational uses into these areas increases the potential for conflict between consumptive and non-consumptive users. Subsistence trappers may be adversely affected during certain times of the year by displacement of furbearers, and subsistence hunters may be adversely affected during winter hunting seasons by the temporary displacement of wildlife, particularly moose and caribou.

Because of concerns about the declining number of ptarmigan in Wildlife Management Unit 13, which encompasses the east side of the south additions and important subsistence use areas south of Cantwell, hunting bag limits have been reduced and the season shortened to close on March 31. One of the reasons for shortening the season from April 30 to March 31 was to avoid hunting and activity during the nesting period in April. Increased recreation, particularly snowmachine use, could have a negative effect by causing displacement of ptarmigan populations during their sensitive breeding and nesting period (Denali Subsistence Resource Commission Meeting Minutes, August 9, 1996 and June 28, 1993).

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. 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.

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 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 along the Alaska Range in the vicinity of Windy Pass 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 snowcover is present, and during early winter, use is relatively low. As snowpack increases so does snowmachine use. In late winter when the days are lighter, warmer, and there's lots of snow, 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 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. The 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.

Due to the potential for high levels of widespread recreation that could create unfavorable conditions for wildlife (i.e. presence and noise from visitors would scare

wildlife), alternative 1 would have major impacts on distribution of subsistence resources.

Alternative 2

Redistribution of wildlife populations is not expected under alternative 2 because of the emphasis on protecting wildlife habitat and highly dispersed recreation. Snowmachine use in the park additions and preserve would be limited to traditional activities, which would result in an immediate decrease in the non-subsistence snowmachine use mentioned under alternative 1. The impacts described under alternative 1 would therefore not occur. Subsistence opportunities would likely improve as compared to current conditions because visitor use, particularly non-subsistence snowmachine use, would be reduced, so wildlife would be less likely to be frightened and move elsewhere.

Alternative 3

Alternative 3 provides for dispersed recreational uses, including some motorized access, in parts of the park additions and preserve that are used for subsistence. Because non-subsistence uses would be managed for low encounter rates and minimal impacts to natural resources in most of the park additions and preserve, only minimal redistribution of populations would occur.

Snowmachine use would be limited to subsistence and other traditional activities in the park and preserve additions, and to established winter corridors for recreational use. Therefore, there would be an immediate decrease in non-subsistence snowmachine use throughout the park and preserve, but the winter corridors would result in areas of more concentrated snowmachine use.

Establishing corridors would channel snowmachine use in the Broad Pass area; to the toes of the Ruth, Tokositna, and Kanikula glaciers from the Tokositna River; and along the Yentna, Tokositna, and Kantishna/Muddy Rivers (135 linear miles of winter corridors). Trapping occurred west of Cantwell Creek in the 1990's, but it does not generally occur there presently, so high use snowmachine corridors designated under this alternative in the Broad Pass area would not conflict with areas around Cantwell that are currently used for subsistence activities. Along most of the other corridors, these higher use areas overlap with areas currently or traditionally used for subsistence activities. Encounters with wildlife along these corridors could cause behavioral disturbance, increase stress levels, and temporarily displace wildlife.

Minor impacts that would result would be attributable to snowmachine use, airplane access, and other increasing recreational uses that could scare wildlife and cause them to relocate.

Alternative 4 (Preferred Alternative)

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, Bull River, and Cantwell Creek; to the toes of the Ruth, Tokositna, and Kanikula glaciers from the Tokositna River; along the Yentna, Tokositna, and Kantishna/Muddy Rivers. In a future wilderness proposal, accommodation would be made as necessary for recreational snowmachine access along 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 of up to six people. Nearly all of the winter corridors overlap with areas currently or traditionally used for subsistence activities.

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. As the range of non-subsistence snowmachine use overlaps with subsistence use areas, the potential for conflict between these user groups increases.

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.

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 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 along the Alaska Range in the vicinity of Windy Pass provide important winter habitat for moose and caribou because snow depths associated with the pass area are less than in other areas.

Wildlife may be displaced by snowmachines in the Broad Pass area south of Cantwell, along the Stampede corridor, in the southwest preserve, and in the Tokositna and Lower Ruth areas, and may expend valuable energy fleeing from them. Potential adverse impacts on wildlife most likely would occur during mid-to-late winter, when wildlife is

likely to be in a nutritionally-stressed condition. Some dispersion is also possible in the northwest preserve as wildlife could be frightened by non-subsistence motorboat and snowmachine use.

Subsistence users in the northwest preserve and adjacent park additions have also expressed concerns about motorized use. Additional non-subsistence use involving snowmachines and motorboats in subsistence use areas, such as along Birch Creek, could result in displacement of furbearers and moose, cabin vandalism and unauthorized use, disturbed traps, and conflicts between recreational and subsistence users (letters from Miki and Julie Collins, 7/16/00, 7/24/00 and 3/3/01). Introducing new or expanded recreational uses into these areas increases the potential for conflict between consumptive and non-consumptive users. Subsistence trappers may be adversely affected during certain times of the year by displacement of furbearers, and subsistence hunters may be adversely affected during winter hunting seasons by the temporary displacement of wildlife, particularly moose and caribou.

Because of concerns about the declining number of ptarmigan in Wildlife Management Unit 13, which encompasses the east side of the south additions and important subsistence use areas south of Cantwell, hunting bag limits have been reduced and the season shortened to close on March 31. One of the reasons for shortening the season from April 30 to March 31 was to avoid hunting and activity during the nesting period in April. Increased recreation, particularly snowmachine use, could have a negative effect by causing displacement of ptarmigan populations during their sensitive breeding and nesting period (Denali Subsistence Resource Commission Meeting Minutes, August 9, 1996 and June 28, 1993).

Redistribution of wildlife could also occur as a result of expanding the hunting guide area in the southwest preserve. Human presence, aircraft used to access the area, and gunshots may frighten wildlife, causing animals to relocate.

Due to the potential for high levels of widespread recreation and increases in non-subsistence snowmachine use that could create unfavorable conditions for subsistence wildlife populations, alternative 4 would have moderate impacts on subsistence resources and opportunities.

Alternative 5

There would be considerable potential for redistribution of resources under alternative 5 because of continued increases in non-subsistence activities in important subsistence use areas. Redistribution of wildlife populations would result from greater levels of motorized use, including snowmachine use, motorboats, and airplane landings.

Access by snowmachine to the park additions and preserves would continue and grow. Designating corridors for winter use would focus snowmachine use in the following places: from the southern park boundary to the Old Park boundary near the West Fork Chulitna, Bull River, and Cantwell Creek; to the toes of the Ruth, Tokositna, and

Kanikula glaciers from the Tokositna River; to Kantishna from the Sushana River; along the Yentna, Tokositna, and Kantishna/Muddy Rivers. In a future wilderness proposal, accommodation would be made as necessary for recreational snowmachine access along corridors and throughout those areas designated as Management Area A (18% of the total park area plus 183 linear miles of 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 of up to six people. Nearly all of the winter corridors overlap with areas currently or traditionally used for subsistence activities. Increases in snowmachine use would likely frighten animals and cause them to relocate. Potential adverse impacts on wildlife most likely would occur during mid-to-late winter, when wildlife is likely to be in a nutritionally-stressed condition.

Redistribution of wildlife could also occur as a result of expanding the hunting guide areas in the southwest and northwest preserves. Human presence, aircraft used to access the area, and gunshots may frighten wildlife, causing animals to relocate.

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. As the range of non-subsistence snowmachine use overlaps with subsistence use areas, the potential for conflict between these user groups increases.

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.

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 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 along the Alaska Range in the vicinity of Windy Pass provide important winter habitat for moose and caribou because snow depths associated with the pass area are less than in other areas.

Wildlife may be displaced by snowmachines in the Broad Pass area south of Cantwell, along the Stampede corridor, in the southwest preserve, and in the Tokositna and Lower Ruth areas, and may expend valuable energy fleeing from them. Potential adverse impacts on wildlife most likely would occur during mid-to-late winter, when wildlife is likely to be in a nutritionally-stressed condition. Some dispersion is also possible in the northwest preserve as wildlife could be frightened by non-subsistence motorboat and snowmachine use.

Subsistence users in the northwest preserve and adjacent park additions have also expressed concerns about motorized use. Additional non-subsistence use involving snowmachines and motorboats in subsistence use areas, such as along Birch Creek, could result in displacement of furbearers and moose, cabin vandalism and unauthorized use, disturbed traps, and conflicts between recreational and subsistence users (letters from Miki and Julie Collins, 7/16/00, 7/24/00 and 3/3/01). Introducing new or expanded recreational uses into these areas increases the potential for conflict between consumptive and non-consumptive users. Subsistence trappers may be adversely affected during certain times of the year by displacement of furbearers, and subsistence hunters may be adversely affected during winter hunting seasons by the temporary displacement of wildlife, particularly moose and caribou.

Because of concerns about the declining number of ptarmigan in Wildlife Management Unit 13, which encompasses the east side of the south additions and important subsistence use areas south of Cantwell, hunting bag limits have been reduced and the season shortened to close on March 31. One of the reasons for shortening the season from April 30 to March 31 was to avoid hunting and activity during the nesting period in April. Increased recreation, particularly snowmachine use, could have a negative effect by causing displacement of ptarmigan populations during their sensitive breeding and nesting period (Denali Subsistence Resource Commission Meeting Minutes, August 9, 1996 and June 28, 1993).

Due to the potential for high levels of widespread recreation that could create unfavorable conditions for wildlife (i.e. presence and noise from visitors would scare wildlife), Alternative 5 would have major impacts on distribution of subsistence resources.

(c) Habitat Loss:

None of the alternatives would result in significant habitat loss. Alternative 5 would result in the greatest habitat loss. Proposed facilities in alternative 5 include some trails and campsites on the south side of the park additions and temporary facilities to support winter recreation. These facilities would result in only negligible or temporary habitat loss.

2. Restriction of Access:

Access for subsistence uses on the ANILCA park and preserve additions is granted pursuant to Sections 811(a)(b) and 1110(a). Section 811(b) of ANILCA states that “rural residents engaged in subsistence uses shall have reasonable access to subsistence resources on the public lands.” Section 1110(a) of ANILCA authorizes the use of snowmachines for traditional activities during periods of adequate snow cover.

None of the alternatives would restrict access for subsistence. The National Park Service would take action to manage visitor use under many circumstances if that use would be detrimental to subsistence resource values of the park. Proposed registration requirements would be designed to count and track the level of use and would not disrupt subsistence uses. Subsistence users would be registered automatically by meeting eligibility requirements.

3. Increase in Competition:

Alternative 1

Increasing use of the preserve areas could eventually result in additional hunting activity and competition for wildlife resources. For example, Lake Minchumina area subsistence users have expressed concerns that unrestricted hunting in the northwest preserve, especially along the Muddy River, would deplete moose populations and prevent subsistence hunters from obtaining meat (letter from Miki and Julie Collins, 7/24/00). Although there is less subsistence use in the southwest preserve, the same effect could occur in that area.

The park and preserve additions are open to both subsistence and non-subsistence fishing. Subsistence use of fisheries is generally infrequent except in the northwest preserve. National Park Service regulations and provisions of the Alaska National Interest Lands Conservation Act mandate that if and when it is necessary to restrict the taking of fish, subsistence users are the priority consumptive users on federal public lands. They would be given preference on such lands over other consumptive uses (ANILCA, Section 802(2)). Continued implementation of the ANILCA provisions should mitigate any increased competition from resource users other than eligible subsistence users.

Increased non-subsistence use in the park and preserve additions, especially snowmachine use, leads to more frequent user conflicts (letter from Russ Wilson, 12/28/99; letter from Miki and Julie Collins, 7/24/00). Conflict is likely in areas where non-subsistence use is rapidly increasing, such as south of Cantwell. Higher levels of use have the potential to displace local wildlife resources farther from common access corridors and into the Old Park, where these resources would be out of reach of subsistence users. In other places, such as in the northwest preserve, increased non-subsistence use over time, particularly snowmachine and motorboat use, could result in less wildlife being

locally available, so subsistence users would have to travel farther to locate and harvest subsistence resources. To prevent any restriction to subsistence resources due to increased recreational use in the park additions and preserve (especially along common access corridors), the National Park Service would take a reactionary approach that may result in emergency closures to recreation.

Increased use and access near subsistence traplines near Lake Minchumina encourage snowmachiners and other travelers from the Kantishna area and the road system to use subsistence trapline routes. Every year the trapline is open, additional users follow it into the park. Subsistence users find it necessary to patrol their cabins to make sure recreational users are not using them illegally, and this requires additional time away from subsistence activities. Additional trails made from recreational users can confuse the dog teams of the subsistence users. To avoid conflicts with recreational users, subsistence users have altered their trapping schedule by pulling sets early. Subsistence users have stated that rapid increases in numbers of people cause considerable concern about their way of life and connection to a pristine environment being threatened (letter from Collins, 6/2/00).

Alternatives 2 and 3

None of the proposals in alternatives 2 and 3 are expected to result in increased competition for subsistence resources. Non-subsistence snowmachine use in the Broad Pass area, for example, could be expected to decrease significantly in alternative 2, resulting in far fewer conflicts with subsistence uses.

Alternative 4 (Preferred Alternative)

Increases in recreation and facilitated access would occur throughout the park; however, management zoning would allow the park to manage for desired conditions in areas used for subsistence.

Minor competition would occur in the southwest preserve as the hunting guide area would be expanded.

Alternative 5

As in alternative 1, improved access to the preserve areas over time could result in additional hunting activity and competition for wildlife resources. Alternative 5 differs from alternative 1 in that non-subsistence use would be managed using the tools described in Actions Common to All Action Alternatives to achieve the desired conditions for each management area. However, more hunting may occur in the southwest and northwest preserve since there would be an additional guiding company in each. The potential for increased competition would likely be about the same as under alternative 1. The potential for restrictions to subsistence access could be expected to be minor or local.

VI. Availability of Other Lands and Alternatives to the Proposed Action

The backcountry management plan and general management plan amendment includes all areas within the park additions and preserve that are open to subsistence uses. Therefore, there are no other lands that can be substituted in the proposed action.

VII. Alternatives Considered

The backcountry management plan includes a full range of alternatives with proposals for different levels of recreational use and access improvements. This range of alternatives includes some alternatives in which impacts on subsistence uses would be avoided (see Findings below).

VIII. Findings

The above evaluations demonstrate that the National Park Service would have to take reactionary measures, such as closing areas to recreation, in order to prevent a significant restriction of subsistence resources as reasonably foreseeable from alternative 1 (no action alternative). There would be no significant restriction from alternatives 2, 3, 4, or 5; however, increases in non-subsistence use from alternatives 4, and to a greater extent alternative 5, would negatively impact subsistence resources and opportunities in the Cantwell, Kantishna, and Minchumina areas.

Continuing current management direction under alternative 1 would result in rapidly increasing recreational use in parts of Denali National Park and Preserve, including in important subsistence use areas. The main impact from non-subsistence activities, such as snowmachine use and motorboat use, would be redistribution of wildlife resources available to subsistence users and competition for resources. This impact could be expected to increase over time as visitor use increases. There are no provisions in current management plans to allocate between recreational and subsistence uses, so increased user conflicts could be expected at some locations.

The Broad Pass area southwest of Cantwell is an important subsistence use area as well as a popular destination for non-subsistence snowmachine use during the winter. The Subsistence Resource Commission has documented concerns about restrictions on subsistence uses because of rapidly increasing recreational uses. Other subsistence use areas of concern include the Stampede corridor and the northwest preserve. The northwest preserve could be affected by increasing snowmachine and motorboat use over time.

Alternative 5 includes provisions for managing recreational uses and allocating between recreational and subsistence uses. This could be expected to result in fewer impacts than under alternative 1. However, the zoning scheme under alternative 5 allows for higher levels of resource impacts (as compared to the other action alternatives) and provides for increased access throughout much of the park and preserve additions, including important subsistence use areas. This alternative would also expand hunting guide areas

in the southwest and northwest preserve; however, the areas would be limited geographically and use would be limited to only certain times of the year to prevent a significant restriction to subsistence resources. In light of additional access and activity proposed under this alternative, the National Park Service may have to take management action in order to prevent a significant restriction to subsistence resources throughout the life of the backcountry management plan (the next 15-20 years).

For subsistence purposes, alternative 2 is recommended as the preferred management option considered in the environmental impact statement because it would have the least overall impacts to subsistence resources and opportunities.

While alternative 4 (preferred alternative) is not recommended as the preferred management option for subsistence, this alternative would not cause a significant restriction to subsistence resources. Widespread visitor use has the potential to create conflicts with subsistence due to increased competition and redistribution of resources; however, management zoning under this alternative protects subsistence resources by allowing for managed growth and lower levels of use in areas used for subsistence. Alternative 4 would not restrict access for subsistence. The National Park Service would take action to manage visitor use under many circumstances if that use would be detrimental to subsistence resource values of the park.

Appendix D: Backcountry Units and Requirements

The 1976 *Backcountry Management Plan* for Mt. McKinley National Park established a system of backcountry units, associated use limits, a mandatory permit system, and made other administrative decisions such as the prohibition of open fires and pets within the park backcountry. Notice of the permit and use limit decisions was provided in the Federal Register on June 11, 1976 in volume 41, number 114. Subsequent regulations were promulgated at 36 CFR § 13.63 (b) that allowed camping in accordance with the Backcountry Management Plan.

Since that time, as part of 1986 *General Management Plan* and other administrative actions necessary to respond to emerging issues, operational revisions to this 1976 plan have occurred such as changes in unit boundaries, the unit numbering system, and the adjustment of a few overnight use limits within the subset of units where a backcountry camping permit is currently required. These changes have been incorporated as revisions to the original 1976 plan and continue to be implemented through existing regulations and, when appropriate, the Superintendent's Compendium for Denali National Park and Preserve.

Map D-1 shows the system of backcountry units that is currently in use at Denali National Park and Preserve. Table D-1 shows how the revised existing backcountry management plan is being currently implemented with respect to backcountry camping permits, Bear Resistant Food Container use, and overnight camping limits.

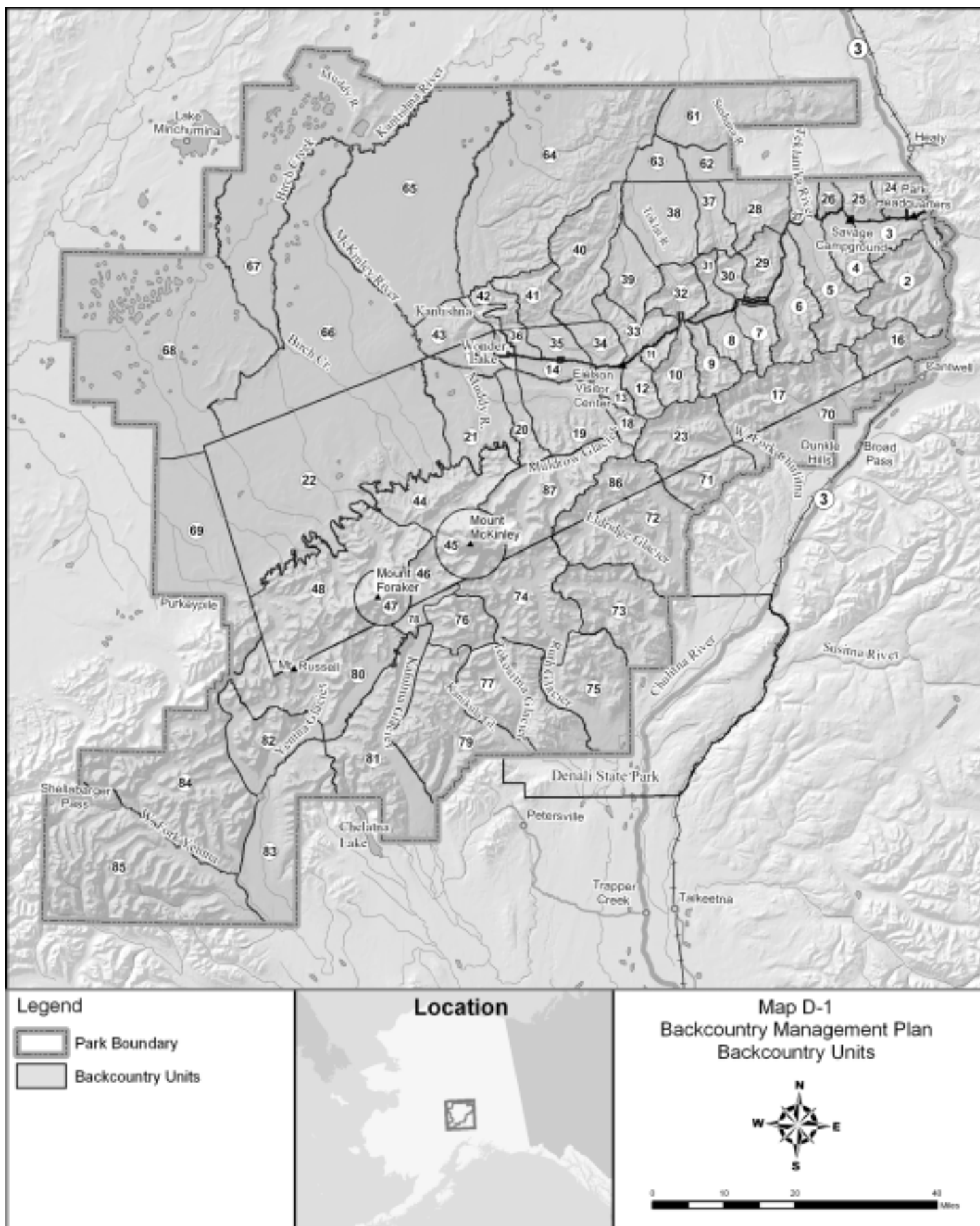


Table D-1 Permit and Bear Resistant Food Container Requirements – Denali National Park and Preserve

Unit Number	Unit Name	Backcountry Camping Permit	Bear Resistant Food Container	Overnight Limit (# Of People)
1	Triple Lakes	Required	Required	12
2	Riley Creek	Required	Required	12
3	Jenny Creek	Required	Required	4
4	Upper Savage	Required	Required	6
5	Upper Sanctuary	Required	Required	6
6	Upper Teklanika	Required	Required	6
7	Upper East Fork	Required	Required	4
8	Polychrome Glaciers	Required	Required	6
9	East Branch Upper Toklat	Required	Required	6
10	West Branch Upper Toklat	Required	Required	6
11	Stony Dome	Required	Required	2
12	Sunset/Sunrise Glaciers	Required	Required	4
13	Mount Eielson	Required	Required	4
14	McKinley Bar East	Required	Required	4
15	McKinley Bar West	Required	Required	4
16	Windy Creek	Required	Required	8
17	Foggy and Easy Pass	Required	Required	8
18	Upper Glacier Creek	Required	Required	4
19	Pirate Creek	Required	Required	4
20	McGonagall Pass	Required	Required	4
21	Muddy River	Required	Required	8
22	Upper Foraker	Required	---	---
23	West Fork Glacier	Required	Required	8
24	Mount Healy	Required	Required	4
25	Healy Ridge	Required	Required	4
26	Primrose Ridge	Required	Required	4
27	Mount Wright	Required	Required	4
28	Sushana River	Required	Required	8
29	Igloo Mountain	Required	Required	4
30	Tributary Creek	Required	Required	4

Table D-1 Permit and Bear Resistant Food Container Requirements – Denali National Park and Preserve, continued

Unit Number	Unit Name	Backcountry Camping Permit	Bear Resistant Food Container	Overnight Limit (# Of People)
31	Polychrome Mountain	Required	Required	6
32	Middle Toklat	Required	Required	4
33	Stony Hill	Required	Required	4
34	Mount Galen	Required	Required	4
35	Moose Creek	Required	Required	4
36	Junbo Creek	Required	Required	2
37	Lower East Fork	Required	Required	6
38	Lower Toklat	Required	Required	6
39	Stony Creek	Required	Required	4
40	Clearwater Fork	Required	Required	12
41	Spruce Peak	Required	Required	12
42	Eureka Creek	Required	Required	12
43	Eldorado Creek	Required	Required	12
44	Peters Glacier	Required	---	---
45	Mount McKinley	Required	---	---
46	Upper Kahiltna	Required	---	---
47	Mount Foraker	Required	---	---
48	Herron Glacier	Required	---	---
61	Stampede	---	---	---
62	Southeast Stampede	---	---	---
63	Southwest Stampede	---	---	---
64	Kantishna Hills	---	---	---
65	Moose - McKinley	---	---	---
66	McKinley - Birch	---	---	---
67	Birch - Foraker Preserve	---	---	---
68	Herron - Highpower Preserve	---	---	---
69	Swift Fork	---	---	---
70	Bull River	---	---	---
71	Ohio Creek	---	---	---
72	Eldridge Glacier	---	---	---
73	Buckskin Glacier	---	---	---
74	Upper Ruth	---	---	---
75	Lower Ruth	---	---	---
76	Mount Hunter	---	---	---
77	Tokositna Glacier	---	---	---

Table D-1 Permit and Bear Resistant Food Container Requirements – Denali National Park and Preserve, continued

78	Middle Kahiltna	*****	*****	*****
79	Little Switzerland	*****	*****	*****
80	Upper Yentna-Lacuna	*****	*****	*****
81	Lower Kahiltna	*****	*****	*****
82	Dall-Yentna Preserve	*****	*****	*****
83	Yentna River Preserve	*****	*****	*****
84	Mount Dall Preserve	*****	*****	*****
85	Kitchatna Preserve	*****	*****	*****
86	Mount Mather	Required	*****	*****
87	Mount Brooks	Required	*****	*****

Appendix E: Minimum Requirement Procedure

STEP 1 – DETERMINING THE MINIMUM REQUIREMENT

SHEET 1

Is Administrative Action Needed?

What is the problem/issue that **may** require administrative action? Do not include methods or tools here. This sheet only refers to the issue or problem, not proposed action/project, or tools to be used. Include references from other legislation, policy, or plans, decisions, analyses, and how this issue is addressed in those documents.

Describe briefly or attach description:

The following questions assist in analyzing whether the issue needs to be resolved in wilderness. Do not consider what tools are to be used here. Please circle **Yes** or **No**, and explain your reasoning:

1. Is this an emergency? **Yes** **No** If yes, follow established procedures for search and rescue (SAR), fire or other plans/policies. If no, please continue.

2. Is this problem/issue subject to valid existing rights, such as access to a valid mining claim, state lands, etc? **Yes** **No**

If no, continue with **Sheet 1**.

If yes, briefly explain here and then proceed to **Sheet 3**

3. Can the problem/issue be addressed by administrative actions outside a wilderness area? (For example, the administrative actions could be an information program at the visitor center or trailhead instead of a physical action in the wilderness, etc) **Yes** **No**

If yes, conduct actions outside wilderness. If no, continue with **Sheet 2**.

4. Is there a special provision in legislation (the 1964 Wilderness Act or subsequent laws), that allows this project or activity? (For example, maintenance of dams or water storage facilities, access to private inholdings, etc.) **Yes** **No** If yes, Go to **SHEET 3**; if no, Go To **SHEET 2**.

STEP 1: DETERMINING THE MINIMUM REQUIREMENT (Continued)

SHEET 2

Is Administrative Action Needed? (Continued)

The following questions are provided to evaluate whether resolving the issue protects wilderness character and values identified in the Wilderness Act. Answer the questions in terms of the need to resolve the issue/problem. If the answer to most of the questions is yes, then the issue/problem probably requires administrative action. **Please circle Yes or No for each answer, and briefly explain.**

1. If the issue/problem is not resolved, or action is not taken, will the natural processes of the wilderness be adversely affected?
Yes No Why/How?

2. If the issue/problem goes unresolved, or action is not taken, will the values of solitude or primitive and unconfined type of recreation be threatened?
Yes No Why/How?

3. If the issue/problem goes unresolved or action is not taken will evidence of human manipulation, permanent improvements, or human habitation be substantially noticeable?
Yes No Why/How?

4. Does addressing the issue/problem or taking action protect the wilderness as a whole as opposed to a single resource?
Yes No Why/How?

5. Does addressing this issue/problem or taking action contribute to protection of an enduring resource of wilderness for future generations?
Yes No Why/How?

6. Is this an issue for reasons other than convenience or cost of administration?
Yes No Why/How?

If administrative action is warranted, then proceed to Sheet 3 to determine the minimum tool or method for resolving the problem.

STEP 2: DETERMINING THE MINIMUM TOOL

SHEET 3: Determining the Minimum Tool: Fill out a Sheet 3 for each alternative.

Identify and describe a range of alternatives including those that utilize traditional tools and non-motorized and mechanized means as well as other methods.

Alternative # _____

Describe briefly or attach description:

Circle yes or no:

Does this alternative involve:

use of temporary road?	Yes	No
use of motor vehicles?	Yes	No
use of motorized equipment?	Yes	No
use of motorboats?	Yes	No
landing of airplanes?	Yes	No
landing of helicopters?	Yes	No
use of mechanical transport?	Yes	No
creating a structure or installation?	Yes	No
Other impacts to wilderness character? _____	Yes	No

The next set of descriptions may be put on Optional SHEET 3a, if desired:

Describe the biophysical effects/benefits of this alternative:

Describe the social/recreational effects/benefits:

Describe societal/political effects/benefits:

Describe health and safety concerns/benefits:

Describe economic and timing considerations/benefits:

Describe heritage resource considerations/benefits:

**STEP 2: DETERMINING THE MINIMUM TOOL
(Continued)**

SHEET 4: Selection of the Minimum Tool Alternative

Attach all alternative sheets to this summary page.

What is the method or tool that will allow the issue/problem to be resolved or an action to be implemented with a minimum of impacts to the wilderness?

The selected alternative is # _____.

Describe the specific operating requirements for the action. Include information on timing, locations, type of actions, etc. (Use this space or attach a separate sheet.)

What are the maintenance requirements?

What standards and designs will apply?

Develop and describe any mitigation measures that apply.

What will be provided for monitoring and feedback to strengthen future effects and preventative actions to be taken to help in future efforts?

Approvals:

Prepared by: _____ **Date:** _____

Recommended by: _____ **Date:** _____

Recommended by: _____ **Date:** _____

Approved by: _____ **Date:** _____

Appendix F: Cost Analysis

The following cost analysis is derived from management actions and predicted impacts on park operations as described in chapters 2 and 4.

Table B-1: Cost Analysis

OPERATIONS - Additional Annual Cost over Current Program				
	Alternative			
Cost Component	2	3	4	5
Visitor Information	209,000	319,000	438,000	438,000
Field Operations/Enforcement	-298,000	192,000	445,000	763,000
Aerial Patrol/Monitoring	40,000	54,000	72,000	90,000
Planning/Commercial Use Mgt.	41,000	41,000	124,000	166,000
Facility Maintenance	0	218,000	253,000	379,000
Research and Monitoring	246,000	246,000	655,000	838,000
Total	238,000	1,070,000	1,987,000	2,674,000
CONSTRUCTION – One-time Costs Including Equipment and Materials				
	Alternative			
Building Facilities	2	3	4	5
Broad Pass visitor contact station	0	800,000	800,000	800,000
Public use cabins	0	0	0	150,000
Trail Facilities				
Hiking trails	0	250,000	300,000	600,000
Extend winter multi use trail: Mile 7 to Savage	0	0	0	100,000
Total	0	1,050,000	1,100,000	1,650,000

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Appendix H: Development of Indicators and Standards

Development of indicators and standards for the Denali National Park and Preserve Backcountry Management Plan follows the process described in the 1997 *Visitor Experience and Resource Protection Handbook* (NPS 1997b), which provides guidance for implementation of the VERP framework at national park units. Under the 1978 National Parks and Recreation Act (NPRA, 16 USC § 1 note, 92 Stat. 3467), the National Park Service is required to address carrying capacity in its general management plans. VERP is the framework through which the NPS meets this statutory mandate, considering carrying capacity as “the type and level of visitor use that can be accommodated while sustaining acceptable resource and social conditions that complement the purpose of a park.”

The VERP framework involves the following essential steps:

- 1) Describe a potential range of desired visitor experiences and resource conditions (prescriptive management areas or zones)
- 2) Allocate the potential zones to specific locations in the park
- 3) Select indicators and standards for each zone; develop a monitoring plan
- 4) Monitor resource and social indicators
- 5) Take management action as needed if standards are being approached or exceeded.

Management areas (zones) are described and allocated in chapter 2, indicators and standards selected, and monitoring protocols outlined. **Indicators** are defined as specific, measurable physical, ecological, or social variables that reflect the overall condition of a zone. **Standards** are defined as the minimum acceptable condition for each indicator variable.

Indicators

The following characteristics were considered desirable for indicators of visitor experience and resource quality in the Denali backcountry:

- Specific
- Objective
- Reliable and repeatable
- Related to visitor use
- Sensitive to visitor use
- Responsive to management action
- Cost efficient and effective
- Significant in terms of the issues being addressed by planning

Appropriate indicators are derived from the purposes and desired future conditions of the management areas described in chapter 2. They are not intended to measure every aspect of the resource conditions and visitor experience in the backcountry, but to provide a few

key variables that can be monitored to broadly indicate whether desired conditions are being achieved.

National Park Service planning staff used many sources of information to develop the indicators in the revised draft plan, including consultation of available literature (for example, Vande Kamp et al. 2001; Manning and Lime, 2000; Merigliano, 1989), the results of park-specific surveys (e.g. Swanson et al., 2002), consultation with park resource experts, NPS experts in other locations, and subject matter authorities in other agencies (for example, personal comm. with Skip Ambrose, NPS National Soundscape Program; David Cole and Alan Watson, Aldo Leopold Institute). Public involvement and comment on the revised draft plan is expected to be a very important source of information for the final set of indicators to be published with the final management plan.

The draft indicators selected for the Denali Backcountry Management Plan include the following:

Trail and Campsite Disturbance. Trail and campsite disturbances are the most common impacts of recreation use in wilderness areas (Hendee and Dawson, 2002). This type of disturbance shows up frequently in studies of potential indicators of quality (Vande Kamp et al., 2001), and appears as a concern for some visitors in a Denali survey of overnight backcountry users (Swanson et al., 2002). This type of disturbance serves as an indicator of overuse, usually along particularly popular travel routes and at popular destinations. Backcountry patrols have gathered data primarily in the Denali Wilderness that can be used to quantify the level of existing disturbance.

Litter and Human Waste. Studies of outdoor recreation indicators of quality have shown that litter and other signs of use impacts to be universally important (Vande Kamp et al., 2001). In a survey of overnight backcountry users at Denali, 89% reported being somewhat bothered or very bothered by seeing litter in the backcountry, and 100% reported being somewhat bothered or very bothered by seeing toilet paper or human waste (Swanson et al., 2002). The percentage of visitors encountering litter or human waste is the specific indicator.

Evidence of Modern Human Use and Landscape Modifications. These indicators are derived from direction provided by the Wilderness Act and the unique history of Denali as described in the Wilderness section of chapter 3. Management decisions have been driven by a long-held ethic that the landscape should not be altered by human development. The “Landscape Modifications” category is not truly an indicator, but simply an instruction to NPS managers as to whether modifying the landscape by adding trails, sanitation facilities, fixed ropes, or other permanent fixtures is acceptable in order to accommodate visitor use. In light of that management guidance, this category also communicates an appropriate expectation to backcountry visitors. The number of encounters with evidence of modern human use is intended to capture the entire range of impacts on wilderness character from vehicles, equipment, and facilities that are

generally incompatible with the park's history and legislative purpose, although it is recognized that some specific exceptions are allowed by ANILCA, the Wilderness Act, and other legislation.

Natural Sound Disturbance. In addition to being a resource that can be damaged in its own right, the degree of natural sound disturbance is also related to wilderness character and experience. It has been a major source of concern for national park managers across the country (e.g., NPS 1995b). However, it is also a factor in the wilderness experience of visitors, as indicated by visitor comments and a recent Denali overnight backcountry visitor survey, which showed that the number of encounters with aircraft, the average time of aircraft encounters per day, and the average daily maximum loudness were all significant predictors of decreasing overall visitor enjoyment of the backcountry (Swanson et al., 2002). These are translated into specific indicators that are the maximum number of motorized noise intrusions per day over the natural ambient sound level (thus factoring in the relative importance of loud, highly noticeable noise), the percentage time per hour that motorized noise is audible, and the maximum sound level. These specific indicators were also informed by indicators being developed for other national parks (Ambrose, pers. comm.).

Encounters with People and Encounter with Large Groups. Although literature over the past few years has shown the idea of "solitude" to be considerably more complex than a simple encounter rate, the encounter rate remains a useful indicator. Although a weak indicator of visitor satisfaction with wilderness experience, there is a relationship (Stewart and Cole, 2001; Watson, 1995). More importantly, encounter rates are correlated with use density which in turn is related to a variety of desirable wilderness characteristics such as opportunities to view wildlife and low user conflict for desired routes or camps (Cole, pers. comm.). Normative evaluations of wilderness user desires for wilderness experience often show a preference for few encounters, most famously noted in early research by the University of Washington Cooperative Parks Study Unit (Stankey, 1973). The survey of overnight backcountry users at Denali demonstrated that 78% of surveyed visitors preferred to see two or fewer other parties per day (Swanson et al., 2002).

Camping Density. The ability to camp out of sight and sound of others has been demonstrated to be an important indicator of quality of wilderness experience (Vande Kamp, 2001). Eighty-two percent of respondents in the Denali backcountry survey indicated a preference to have no parties camped within sight or sound (Swanson et al., 2002).

Accessibility and Administrative Presence are not true indicators because they are not dependent on the amount of visitor use and they are completely dependent either on management action or actions outside of management control. They are intended to provide guidance to management on the degree to which ranger patrols or resource management activities should be visible in an area, and the degree to which management should actively seek to provide access to an area.

Standards

There are five characteristics of good standards. They are:

- Quantitative
- Time or space-bounded
- Expressed as a probability
- Impact-oriented
- Realistic

While research can help determine existing conditions and the realism of particular standards, setting standards is an inherently subjective process that relies heavily on professional judgment of land managers familiar with the resource and public involvement. Proposed standards for this plan were selected by National Park Service planners and resource managers with reference to the best resource information available and with reference to the purposes of the national park and preserve as specified in legislation. However, consistent with the VERP process there is a need for public involvement in selecting appropriate standards, which is to be accomplished during the public comment period on the draft plan. The standards presented in alternatives are proposals only and are intended to be modified with the assistance of the public.

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