

5. Environmental Consequences

5.1 Introduction

The purpose of this chapter is to identify, describe, and compare potential environmental effects that could result from implementing the six management alternatives proposed in the Revised Comprehensive Conservation Plan (Plan, Revised Plan) for Arctic National Wildlife Refuge (Arctic Refuge, Refuge). The analysis was conducted for the Environmental Impact Statement (EIS) and to comply with the National Environmental Policy Act (NEPA). Effects on the physical and biological (biophysical) and socioeconomic (human) environments of the Refuge were considered. Existing conditions of the physical, biological, and socioeconomic environment are described in Chapter 4, and care was taken to ensure that the elements of the major issues—Wilderness, wild and scenic rivers, and visitor use management of the Kongakut River, as identified in Chapter 3—were addressed in the analysis contained in this chapter. Current management (Alternative A) provides the basis for comparing the possible environmental effects of Alternatives B through F (Table 5-2).

This chapter includes the following sections:

- Section 5.1 introduces the terms and concepts used throughout this chapter
- Section 5.2 describes the effects common to all alternatives (A – F) and those common to the five action alternatives (B – F). This includes:
 - the effects of the management policies and guidelines (Section 5.2.3)
 - the effects of the goals and objectives (Section 5.2.4)
 - the effects of the Revised Plan on reasonably foreseeable future actions (Section 5.2.5)
- Section 5.3 describes the direct, indirect, and cumulative effects of the No Action alternative, Alternative A
- Sections 5.4 through 5.9 describe the direct, indirect, and cumulative effects from each of the five action alternatives (B – F) as compared to Alternative A.
- Section 5.10 is the ANILCA Section 810 Analysis on the effects of the alternatives on subsistence uses and needs
- Section 5.11 is the analysis of the direct, indirect, and cumulative effects of each of the alternatives on low-income and minority populations in compliance with Executive Orders 12898 and 12948.
- Section 5.12 discloses irreversible and irretrievable commitments of resources
- Section 5.13 discusses the relationship between local short-term uses and the maintenance and enhancement of long-term productivity
- Section 5.14 discloses unavoidable adverse effects

5.1.1 Definitions

Possible effects of each alternative on the biophysical and human environments of the Refuge were compared using a set of general terms to describe the intensity, duration, scale, and nature of potential impacts. In this EIS, these terms are defined as follows:

5.1.1.1 Intensity of the Effects

- No effect – Impacts resulting from the specified management action would not affect resources on Refuge lands or public use opportunities.
- Negligible – Impacts resulting from the specified management action would have no measurable effect on resources on Refuge lands or public use opportunities.
- Minor – Impacts resulting from the specified management action can be reasonably expected to have detectable though limited effect on resources on Refuge lands or public use opportunities.
- Moderate – Impacts resulting from the specified management action can be reasonably expected to have detectable and apparent effect on resources on Refuge lands or public use opportunities.
- Major – Impacts resulting from the specified management action can be reasonably expected to have readily apparent and substantial effect on resources on Refuge lands or public use opportunities.

5.1.1.2 Duration of the Effects

- Short-term – Effects on resources on Refuge lands or public use opportunities that only occur during implementation of a management action.
- Medium-term – Effects on resources on Refuge lands or public use opportunities that occur during implementation of the management action and are expected to persist for some time into the future though not throughout the life of this Plan (not longer than 15 years).
- Long-term – Effects on resources on Refuge lands or public use opportunities that occur during implementation of the management action and are expected to persist throughout the life of this Plan and, most likely, longer (more than 15 years).

5.1.1.3 Scale of the Effects

- Site-specific – Positive or negative impacts occurring at a specific site that is relatively small in size (e.g., a trailhead or nest site).
- Local – Positive or negative impacts occurring throughout a specific area that is large in size (e.g., along an entire trail or throughout an entire home range.).
- Wilderness Study Area (WSA) – Positive or negative impacts occurring throughout one or more WSAs.
- Refuge-wide – Positive or negative impacts occurring throughout the Refuge but that generally do not affect resources or public use opportunities outside the Refuge.
- Regional – Positive or negative impacts occurring throughout or nearly throughout an area, including and much larger than the Refuge. For Arctic Refuge, this would include the Alaskan North Slope, the Brooks Range, and eastern interior Alaska.

5.1.1.4 Nature of the Effects

- Direct – Impacts result from the management action and occur at the same time and place as the action.
- Indirect – Impacts result from the management action but occur later in time and/or farther removed in distance but are still reasonably foreseeable.

- Positive – Impacts resulting from management actions maintain or enhance the quality and/or quantity of resources on Refuge lands or public use opportunities.
- Negative – Impacts resulting from management actions degrade the quality and/or quantity of resources on Refuge lands or public use opportunities.

5.1.2 Resource Categories

As described in Chapter 3, multiple elements combine to create each alternative: goals and objectives; management policies and guidelines; management categories; and issues. Alternative A would continue the management direction from the 1988 Plan and would not include the goals and objectives or management policies and guidelines discussed in the Revised Plan. In this chapter, we will describe the effects of each element of each alternative on the biophysical and human environments, and various resource categories within these environments. We also include a discussion of the scientific return and economic input of each alternative on the Poker Flat Research Range Sounding Rockets Program (see Section 5.1.4).

All resources, species, and public use opportunities on the Refuge are important, but many are not expected to undergo change (positive or negative) as a result of implementing any of the alternatives. For this reason, not all species, resources, or public uses in or related to Arctic Refuge are discussed in this chapter. Site-specific environmental effects of activities that would require NEPA documentation will be addressed in subsequent environmental assessment (EA) documents or EISs.



5.1.2.1 Resource Categories for the Biophysical Environment

For each major planning issue, we analyzed the possible effects of the proposed management alternatives on the physical and biological environments of the Refuge for the following broad categories of resources, which are discussed in detail in Chapter 4:

- Permafrost and soils
- Air quality
- Water quality and aquatic habitats
- Vegetation and terrestrial habitats
- Fish populations and natural diversity
- Bird populations and natural diversity
- Mammal populations and natural diversity

5.1.2.2 Resource Categories for the Human Environment

For each major planning issue, we analyzed the possible effects of the alternative on the human environment of the Refuge for the following categories:

- Local economy and commercial uses
- Cultural resources
- Subsistence
- Visitor services and recreation opportunities
- Wilderness characteristics
- Special designations – these include the Firth-Mancha and Shublik Springs Research Natural Areas (RNAs), the Neruokpuk Lakes Public Use Natural Area (PUNA), the Refuge's Marine Protected Area (MPA), and the Refuge's three existing wild rivers (Ivishak, Sheenjek, and Wind rivers)
- Public health and safety
- Refuge operations

5.1.2.3 Resource Categories for Poker Flat Research Range

The primary purpose of this section is to evaluate the potential effects of the Plan's alternatives on the scientific return and economic input of the Poker Flat Research Range (Poker Flat). Scientific return is described qualitatively and in broad terms. Economic input is discussed quantitatively.

Assumptions - The analysis of potential impacts in this section relies heavily on mission profiles (e.g., trajectories, planned impact points, etc.) from within the past 10 years. Although each future mission would present a specific case, it is expected that the next 10-15 years of activity at Poker Flat will closely resemble the recent past, thereby providing insight into potential impacts or use conflicts under each alternative.

Estimates of economic impacts in this chapter were obtained using the Regional Input-Output Modeling System developed by the Bureau of Economic Analysis (BEA 2011); its multipliers use a combination of national and regional data to estimate the potential economic impacts of an industry's activity on other industries within the region of impact that supplies resources to that industry. Multipliers are provided to estimate impacts on economic output, earnings, employment, and value added. Impacts from economic output are evaluated using the value

added to the regional economy in terms of final goods and services directly comparable to gross domestic product, which is a widely used indicator of economic activity that represents the final value of all goods and services. The majority of Poker Flat employees reside in the Fairbanks North Star Borough (FNSB). Therefore, the FNSB is the region of impact for this socioeconomic analysis. Because no substantial economic impact from the Poker Flat facility occurs in the North Slope Borough, we have excluded that region from the model.

5.1.3 Cumulative Effects

At the end of each alternative, we discuss the anticipated cumulative effects on the biophysical and human environments. Cumulative effects include the incremental effects of the actions for an alternative when these are added to past, present, and reasonably foreseeable future actions. Cumulative effects can be the result of individually minor impacts, which can be major when added over time. If there are no direct or indirect effects of a proposed action, then there will be no cumulative effects. As the proposed action is U.S. Fish and Wildlife Service (Service) management of Arctic Refuge, few direct or indirect effects are not negligible or minor. Most effects of Service management are positive on most resources. Therefore, the cumulative effects analysis of each alternative is limited and in all cases only minor, if any, cumulative effects are anticipated. The cumulative effects discussion focuses on the three major issues: Wilderness, wild and scenic rivers, and the Kongakut River.

5.1.4 Reasonably Foreseeable Future Actions

In this section, we describe the reasonably foreseeable future actions considered in our analysis of cumulative effects. Reasonably foreseeable future actions include those Federal and non-Federal activities not yet undertaken, but sufficiently likely to occur, that we should take into account in reaching a decision (43 CFR 46.30). Reasonably foreseeable future actions include but are not limited to actions for which there are existing decisions, funding, or proposals identified by an agency. Reasonably foreseeable future actions do not include those actions that are highly speculative or indefinite. Each of the reasonably foreseeable actions currently under analysis are described briefly here and in more detail in Appendix C.

Gates of the Arctic National Park and Preserve, General Management Plan— In February 2010, Gates of the Arctic National Park and Preserve filed a Notice of Intent to prepare an EIS for an amendment to its 1986 General Management Plan and to conduct a wilderness study. The two planning processes overlap in their analyses of cumulative effects across the Arctic region.

National Petroleum Reserve–Alaska, Integrated Activity Plan and EIS— On March 30, 2012, the Bureau of Land Management (BLM) released a draft Integrated Activity Plan and EIS for the entire National Petroleum Reserve–Alaska (NPR-A). This document updates and replaces current plans for the northeastern and northwestern part of the NPR-A and would, for the first time, provide a plan for the southernmost part of the area. The draft plan incorporates the most current information and lays out management goals, objectives, and actions across the entire NPR-A. Other issues the plan considered are climate change, invasive species, raptor habitat, and the recent listing of polar bears as a threatened and endangered species. The final Integrated Activity Plan and EIS are scheduled to be released in November 2012 with a

record of decision (ROD) by the end of the calendar year. The two planning efforts overlap in their analyses of cumulative effects across the Arctic region.

Eastern Interior Resource Management Plan—On February 24, 2012, the BLM released a draft Resource Management Plan for their Eastern Interior Planning Area. The draft plan establishes goals and objectives for managing resources, and it outlines the measures needed to achieve those goals and objectives. It identifies lands available for certain uses, along with any restrictions on those uses, and lands closed to certain uses. BLM’s “Upper Black River Unit” is adjacent to the southeast boundary of Arctic Refuge and is currently not included in any existing land use plan. The two planning efforts overlap in their analyses of cumulative effects.

Polar Bear Conservation Plan—The Service is in the early planning stage of developing the Polar Bear Conservation Plan, in compliance with the Endangered Species Act and the Marine Mammal Protection Act. The plan will include a recovery plan and a conservation plan that will guide management and research activities now and into the future; it is scheduled to be completed in the fall/winter of 2013. Polar bears associated with Arctic Refuge are part of the southern Beaufort Sea stock. Arctic Refuge also includes substantial areas of polar bear critical habitat and numerous known den sites (see Chapter 4, Section 4.3.7).

Alaska Pipeline Project—The Alaska Pipeline Project would include a gas treatment plant near Prudhoe Bay, Alaska; a gas transmission pipeline that would connect the Point Thomson field (gas extraction location) to the gas treatment plant; and a transmission pipeline that would deliver the gas to market. A portion of the pipeline is expected to run adjacent to the westernmost border of Arctic Refuge, near the Atigun Gorge. Approvals for the project are expected in 2014, and the first gas extraction is expected to commence in 2020 at the earliest. The cumulative effects areas of the Alaska Pipeline Project and the Revised Plan overlap.

Point Thomson Project—The Point Thomson Project would develop the Thomson Sand Reservoir to extract gas condensate and oil for the purpose of commercial production. The project would be located on the North Slope of Alaska west of Arctic Refuge. The site would include three drilling pads, wells, infield roads, pipelines, a landing area, and a gravel mine. Two of the drilling pads would be located two and five miles from the western boundary of the Refuge: the central pad would be located five miles from the Refuge boundary and eight miles from the Canning River; the east pad would be located two miles from the Refuge boundary and five miles from the Canning River. A final EIS was released in July 2012. Selection of the preferred alternative has been deferred to the project’s ROD, which will be issued after public notice of a Clean Water Act Section 404 permit application.

Poker Flat Research Range—The National Aeronautics and Space Administration (NASA) is currently preparing an EIS for its Sounding Rockets Program at the Poker Flat Research Range, and the Service is a cooperating agency for the NASA EIS. Downrange flight zones are the areas over which rockets are launched and within which spent stages and payloads impact the ground. Lands owned or managed by the Service, BLM, State of Alaska, Native Village of Venetie Tribal Government, Alaska Native organizations, and individuals are within these flight zones, including portions of Arctic Refuge. NASA’s EIS will assess the impacts of the Sounding Rockets Program, including the effects of recovery versus abandonment of spent

rocket parts, payloads, and other equipment. It will also discuss a variety of recovery initiatives. Upon completion of the EIS, NASA hopes the Service will issue limited authorizations for the Poker Flat Sounding Rockets Program so that it may continue.

Foothills West Transportation Access Project— The Foothills West Transportation Access Project (commonly referred to as the Foothills Project or Umiat Road Project) proposes to construct an all season gravel road from the Dalton Highway to Umiat, Alaska. The purpose of the project is to provide access to oil and gas resources both along the northwestern foothills of the Brooks Range and within the NPR-A. The road would provide exploration and development opportunities for the area and facilitate NPR-A development. The U.S. Army Corps of Engineers is currently developing an EIS for the project. The cumulative effects areas of the Foothills West Project and the Revised Plan overlap.

Barter Island Airport Improvements— Barter Island Airport is within Arctic Refuge and provides the only year-round access to the community of Kaktovik, Alaska. The Federal Aviation Administration and North Slope Borough plan to relocate the airport to the south side of Barter Island, about one mile southwest of Kaktovik, onto lands owned by the Kaktovik Iñupiat Corporation (KIC). The site is at the island's highest elevation and is therefore less susceptible to flooding. An EA was completed for this project in January 2009. Construction will begin after freeze-up in late 2012 and is expected to take three years to complete. Under the terms of a land exchange that granted Arctic Slope Regional Corporation the subsurface estate under KIC lands, the Refuge has input over the design and reclamation of the material sites that would be used for the project.

Beaufort Sea Oil and Gas Leases— The Bureau of Ocean Energy Management released a final Programmatic Environmental Impact Statement on June 26, 2012, which analyzes six oil and gas lease planning areas for the leasing period of 2012-2017. The proposed action includes a lease sale in 2017 for the Beaufort Sea Planning Area, including waters just north of Arctic Refuge, with proposed subsistence deferment areas near Kaktovik and an area on the far western border of the planning area. Any sale that takes place in 2017 will require an EIS be provided to the Bureau of Ocean Energy Management prior to any exploration activities in the lease area.

State Notice of Sale of North Slope Leases— On December 7, 2011, the State of Alaska Department of Natural Resources issued a Notice of Sale for 3,145 tracts of State land in the Beaufort Sea, the North Slope, and the North Slope foothills areas. These leases allow for the possibility of oil and gas exploration and development in the areas near Arctic Refuge, including four tracts adjacent to the Refuge boundary.

State of Alaska Predator Management— The Alaska Board of Game authorized intensive management of brown bear in Game Management Unit (GMU) 26B in order to lessen predatory pressure on the GMU's muskox population. GMU 26B contains both State-owned land and a portion of Arctic Refuge. With the exception of Refuge lands, the proposal as accepted by the Board of Game will allow 20 brown bears to be taken annually.

5.2 Effects Common to Alternatives

In this section, we describe the direct and indirect effects that are the same across the alternatives. As discussed in Chapter 3, Section 3.2, multiple elements combine to create each alternative. While we considered the full suite of elements for each alternative in this effects analysis, we found that the primary differences between the alternatives were the effects associated with the different approaches to the three planning issues: Wilderness, wild rivers, and Kongakut River visitor use management. The effects of the management policies and guidelines and the goals and objectives were the same across the five action alternatives (B-F) (see Sections 5.2.1 and 5.2.2). Similarly, the effects of the Revised Plan on the reasonably foreseeable future actions were the same across the alternatives.

Numerous management programs would continue regardless of the alternative selected. For example, we would continue to abide by the International Porcupine Caribou Herd Conservation Agreement, offer the six priority public uses identified in the National Wildlife Refuge System Improvement Act of 1997, and manage the Arctic Village Sheep Management Area. While these programs are not mentioned in the effects analysis, the Refuge is committed to implementing them. Please refer to Chapter 3, Section 3.2.1 for a description of the management programs that would continue under all the alternatives.

5.2.1 Effects of the Planning Issues Common to All Alternatives

5.2.1.1 Effects of the Wilderness Issue Common to All Alternatives

The administrative act of recommending an area for Wilderness designation would have no effect on Refuge resources or operations. Areas recommended for Wilderness would continue to be managed under the Minimal Management category (see Chapter 2, Section 2.3.3) as they are now. Therefore, the effects of the Wilderness issue under each of the six alternatives are the same, even though each alternative presents a different approach to this issue. If Congress were to designate any of Wilderness Study Areas (WSAs) as Wilderness, then the effects would vary across the alternatives, and it is these effects that are discussed in see Sections 5.3 to 5.9.

5.2.1.2 Effects of the Wild and Scenic River Issue Common to All Alternatives

The Wild and Scenic Rivers Act requires rivers determined suitable for designation as wild rivers be managed to maintain their free-flowing character, outstandingly remarkable values, and preliminary or recommended classification (i.e., wild, scenic, or recreational), whether or not they are recommended for designation. Under each alternative, the Refuge would use existing management tools to protect the values for rivers that are suitable but not recommended for designation. Therefore, wild and scenic river suitability determination adds a management commitment to Refuge staff across all alternatives, and the effects on Refuge operations would be negligible to minor, long-term, local, and negative. For a complete description of the effects of maintaining river values for suitable but not recommended rivers on each of the resource categories, please see the effects analysis of the wild and scenic river issue under Alternatives A (Section 5.3). For those alternatives that recommend suitable rivers (Alternatives B-E), additional effects are described.

General efforts to maintain wilderness characteristics and/or manage the Refuge as a naturally functioning ecosystem through the proposed goals, objectives, management policies, and guidelines would be the same for Alternatives B-F. These management tools would generally serve to maintain the free-flowing character of the Refuge's rivers and protect the outstandingly remarkable values of the four rivers found suitable for inclusion in the National Wild and Scenic Rivers System (NWSRS) (for more information, see the effects of the wild and scenic river issue under Alternative F, Section 5.9 of this chapter)).

For alternatives that recommend one or more rivers for inclusion in the NWSRS, additional effects would be incurred beyond baseline effects, and these are described in Sections 5.4 to 5.8.

5.2.1.3 Effects of the Kongakut River Visitor Management Issue Common to All Alternatives

Under all the alternatives, the Kongakut River would continue to be managed under the Wilderness Management category, including the statutory protections afforded by the Wilderness Act. Additionally, a set of management actions already in place and specific to the Kongakut River valley would continue to be used by Refuge staff and the Service under each of the six alternatives (see Chapter 3, Section 3.2.2.3, "Kongakut River Visitor Management" for a description of the management actions common to all the alternatives). In general, we believe existing management provides important protections to the biophysical and human environments in the Kongakut River valley; however, degradation of resources and visitor experience continues. For a complete description of the effects of current management, please see the effects analysis of the Kongakut River visitor use management issue under Alternative A (Section 5.3).

Assumptions - Under all alternatives, the current level of use in the Kongakut River valley is expected to continue, although some of the alternatives would freeze current use levels for up to four years and/or curb (but not halt) visitor impacts on resources. Because the Kongakut River flows through arctic habitats, physical damage (e.g., hardened campsites, trailing, etc.) may be irreparable, or at best take many years to recover. Under all the alternatives, degradation of the Kongakut Rivers's physical and experiential resources would continue, until focused, integrated strategies for mitigating such impacts are developed and implemented through step-down planning, but at variable rates, depending on the alternative (see Sections 5.3 to 5.9 for a discussion of these effects).

All the alternatives include a commitment to complete a Public Use Management Plan (Alternative A) or a Visitor Use Management Plan (VUMP) (Alternatives B-F). Step-down planning efforts would allow the Refuge to address visitor use concerns holistically, rather than drainage-by-drainage or area-by-area, thus limiting or avoiding visitor displacement, public use conflicts, and visitor impacts to other areas of the Refuge. As the step-down plan unfolds, it is likely to have impacts on visitor services and recreational opportunities, local economy and commercial services, and Refuge operations. The effects are likely to be minor to moderate, long-term, local, and positive for most environments affected by the Plan; however, the effects could also be minor to moderate, long-term, local, and negative to any commercial services potentially restricted or curtailed as a result of the step-down plan.

5.2.2 Effects of the Planning Issues on Resource Categories across All Alternatives

This section evaluates the effects that are common or consistent across all the alternatives.

5.2.2.1 Effects of the Planning Issues on the Biophysical Environment across All Alternatives**Permafrost and Soils Under All Alternatives**

Under all alternatives, the effects of visitor use and construction of temporary facilities could result in local impacts to soils and permafrost. Damage could include destruction of soil structure by compaction, removal of the uppermost organic layers of soil, soil erosion, melting of permafrost, and ground subsidence due to thawing of buried ice and permafrost. Disturbance would be site-specific and restricted to areas receiving repeated use, such as base camps and aircraft accessible sites. It is anticipated these effects would be negligible to minor, site-specific, long-term, and negative.

Air quality Under All Alternatives

None of the actions or activities presented under any of the alternatives would affect air quality, and there would be no long-term or cumulative effects from Refuge management. Designation of more Wilderness, wild and scenic rivers, or different management scenarios for the Kongakut River would have no effect on air quality.

Water Quality and Aquatic Habitats Under All Alternatives

Under all alternatives, the effects of visitor use on water quality and aquatic habitats are anticipated to be negligible to minor, site-specific, and short-term. Possible negative impacts could arise from spills occurring during potential transfer and storage of fuels supporting boating, aircraft, or other public use activities. Permit stipulations for commercial operators limit storage of fuels on the Refuge. Scientific sampling equipment such as gauging stations could be installed in lands or waters not designated as Wilderness to monitor water quality and quantity in aquatic habitats.

Human waste accumulation could result in negligible to minor diminished water quality in site-specific locations for a short duration with no long-term effects. Water quality monitoring at the Refuge has not been conducted to identify impacts of human waste because it is expected that river water quality throughout the Refuge remains very clean compared to standards established by the Environmental Protection Agency for recreational waters. Damage to vegetation and terrestrial habitats can lead to erosion, which could indirectly result in moderate, long-term, site-specific and negative effects to water quality and aquatic habitats (see “Vegetation and Terrestrial Habitats Under All Alternatives”).

Vegetation and Terrestrial Habitats Under All Alternatives

Under all alternatives, direct effects of visitor use on vegetation include: 1) trampling; 2) damage to trees and shrubs; and 3) the possible introduction of invasive plants. Disturbances to vegetation would be site-specific and restricted to areas receiving repeated use, such as

base camps and aircraft accessible sites. We anticipate these effects would be negligible to minor, site-specific, short-term, and negative.

The arctic and subarctic plant communities on the Refuge are slow growing and do not recover quickly from disturbance. Indirect effects of visitor use on vegetation include the effects of soil and snow compaction. Damage to the point that bare ground is exposed can result in erosion, which in turn could have minor to moderate, long-term, site-specific, and negative effects to vegetation and terrestrial habitats, as well as to water quality and aquatic habitats (see “Water Quality and Aquatic Habitats Under All Alternatives”).

Fish Populations and Natural Diversity Under All Alternatives

The potential for human activities to affect fish abundance and distribution will vary, depending on the scale, location, and timing of the activity, and this would be true under all alternatives. None of the alternatives would adversely affect Yukon River salmon habitat or populations, or our international treaty obligations regarding fish.

Bird Populations and Natural Diversity Under All Alternatives

The potential for human activities to affect bird abundance and distribution will vary, depending on the scale, location, and timing of the activity, and this would be true under all alternatives. None of the alternatives would adversely affect our international treaty obligations regarding birds.

Mammal Populations and Natural Diversity Under All Alternatives

The potential for human activities such as hunting and trapping to affect mammal abundance and distribution will vary, depending on the scale, location, and timing of the activity, and this would be true under all alternatives. Effects would be managed through regulations, including hunting and trapping regulations, other State and Federal regulations, and any regulations proposed and promulgated as a result of Refuge step-down plans. Current and future regulations will have the same effects under all alternatives. Additionally, none of the alternatives would adversely affect the Porcupine caribou herd or our international agreement regarding this herd.

5.2.2.2 Effects of the Planning Issues on the Human Environment across All Alternatives

Local Economy and Commercial Uses Under All Alternatives

There are no similar or common effects on local economy and commercial uses. Effects on local economy and commercial uses vary across the alternatives.

Cultural Resources Under All Alternatives

Federal and State laws and regulations would continue to provide direction for the management of cultural resources. Inventorying and monitoring would continue as required. People using Refuge lands and waters for a variety of purposes might cause some damage to

sites (intentionally or unintentionally). However, loss of cultural resources is primarily a result of natural forces, especially erosion, and is largely due to factors beyond our control. Negative effects could range from minor to major, long-term, and site-specific to local. If there are impacts to properties eligible for National Register of Historic Places inclusion, the impacts are, by definition, not negligible.

Subsistence Under All Alternatives

None of the alternatives would affect the opportunity for continued subsistence uses, nor would they restrict the availability of subsistence resources to federally qualified subsistence hunters.

Visitor Services and Recreation Opportunities Under All Alternatives

None of the alternatives would affect law enforcement and other Refuge staff response to known legal and special use permit violations or to identified natural resource concerns. The Service and the Refuge would continue to respond to such issues in the same manner as they do now.

Wilderness Characteristics Under All Alternatives

Under all alternatives, a management focus on less manipulation of the environment and promoting actions that facilitate solitude, self-discovery, self-reliance, remoteness, and primitive or unconfined recreational experiences would have negligible, indirect, long-term, Refuge-wide, positive effects on wilderness characteristics.

Special Designations Under All Alternatives

There would be no effects to the Neruokpuk Lakes PUNA, Firth-Mancha RNA, or Shublik Springs RNA as a result of Wilderness recommendation or designation. These three areas are already in designated Wilderness.

There would be no effects to the Neruokpuk Lakes PUNA, Firth-Mancha RNA, or the Refuge's three existing wild rivers as a result of wild river recommendation or designation.

Long-term, there would be no effect to the Neruokpuk Lakes PUNA, Firth-Mancha RNA, or Shublik Springs RNA as a result of Kongakut River visitor use management, nor would there be any direct effects to the Refuge's three existing wild rivers. However in the short-term, interim management could affect these special designations if commercial recreational guides elect to divert their operations from the Kongakut River to the PUNA, RNAs, or existing wild rivers (see "Special Designations" in Sections 5.4.3 and 5.5.3.).

Public Health and Safety Under All Alternatives

Under all alternatives, the Refuge manager is authorized in emergencies to take whatever prudent and reasonable actions are necessary to address public health and safety. In this regard, there are no differences between the alternatives, and there would be no adverse effect to public health and safety under any of the alternatives.

Refuge Operations Under All Alternatives

Based on the long-range planning and budget forecasts for the Department of the Interior (DOI) and the Service, appropriations and agency funding are expected to be flat or decreasing. The Service would be limited in operational funds, which would have a moderate to major effect on future staffing and operational capacities. Some needed positions would not be filled. Some programs would be reduced or eliminated based upon current program needs and priorities. The lack of staffing would result in an inability to ensure adequate resource management oversight, provision of visitor use activities, and planning for the future.

Under all five action alternatives, future step-down planning and the need to complete Minimum Requirement Analyses (MRAs) for all past and future management actions in designated Wilderness would result in moderate, short-term, Refuge-wide, and negative impacts to Refuge operations. Once completed, step-down plans and the monitoring protocols and other management controls that the plans would put in place, should increase staff efficiency and reduce the amount of time Refuge staff spend on resource concerns. Long-term, these effects would be minor to moderate, Refuge-wide, and positive.

5.2.2.3 Effects of the Planning Issues on Poker Flat Research Range across All Alternatives

Nothing in any of the alternatives would directly limit or curtail the Poker Flat Sounding Rockets Program. The administrative act of recommending Wilderness or wild rivers would have no effect on Poker Flat, nor would any of the management actions proposed for the Kongakut River. If Congress were to designate additional Wilderness or wild rivers, potential effects on Poker Flat would vary across alternatives, as discussed elsewhere in this chapter.



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5.2.3 Effects of the Management Policies and Guidelines

For Alternative A, the Management Policies and Guidelines (guidelines) included in the 1988 Plan would continue to be used. Continuing management under the 1988 guidelines would not change the current situation; thus, any impacts on the biophysical or human environment resulting from current management would continue under Alternative A. However, all five of the action alternatives (B–F) would adopt new Arctic Refuge management policies and guidelines. This section evaluates the effects of the new guidelines and policies on resource categories. For an explanation of the differences between the management direction under Alternative A and that which would be adopted under Alternatives B–F, please refer to Table 3-2 in Chapter 3, Section 3.3.

As in the 1988 Plan, the Revised Plan assigns management direction to three categories—Minimal, Wild River, and Wilderness Management. None of the alternatives in this Revised Plan assign Refuge lands to the Intensive or Moderate Management categories. Lands recommended in this Plan for Wilderness or wild river status are managed in the Minimal Management category and would be assigned to the Wilderness or Wild River Management categories only if Congress designated those lands and waters as part of the National Wilderness Preservation System (NWPS) or the NWSRS.

5.2.3.1 Effects of the Management Policies and Guidelines on the Biophysical Environment

Those changes in the management policies and guidelines that have effects on the biophysical environment include:

- 1) an added emphasis on studying the effects of climate change on wildlife and ecosystems, including modeling future scenarios (Chapter 2, Section 2.4.10.1);
- 2) an increased focus on perpetuating the distinctive qualities of the Refuge’s resources in their natural condition and retaining their wild character (Chapter 2, Section 2.4.11.1); and
- 3) an increased focus on maintaining the natural diversity of native species and maintaining functioning ecosystems without human interference.

By emphasizing the perpetuation of ecological processes, natural diversity, and the free function of natural communities in the Refuge, the management policies and guidelines would allow the Refuge to continue to serve as a natural laboratory of international importance and provide opportunities for scientific understanding of wildlife, ecology, geophysics, and the changing climate. We believe implementing the management policies and guidelines would have a positive effect on the biophysical environment. Habitat manipulation or other management actions may be authorized by the Refuge manager in cases of management emergencies (see Chapter 2, Section 2.4.2).

Effects of Guidelines on Permafrost and Soils

Perpetuating natural conditions, wild character, biological diversity, and maintaining intact ecosystem function (recognizing that ecosystems are dynamic) would allow natural vegetative cover to protect soils and permafrost from damage, and have negligible to minor, long-term, Refuge-wide, and positive effects on permafrost and soils. Implementing the guidelines could result in increased knowledge of climate change and improved ability to understand, predict, and manage for environmental responses to arctic climate change. However, the guidelines also direct the Service to generally avoid intervening with resources in the Refuge in response to climate change or naturally occurring events, unless the event is determined to be a management emergency. This approach could result in minor to moderate, short- to long-term, site-specific to local, and negative effects if events resulted in the degradation or loss of permafrost and soils. Climate change is not part of our management actions and we would not be able to mitigate for or minimize these effects.

Effects of Guidelines on Air Quality

Implementing the guidelines would have no effect on air quality. Episodes of reduced air quality currently come from long-range transport, such as from forest fires in interior Alaska and industry in Asia, or from industrial developments outside the Refuge. These sources are beyond the purview of the Revised Plan. Wildfires occur on the Refuge occasionally during the summer months and can negatively influence air quality. Ninety-eight percent of the Refuge (including designated Wilderness) is under the “Limited Management Option,” meaning no suppression will occur unless a life-threatening situation or threats to communities exists. Some climate change models predict increased incidence of wildfires in boreal and arctic regions. Increased wildfire incidence would cause minor to moderate, regional, short-term, negative effects on air quality.

Effects of Guidelines on Water Quality and Aquatic Habitats

Perpetuating natural conditions, wild character, biological diversity, and maintaining intact ecosystem function (recognizing that ecosystems are dynamic) would allow natural vegetative cover to protect water quality and aquatic habitats, such as protecting soils from erosion. Effects would be negligible to minor, long-term, Refuge-wide, and positive for water quality and aquatic habitats. However, the guidelines direct the Service to generally avoid intervening with resources in the Refuge in response to climate change or naturally occurring events, unless the event is determined to be a management emergency. This approach could result in minor, short- to long-term, site-specific to local, and negative effects if events resulted in the degradation of water quality and aquatic habitats. Climate change is not part of our management actions and we would not be able to mitigate for or minimize these effects.

Effects of Guidelines on Vegetation and Terrestrial Habitats

Perpetuating native species in their natural diversity and maintaining intact ecosystem function could lessen damage to vegetation and terrestrial habitats resulting from administrative, development, and visitor use activities. Implementing the guidelines could result in increased knowledge of climate change and invasive species and an improved ability to understand, predict, and manage for the environmental responses of vegetation and terrestrial habitats. The effects would be negligible to minor, long-term, Refuge-wide, and positive for vegetation and terrestrial habitats. However, the guidelines also direct the Service to generally avoid intervening with resources in the Refuge in response to climate change or naturally occurring events, unless the event is determined to be a management emergency. This approach could result in minor, short- to long-term, site-specific to local, and negative effects if events and/or changing climate resulted in the degradation or loss of vegetation and terrestrial habitats. Climate change is not part of our management actions and we would not be able to mitigate for or minimize these effects.

Effects of Guidelines on Fish Populations and Natural Diversity

Perpetuating populations and native species in their natural diversity and maintaining intact ecosystem function (recognizing that ecosystems are dynamic) would allow fish populations and natural diversity to continue without human intervention. Effects would be negligible to minor, long-term, Refuge-wide, and positive for fish populations and natural diversity. However, the guidelines direct the Service to generally avoid intervening with resources in the Refuge in response to climate change or naturally occurring events, unless the event is determined to be a management emergency. This approach could result in changes to species presence, abundance, or distribution; the gradual loss or decline of some fish populations; or new species might move into the area. The effects could be positive, negative, or neutral, depending on what actually occurs and people's perceptions of these changes.

Effects of Guidelines on Bird Populations and Natural Diversity

Perpetuating populations and native species in their natural diversity and maintaining intact ecosystem function (recognizing that ecosystems are dynamic) would allow bird populations and natural diversity to continue without human intervention. Most bird species are migratory, and therefore beneficial effects could be expressed over a larger area than the Refuge. Effects would be negligible to minor, long-term, regional or greater, and positive for bird populations and natural diversity. However, the guidelines direct the Service to generally avoid intervening with resources in the Refuge in response to climate change or naturally occurring events, unless the event is determined to be a management emergency. This approach could result in changes to species presence, abundance, or distribution; the gradual loss or decline of some bird populations; or new species might move into the area. The effects could be positive, negative, or neutral, depending on what actually occurs and people's perceptions of these changes. Again, because most bird species are migratory, effects could be expressed over a larger area than the Refuge.

Effects of Guidelines on Mammal Populations and Natural Diversity

Perpetuating populations and native species in their natural diversity and maintaining intact ecosystem function (recognizing that ecosystems are dynamic) would allow mammal populations and natural diversity to continue without human intervention. Some mammal species range over large areas, and therefore beneficial effects could be expressed over a larger area than the Refuge. Effects would be negligible to minor, long-term, Refuge-wide to regional, and positive for mammal populations and natural diversity. However, the guidelines direct the Service to generally avoid intervening with resources in the Refuge in response to climate change or naturally occurring events, unless the event is determined to be a management emergency. This approach could result in changes to species presence, abundance, or distribution; the gradual loss or decline of some mammal populations; or new species might move into the area. The effects could be positive, negative, or neutral, depending on what actually occurs and people's perceptions of these changes. Again, because some mammal species are migratory or range over large areas, effects could be expressed over a larger area than the Refuge.

5.2.3.2 Effects of the Management Policies and Guidelines on the Human Environment

Those changes in the management guidelines that have effects on the human environment would include:

- 1) an increased emphasis on improving formal consultation and coordination with tribal governments, regional and village corporations, and local village councils regarding issues and programs that could affect Native people, their communities, and subsistence use (Chapter 2, Section 2.4.9.2);
- 2) an increased focus on ensuring local rural residents and the Federal Subsistence Regional Advisory Councils associated with the Refuge have a meaningful role and the opportunity to participate in the Federal Subsistence rule-making process (Chapter 2, Section 2.4.13);
- 3) a focus on managing recreation in a manner consistent with the Refuges special values (Chapter 1, Section 1.5) and with an increased emphasis on providing opportunities to experience wildness, adventure, freedom, independence, self-reliance, solitude, and discovery (Chapter 2, Section 2.4.15)
- 4) a focus on perpetuating the distinctive qualities of the Refuge's resources in their natural condition and retaining their wild character (Chapter 2, Section 2.4.11.1);

By focusing management on the special values of the Refuge and working more closely with local communities, the management policies and guidelines would maintain and enhance the human environment, especially subsistence opportunities and various recreational pursuits. In general, we believe the management policies and guidelines would have a positive effect on the human environment.

Effects of Guidelines on Local Economy and Commercial Uses

Implementing the management policies and guidelines could affect local economies or commercial uses to the extent that commercial services catering to recreationists seeking opportunities to experience independence, self-reliance, and solitude might be enhanced, and those more dependent on visitor use facilities and larger, supported groups could be reduced. These effects are likely to be negligible, long-term, Refuge-wide, and negative or positive, depending on whether there is net economic gain or loss to the economy. There would be no effect to local economies or commercial uses from such activities as mineral exploration or development or the commercial gathering of resources such as fish and timber. Such activities do not currently occur on the Refuge, and there would be no change in the management direction concerning such activities regardless of the alternative selected (A – F).

Effects of Guidelines on Cultural Resources

Improving communications, consultations, and cooperation with tribal governments, Native corporations, village councils, and Native organizations would help the Service better understand cultural resource issues and concerns, and would help us identify opportunities for mutual cooperation. Effects would be minor, long-term, Refuge-wide, and positive by ensuring the conservation and protection of cultural resources and the continuation of traditional Native use.

Effects of Guidelines on Subsistence

Perpetuating wildlife and plant populations and natural diversity, while maintaining intact ecosystem function would provide negligible, long-term, Refuge-wide, and positive effects on the availability of subsistence resources and the opportunity for continued subsistence use. However, the guidelines direct the Service to generally avoid intervening with resources in the Refuge in response to climate change or naturally occurring events, unless the event is determined to be a management emergency, including subsistence resources. This approach could result in the gradual loss or decline of subsistence resources, or result in them changing through time. The effects would likely be minor, long-term, Refuge-wide to regional, and negative.

An increased effort to improve communications, consultations and cooperation with local village residents, tribal governments, Native corporations, Native organizations, and Federal Subsistence Regional Advisory Councils associated with the Refuge would provide minor, long-term, Refuge-wide, positive effects since it would ensure local rural residents have a meaningful role and the opportunity to participate in the Federal subsistence rule-making process for the conservation and use of subsistence resources. New guidelines restricting the use of domestic goats, sheep, and camelids on the Refuge could help prevent the spread of disease, primarily to Dall's sheep, and indirectly lead to minor, long-term, Refuge-wide, positive effects on subsistence resource availability and access.

Effects of Guidelines on Visitor Services and Recreation Opportunities

Promoting minimal to no evidence of human modifications or changes upon the landscape, including signs, kiosks, visitor facilities, or roads would have negligible to minor, long-term, Refuge-wide effects. Effects could be seen either as positive or negative, depending on the perspectives and expectations of the Refuge user. By emphasizing recreational opportunities to experience wildness, adventure, freedom, independence, self-reliance, solitude, and discovery, visitor services catering to recreationists seeking such opportunities could be enhanced. Conversely, there could be a reduction in visitor services more dependent on visitor use facilities and larger, supported groups. These effects are likely to be negligible, long-term, Refuge-wide, and negative or positive, depending on the perspective of the Refuge user.

Visitor services and recreation opportunities dependent on select pack animals including domestic goats, sheep, and camelids (e.g., alpacas and llamas) would not be allowed on Arctic Refuge; straw and hay bedding would not be allowed for dog teams; and pelletized weed-free feed would be required for other types of pack animals (e.g., horses) (see Chapter 2, Sections 2.4.12.8 and 2.4.12.9). These policies would result in negligible, long-term, Refuge-wide, and negative effects to recreationists and commercial service providers using pack animals; however, these management provisions should also result in negligible to minor, long-term, Refuge-wide, and positive effects on wildlife populations, especially Dall's sheep.

Under the 1988 Plan, the Refuge could authorize helicopter landings through a special use permit; however, none have been issued on Arctic Refuge for recreational access. Thus, there would be no change in actual use of helicopters for recreational access by implementing any of the alternatives.

Effects of Guidelines on Wilderness Characteristics

Less manipulation of the environment and more promotion of actions that facilitate solitude, self-discovery, self-reliance, remoteness, and primitive or unconfined recreational experiences would provide minor, long-term, Refuge-wide, positive effects to wilderness characteristics.

Effects of Guidelines on Special Designations

The management policies and guidelines would adopt a management approach where natural systems prevail and there would be little direct management intervention, except for restoration of impaired sites. This could have indirect, negligible, long-term, local, and positive effects on the Refuge's specially designated areas under the five action alternatives (B – F).

Effects of Guidelines on Public Health and Safety

The management policies and guidelines direct the Refuge to avoid using signs, marked trails, roads, public use cabins, or other similar visitor facilities on the Refuge. While the use of these tools could increase safe travel through wild areas, this management approach is no different than under current management, and therefore there is no effect. It may be necessary when an emergency occurs on the Refuge to deviate from the Plan's policies and guidelines and undertake actions not normally allowed on the Refuge to ensure public health and safety.

Effects of Guidelines on Refuge Operations

In accordance with current national and regional Service policies, all Refuge management activities in designated Wilderness must be supported by an MRA whether or not any prohibited uses are proposed. Normally prohibited uses (e.g., motor vehicles, motorized equipment, helicopters, structures, installations, temporary roads, etc.) would be approved only where found to be the minimum necessary to manage the area as Wilderness. This change would increase the paperwork burden on Refuge staff, but would enhance Wilderness character. Effects on Refuge operations would likely be negligible, long-term, and negative for those management activities in designated Wilderness.

Nothing in the Revised Plan would affect the jurisdiction or responsibilities of the State with respect to fish and wildlife management. However, the management policies and guidelines would generally adopt a non-intervention approach to fish and wildlife management, with exceptions for management emergencies; this approach could conflict with State fish and wildlife management goals.

5.2.3.3 Effects of the Management Policies and Guidelines on Poker Flat Research Range

The new management policies and guidelines do not address NASA or Poker Flat by name and would have no direct effects on the Sounding Rockets Program. Because the new guidelines support naturally functioning ecosystems, retaining wilderness characteristics, and minimizing human imprints on the landscape, adopting the new guidelines would indirectly affect Poker Flat. In order to meet the guidelines, the Refuge would expect NASA to continue efforts to clean up past and future spent rocket parts throughout the Refuge. NASA would be considered an important partner in meeting the guidelines. Implementing the guidelines would result in minor, short- and long-term, Refuge-wide, and negative economic effects to NASA due to increased costs associated with clean-up efforts. On the other hand, implementing the guidelines would support increasing our knowledge of climate change and other scientific pursuits, and indirectly this could result in negligible to minor, long-term, Refuge-wide, and positive effects to the scientific return of Poker Flat and the Sounding Rockets Program.

5.2.4 Effects of the Goals and Objectives

The 1988 Plan did not include goals, objectives, or strategies for managing the Refuge. Because Alternative A is a continuation of current management, Alternative A would not include goals or objectives, consistent with current Refuge management. Continuing management under the 1988 Plan would not change the current situation; thus, any impacts on the biophysical or human environment resulting from current management would continue under Alternative A. However, all five of the action alternatives (B–F) would adopt new management goals and objectives for Arctic Refuge.

The Revised Plan contains a set of nine goals with associated objectives and strategies that would be implemented over the 15-year life of the Plan (see Chapter 2, Section 2.1). These goals, objectives, and strategies would allow the Refuge to more proactively direct staff, funding, and other resources towards management of the Refuge than we currently do under the 1988 Plan. The following sections evaluate the effects of the proposed goals and objectives

on resource categories in the biophysical and human environments, including effects on the Poker Flat Research Range Sounding Rockets Program.

5.2.4.1 Effects of the Goals and Objectives on the Biophysical Environment

The proposed goals and objectives support naturally functioning ecosystems, retaining wilderness characteristics, and conducting collaborative research on a variety of resources within the Refuge and on climate change. Although public use is encouraged, visitors are also encouraged to minimize impacts on Refuge resources. In general, we anticipate implementing goals and objectives would have a positive effect on the biophysical environment.

Effects of Guidelines on Permafrost and Soils

Goals and objectives that encourage Refuge users to minimize impacts would have minor, long-term, local, and positive effects on soils and permafrost, while objectives focused on restoring damaged or impaired sites could have minor to moderate, long-term, site-specific, and positive effects on permafrost and soils. Implementing the goals and objectives would result in increased knowledge of climate change and an improved ability to understand, predict, and manage for environmental responses to arctic climate change. Therefore, goals and objectives focused on maintaining functioning ecosystems without human interference would indirectly provide negligible, long-term, Refuge-wide, and positive effects on permafrost and soils.

Effects of Guidelines on Air Quality

Implementing the goals and objectives would have no effect on air quality.

Effects of Guidelines on Water Quality and Aquatic Habitats

Goal 3 and its associated objectives focus specifically on research and studies that would increase our understanding of and appreciation for waters in the Refuge and the diverse aquatic habitats these waters support. Implementing this goal and its objectives would increase knowledge of aquatic habitats and their function in the Refuge. They would also improve our ability to respond to any water quality and aquatic habitat concerns identified by these studies. Indirectly then, Goal 3 and its objectives would have minor to moderate, long-term, Refuge-wide, and positive effects on water quality and aquatic habitats.

Multiple goals and objectives are aimed at perpetuating biological diversity and wilderness characteristics and maintaining intact ecosystem function, including water quality and aquatic habitats. These would result in negligible, long-term, Refuge-wide, and positive effects on water quality and aquatic habitats. Goals and objectives that encourage Refuge users to minimize impacts and those that would establish user capacities (Objective 3.5) would have negligible to minor, long-term, site-specific, and positive effects on water quality and aquatic habitats.

Effects of Guidelines on Vegetation and Terrestrial Habitats

Goals and objectives that encourage Refuge users to minimize impacts to vegetation would have negligible to minor, long-term, local, and positive effects, while objectives focused on restoring damaged or impaired sites would have minor to moderate, long-term, site-specific, and positive effects on vegetation and terrestrial habitats. Goals and objectives focused on long-term collaborative research on vegetation and habitats and maintaining intact ecosystem function would improve our ability to understand, predict, and manage vegetation and terrestrial habitats, resulting in indirect, negligible, long-term, Refuge-wide, and positive effects on vegetation and terrestrial habitats.

Effects of Guidelines on Fish Populations and Natural Diversity

Implementing those goals and objectives that would increase knowledge of aquatic habitats and their function in the Refuge and those that would improve our ability to respond to water quality and aquatic habitat concerns would provide negligible, indirect, long-term, Refuge-wide, and positive effects on fish populations and natural diversity. Similarly, goals and objectives requiring long-term collaborative research on fish populations and natural diversity and those focused on maintaining intact ecosystem function would indirectly provide negligible to minor, long-term, Refuge-wide, and positive effects on fish populations and natural diversity.

Effects of Guidelines on Bird Populations and Natural Diversity

Goals and objectives requiring long-term collaborative research on bird populations and natural diversity and those focused on maintaining intact ecosystem function would indirectly provide negligible to minor, long-term, Refuge-wide, and positive effects on bird populations and natural diversity.

Effects of Guidelines on Mammal Populations and Natural Diversity

Goals and objectives requiring long-term collaborative research on mammal populations and natural diversity and those focused on maintaining intact ecosystem function would indirectly provide negligible to minor, long-term, Refuge-wide, and positive effects on mammal populations and natural diversity.

5.2.4.2 Effects of the Goals and Objectives on the Human Environment

The proposed goals and objectives support naturally functioning ecosystems, retaining wilderness characteristics, and providing opportunities for wildlife-dependent and wilderness-associated recreational activities. Although public use is encouraged, visitors are also encouraged to minimize impacts on Refuge resources. In consultation with appropriate parties, the Refuge would provide for continued subsistence opportunities and document, conserve, and protect cultural resources. While on-site visitor contacts would be minimized, Refuge staff would provide outreach to those interested in the Refuge to enhance their understanding, appreciation, and stewardship of the Refuge and its resources. In general, we anticipate implementing the goals and objectives would have a positive effect on the human environment.



Effects of Goals and Objectives on Local Economy and Commercial Uses

Nothing in the goals and objectives would directly affect local economy and commercial uses as compared to the current situation; therefore, the goals and objectives would have no effect on local economy and commercial uses. Local economy and commercial uses could potentially be indirectly affected by goals and objectives requiring step-down plans that in turn result in changes to visitor or commercial services. Such effects would likely be negligible, long-term, Refuge-wide, and positive or negative, depending whether there is net economic gain or loss to the economy.

Effects of Goals and Objectives on Cultural Resources

Goal 8 and its associated objectives focus specifically on documenting, protecting, and conserving cultural resources in consultation with appropriate parties. Implementing this goal and its objectives would result in moderate, Refuge-wide to regional, long-term, positive effects on cultural resources.

Effects of Goals and Objectives on Subsistence

Goals and objectives that focus on perpetuating wildlife and plant populations, and natural diversity, while maintaining intact ecosystem function would provide negligible, long-term, Refuge-wide to regional, and positive effects on the availability of subsistence resources and the opportunity for continued subsistence use. Goal 4 and its associated objectives focus on

improving communications, consultations, and cooperation with local village residents, tribal governments, Native corporations, Native organizations, and Federal Subsistence Regional Advisory Councils associated with the Refuge. Implementing this goal and its objectives would provide minor to moderate, Refuge-wide to regional, long-term, positive effects by ensuring the continuation of subsistence opportunities and providing local rural residents to have a meaningful role and the opportunity to participate in the Federal subsistence rule-making process for the conservation and use of subsistence resources.

Effects of Goals and Objectives on Visitor Services and Recreation Opportunities

Goals 5 and 9, and their associated objectives, focus on providing opportunities for wildlife-dependent and wilderness-associated recreation and on providing outreach to enhance understanding, appreciation, and stewardship of the Refuge. These goals and objectives encourage Refuge users (including Refuge staff) to minimize impacts, and signs, kiosks, and visitor facilities would be avoided in the Refuge.

Visitor use of the Refuge is higher in some areas than in other areas, and both biophysical resources and visitor experiences have changed or been impaired in specific high-use areas. Effects could worsen if visitation to popular locations continues to increase without active restoration of sites or management of visitor experiences. Effects could include the displacement of visitors and visitor services to other areas of the Refuge and/or the differential availability of certain recreation opportunities and the visitor services that cater to them. Objective 5.4 would require the Refuge to complete a Refuge-wide VUMP that would address visitor services and recreational opportunities holistically across the entire Refuge.

The effects of the goals and objectives on visitor services and recreation opportunities would be minor to moderate, Refuge-wide, and long-term. Effects could be seen either as positive or negative, depending upon the perspectives and expectations of the Refuge user. Refuge staff believes visitor services and recreational opportunities will ultimately be improved by implementing the Plan's goals and objectives.

Effects of Goals and Objectives on Wilderness Characteristics

Goal 2 and its associated objectives focus on perpetuating natural conditions and wilderness characteristics throughout the Refuge. Goal 5 and its objectives provide for wilderness-associated recreational opportunities including promoting opportunities for self-discovery, self-reliance, solitude, and primitive or unconfined recreational experiences. The goals and objectives would result in minor, long-term, Refuge-wide, positive effects to wilderness characteristics.

Effects of Goals and Objectives on Special Designations

Objective 3.5 prioritizes completing a Comprehensive River Management Plan (CRMP) for each of the Refuge's existing three designated wild rivers. Implementation would result in minor, long-term, local, and positive effects for the Ivishak, Sheenjek, and Wind wild river corridors. Objectives focused on water assessment and monitoring could also have minor, long-term, local, and positive effects on the Refuge's three designated wild rivers if they were to be included in the monitoring and assessment study.

Objective 3.1 prioritizes study of the Refuge's MPA. An increased understanding of natural variability in near shore ecosystems, the relationships between marine and terrestrial systems, and the potential impacts of climate change on lagoon ecosystems would improve our ability to manage the MPA and indirectly result in negligible to minor, long-term, local, and positive effects for the MPA.

The goals and objectives would have no effect on the Firth-Mancha or Shublik Spring RNAs or the Neruokpuk Lakes PUNA special designations.

Effects of Goals and Objectives on Public Health and Safety

Objective 5.3 (Chapter 2, Section 2.1.5) directs the Refuge to avoid using signs, marked trails, roads, public use cabins, or other similar visitor facilities on the Refuge. While the use of these tools could increase safe travel through wild areas, this management approach is no different than under current management, and therefore there is no effect. It may be necessary when an emergency occurs on the Refuge to deviate from the Plan's policies and guidelines and undertake actions not normally allowed on the Refuge to ensure public health and safety.

Effects of Goals and Objectives on Refuge Operations

The goals and objectives call for developing six step-down management plans; implementing a visitor use study, a traditional access study, and a national interest study; develop protocols and priorities for scientific research by cooperators; repeat baseline water quality studies, initiate study of the MPA; identify and determine the status of rare species; complete a cultural resource inventory and develop a cultural resource atlas and archive; review existing MRAs and complete new MRAs; and conduct environmental analyses as appropriate for proposed projects. The full set of goals and objectives outline priority projects and programs for managing the Refuge. Some work would be a continuation of existing activities being conducted under current management. New projects, studies, and programs would be in addition to ongoing commitments. Implementing the goals and objectives would result in moderate, short- to long-term, Refuge-wide effects to Refuge operations. In the short-term, the effects would be negative as current Refuge operation priorities would change and the staff would take on new work. However, in the long-term, the goals and objectives would allow the Refuge to more proactively direct staff, funding, and other resources towards management of the Refuge, and the completed programs and projects would improve staff knowledge, efficiency, and ability to manage resources in the Refuge. Thus long-term, the effects would be positive.

5.2.4.3 Effects of the Goals and Objectives on Poker Flat Research Range

Objective 5.4 includes restoring natural conditions and visitor experiences. Objective 2.7 focuses on restoring damaged or impaired sites, removing contaminants, and cleaning up debris across the Refuge. NASA is specifically mentioned in Objective 2.7 as a partner for removing spent rocket parts. Implementing the goals and objectives would result in minor, short- and long-term, Refuge-wide, negative economic effects to NASA due to costs associated with clean-up efforts. Goals 6 and 7 focus on the Refuge partnering and collaborating with other scientists on long-term climate change and ecological research. To the extent that NASA would continue to collaborate or contribute to these efforts, there would be negligible to minor, long-term, Refuge-wide to regional, positive effects on scientific return.

5.2.5 Effects of the Alternatives on Reasonably Foreseeable Future Actions

This section discusses the anticipated effects of the Revised Plan on the twelve reasonably foreseeable future actions identified in Section 5.1.4. The effects of the Revised Plan would be the same across all the alternatives, with the exception of Poker Flat, which is discussed in the analysis under each alternative. The effects of the proposed actions on Arctic Refuge are briefly mentioned in Appendix C and will be disclosed in the NEPA documents that have or will be prepared for each of the actions.

Gates of the Arctic National Park and Preserve, General Management Plan—None of the alternatives in the Revised Plan would be expected to adversely affect the General Management Plan because both conservation system units operate under the mandates of ANILCA and have similar management objectives. For those resources that are shared between the conservation system units, such as far-ranging wildlife populations, the Revised Plan's focus on perpetuating natural diversity and letting ecological systems prevail should be positive for the General Management Plan. It is possible that some commercial service providers could decide not to operate in Arctic Refuge in response to the Service's management policies, and they could be displaced to Gates of the Arctic. These effects would likely be negligible. The Service and National Park Service will continue to coordinate their respective planning efforts.

National Petroleum Reserve-Alaska, Integrated Activity Plan and EIS—Due to the distance to the Refuge, we do not expect any of the alternatives in the Revised Plan would have any effect on the Integrated Activity Plan and EIS. The Service and BLM will continue to coordinate their respective planning efforts.

Eastern Interior Resource Management Plan—None of the alternatives in the Revised Plan would be expected to affect the Resource Management Plan. It is possible that some commercial service providers could decide not to operate in Arctic Refuge in response to the Service's management policies, and they could be displaced to Eastern Interior lands managed by BLM. These effects would likely be negligible. The Service and the BLM will continue to coordinate their respective planning efforts.

Polar Bear Conservation Plan—None of the alternatives in the Revised Plan would be expected to affect the Polar Bear Conservation Plan.

Alaska Pipeline Project—None of the alternatives in the Revised Plan are expected to affect the Alaska Pipeline Project.

Point Thomson Project—None of the alternatives in the Revised Plan would be expected to have any direct or indirect effects on the Point Thomson Project. The Service and the U.S. Army Corps of Engineers will continue to coordinate our respective planning efforts.

Poker Flat Research Range— Effects of the Revised Plan’s alternatives on the Poker Flat Sounding Rockets Program vary across alternatives and are described in each section of this chapter.

Foothills West Transportation Access Project— We do not expect the Revised Plan to have any impact on the Foothills West Transportation project.

Barter Island Airport Improvements— None of the alternatives in the Revised Plan would be expected to affect the Barter Island Airport Improvement project.

Beaufort Sea Oil and Gas Leases— The Revised Plan would not have any impact on the sale of oil and gas leases in the Beaufort Sea, nor would we expect any of the Plan’s alternatives to affect any future oil and gas exploration and development activities stemming from the leases.

State Notice of Sale of North Slope Leases— None of the alternatives in the Revised Plan would affect the actions taken by the State of Alaska in regards to the sale of oil and gas leasing or any future oil and gas exploration and development activities stemming from the leases.

State of Alaska Predator Management Proposal 130— The Service does not expect any of approaches to the planning issues in the Revised Plan to affect this action. However, the management policies and guidelines that would be adopted under alternatives B–F would focus Refuge management on perpetuating natural diversity, letting ecological systems prevail, and generally avoiding responses to climate change. This management approach could adversely affect the State’s efforts to achieve target wildlife population levels.

5.3 Effects of Alternative A (Current Management)

Alternative A is the continuation of current management. The impacts on resources described in this section are expected to occur if current management of the Refuge continues into the future. This section evaluates the implication or impacts on resource categories in each major issue: Wilderness, wild and scenic rivers, and Kongakut River visitor management.

5.3.1 Alternative A Introduction

Wilderness – Approximately 7.16 million acres of designated Wilderness would continue to be managed under Wilderness Management. No new areas would be recommended for Wilderness designation.

Wild and Scenic Rivers – Alternative A proposes to complete eligibility and suitability studies but not recommend any rivers for inclusion in the NWSRS. Even without a recommendation for designation, however, the Refuge would maintain the outstandingly remarkable values for the four suitable rivers (Atigun, Marsh Fork Canning, Hulahula, and Kongakut) using management tools under the 1988 Plan's Minimal and Wilderness Management categories, along with that Plan's management direction.

Kongakut River – Existing visitor use management actions for the Kongakut River would continue under Alternative A. This alternative stipulates that a Refuge-wide Public Use Management Plan be completed, and this step-down plan could modify current management actions on the Kongakut related to public use.

5.3.2 Effects on the Biophysical Environment from Alternative A

Wilderness – Under this alternative, none of the WSAs would be recommended for Wilderness designation, and these areas would continue to be managed under the Minimal Management category. Minimal Management already affords a high degree of administrative protection to the biophysical environment, and there would be no effect to any of the biophysical resource categories if additional Wilderness is not recommended.

Wild and Scenic Rivers – Although the four suitable rivers are not recommended for wild river designation under this alternative, their outstandingly remarkable values would be protected by the using existing management tools such as Minimal Management and Wilderness Management. In general, these protections would have negligible, short- to medium-term, site-specific to local, and positive effects on the biophysical environment. Six biophysical resource categories would be affected, as described in the following text.

Kongakut River – Existing visitor use management actions for the Kongakut River would continue under this alternative. While current management tools offer some protections to the biophysical environment in the river corridor, resource degradation and wildlife disturbance continues. Overall, continuing current management would result in minor, long-term, site-specific to local, and negative effects on the biophysical environment.

Permafrost and Soils Under Alternative A

Wilderness – No effects on permafrost and soils would occur if no new wilderness recommendations are made.

Wild and Scenic Rivers – Protecting the values associated with suitable rivers using management direction from the 1988 Plan would result in no effects to negligible, long-term, site-specific, and positive effects on permafrost and soils. Ongoing visitor use could still damage soils and permafrost in suitable river corridors, for example, at heavily used campsites, resulting in negligible to minor, short- to medium-term, site-specific, and negative effects.

Kongakut River – Visitor use in the Kongakut River valley continues to damage soils and permafrost, such as at heavily used access areas, resulting in negligible to minor, short-term, site-specific, and negative effects.

Water Quality and Aquatic Habitats Under Alternative A

Wilderness – Not recommending any new Wilderness areas would not affect water quality and aquatic habitats in areas outside designated Wilderness. Water bodies in designated Wilderness would continue to benefit from the high level of habitat protection that Wilderness affords.

Wild and Scenic Rivers – Protecting the values associated with suitable rivers using management direction from the 1988 Plan would result in no effects to negligible, long-term, site-specific, and positive effects on water quality and aquatic habitats. Ongoing visitor use could still damage aquatic habitats in suitable river corridors, resulting in negligible to minor, short- to medium-term, site-specific, and negative effects.

Kongakut River – Visitor use (hiking, hunting, and camping in the river corridor or floating the river) under current management would cause negligible, short-term, site-specific, negative impacts to water quality and aquatic habitats.

Vegetation and Terrestrial Habitats Under Alternative A

Wilderness – No effects on vegetation and habitat would occur if no new wilderness recommendations are made.

Wild and Scenic Rivers – Protecting the values associated with suitable rivers using management direction from the 1988 Plan would result in no effects to negligible, long-term, site-specific, and positive effects on vegetation and terrestrial habitats. Ongoing visitor use could still damage vegetation and terrestrial habitats in suitable river corridors (at heavily used campsites, for example), resulting in negligible to minor, short- to medium-term, site-specific, and negative effects.

Kongakut River – Visitor use in the Kongakut River valley continues to damage vegetation and terrestrial habitats, especially at heavily used sites, resulting in negligible to minor, short-term, site-specific, and negative effects.

Fish Populations and Natural Diversity Under Alternative A

Wilderness – No effects on fish populations and natural diversity would occur if no new Wilderness recommendations are made.

Wild and Scenic Rivers – While no rivers are recommended, river values would be protected using existing Minimal and Wilderness Management categories. This would have negligible, long-term, local, and positive effects.

Kongakut River – Direct effects from harvesting fish (especially Dolly Varden and arctic grayling) and disturbance by floaters are thought to be negligible, short-term, site-specific to local, and negative. Indirect impacts from substrate disturbance by foot traffic in and out of the river can lead to increased turbidity, especially in popular camping sites at the confluence of feeder streams. Effects are also thought to be negligible, short-term, site-specific to local, and negative to fish populations and natural diversity.

Bird Populations and Natural Diversity Under Alternative A

Wilderness – No effects on bird populations and natural diversity would occur if no new Wilderness recommendations are made.

Wild and Scenic Rivers – There would be negligible, long-term, local, and positive effects on bird populations and natural diversity under this alternative. Riparian areas tend to have higher density and diversity of birds compared to surrounding habitats, and river values would be protected using existing Minimal and Wilderness Management categories.

Kongakut River – Maintaining current management of the Kongakut River would result in negligible, short-term, site-specific, and negative impacts on bird populations, primarily through disturbance of breeding, feeding, and molting individuals.

Mammal Populations and Natural Diversity Under Alternative A

Wilderness – No effects on mammal populations would occur if no new Wilderness recommendations are made.

Wild and Scenic Rivers – There would be negligible, long-term, local, and positive effects on mammal populations and natural diversity under this alternative because river values would be protected using existing Minimal and Wilderness Management categories.

Kongakut River – Maintaining current management of the Kongakut River would result in minor, short-term, site-specific to local, and negative impacts on mammal populations through disturbance of migratory (caribou) and resident species.

5.3.3 Effects on the Human Environment from Alternative A

Wilderness – Under this alternative, none of the WSAs would be recommended for Wilderness designation, and these areas would continue to be managed under the Minimal Management category. Minimal Management already affords a high degree of administrative protection to the human environment. However, under Minimal Management there would be effects to cultural resources, visitor services and recreational opportunities, and wilderness characteristics.

Wild and Scenic Rivers – Although the four suitable rivers are not recommended for wild river designation under this alternative, their outstandingly remarkable values would be protected by using existing management tools such as Minimal Management and Wilderness Management. In general, these protections would have negligible, short- to medium-term, site-specific to local, and positive effects on the human environment. The resource categories that would be affected include: cultural resources; wilderness characteristics; and Refuge operations.

Kongakut River – Existing visitor use management actions for the Kongakut River would continue under this alternative. While current management tools offer some protections to the human environment in the river corridor, degradation of resources and visitor experience continues. Overall, continuing current management would result in moderate, long-term, local, and negative effects on the human environment. Current management would affect the following resource categories: local economy and commercial uses; cultural resources; visitor services and recreational opportunities; and wilderness characteristics.

Local Economy and Commercial Uses Under Alternative A

Wilderness – There would be no effect to the local economy or commercial uses. Commercial services would continue as currently managed.

Wild and Scenic Rivers – While no rivers would be recommended for inclusion in the NWSRS, the Refuge would protect outstandingly remarkable values using available management tools. There should be no measurable effect on local economy and commercial uses.

Kongakut River – Continuing current management on the Kongakut River could have effects on local economy and commercial uses. Because permits are currently issued non-competitively, commercial use of the Kongakut could increase. If use were to increase, it could be limited if found necessary to keep the use compatible with Refuge purposes. Additional commercial use in response to increasing visitor use would make a minor contribution to local economies. Visitors to the Kongakut often travel through Arctic Village or Kaktovik, resulting in an increase in business for local service providers. However, if experiential conditions continue to erode, at some point the Kongakut could cease to offer the experience its visitors are seeking, thus potentially displacing visitors whose standards for wilderness experience opportunities are not met by river conditions. Displacement could be to other areas in or outside the Refuge. If displacement is confirmed to be occurring in the Refuge, the economic and commercial opportunities would not be lost; but economic and commercial opportunities might be lost if displacement occurred outside the Refuge. Some guiding services have informed Refuge staff that the current conditions on the Kongakut (i.e., crowding, aircraft overflights, human waste accumulations, etc.) have already driven them either to stop operating in Arctic Refuge or to offer trips on other Arctic Refuge rivers, such as the Marsh Fork Canning or Hulahula Rivers. The concentration of visitors on the Kongakut has

displaced, and may continue to displace, visitation elsewhere and may result in crowding and impacts to other Refuge rivers. If the current management strategy continues to be applied, short-term effects could be minor, local, and negative; while the long-term effects could be moderate, local to Refuge-wide, and negative.

Cultural Resources Under Alternative A

Wilderness – Not recommending additional Wilderness areas would not change ongoing effects to cultural resources. Ongoing damage or loss of cultural resources would continue, primarily as a result of erosion and other natural forces, and would be minor to major, long-term, site-specific, and negative.

Wild and Scenic Rivers – Public use would continue on the four rivers determined suitable for inclusion in the NWSRS but not recommended under this alternative. The effects of public use on cultural resources would likely be minor, long-term, site-specific, and negative. The Refuge could use existing Minimal and Wilderness Management categories to mitigate these effects. To comply with the Wild and Scenic Rivers Act, the Refuge would protect the Cultural outstandingly remarkable value on the Hulahula River. An increased management focus on cultural resources in this river corridor would result in minor, long-term, site-specific to local, and positive effects.

Kongakut River – Due to the level of visitation to the Kongakut River drainage by hikers and floaters, cultural resources in the area could be threatened by intentional or inadvertent disturbance. However, the Kongakut has received a relatively high level of visitation for at least two decades, and cultural resource damage might have already occurred. Since there has been no baseline resource inventory work conducted, the nature and extent of the damage is unknown. Continued effects are likely to range from minor to major, long-term, site-specific to local, and negative.

Subsistence Under Alternative A

Wilderness – There would be no effect to subsistence opportunities, uses, or resources under Alternative A. Traditional access and subsistence uses would continue to be allowed according to current regulations and policies.

Wild and Scenic Rivers – There would be no anticipated effect to subsistence opportunities, uses, or resources. Traditional access and subsistence uses would continue to be allowed according to current regulations and policies.

Kongakut River – There would be no effect to subsistence opportunities, uses, or resources. Subsistence use of the Kongakut is minimal and generally occurs outside the primary recreation seasons.

Visitor Services and Recreation Opportunities Under Alternative A

Wilderness – Visitor services and recreational opportunities outside the Refuge's designated Wilderness area would continue to be managed via Minimal Management, and the Refuge would continue to provide a variety of recreational opportunities for Refuge visitors. Continuing current management practices could affect visitor services and recreational

opportunities in specific high use areas (e.g., the Atigun River area). With no active restoration of impaired sites or management of visitor experiences, visitors seeking certain recreational opportunities such as solitude and natural conditions could be displaced, indirectly resulting in the differential availability of certain visitor services. This could result in negligible to minor, long-term, site-specific to local, and negative effects to visitor services and recreational opportunities focused on solitude and natural conditions. However, Refuge staff could administratively decide to limit the number and types of visitor services in certain areas of the Refuge in order to preserve wilderness characteristics or improve recreational opportunities, thus minimizing impacts to visitors seeking wilderness-associated recreation.

No statutory protections from roads, facilities, installations, and recreational improvements, nor any statutory requirements to manage for wilderness characteristics, could result in negligible, long-term, local to Refuge-wide, negative effects to visitor services that cater to solitude and wilderness-associated opportunities and experiences.

Current management would not be expected to affect recreational opportunities for freedom, independence, exploration, challenge, self-reliance, and discovery. Additionally, routine law enforcement patrols and visitor use monitoring would continue on the Refuge as under current management, and there would be no effect to these programs under Alternative A.

Wild and Scenic Rivers – There would be no effect on visitor services and recreation opportunities under this alternative.

Kongakut River – Current management allows for nearly unrestricted recreational opportunities in the Kongakut River valley. There are no limits to the number of recreational guides or air operators offering services on the Kongakut River, nor are there any restrictions to private users. Current management contributes to perceptions of crowding and reduced visitor experience on the Kongakut River and is displacing use to other areas of the Refuge. The effects are moderate, short- and long-term, local to Refuge-wide, and negative.

Private airplanes may land on any suitable surface, whether vegetated or unvegetated. The lack of restrictions and/or limits may result in degradation of the Kongakut's physical resources and affect visitor experience. Because this river flows through arctic habitats, physical damage (e.g., hardened campsites, trailing, etc.) may be irreparable, or at best take many years to recover. Effects are minor to moderate, long-term, site-specific, and negative.

Visitor experience is affected by human waste accumulations, particularly at popular campsites, put-ins, and take-outs; decomposition could require years and possibly decades. These effects are moderate, long-term, site-specific to local, and negative.

Wilderness Characteristics Under Alternative A

Wilderness – Lands and waters outside designated Wilderness would not receive the protections afforded by the Wilderness Act. Non-Wilderness areas would continue to be managed in the administrative Minimal Management category, which includes most of the protections and prohibitions of designated Wilderness. Short-term, impacts are likely to be negligible to minor, Refuge-wide, and positive. However, Minimal Management is an administrative management category subject to change and does not have the enduring statutory protections afforded by designated Wilderness. Therefore, in the long-term, effects would be negligible to minor, Refuge-wide, and negative.

Wild and Scenic Rivers – Protecting outstandingly remarkable values on the Refuge’s four suitable rivers using existing Minimal and Wilderness Management categories would have no effect to negligible, long-term, local, and positive effects on wilderness characteristics.

Kongakut River – Although the Kongakut River and its tributaries flow entirely in designated Wilderness, the river offers what might be the lowest quality Wilderness experience on the Refuge. During peak periods, visitors to the Kongakut are almost guaranteed to encounter at least one other group, to hear multiple airplanes daily, and to see visible impacts from previous visitors. For most visitors, this doesn’t constitute a high-quality Wilderness experience. Current levels of visitation do not meet many people’s standards about opportunities for solitude, resources in a natural condition, remoteness, natural quiet, or other key indicators of Wilderness character. Under current management, the quality of Wilderness recreational opportunities could continue to degrade. These effects are likely to be minor to moderate, long-term, local, and negative. However, the high level of freedom and unconfined recreation offered on the Kongakut may balance the degradation.

Special Designations Under Alternative A

Wilderness – There would be no effects to any of the Refuge’s special designation areas under this alternative.

Wild and Scenic Rivers – There would be no effects to any of the Refuge’s special designation areas under this alternative.

Kongakut River – There would be no effects to any of the Refuge’s special designation areas under this alternative.

Public Health and Safety Under Alternative A

Wilderness – This alternative would have no effect on public health and safety. In emergencies, the Refuge manager is authorized to take whatever prudent and reasonable actions are necessary.

Wild and Scenic Rivers – This alternative would have no effect on public health and safety. In emergencies, the Refuge manager is authorized to take whatever prudent and reasonable actions are necessary.

Kongakut River – This alternative would have no effect on public health and safety. In emergencies, the Refuge manager is authorized to take whatever prudent and reasonable actions are necessary.

Refuge Operations Under Alternative A

Wilderness – Under this alternative, there would be no effect on Refuge operations because there would be no additional administrative tasks regarding designated Wilderness.

Wild and Scenic Rivers – Protecting the outstandingly remarkable values for the Refuge’s four suitable rivers using existing Minimal and Wilderness Management categories would have from no effect to negligible, short- to medium-term, local, and negative effects on staff

and Refuge operations. To maintain river values, staff would periodically conduct site assessments and monitoring in the corridors of the four suitable rivers.

Kongakut River – Under this alternative, there would be no effect on Refuge operations.

5.3.4 Effects on Poker Flat Research Range from Alternative A

It is anticipated that implementing Alternative A would not affect the continued launch of sounding rockets from Poker Flat nor their scientific return. NASA would continue to conduct its missions such that there are no planned impacts within Mollie Beattie Wilderness, and through the University of Alaska Fairbanks, secure permission for landing and recovery of rocket hardware within the remaining areas of Arctic Refuge on an as-needed basis. NASA would continue to follow the specific terms and conditions governing launch and recovery operations included in Refuge-issued authorizations.

Economic Input – Poker Flat’s continued operations under this alternative would result in the following economic inputs to the Fairbanks North Star Borough (Table 5-1). The value added from Poker Flat operations accounts for less than one-tenth of 1 percent of the total gross domestic product, and approximately 1.3 percent of the professional, scientific, and technical services industry gross domestic product for the Fairbanks area of Alaska.

Table 5-1. Estimated economic effects from Poker Flat operations by activity

Annual Impacts (2010 Dollars)	Direct Economic Output	Value Added	Direct Earnings	Indirect Earnings
Normal Operations	\$1,900,000	\$1,900,000	\$1,400,000	\$640,000
Launch Activities	\$310,000	\$300,000	\$210,000	\$100,000
Maintenance Activities	\$160,000	\$150,000	\$52,000	\$24,000
Total	\$2,400,000	\$2,300,000	\$1,600,000	\$800,000

Additionally, alternatives under consideration in NASA’s EIS for Poker Flat include varying degrees of spent stage and payload recovery; estimated to range from \$20,500 to \$321,000 in additional direct economic output and from \$18,000 to \$282,000 in value added per year.

Depending on level of effort for both historic and future-launched items, annual recovery efforts could generate the equivalent of 0 to 4 full-time jobs in the area. Continued operations at Poker Flat would enable the full value of these recovery operations to contribute to the local economy.

5.3.5 Cumulative Effects of Alternative A

Under Alternative A, no new areas of the Refuge would be recommended for designation as Wilderness. There would be no foreseeable cumulative effects to the biophysical and human environments as a result of this alternative.

Four rivers would be suitable for wild river designation but would not be recommended for inclusion in the NWSRS. There would be negligible cumulative effects to the biophysical and human environments. Continuing current management under Minimal Management and Wilderness categories would protect the outstandingly remarkable values identified for these rivers.

Until completion of a Public Use Management Plan, management actions for the Kongakut River could result in overall negligible to minor cumulative effects to the biophysical and human environments. As visitor use increases, there is the potential for some minor cumulative effects to the biophysical and human environments, and particularly to visitor experience.

The effects of Alternative A would be cumulative to other effects in the planning region, including the effects of climate change, development activities, and management decisions made by others (such as the reasonably foreseeable future actions listed in Section 5.1.4). Cumulatively, Refuge management under Alternative A would have negligible to minor effects on the biophysical and human environments in the region.



5.4 Effects of Alternative B

This section evaluates the implications or impacts of Alternative B on resource categories for each major issue: Wilderness, wild and scenic rivers, and Kongakut River visitor management.

5.4.1 *Alternative B Introduction*

Wilderness – Alternative B recommends the qualified and suitable lands and waters of the Brooks Range WSA (5.82 million acres) for Wilderness designation. The administrative act of recommending the Brooks Range WSA would have no effect on any resource category. However, the effects analysis here considers the effects of Wilderness designation on the resource categories should Congress choose to designate the Brooks Range WSA as Wilderness.

Wild and Scenic Rivers – Alternative B recommends wild river designation for three of the Refuge's four suitable rivers: Marsh Fork Canning, Hulahula, and Kongakut. Rivers recommended for wild river status must be protected until Congress acts to designate or reject a recommendation for designation. Pending congressional action, the Service would use interim management prescriptions to manage each recommended river for the outstandingly remarkable values for which it was found eligible (see Appendix I, Section 4.4).

If Congress were to designate these rivers as wild, the interim management prescriptions would stay in effect until the Refuge completes a CRMP for each river. The river's CRMP would formalize the requirement to preserve the river's outstandingly remarkable values and other values found through inventory, in perpetuity. These rivers would be part of the NWSRS and be afforded the protections of the Wild and Scenic Rivers Act (see Appendix I, Section 4.5). The lower portion of the Hulahula River is owned by KIC. Those portions of the Hulahula River that flow through KIC lands would be recommended for wild river designation, and the corridor would be managed in partnership with KIC. For wild rivers or river segments within designated Wilderness, the more restrictive provisions of the Wild and Scenic Rivers Act and the Wilderness Act would apply.

Kongakut River – Alternative B proposes that Kongakut River management issues be addressed in a Visitor Use Management and/or Wilderness Stewardship step-down plan, which would, among other things, develop long-term monitoring protocols. Until the step-down plan(s) is completed, the Service would implement a variety of interim management actions to protect resources in the Kongakut River valley, including an interim cap on commercial recreation guides (see Chapter 3, Section 3.2.3.3).

5.4.2 *Effects on the Biophysical Environment from Alternative B*

Wilderness – If the Brooks Range WSA were designated as Wilderness, restrictions on activities that could damage Refuge resources may be less likely to change over time and may be more likely to be enforced, providing greater certainty of long-term protection for wildlife and habitats. The Brooks Range WSA is currently under Minimal Management, and this management category already affords a high degree of administrative protection to the biophysical environment. However, by protecting natural conditions, Wilderness designation could have minor, long-term, WSA-wide, positive effects on the value of the WSA for ecological research and monitoring.

Resource categories that could be affected by Wilderness designation of the Brooks Range WSA include: permafrost and soils; water quality and aquatic habitats; vegetation and terrestrial habitats; fish populations and natural diversity; bird populations and natural diversity; and mammal populations and natural diversity. Research on the biophysical environment could also be affected due to the need to complete MRAs for all Refuge management activities (see “Refuge Operations” in Section 5.4.3).

Wild and Scenic Rivers – Implementing interim management prescriptions for three of the Refuge’s suitable rivers would result in negligible, medium-term, site-specific, and positive effects on biophysical resources within these river corridors. If these rivers were to be designated as wild rivers by Congress, the effects would be minor, long-term, local, and positive because designation would require the Refuge to develop CRMPs for each river. The CRMPs would include an inventory and assessment of biophysical resources in the wild river corridor as well as a monitoring program for ongoing assessment and protection of these resources. Six of the biophysical resource categories would be affected, as described in this section.

Kongakut River – Alternative B recommends interim management tools to address biophysical resource concerns in the Kongakut River valley until such time as a VUMP and/or Wilderness Stewardship Plan (WSP) are completed. While these management actions would curb effects to biophysical resources, the alternative would not eliminate such effects. These interim tools would have negligible to minor, long-term, local, and positive effects on biophysical resources. Six of the biophysical resource categories would be affected, as follows.

Permafrost and Soils Under Alternative B

Wilderness – Wilderness designation would have indirect, negligible to minor, long-term, WSA-wide, and positive effects to permafrost and soils because of the additional statutory protection Wilderness management provides regarding natural conditions.

Wild and Scenic Rivers – Interim management prescriptions to protect the free-flowing character and outstandingly remarkable values for those rivers that are suitable and recommended would result in negligible, medium-term, site-specific, and positive impacts to permafrost and soils in these river corridors. The CRMPs that would be prepared for the Marsh Fork Canning, Hulahula, and Kongakut Rivers if they are designated as wild rivers by Congress would include an inventory of current permafrost and soil conditions and a monitoring program for ongoing assessment and protection of these resources. The CRMP would also establish protocols to prevent and/or repair damage caused by visitor use. The resultant effects would be minor, site-specific to local, long-term, and positive.

Kongakut River – Refuge visitors have the potential to damage soils and permafrost by trampling, particularly at campsites and access points such as landing areas. Enhanced management of visitor use in the Kongakut River area under Alternative B would decrease site-specific impacts. Site-specific disturbances from visitors occur extensively up and down the Kongakut River corridor, so enhanced management would also decrease impacts at the local scale. This alternative would have negligible to minor, long-term, site-specific to local, positive impacts on permafrost and soils in the Kongakut River corridor.

Water Quality and Aquatic Habitats Under Alternative B

Wilderness – Wilderness designation of the Brooks Range WSA would provide long-term, statutory protection for wilderness characteristics, including aquatic habitats. Designation would result in negligible to minor, long-term, WSA-wide, positive effects to water quality and aquatic habitats.

Wild and Scenic Rivers – Interim management prescriptions to protect the free-flowing character and outstandingly remarkable values for those rivers that are suitable and recommended would result in negligible, medium-term, site-specific, and positive impacts to water quality and aquatic habitats in these river corridors. If the three recommended rivers were designated as wild rivers by Congress, CRMPs would be prepared for each river. The CRMPs would include an inventory of current water quality and aquatic habitat condition and a monitoring program for ongoing assessment and protection of these resources. The CRMP would also establish protocols to prevent and/or repair damage caused by visitor use. The effects of designation would be minor, site-specific to local, long-term, and positive.

Kongakut River – Water quality and aquatic habitats can be affected by increased visitor use through increased vegetation trampling and soil compaction, which increases the potential for runoff and sediment loading. Outreach about proper waste disposal and minimizing visitor impacts, along with monitoring the effectiveness of management actions, would have minor, long-term, local, and positive effects on water quality and aquatic habitats along the Kongakut River.

Vegetation and Terrestrial Habitats Under Alternative B

Wilderness – Although management strategies are similar for Wilderness Management and Minimal Management, Wilderness designation is a more permanent commitment to maintain natural conditions. Wilderness designation would likely have negligible to minor, long-term, WSA-wide, and positive effects on vegetation and terrestrial habitats because of the long-term, statutory protections designation would provide to Wilderness character.

Wild and Scenic Rivers – Interim management prescriptions to protect the free-flowing character and outstandingly remarkable values for those rivers that are suitable and recommended would result in negligible to minor, medium-term, site-specific, and positive impacts to vegetation and terrestrial habitats in these river corridors. If the three recommended rivers were designated as wild rivers by Congress, CRMPs would be prepared for each river. The CRMPs would include an inventory of current vegetation and terrestrial habitat condition and a monitoring program for ongoing assessment and protection of these resources. The CRMP would also establish protocols to prevent and/or repair visitor use damage, which would result in minor, long-term, site-specific to local, and positive effects to vegetation and terrestrial habitats.

Kongakut River – Refuge visitors may damage vegetation and habitats, particularly at campsites and access points such as landing areas. Potential damage includes the direct effects of trampling, breakage of trees and shrubs, the possible introduction of invasive plants, and the exclusion of wildlife from riparian and adjacent habitats. Indirect effects include soil and snow compaction as a result of trampling. Most disturbances to vegetation are site-specific and restricted to areas receiving repeated use, such as hunting camps near fixed-wing aircraft-accessible sites and campsites used by floaters. These areas are presently monitored and assessed for negative impacts. Disturbances are local in scale, as site-specific disturbances

occur extensively along the Kongakut River corridor. The additional management proposed in Alternative B would have negligible to minor, long-term, site-specific to local, positive impacts on vegetation and terrestrial habitats in the Kongakut River drainage.

Fish Populations and Natural Diversity Under Alternative B

Wilderness – Wilderness designation provides long-term protections for fish populations and natural diversity through the statutory requirements of the Wilderness Act. Effects of designation of the Brooks Range WSA on fish populations and natural diversity would therefore be minor, long-term, WSA-wide, and positive.

Wild and Scenic Rivers – The Service would use interim management prescriptions to manage each recommended river for its free-flowing character and the outstandingly remarkable values for which it was found eligible. This would result in negligible, medium-term, local, and positive impacts to fish populations and natural diversity. If Congress were to designate recommended rivers, CRMPs would be prepared, resulting in minor, long-term, local, and positive effects to fish populations and natural diversity because of the assessment and monitoring programs that are required in the CRMPs for each river.

Kongakut River – Dolly Varden and grayling are popular fish sought by anglers on the Kongakut River. Harvest levels of these fish species are unknown and thought to be low. Providing outreach materials on proper catch-and-release techniques could lead to increased survival rates of released fishes, resulting in negligible, long-term, local, and positive effects. Enhanced management of visitors to the Kongakut, such as temporarily capping commercially guided recreation, would have positive effects by reducing substrate disturbance in and out of the river. This effect would indirectly result in negligible, short-term, local, and positive effects on fish populations and natural diversity.

Bird Populations and Natural Diversity Under Alternative B

Wilderness – If Congress were to designate the Brooks Range WSA as Wilderness, natural conditions would be maintained using the Wilderness Management category. This would likely have long-term, positive effects on bird populations in the Brooks Range WSA. Because most bird species are migratory, beneficial effects could be expressed over a larger area than the Brooks Range WSA. Under current management, disturbance to birds and alteration of their habitats is minimal. However, Wilderness designation, with its long-term commitment to maintaining natural conditions, could have negligible, long-term, regional or greater, and positive effects.

Wild and Scenic Rivers – There would be negligible, medium-term, local, and positive effects on bird populations and natural diversity under this alternative. The Service would use interim management prescriptions to manage each suitable and recommended river for the outstandingly remarkable values for which it was found eligible. Because riparian areas tend to have higher density and diversity of birds compared to surrounding habitats, maintaining river values should indirectly have positive effects on bird populations and natural diversity. If Congress were to designate recommended rivers, CRMPs would be prepared, resulting in minor, long-term, local, and positive effects to bird populations and natural diversity in these river corridors because of the assessment and monitoring programs that are required in the CRMPs.

Kongakut River – Enhanced management of human use of the Kongakut River valley would have negligible to minor, long-term, site-specific to local, and positive effects on bird populations and natural diversity. Monitoring visitor impacts on bird habitats would lead to the development of conservation measures to mitigate visitor impacts on birds if adverse effects are detected. Outreach materials would benefit birds by helping visitors reduce disturbance to nesting raptors and other species, and minimize impacts to bird habitats. Enhanced management of user groups on the river, such as by temporarily capping commercially guided recreation, would have positive effects by reducing disturbance to birds and bird habitat along the river.

Mammal Populations and Diversity Under Alternative B

Wilderness – Wilderness designation would result in minor, long-term, WSA-wide to regional, and positive effects in the Brooks Range WSA on mountain species like Dall's sheep and Alaska marmots because of the more permanent commitment to protect natural conditions in designated Wilderness, including mammal populations and habitats.

Wild and Scenic Rivers – There would be negligible, medium-term, local, and positive effects on mammal populations and natural diversity under this alternative. The Service would use interim management prescriptions to manage the free-flowing character of each recommended river and to maintain the outstandingly remarkable values for which each river was found eligible. This would indirectly affect mammal populations and natural diversity. If Congress were to designate recommended rivers, CRMPs would be prepared, resulting in minor, long-term, local, and positive effects to mammal populations and natural diversity in these river corridors because of the assessment and monitoring programs that would be included in the CRMPs.

Kongakut River – Enhanced management of human use of the Kongakut River valley would have negligible to minor, long-term, site-specific to local, and positive effects on mammal populations. Monitoring visitor impacts to habitats would lead to the development of conservation measures to mitigate visitor impacts on mammals if adverse effects are detected. Outreach materials would benefit mammals by helping visitors reduce disturbance to resident and migratory species, and minimize impacts to mammal habitats. Enhancing management of user groups on the river, such as by temporarily capping commercially guided recreation, would have positive effects by reducing disturbance to mammal populations and diversity along the river.

5.4.3 Effects on the Human Environment from Alternative B

Wilderness – Under current management, public use of the Refuge is managed similarly in designated Wilderness and in areas under Minimal Management. Most regulations on public use are derived from the area's status as a refuge and by State law. Public use is subject to Federal regulations implementing Federal laws (e.g., ANILCA, Refuge Administration Act), State laws (e.g., Alaska Statute 19.40.210, which prohibits off-road vehicles from the Dalton Highway), and State regulations (e.g., the State of Alaska hunting and fishing regulations). However, by protecting wilderness characteristics (both biophysical and experiential), Wilderness designation could have negligible to minor, long-term, WSA-wide, positive effects on the human environment.

If the Brooks Range WSA were to be designated as Wilderness, it would affect the following resource categories: local economy and commercial uses; cultural resources; subsistence; visitor services and recreational opportunities; wilderness characteristics; two of the Refuge's three designated wild rivers; Refuge operations; and Poker Flat.

Wild and Scenic Rivers – Alternative B would recommend three of the Refuge's rivers for inclusion in the NWSRS (Hulahula, Marsh Fork Canning, and Kongakut), and interim management prescriptions would be implemented for these rivers (see Appendix I, Section 4.4). The Atigun River would be protected using existing management tools available under the current Minimal Management category. If Congress were to designate any of the three recommended rivers, CRMPs would be developed and implemented for the continued protection of these rivers and their associated values. CRMPs and interim management prescriptions would lay out strategies that might affect the following resource categories: local economy and commercial uses; cultural resources; subsistence; visitor services and recreational opportunities; wilderness characteristics; special designations; and Refuge operations.

Kongakut River – Under this alternative, a VUMP would be initiated immediately upon approval of the Revised Plan. Until the VUMP takes effect, interim management tools would be implemented, including a temporary cap on commercial recreational guides. Effects of the interim management tools on the human environment would likely be moderate, long-term, local, and positive. Effects of the interim management tools would affect the following resource categories: local economy and commercial uses; cultural resources; subsistence; visitor services and recreational opportunities; wilderness characteristics; special designations; public health and safety; and Refuge operations.

Local Economy and Commercial Uses Under Alternative B

Wilderness – Designation of the Brooks Range WSA as Wilderness could affect commercial uses. In designated Wilderness, the Wilderness Act of 1964 and Service Wilderness policy prohibit commercial enterprises with few exceptions. Commercial services that help people access the Refuge to realize the recreational opportunities and wilderness characteristics of the area, such as guides and transportation companies, are allowed provided these uses are compatible with Refuge purposes, including Wilderness Act purposes. Other commercial enterprises, such as commercial filming, are limited in Wilderness by Service policy. Designation could potentially attract more wilderness-oriented visitors to the Refuge, resulting in increased business opportunities for recreation guides, air operators, and other commercial service providers in local communities. Effects would be negligible to minor, long-term, WSA-wide, and positive for recreational service providers.

Big-game hunting guides in guide use areas within the Brooks Range WSA could have to comply with stricter guidelines in order to minimize the effect of activities on Wilderness character. Because guide use areas are competitively awarded, effects would vary, depending on the guide. Effects could range from no effect to negligible to minor, long-term, WSA-wide, and negative or positive.

Wild and Scenic Rivers – Interim management provisions for suitable and recommended rivers are based on available management tools. In general, there would be no change to the management of the three suitable and recommended rivers, and therefore there would be no effects on local economy and commercial uses. However, if Refuge staff was to determine that

one or more of the outstandingly remarkable values of these rivers was threatened and changes or restrictions to commercial services would mitigate the threat, then the Refuge could impose interim restrictions on commercial services. These restrictions would likely result in negligible, short-term to long-term, local, and negative effects to the local economy and commercial uses. If Congress were to designate the suitable and recommended rivers under this alternative, CRMPs would be developed. If the CRMPs were to limit or reduce the level of commercial use in order to protect outstandingly remarkable or other river values, there could be minor, long-term, local, and negative effects on the local economy and commercial uses.

Kongakut River – Limiting the number of guides and their use from 2013 to 2016 or until the VUMP is completed could limit the economic contribution of the river. Some service providers may decide not to offer a trip(s) on the Kongakut or may be unable to grow their business. Other commercial service providers may be unable to start a new business during the period of the cap. The effects would likely be minor, short-term, local, and negative.

A step-down VUMP would likely have effects on the local economy and commercial uses. Step-down planning would be done in conjunction with key stakeholders and the public. Depending on the nature of the changes and/or restrictions imposed by the VUMP, the effects could be minor to moderate, long-term, site-specific to Refuge-wide, and positive or negative for guides and commercial air operators operating on the Refuge. Should the plan limit or reduce the level of commercial use, minor to moderate negative effects would be anticipated to those guides adversely affected by such limits, and this could indirectly result in negligible to minor effects on local economies.

Cultural Resources Under Alternative B

Wilderness – Wilderness designation could indirectly have negligible, long-term, WSA-wide, and positive effects on cultural resources. By protecting natural conditions and wilderness characteristics, Wilderness could provide long-term protection for cultural resources and traditional lands, waters, and resources used by local residents and serve to perpetuate the conditions in which their cultures evolved. However, the intentional and unintentional losses of cultural resources would likely continue even within designated Wilderness, primarily as a result of erosion and other natural forces, resulting in similar effects as under Alternative A.

Wild and Scenic Rivers – Public use would continue on those rivers determined suitable for inclusion in the NWSRS. The effects of public use on cultural resources would likely be minor, long-term, site-specific, and negative. Interim management prescriptions could mitigate these effects because the Refuge would use the prescriptions to maintain river values. Under Alternative B, the Hulahula River is recommended for wild river designation. The Hulahula has a Cultural outstandingly remarkable value, and the Refuge is required to manage the river to maintain this value. Therefore, this river would have a higher level of protection for cultural resources. If Congress were to designate recommended rivers, CRMPs would be prepared, resulting in minor, long-term, local, and positive effects to cultural resources because of the assessment and monitoring programs that would be included in the CRMPs.

Kongakut River – Under Alternative B, cultural resource losses (intentional or unintentional) would likely continue in the Kongakut River valley. However, outreach emphasizing stewardship of cultural resources in the Kongakut River drainage could minimize potential impacts. Limiting the amount of guided use prior to completion of the VUMP should have negligible, short-term,

local, positive effects on cultural resources. The VUMP would include a better understanding of the cultural resources of the area and their condition, and it would provide appropriate cultural resource management. The VUMP should result in negligible to minor, long-term, local, and positive effects to cultural resources as compared to Alternative A.

Subsistence Under Alternative B

Wilderness – Designation of the Brooks Range WSA would provide long-term, statutory protection to habitats and natural conditions, especially those found near Arctic Village and Venetie, thus indirectly serving to perpetuate the subsistence resources upon which local residents are so dependent. In general, subsistence uses in Wilderness would continue as they have under Minimal Management, and the harvest of subsistence resources would continue. Designation would not restrict subsistence use of resources in the Refuge, and the right of subsistence users to conduct traditional activities using traditional modes of transportation would continue. Effects of Wilderness designation to subsistence opportunities and resources would be negligible, long-term, WSA-wide, and positive.

The subsistence use of cabins would continue, although requests for construction or location of new cabins would receive greater scrutiny. Wilderness designation could also increase visitor use near Arctic Village's traditional and subsistence use areas, which could increase conflicts between locals and visitors. These effects would be expected to be negligible to minor, long-term, local, and negative.

Wild and Scenic Rivers – Under this alternative, interim management prescriptions combined with outreach regarding cultural and subsistence use in drainages recommended as wild rivers could improve understanding and reduce real and/or perceived conflict between local users and nonlocal visitors. The effects would likely be negligible, medium-term, local, and positive. If Congress were to designate the three rivers, CRMPs would be developed that establish user capacities for each river. The Refuge could then limit or control visitor use to ensure outstandingly remarkable and other river values are maintained, and this could indirectly result in fewer conflicts between subsistence users and visitors. CRMPs could therefore result in minor, long-term, and local effects that would be positive for subsistence resources and uses.

If Congress were to designate the entire extent of the Hulahula River as a wild river, the Service would partner with KIC regarding river management where it flows through KIC lands. The effects on subsistence could change as the process unfolds. Effects could range from negligible to moderate, short- to long-term, site-specific to local, and positive to negative, depending on the process, perceptions, and levels of protection afforded cultural and subsistence resources in the river corridor.



Kongakut River – Interim limits on guided use and outreach regarding cultural and subsistence use in the Kongakut River drainage could improve understanding, and reduce real and/or perceived conflict, between local users and nonlocal visitors. Voluntary actions by authorized guides and commercial air operators could also reduce the potential for conflicts among recreational visitors and subsistence users. The effects are likely to be minor, long-term, local, and positive.

Visitor Services and Recreation Opportunities Under Alternative B

Wilderness – Congressional designation of the Brooks Range WSA as Wilderness would have positive and negative effects on visitor services and recreational opportunities. Statutory protection of the area from roads, facilities, and recreational improvements would positively affect recreational opportunities for solitude, exploration, and freedom. Wilderness designation would potentially result in fewer installations and less visitor contact, which would enhance wilderness-associated recreational opportunities and experiences. Dalton Highway road access to the Brooks Range WSA would make it possible for visitors to reach designated Wilderness in an economically feasible manner without requiring aircraft support. Minimal Management already affords a high degree of wilderness-associated recreational opportunities and experiences, and so the effects of Wilderness designation would be negligible to minor, long-term, WSA-wide, and positive.

Because roads, facilities, recreational improvements, and commercial enterprises are not typically allowed in designated Wilderness, some visitor services could be directly and negatively impacted by Wilderness designation. No new cleared landing areas would be allowed in designated Wilderness, motorized generators and water pumps would not be allowed, and transportation and utility systems could only be authorized by Congress. Additionally, the Refuge might need to consider imposing limits on the number and types of visitor services in certain areas of the Refuge in order to preserve Wilderness character (should the area be designated as Wilderness). This would indirectly result in the loss of some recreational opportunities dependent on the impacted visitor services. These impacts are likely to be minor, long-term, specific to the WSA, and negative.

To preserve experiential opportunities associated with Wilderness character (such as opportunities for solitude), the Refuge may decide to have fewer routine law enforcement patrols and less visitor use monitoring on the ground in designated Wilderness areas. The resultant effects would likely be minor, temporary to short-term, local, and negative or positive, depending on the perception of the Refuge user. Fewer routine patrols and less on-the-ground visitor use monitoring could result in the failure to detect degraded or impaired sites in designated Wilderness, resulting in minor, long-term, site-specific, and negative effects.

Wild and Scenic Rivers – Interim management provisions for suitable and recommended rivers are based on available management tools. In general, there would be no change to the management of the three suitable and recommended rivers, and therefore there would be no effects on visitor services and recreational opportunities. However, if Refuge staff was to determine that one or more of the outstandingly remarkable values of these rivers was threatened and changes or restrictions on visitors would mitigate the threat, then the Refuge could impose interim restrictions on visitor services, which could in turn affect recreational opportunities. These restrictions would likely result in negligible, short-term to long-term, local, and negative effects to visitor services and recreational opportunities. However, if Congress were to designate any of the suitable and recommended rivers, the Refuge would be

required to determine the user capacity of each designated river. If the number of visitors exceeds the determined user capacity, the Refuge might need to limit use. The effects would likely be minor to moderate, long-term, local, and positive or negative. Visitor experience could be enhanced by limiting use; however, some visitors might not be able to experience the river due to lack of river access. Any limitations on use of designated rivers could potentially displace visitors to other rivers in the Refuge.

Kongakut River – This alternative proposes to adopt management strategies based on a Refuge-wide Visitor Use Management step-down plan. As the step-down plan unfolds, it is likely to affect visitor services and recreational opportunities. Through the VUMP, Refuge managers will consider levels of use, timing and distribution of use, and activities and behaviors of visitors. Managers may use education, site management, regulation, enforcement, and/or rationing/allocation to manage visitor use at Arctic Refuge. The effects would likely vary, depending on the visitor, ranging from no effect to minor to moderate, long-term, local, and positive or negative. The effects of proposed visitor use management will be fully evaluated as part the step-down planning process.

Developing outreach materials with preferred practices and strategies for minimizing impacts would likely raise the level of awareness of commercial and private users. In turn, this could lead to higher quality experiences for all users by reducing the amount of physical and experiential impacts occurring on the river, including those associated with human waste. The effects of outreach actions would likely be minor, long-term, local, and positive.

Improving monitoring programs for physical and social conditions could better inform management about areas of concern, thus allowing management to take appropriate, responsive action before continued degradation occurs. The effects of improved monitoring on visitor services and recreational opportunities would be minor to moderate, long-term, local, and positive. However, site-specific monitoring and rehabilitation could result in Refuge staff contributing to crowding and other user impacts on the river. These effects are likely to be minor, short-term, local, and negative. Effects could be mitigated to some extent by timing Refuge activities to occur outside peak use.

Publishing schedules of past guided and non-guided visitor use (currently available from commercial permit client use reports) could increase visitor awareness regarding Kongakut River use periods but would likely do little to redistribute use across the season. Asking guides and commercial air operators to voluntarily limit their activities could have minor, short-term, local, and positive effects on visitor experiences.

Placing an interim cap on recreational guides would affect recreational opportunities and visitor services in the Kongakut River valley. Some service providers may decide not to offer a trip(s) on the Kongakut or may be unable to grow their business, while other commercial service providers might be unable to offer their services during the period of the cap. While recreational opportunities are not expected to decline, this alternative could be perceived by recreationists and visitor service providers as curtailing or limiting opportunities, and could result in displacing recreation and visitor services to other areas of the Refuge. Other people might perceive a cap on commercial guides as an opportunity to recreate independently in the Kongakut River valley. These effects would be minor, short-term, local, and positive or negative, depending on the perception of different individuals and groups.

Wilderness Characteristics Under Alternative B

Wilderness – Congressional designation of the Brooks Range WSA as Wilderness would have a positive effect on wilderness characteristics. Wilderness areas are protected from roads, facilities, recreational improvements, commercial enterprises, helicopters, and installations. These protections would enhance wilderness characteristics and people's experiences in the area. Additionally, the Service would more closely consider our own Refuge management activities and their effects through the MRA process. The Brooks Range WSA is currently under Minimal Management, and this management category already affords a high degree of administrative protection to wilderness characteristics. Wilderness designation would offer statutory protection to these characteristics and would represent a more permanent commitment to their protection. These effects would likely be minor, long-term, WSA-wide, and positive.

Wild and Scenic Rivers – Implementing interim management prescriptions for suitable and recommended rivers would have no effect to negligible, medium-term, local, and positive effects on wilderness characteristics. If Congress were to designate the Marsh Fork Canning, Hulahula, and Kongakut as wild rivers, a CRMP would be prepared for each river, resulting in minor to moderate, long-term, local, and positive effects to wilderness characteristics because of the assessment and monitoring programs that would be included in the CRMPs. In addition, the Refuge would establish user capacities and protect the outstandingly remarkable and other river values in the wild river corridor, which would have minor to moderate, long-term, local, and positive effects on wilderness characteristics. Beneficial effects on wilderness characteristics would also be realized for those portions of the Hulahula and Kongakut Rivers in designated Wilderness because the more restrictive provisions of the Wild and Scenic Rivers Act and the Wilderness Act would be applied to the management of these rivers.

Kongakut River – Interim limits on commercial recreation guides and their clients would minimize or lessen impacts on wilderness characteristics, but would not eliminate them. Activities would be frozen at current levels, thus curbing negative effects on wilderness characteristics, but ongoing impacts from continued use would not be affected. The effects of implementing an interim cap on guides would be minor, short-term, local, and positive for wilderness characteristics.

Working with air operators to disperse flight paths could reduce air traffic, therefore improving wilderness experiences for visitors. Because Arctic Refuge does not have jurisdiction over airspace, compliance with this request could not be enforced. To the extent we are able to achieve voluntary compliance with air operators, the effects to wilderness characteristics would likely be minor to moderate, short-term, local, and positive. Similarly, asking commercial guides and commercial air operators to minimize effects on Refuge visitors would have minor to moderate, short-term, local, and positive effects on wilderness characteristics, to the extent we are able to achieve compliance.

Improved monitoring of visitor experiences would: 1) tie observed conditions to management goals for biophysical resources; 2) help identify thresholds of acceptable changes in the biophysical environment; and 3) provide input on actions that could be taken to prevent negative Wilderness character indicator thresholds from being reached. Monitoring could result in improved management strategies for wilderness characteristics, and over the long-term, indirectly create moderate, local, and positive improvements to wilderness characteristics.

Visitors seeking solitude and other values associated with Wilderness might have already been displaced from the Kongakut River. Implementing interim Kongakut River visitor use management prescriptions and ultimately prescriptions from a VUMP could stop

displacement and enhance wilderness characteristics enough that visitors seeking solitude would return to the Kongakut. Outreach efforts focused on minimal impact techniques and desired behaviors for visitors would likely result in minor, long-term, local, and positive effects on wilderness characteristics. Rehabilitating impacted sites could help restore the river to its natural condition, thus improving Wilderness character. The effects are likely to be minor, long-term, local, and positive.

Special Designations Under Alternative B

Wilderness – Wilderness designation would have negligible to minor, long-term, WSA-wide, and positive effects for the Ivishak, and Wind Rivers, as they are entirely in the Brooks Range WSA. Wild and Scenic Rivers Act protections are complimentary to the protections of the Wilderness Act, and for wild rivers within designated Wilderness, the more restrictive provisions of the Wild and Scenic Rivers Act and the Wilderness Act would apply.

Wild and Scenic Rivers – The Shublik Springs RNA is downstream from the Marsh Fork Canning River. There would be negligible to minor, long-term, local, and positive effects for the Shublik Springs RNA if the Marsh Fork Canning is designated as a wild river; the Marsh Fork would have added resource protections, and visitor experiences would be expected to improve. Similarly, protecting the free-flowing character and outstandingly remarkable and other values of the Hulahula and Kongakut Rivers would provide indirect, negligible, long-term, local, and positive effects on the MPA.

Kongakut River – There could be indirect, negligible, long-term, local, and positive effects to the MPA as a result of more proactive management of the Kongakut River. Some commercial recreation guides might elect to divert their operations from the Kongakut to one of the Refuge's three wild rivers (Ivishak, Sheenjek, and Wind Rivers) or to the Refuge's RNAs or PUNAs. Effects would range from no effect to negligible to minor, short- to medium term, local, and negative.

Public Health and Safety Under Alternative B

Wilderness – Wilderness recommendation or designation of the Brooks Range WSA would have no effect on public health and safety. Public health and safety would continue as under current management.

Wild and Scenic Rivers – Neither interim management prescriptions nor wild river designations for the Marsh Fork Canning, Hulahula, and Kongakut Rivers would have any effect on public health and safety.

Kongakut River – Developing a Visitor Use Management step-down plan and providing targeted messages to Refuge visitors would have no effect to negligible, long-term, Refuge-wide, and positive effects on public health and safety issues.

Refuge Operations Under Alternative B

Wilderness – Congressional designation of the Brooks Range WSA as Wilderness would affect overall Refuge operations, both in terms of paperwork and in terms of research. If the Brooks Range WSA is designated as Wilderness, Refuge management activities would be subject to

an MRA process, and normally prohibited uses would be approved only if they are determined to be the minimum necessary to manage the area as Wilderness. New Wilderness designation could therefore increase the paperwork burden for Refuge staff. These effects would likely be negligible, long-term, WSA-wide, and negative.

Additionally, proposed research conducted as a Refuge management activity would be subject to an MRA to determine if it is necessary to accomplish the purposes of the Refuge, including Wilderness Act purposes, and that any normally prohibited uses are necessary to meet the minimum requirements for managing the area as Wilderness. The MRA process could negatively affect long-term research projects with established data collection protocols or research that might require permanent installations, such as climate change research. Decisions are made on a case-by-case basis, however, and it is possible that installations could be allowed. There is some uncertainty as to the extent that Wilderness designation would limit the ability to conduct research or monitoring necessary to affect conservation measures. We believe the effects would be negligible, long-term, WSA-wide, and negative.

Wilderness designation would not affect the jurisdiction or responsibilities of the State with respect to wildlife, although actions would need to be consistent with maintaining Wilderness character. For some State activities, an MRA might be required. We believe the effects would be negligible, long-term, WSA-wide, and negative.

Wild and Scenic Rivers – There would be no effect to negligible, medium-term, local, and negative effects to Refuge operations under interim management prescriptions. Overall, management of suitable and recommended rivers would continue as under current management. However, Refuge staff would likely conduct periodic monitoring and assessments of the river corridors to ensure outstandingly remarkable values are being maintained.

Should Congress designate suitable and recommended rivers, there would be effects to Refuge operations. There would be an additional workload for preparing a CRMP in the short term; the effects would be moderate, short-term, Refuge-wide, and negative. In the medium-term, monitoring and the potential for adjusting user limits would result in moderate, Refuge-wide, and negative effects through the expenditure of staff time and budget. However, once the CRMPs are completed and monitoring protocols and a system for managing the rivers are in place, there should be less strain on Refuge staff dealing with day-to-day issues. Thus, over the long-term, effects would be minor, Refuge-wide, and positive.

Kongakut River – This alternative would require additional staff time and budget to: 1) execute a revised monitoring program; 2) develop outreach materials; 3) compile and publish schedules of proposed launch dates; 4) establish, implement, and monitor an interim cap on commercial recreational guides; 5) conduct site-specific rehabilitation; and 6) develop and execute a step-down management plan. The effects are likely to be moderate, short- to medium term, Refuge-wide, and negative. Indirectly, limits placed on commercial guides could negatively affect the Service's relationship with these stakeholders in the short-term. Over the long-term, however, there should be less strain on Refuge staff dealing with day-to-day river management concerns, and more public buy-in on management of the Kongakut River, resulting in minor, long-term, Refuge-wide, and positive effects.

5.4.4 Effects on Poker Flat Research Range from Alternative B

Implementing Alternative B would have a major adverse effect on NASA's ability to launch sounding rockets from Poker Flat. As shown in Figure 5-1, the most commonly flown sounding rocket configurations within the past 10 years have been the Black Brant-class and Terrier-Orions, the trajectories of which would likely have a planned impact within the Brooks Range WSA. Assuming a launch rate of four rockets per year, designation of the Brooks Range WSA as Wilderness could eliminate NASA's ability to fly an expected 28 of the 30 Arctic Refuge-landing missions within the 15-year planning horizon of the Revised Plan because NASA is required to avoid landings in designated Wilderness.

Considering that at least half of its future missions at Poker Flat would be excluded by implementing this alternative, it is likely that NASA would discontinue funding Poker Flat's operations and maintenance all together.

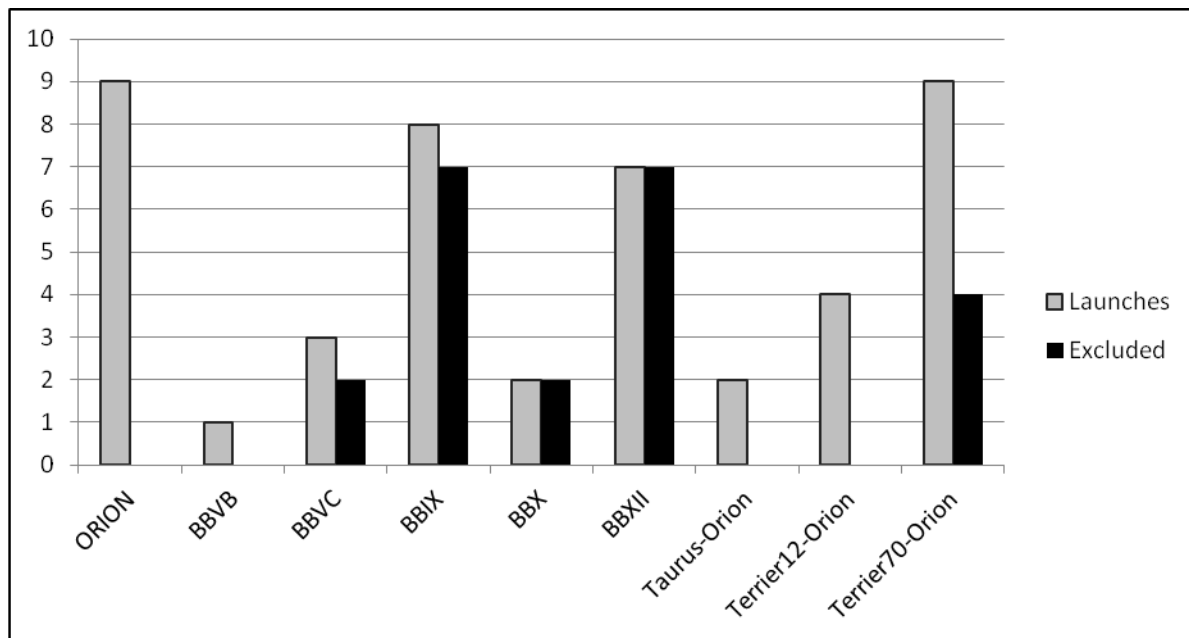


Figure 5-1. Sounding rockets launched from Poker Flat within last 10 years and those that would have been excluded if the Brooks Range WSA were designated as Wilderness

Scientific Return - The loss of NASA's ability to conduct Poker Flat-enabled science would have long-reaching adverse implications on the nation's ability to study and understand geospace at high latitudes. A large range of unexplained, critical phenomena can only be explored with in situ probes on sounding rockets, which gather vertical profiles of measured parameters and are essential for the study of the upper atmosphere and ionosphere. The information collected by Poker Flat-enabled missions is then available for use in applied fields, such as in the development of models of the upper atmosphere including upper atmospheric wind circulation; or the improvement of communications, navigation, and power systems.

Other commonly employed tools to study geospace, including orbiting satellites and ground-based observation stations, cannot collect the requisite data that is afforded by a sounding rocket launch. For example, in some cases, earth-orbiting satellites cannot gather adequate

measurements as the satellites are traveling too fast or are too high. In other cases, measurements taken during sounding rocket flights are used to calibrate or verify remote measurements taken from orbiting or land-based instruments. In summary, NASA's inability to launch sounding rockets from Poker Flat would result in a loss of its ability to carry out a substantial number of unique scientific measurements at high latitudes, which would not only have a long term adverse effect on the entire NASA Sounding Rockets Program, but would also have indirect effects on a host of related technologies.

Effects could be mitigated, however, if Congress were to include a special provision in any Wilderness establishing legislation that would allow the regulated use of the Wilderness area for rocket landings. The ROD for the Revised Plan will identify whether the Service supports such a provision, should the decision select an alternative that recommends additional Wilderness areas.

Economic Input - The discontinuation of sounding rocket launches at Poker Flat would also have socioeconomic effects on the local area. Assuming four launches per year, the economic inputs summarized in Figure 5-1 would likely be lost, which would be a minor, long-term, regional, and negative impact. While it is possible that other government, commercial, or academic institutions might utilize Poker Flat, it is not known to what extent that might occur.



5.4.5 Cumulative Effects of Alternative B

The qualified and suitable lands and waters of the Brooks Range WSA (5.82 million acres) would be recommended for designation as Wilderness. There would be no cumulative effects related to the administrative act of recommending Wilderness. Should the Brooks Range WSA be designated Wilderness, the cumulative effects would be negligible to minor, long-term, WSA-wide, and positive, as designated Wilderness provides more permanent statutory protection to the biophysical and human environments. Refuge management activities within Wilderness would be subject to MRAs, and certain activities as discussed previously would be subject to a higher level of scrutiny.

Three rivers would be recommended for wild river designation: the Marsh Fork Canning, the Hulahula, and the Kongakut. If Congress were to include these rivers in the NWSRS, they would be afforded the protections of the Wild and Scenic Rivers Act. Permanent management prescriptions and river-specific CRMPs would be completed, which would include the ability to limit and control visitor use. The cumulative effects of these actions would present minor to moderate effects to the biophysical and human environments.

Cumulative effects as a result of management actions for the Kongakut river under this alternative would be minor due to increasing outreach, more proactively managing the area, and capping visitor use from commercial recreational guides until such time as a Refuge-wide VUMP is developed.

The effects of Alternative B would be cumulative to other effects in the planning region, including the effects of climate change, development activities, and management decisions made by others (such as the reasonably foreseeable future actions listed in Section 5.1.4). Cumulatively, Refuge management under Alternative B would have negligible to minor effects on the biophysical and human environments in the region.

5.5 Effects of Alternative C

This section evaluates the implication or impacts of Alternative C on resource categories for each major issue: Wilderness, wild and scenic rivers, and Kongakut River visitor management.

5.5.1 *Alternative C Introduction*

Wilderness – Alternative C recommends the qualified and suitable lands and waters of the Coastal Plain Wilderness Study Area (1.57 million acres) for Wilderness designation. The administrative act of recommending the Coastal Plain WSA would have no effect on any resource category. However, the effects analysis here considers the effects of Wilderness designation on the resource categories should Congress choose to designate the Coastal Plain WSA as Wilderness.

Wild and Scenic Rivers – Alternative C recommends Wild and Scenic Rivers Act protections for an 11-mile segment of the Atigun River, originating at the Refuge's westernmost boundary and extending to the river's confluence with the Sagavanirktok River. Rivers recommended for wild river status must be protected until Congress acts to designate or reject a recommendation for designation. Pending congressional action, the Service would use interim management prescriptions to manage the Atigun River for the outstandingly remarkable values for which it was found eligible (see Appendix I, Section 4.4). If Congress were to designate this 11-mile segment of the Atigun River as wild, the Refuge would prepare a CRMP. The river's CRMP would formalize the requirement to preserve the river's outstandingly remarkable values and other values found through inventory, in perpetuity. The river would become part of the NWSRS and be afforded the protections of the Wild and Scenic Rivers Act (see Appendix I, Section 4.5).

For the three rivers determined suitable but not recommended for wild river designation (Marsh Fork Canning, Hulahula, and Kongakut), the Refuge would maintain outstandingly remarkable values using the management tools available under the Wilderness and Minimal Management categories, goals, objectives, management policies, and guidelines (see Chapter 2).

Kongakut River – Alternative C proposes Kongakut River management identical to that described in Alternative B (see Section 5.4.1).

5.5.2 *Effects on the Biophysical Environment from Alternative C*

Wilderness – If the Coastal Plain WSA were designated as Wilderness, restrictions on activities that could damage Refuge resources may be less likely to change over time and may be more likely to be enforced, providing greater certainty of long-term protection for wildlife and habitats. The Coastal Plain WSA is currently under Minimal Management, and this management category already affords a high degree of administrative protection to the biophysical environment. However, by protecting natural conditions, Wilderness designation could have minor, long-term, WSA-wide, positive effects on the value of the WSA for ecological research and monitoring.

Resource categories that could be affected by Wilderness designation of the Coastal Plain WSA include: permafrost and soils; water quality and aquatic habitats; vegetation and terrestrial habitats; fish populations and natural diversity; bird populations and natural diversity; and mammal populations and natural diversity. Research on the biophysical

environment could also be affected due to the need to complete MRAs for all Refuge management activities (see “Refuge Operations” in Section 5.5.3).

Wild and Scenic Rivers – Implementing interim management prescriptions for the Atigun River would result in negligible, medium-term, site-specific, and positive effects on biophysical resources in this river corridor. However, if the Atigun River was designated a wild river by Congress, the effects would be minor, long-term, local, and positive because designation would require the Refuge to develop a CRMP for the Atigun River. The CRMP would include an inventory and assessment of biophysical resources in the wild river corridor as well as a monitoring program for ongoing assessment and protection of these resources. Six of the biophysical resource categories would be affected, as described in this section.

Kongakut River – Alternative C recommends interim management tools to address the biophysical resource concerns of the Kongakut River valley until such time as a VUMP and/or WSP are completed. While these management actions would curb effects to biophysical resources, the alternative would not eliminate such effects. These interim tools would have negligible to minor, long-term, local, and positive effects on biophysical resources. Six of the biophysical resource categories would be affected, as follows.

Permafrost and Soils Under Alternative C

Wilderness – Wilderness designation would have indirect, negligible to minor, long-term, WSA-wide, and positive effects to permafrost and soils because of the additional statutory protection Wilderness management provides regarding natural conditions.

Wild and Scenic Rivers – Interim management prescription would be implemented for the portion of the Atigun River recommended for wild river status. Interim prescriptions would maintain or improve (through rehabilitation) current permafrost and soil conditions. Interim prescriptions would therefore have negligible, medium-term, site-specific, positive effects. If Congress were to designate the Atigun River as a wild river, a CRMP would be prepared. The CRMP would also establish protocols to prevent and/or repair damage caused by visitor use. The resultant effects would be minor, long-term, site-specific to local, and positive on permafrost and soils.

Kongakut River – Refuge visitors have the potential to damage soils and permafrost by trampling, particularly at campsites and access points such as landing areas. Enhanced management of visitor use in the Kongakut River area under Alternative C would decrease site-specific impacts to permafrost and soils. Site-specific disturbances from visitors occur extensively up and down the Kongakut River corridor, so enhanced management would also decrease impacts at the local scale. This alternative would have negligible to minor, long-term, site-specific to local, positive impacts on permafrost and soils in the Kongakut River corridor.

Water Quality and Aquatic Habitats Under Alternative C

Wilderness – Wilderness designation of the Coastal Plain WSA would provide a long-term, statutory protection for wilderness characteristics, including aquatic habitats. Designation would result in minor, long-term, WSA-wide, and positive effects to water quality and aquatic habitats.

Wild and Scenic Rivers – Interim management prescriptions to protect the free-flowing character and outstandingly remarkable values of the Atigun River would maintain or improve (through rehabilitation) current water quality and aquatic habitat conditions. Interim prescriptions would therefore have negligible, medium-term, site-specific, positive effects to water quality and aquatic habitats. If Congress were to designate the Atigun River as a wild river, a CRMP would be prepared. The CRMP would include an inventory of current water quality and aquatic habitat condition and a monitoring program for ongoing assessment and protection of these resources. The CRMP would also establish protocols to prevent and/or repair damage caused by visitor use. The effects of designation would be minor, long-term, site-specific to local, and positive on water quality and aquatic habitats.

Kongakut River – Water quality and aquatic habitats can be affected by increased visitor use through increased vegetation trampling and soil compaction, which increases the potential for runoff and sediment loading. Outreach about proper waste disposal and minimizing visitor impacts, along with monitoring the effectiveness of management actions, would have minor, long-term, local, and positive effects on water quality and aquatic habitats along the Kongakut River.

Vegetation and Terrestrial Habitats Under Alternative C

Wilderness – Although management strategies are similar for Wilderness Management and Minimal Management, Wilderness designation is a more permanent commitment to maintain natural conditions. Wilderness designation would likely have negligible to minor, long-term, WSA-wide, and positive effects on vegetation and terrestrial habitats because of the long-term, statutory protections designation would provide to Wilderness character.

Wild and Scenic Rivers – Interim management prescriptions would be implemented to protect the free-flowing character and outstandingly remarkable values of the Atigun River. Interim prescriptions would maintain or improve (through rehabilitation) current vegetation and terrestrial habitat conditions. Interim prescriptions would therefore have negligible to minor, medium-term, site-specific, and positive impacts to vegetation and terrestrial habitats in the Atigun River corridor. If Congress were to designate the Atigun River, a CRMP would be prepared and implemented. The CRMPs would include an inventory of current vegetation and terrestrial habitat condition and a monitoring program for ongoing assessment and protection of these resources. The CRMP would also establish protocols to prevent and/or repair visitor use damage, which would result in minor, long-term, site-specific to local, and positive effects to vegetation and terrestrial habitats.

Kongakut River – Refuge visitors may damage vegetation and habitats, particularly at campsites and access points such as landing areas. Potential damage includes the direct effects of trampling, breakage of trees and shrubs, the possible introduction of invasive plants, and the exclusion of wildlife from riparian and adjacent habitats. Indirect effects include soil and snow compaction as a result of trampling. Most disturbances to vegetation are site-specific and restricted to areas receiving repeated use, such as hunting camps near fixed-wing aircraft-accessible sites and campsites used by floaters. These areas are presently monitored and assessed for negative impacts. Disturbances are local in scale, as site-specific disturbances occur extensively along the Kongakut River corridor. The additional management proposed in Alternative C would have negligible to minor, long-term, site-specific to local, and positive impacts on vegetation and terrestrial habitats in the Kongakut River drainage.

Fish Populations and Natural Diversity Under Alternative C

Wilderness – Many rivers and streams occur in the Coastal Plain WSA. While this WSA is smaller than the others, the concentration of fish populations and natural diversity are highest. Wilderness designation provides long-term protections for fish populations and natural diversity through the statutory requirements of the Wilderness Act. Effects of designation of the Coastal Plain WSA on fish populations and natural diversity would therefore be minor to moderate, long-term, WSA-wide, and positive.

Wild and Scenic Rivers – The interim management prescriptions implemented to maintain the free-flowing character and outstandingly remarkable values of the Atigun River would result in negligible, medium-term, local, and positive impacts to fish populations and natural diversity. If Congress were to designate the Atigun River, a CRMP would be prepared and implemented, resulting in minor, long-term, local, and positive effects to fish populations and natural diversity because of the assessment and monitoring programs the CRMP would develop for all the river's values.

Kongakut River – Dolly Varden and grayling are popular fish sought by anglers on the Kongakut River. Harvest levels of these fish species are unknown and thought to be low. Providing outreach materials on proper catch-and-release techniques could lead to increased survival rates of released fishes, resulting in negligible, long-term, local, and positive effects. Enhanced management of visitors to the Kongakut, such as temporarily capping commercially guided recreation, would have positive effects by reducing substrate disturbance in and out of the river. This effect would indirectly result in negligible, short-term, local, and positive effects on fish populations and natural diversity.

Bird Populations and Natural Diversity Under Alternative C

Wilderness – If Congress were to designate the Coastal Plain WSA as Wilderness, natural conditions would be maintained using the more permanent commitments of the Wilderness Management category. This would likely have long-term, positive effects on bird populations in the Coastal Plain WSA. While the Coastal Plain WSA is smaller than the other study areas, the concentration of bird populations and natural diversity are highest. Additionally, because most bird species are migratory, beneficial effects could be expressed over a larger area than the WSA. Under current management, disturbance to birds and alteration of their habitats is minimal. However, Wilderness designation, because of its greater long-term commitment to maintaining natural conditions, could have minor to moderate, long-term, regional or greater, and positive effects on bird populations and natural diversity.

Wild and Scenic Rivers – There would be negligible, medium-term, local, and positive effects on bird populations and natural diversity under this alternative. An interim management prescription to maintain the outstandingly remarkable values of the Atigun River would be implemented. Because riparian areas tend to have higher density and diversity of birds compared to surrounding habitats, maintaining river values should indirectly have positive effects on bird populations and natural diversity. If Congress were to designate the Atigun River, a CRMP would be prepared and implemented, resulting in minor, long-term, local, and positive effects to bird populations and natural diversity because of the long-term assessment and monitoring programs of all the river's values that are required in the CRMPs.

Kongakut River – Enhanced management of human use of the Kongakut River valley would have negligible to minor, long-term, site-specific to local, and positive effects on bird populations

and natural diversity. Monitoring visitor impacts to bird habitats would lead to development of conservation measures to mitigate visitor impacts on birds if adverse effects are detected. Outreach materials would benefit birds by helping visitors reduce disturbance to nesting raptors and other species, and minimize impacts to bird habitats. Enhanced management of user groups on the river, such as by temporarily capping commercially guided recreation, would have positive effects by reducing disturbance to birds and bird habitat along the river.

Mammal Populations and Natural Diversity Under Alternative C

Wilderness – Wilderness designation of the Coastal Plain WSA would have positive effects on mammal populations and natural diversity in the WSA, including caribou, muskoxen, polar bears, and microtines that use the coastal plain seasonally or year round. Positive effects would vary from minor to moderate, long-term, WSA-wide to regional, and positive because of the more permanent commitment to protect natural conditions in designated Wilderness, including mammal populations and habitats.

Wild and Scenic Rivers – There would be negligible, medium-term, local, and positive impacts to mammal populations and natural diversity under this alternative. Interim management prescriptions to protect the free-flowing character and outstandingly remarkable values of the Atigun River would indirectly result in positive effects for mammal populations and their habitats within the river corridor. If Congress were to designate the Atigun River, a CRMP would be prepared and implemented, resulting in minor, long-term, local, and positive effects to mammal populations and natural diversity because of the long-term assessment and monitoring programs of all the river's values that would be included in the CRMP.

Kongakut River – Enhanced management of human use of the Kongakut River valley would have negligible to minor, long-term, site-specific to local, and positive effects on mammal populations. Monitoring visitor impacts to habitats would lead to development of conservation measures to mitigate visitor impacts on mammals if adverse effects are detected. Outreach materials would benefit mammals by helping visitors reduce disturbance to resident and migratory species, and minimize impacts to mammal habitats. Enhancing management of user groups on the river, such as by temporarily capping commercially guided recreation, would have positive effects by reducing disturbance to mammal populations and diversity along the river.

5.5.3 Effects on the Human Environment from Alternative C

Wilderness – The Coastal Plain WSA is currently managed under Minimal Management. Under current management, public use of the Refuge is managed similarly in designated Wilderness and in areas under Minimal Management. Most restrictions on public use are derived from the area's status as a refuge and its regulations. Public use is subject to Federal regulations implementing Federal laws (e.g., ANILCA, Refuge Administration Act, etc.), State laws (e.g., Alaska Statute 19.40.210, which prohibits off-road vehicles from the Dalton Highway), and State regulations (e.g., the State of Alaska hunting and fishing regulations). However, by protecting wilderness characteristics (both biophysical and experiential), Wilderness designation could have negligible to minor, long-term, WSA-wide, positive effects on the human environment.

If the Coastal Plain WSA were to be designated as Wilderness, it would affect the following resource categories: local economy and commercial uses; cultural resources; subsistence;

visitor services and recreational opportunities; wilderness characteristics; the Refuge's MPA; and Refuge operations.

Wild and Scenic Rivers – Alternative C would recommend the Atigun River as a wild river. The outstandingly remarkable values of the Marsh Fork Canning, Hulahula, and Kongakut Rivers would be protected under current Minimal Management and Wilderness designations. If Congress were to designate the Atigun River, a CRMP would be developed for the continued protection of the river. In general, these effects would be minor, long-term, local, and positive for the human environment in the Atigun River corridor. CRMPs and interim management prescriptions would lay out strategies that might affect the following resource categories: local economy and commercial uses; subsistence; cultural resources; visitor services and recreational opportunities; wilderness characteristics; and refuge operations.

Kongakut River – Under this alternative, a VUMP would be initiated immediately upon approval of the Revised Plan. Until the VUMP takes effect, interim management tools would be implemented, including a temporary cap on commercial recreational guides. Effects of the interim management tools on the human environment would likely be moderate, long-term, local, and positive. Effects of the interim management tools would affect the following resource categories: local economy and commercial uses; cultural resources; subsistence; visitor services and recreational opportunities; special designations; public health and safety; wilderness characteristics; and Refuge operations.

Local Economy and Commercial Uses Under Alternative C

Wilderness – Designation of the Coastal Plain WSA as Wilderness could affect commercial uses. In designated Wilderness, the Wilderness Act of 1964 and Service Wilderness policy prohibit commercial enterprises with few exceptions. Commercial services that help people access the Refuge to realize the recreational opportunities and wilderness characteristics of the area, such as guides and transportation companies, are allowed provided these uses are compatible with Refuge purposes, including Wilderness Act purposes. Commercial filming is limited in Wilderness by Service policy. Designation could potentially attract more wilderness-oriented visitors to the Refuge, resulting in increased business prospects for recreation guides, air operators, and other commercial service providers in local communities. Effects would be negligible to minor, long-term, WSA-wide, and positive for recreational service providers.

Big-game hunting guides in guide use areas within the Coastal Plain WSA could have to comply with stricter guidelines in order to minimize the effect of activities on Wilderness character. Because guide use areas are competitively awarded, effects would vary, depending on the guide. Effects could range from no effect to negligible to minor, long-term, WSA-wide, and negative or positive.

Wild and Scenic Rivers – Interim management provisions for the Atigun River, which are based on available management tools (see Appendix I, Section 4.4), would not affect local economy and commercial uses. However, if Refuge staff was to determine that one or more of the outstandingly remarkable values of the river was threatened and changes or restrictions to commercial services would mitigate the threat, then the Refuge could impose interim restrictions on commercial services. These restrictions would likely result in negligible, short-term to long-term, local, and negative effects to the local economy and commercial uses. If Congress were to designate the Atigun River as a wild river, Refuge staff would prepare a river-specific CRMP. If the CRMP were to limit or reduce the level of commercial use in order

to protect the river's values, there could be negligible to minor, long-term, local, and negative effects on local economy and commercial uses.

Kongakut River – Limiting the number of guides and their use from 2013 to 2016 or until the VUMP is completed could limit the economic contribution of the river. Some service providers may decide not to offer a trip(s) on the Kongakut or may be unable to grow their business. Other commercial service providers may be unable to start a new business during the period of the cap. The effects would likely be minor, short-term, local, and negative.

A step-down VUMP would likely have effects on the local economy and commercial uses. Step-down planning would be done in conjunction with key stakeholders and the public. Depending on the nature of the changes and/or restrictions imposed by the VUMP, the effects could be minor to moderate, long-term, site-specific to Refuge-wide, and positive or negative for guides and commercial air operators operating on the Refuge. Should the plan limit or reduce the level of commercial use, minor to moderate negative effects would be anticipated to those guides adversely affected by such limits, and this could indirectly result in negligible to minor effects on local economies.

Cultural Resources Under Alternative C

Wilderness – Wilderness designation could indirectly have negligible, long-term, WSA-wide, and positive effect on cultural resources. By protecting natural conditions and wilderness characteristics, Wilderness could provide long-term protection for cultural resources and traditional lands, waters, and resources used by local residents and serve to perpetuate the natural conditions in which their cultures evolved. However, the intentional and unintentional losses of cultural resources would likely continue even within designated Wilderness, primarily as a result of erosion and other natural forces, resulting in similar effects as under Alternative A.

Wild and Scenic Rivers – Public use would continue on those rivers determined suitable for inclusion in the NWSRS. The effects of public use on cultural resources would likely be minor, long-term, site-specific, and negative. Interim management prescriptions for the Atigun River could mitigate these effects in this river corridor because the Refuge would use the prescriptions to maintain the river's values. If Congress were to designate the Atigun River as a wild river, a CRMP would be prepared, resulting in minor, long-term, local, and positive effects to cultural resources because of the assessment and monitoring programs that would be included in the CRMP.

Under Alternative C, the Refuge would use existing management tools to maintain the Cultural outstandingly remarkable value on the Hulahula River, rather than interim management prescriptions or the higher level of protection offered by a CRMP. Effects would range from no effect to negligible to minor, long-term, site-specific, and positive.

Kongakut River – Under Alternative C, cultural resource losses (intentional or unintentional) would likely continue in the Kongakut River valley. However, outreach emphasizing stewardship of cultural resources in the Kongakut River drainage would likely minimize potential impacts. Limiting the amount of guided use prior to completion of the VUMP should have negligible, short-term, local, positive effects on cultural resources. The VUMP would include a better understanding of the cultural resources of the area and their condition, and it would provide appropriate cultural resource management. The VUMP should result in

negligible to minor, long-term, local, and positive effects to cultural resources as compared to Alternative A.

Subsistence Under Alternative C

Wilderness – Wilderness designation of the Coastal Plain WSA would provide long-term, statutory protection to habitats and natural conditions, especially those found near Kaktovik, thus indirectly serving to perpetuate the subsistence resources upon which local residents are so dependent. In general, subsistence uses in designated Wilderness would continue as they have under Minimal Management, and the harvest of subsistence resources would continue. Designation would not restrict subsistence use of resources in the Refuge, and the right of subsistence users to conduct traditional activities using traditional modes of transportation would continue. Effects of Wilderness designation to subsistence opportunities and resources would be negligible, long-term, WSA-wide, and positive.

The subsistence use of cabins would continue, although requests for construction or location of new cabins would receive greater scrutiny. Wilderness designation could also increase visitor use near Kaktovik's traditional and subsistence use areas, which could increase conflicts between locals and visitors. These effects would be expected to be negligible to minor, long-term, local, and negative.

Wild and Scenic Rivers – Under this alternative, interim management prescriptions for the Atigun River combined with outreach regarding cultural and subsistence use in the drainage could improve understanding and reduce real and/or perceived conflict between local users and nonlocal visitors. The effects would likely be negligible, medium-term, local, and positive. If Congress were to designate the Atigun River, a CRMP would be developed that would establish user capacities for the river corridor. The Refuge could then limit or control visitor use to ensure outstandingly remarkable and other river values are maintained, and this could indirectly result in fewer conflicts between subsistence users and visitors. The Atigun River CRMP would therefore result in minor, long-term, and local effects that would be positive for subsistence resources and uses.

Kongakut River – Interim limits on guided use and outreach regarding cultural and subsistence use in the Kongakut River drainage could improve understanding and reduce real and/or perceived conflict between local users and nonlocal visitors. Voluntary actions by authorized guides and commercial air operators could also reduce the potential for conflicts among recreational visitors and subsistence users. The effects are likely to be minor, long-term, local, and positive.

Visitor Services and Recreation Opportunities Under Alternative C

Wilderness – Wilderness designation of the Coastal Plain WSA would have positive and negative effects on visitor services and recreational opportunities. Statutory protection of the area from roads, facilities, and recreational improvements would positively affect recreational opportunities for solitude, exploration, and freedom. Wilderness designation would potentially result in fewer installations and less visitor contact, which would enhance wilderness-associated recreational opportunities and experiences. Minimal Management already affords a high degree of wilderness-associated recreational opportunities and

experiences, and so the effects of Wilderness designation would be negligible to minor, long-term, WSA-wide, and positive.

Because roads, facilities, recreational improvements, and commercial enterprises are not typically allowed in designated Wilderness, some visitor services could be directly and negatively impacted by Wilderness designation. No new cleared landing areas would be allowed in designated Wilderness, motorized generators and water pumps would not be allowed, and transportation and utility systems could only be authorized by Congress. Additionally, the Refuge might need to consider imposing limits on the number and types of visitor services in certain areas of the Refuge in order to preserve Wilderness character (should the area be designated as Wilderness). This would indirectly result in the loss of some recreational opportunities dependent on the impacted visitor services. These impacts are likely to be minor to moderate, long-term, specific to the Coastal Plain WSA, and negative.

To preserve experiential opportunities associated with Wilderness character (such as opportunities for solitude), the Refuge may decide to have fewer routine law enforcement patrols and less visitor use monitoring on the ground in designated Wilderness areas. The resultant effects would likely be minor, temporary to short-term, local, and negative or positive, depending on the perception of the Refuge user. Fewer routine patrols and less on-the-ground visitor use monitoring could result in the failure to detect degraded or impaired sites in designated Wilderness, resulting in minor, long-term, site-specific, and negative effects.

Wild and Scenic Rivers – Interim management provisions for the Atigun River, which are based on available management tools, would generally have no effect on visitor services and recreational opportunities. However, if Refuge staff was to determine that one or more of the outstandingly remarkable values of the river was threatened and changes or restrictions to visitors would mitigate the threat, then the Refuge could impose interim restrictions on visitor services, which in turn could affect recreational opportunities. These restrictions would likely result in negligible, short-term to long-term, local, and negative effects to visitor services and recreational opportunities. Congressional designation of the Atigun as a wild river could attract more visitors. If the number of visitors exceeds the determined user capacity of the river corridor, the Refuge might need to limit use. Effects would likely be minor to moderate, long-term, local, and positive or negative. Visitor experience could be enhanced by limiting use; however, some visitors might not be able to experience the river if access is limited. Any limitations on use of the Atigun River could potentially displace visitors to other Refuge rivers.

Kongakut River – This alternative proposes to adopt management strategies based on a Refuge-wide Visitor Use Management step-down plan. As the step-down plan unfolds, it is likely to affect visitor services and recreational opportunities. Through the VUMP, Refuge managers will consider levels of use, timing and distribution of use, and activities and behaviors of visitors. Managers may use education, site management, regulation, enforcement, and/or rationing/allocation to manage visitor use at Arctic Refuge. The effects would likely vary, depending on the visitor, ranging from no effect to minor to moderate, long-term, local, and positive or negative. The effects of proposed visitor use management will be fully evaluated in the step down planning process.

Developing outreach materials with preferred practices and strategies for minimizing impacts would likely raise the level of awareness of commercial and private users. In turn, this could lead to higher quality experiences for all users by reducing the amount of physical and experiential impacts occurring on the river, including those associated with human waste. The effects of outreach actions would likely be minor, long-term, local, and positive.

Improving monitoring programs for physical and social conditions could better inform management about areas of concern, thus allowing management to take appropriate, responsive action before continued degradation occurs. The effects of improved monitoring on visitor services and recreational opportunities would be minor to moderate, long-term, local, and positive. However, site-specific monitoring and rehabilitation could result in Refuge staff contributing to crowding and other user impacts on the river. These effects are likely to be minor, short-term, local, and negative. Effects could be mitigated to some extent by timing Refuge activities to occur outside peak use.

Publishing schedules of past guided and non-guided visitor use (currently available from commercial permit client use reports) could increase visitor awareness regarding Kongakut River use periods but would likely do little to redistribute use across the season. Asking guides and commercial air operators to voluntarily limit their activities could have minor, short-term, local, and positive effects on visitor experiences.

Placing an interim cap on recreational guides would affect recreational opportunities and visitor services in the Kongakut River valley. Some service providers may decide not to offer a trip(s) on the Kongakut or may be unable to grow their business, while other commercial service providers might be unable to offer their services during the period of the cap. While recreational opportunities are not expected to decline, this alternative could be perceived by recreationists and visitor service providers as curtailing or limiting opportunities, and could result in displacing recreation and visitor services to other areas of the Refuge. Other people might perceive a cap on commercial guides as an opportunity to recreate independently in the Kongakut River valley. These effects would be minor, short-term, local, and positive or negative, depending on the perception of different individuals and groups.



Wilderness Characteristics Under Alternative C

Wilderness – Congressional designation of the Coastal Plain WSA as Wilderness, would have a positive effect on wilderness characteristics. Wilderness areas are protected from roads, facilities, recreational improvements, commercial enterprises, helicopters, and installations. These protections would enhance wilderness characteristics and people's experiences in the area. Additionally, the Service would more closely consider our own Refuge management activities and their effects through the MRA process. The Coastal Plain WSA is currently under Minimal Management, and this management category already affords a high degree of administrative protection to wilderness characteristics. Wilderness designation would offer statutory protection to these characteristics and would represent a more permanent commitment to their protection. These effects would likely be minor, long-term, WSA-wide, and positive.

Wild and Scenic Rivers – Interim management prescriptions for the Atigun River would have no effect to negligible, medium-term, local, and positive effects on wilderness characteristics. If Congress were to designate the Atigun River as a wild river, a CRMP would be prepared, resulting in minor, long-term, local, and positive effects to wilderness characteristics because of the assessment and monitoring programs that would be included in the CRMP. In addition, the Refuge would establish user capacities and protect the outstandingly remarkable and other river values in the wild river corridor, which would have minor to moderate, long-term, local, and positive effects on wilderness characteristics.

Kongakut River – Interim limits on commercial recreation guides and their clients would minimize or lessen impacts on wilderness characteristics, but would not eliminate them. Activities would be frozen at current levels, thus curbing negative effects on wilderness characteristics, but ongoing impacts from continued use would not be affected. The effects of implementing an interim cap on guides would be minor, short-term, local, and positive for wilderness characteristics.

Working with air operators to disperse flight paths could reduce air traffic, therefore improving wilderness experiences for visitors. Because Arctic Refuge does not have jurisdiction over airspace, compliance with this request could not be enforced. To the extent we are able to achieve voluntary compliance with air operators, the effects to wilderness characteristics would likely be minor to moderate, short-term, local, and positive. Similarly, asking commercial guides and commercial air operators to minimize effects on Refuge visitors would have minor to moderate, short-term, local, and positive effects on wilderness characteristics, to the extent we are able to achieve compliance.

Improved monitoring of visitor experiences would: 1) tie observed conditions to management goals for biophysical resources; 2) help identify thresholds of acceptable changes in the biophysical environment; and 3) provide input on actions that could be taken to prevent negative Wilderness character indicator thresholds from being reached. Monitoring could result in improved management strategies for wilderness characteristics, and over the long-term, indirectly create moderate, local, and positive improvements to wilderness characteristics.

Visitors seeking solitude and other values associated with Wilderness might have already been displaced from the Kongakut. Implementing interim Kongakut River visitor use management prescriptions and ultimately prescriptions from a VUMP could stop displacement and enhance wilderness characteristics enough that visitors seeking solitude would return to the Kongakut. Outreach efforts focused on minimal impact techniques and desired behaviors for visitors

would likely result in minor, long-term, local, and positive effects on wilderness characteristics. Rehabilitating impacted sites could help restore the river to its natural condition, thus improving Wilderness character. The effects are likely to be minor, long-term, local, and positive.

Special Designations Under Alternative C

Wilderness – Wilderness designation of the Coastal Plain WSA would have minor, long-term, WSA-wide, and positive effects on those portions of the MPA in the WSA because Wilderness designation would provide statutory protection to the Wilderness character of the MPA.

Wild and Scenic Rivers – There would be no effects to any special designations under this alternative.

Kongakut River – There would be negligible, long-term, local, and positive effects to the MPA as a result of more proactive management of the Kongakut River. Some commercial recreation guides might elect to divert their operations from the Kongakut to one of the Refuge's three wild rivers (Ivishak, Sheenjek, and Wind Rivers) or to the Refuge's RNAs or PUNAs. Effects would range from no effect to negligible to minor, short- to medium term, local, and negative.

Public Health and Safety Under Alternative C

Wilderness – Neither Wilderness recommendation nor designation would not have any effect on public health and safety. Public health and safety would continue as under current management.

Wild and Scenic Rivers – Neither interim management prescriptions nor wild river designation of the Atigun River would have any effect on public health and safety.

Kongakut – Developing a Visitor Use Management step-down plan and providing targeted messages to Refuge visitors would have no effect to negligible, long-term, Refuge-wide, and positive effects on public health and safety issues.

Refuge Operations Under Alternative C

Wilderness – Congressional designation of the Coastal Plain WSA as Wilderness would affect overall Refuge operations, both in terms of paperwork and in terms of research. If the Coastal Plain WSA were to be designated as Wilderness, Refuge management activities would be subject to an MRA process, and normally prohibited uses would be approved only if they are determined to be the minimum necessary to manage the area as Wilderness. New Wilderness designation could therefore increase the paperwork burden for Refuge staff. These effects would likely be minor, long-term, WSA-wide, and negative.

Additionally, proposed research conducted as a Refuge management activity would be subject to an MRA to determine if it is necessary to accomplish the purposes of the Refuge, including Wilderness Act purposes, and that any normally prohibited uses are necessary to meet the minimum requirements for managing the area as Wilderness. The MRA process could negatively affect long-term research projects with established data collection protocols or research that might require permanent installations, such as climate change research. Decisions are made on a case-by-case basis, however, and it is possible that installations could

be allowed. There is some uncertainty as to the extent that Wilderness designation would limit the ability to conduct research or monitoring necessary to affect conservation measures. We believe the effects would be negligible to minor, long-term, WSA-wide, and negative.

Wilderness designation would not affect the jurisdiction or responsibilities of the State with respect to wildlife, although actions would need to be consistent with maintaining Wilderness character. For some State activities, an MRA would be required if Congress were to designate the Coastal Plain WSA as Wilderness. We believe the effects would be negligible, long-term, WSA-wide, and negative.

Wild and Scenic Rivers – There would be no effect to negligible, medium-term, local, and negative effects to Refuge operations under an interim management prescription for the Atigun River. Overall, management of the Atigun River would continue as under current management. However, Refuge staff would likely conduct periodic monitoring and assessments of the river corridor to ensure outstandingly remarkable values are being maintained.

Should Congress include the Atigun River in the NWSRS, there would be effects to Refuge operations. There would be an additional workload to prepare a CRMP in the short-term; the effects would be moderate, short-term, Refuge-wide, and negative. In the medium-term, monitoring and the potential for adjusting user limits would result in minor to moderate, Refuge-wide, and negative effects through the expenditure of staff time and budget. However, once the CRMP is completed and monitoring protocols and a system for managing the river are in place, there should be less strain on Refuge staff dealing with day-to-day issues. Thus, over the long-term, effects would be minor, Refuge-wide, and positive.

Kongakut River – This alternative would require additional staff time and budget to 1) execute a revised monitoring program; 2) develop outreach materials; 3) compile and publish schedules of proposed launch dates; 4) establish, implement, and monitor an interim cap on commercial recreational guides; 5) conduct site-specific rehabilitation; and 6) develop and execute a step-down management plan. The effects are likely to be moderate, short- to medium-term, Refuge-wide, and negative. Indirectly, limits placed on commercial guides could negatively affect the Service's relationship with these stakeholders in the short-term. Over the long-term, however, there should be less strain on Refuge staff dealing with day-to-day river management concerns, and more public buy-in on management of the Kongakut River, resulting in minor, long-term, Refuge-wide, and positive effects.

5.5.4 Effects on Poker Flat Research Range from Alternative C

The service does not expect that implementing Alternative C would have an adverse impact on the continued launch of sounding rockets from Poker Flat. In general, planned impact locations within Arctic Refuge are not further north of the Ivishak River; water landings in the Beaufort Sea/Arctic Ocean are generally not closer than 220 miles (350 kilometers) north of Barter Island.

As designation of the Coastal Plain WSA would likely restrict the future installation of certain infrastructure and the onset of commercial activities within the area, it could benefit the Sounding Rockets Program. The future year-round presence of high value infrastructure and additional people within the Poker Flat flight corridor could place further restrictions on allowable missions due to mandatory flight safety considerations. Implementing Alternative C could alleviate this possibility.

5.5.5 Cumulative Effects of Alternative C

The qualified and suitable lands and waters of the Coastal Plain WSA (1.55 million acres) would be recommended for Wilderness designation. There would be no cumulative effects related to the administrative act of recommending Wilderness. Should the Coastal Plain WSA be designated Wilderness, the cumulative effects would be negligible to minor, long-term, WSA-wide, and positive, since designated Wilderness provides more permanent statutory protection to the biophysical and human environments. Management activities within Wilderness would be subject to MRAs, and certain activities discussed previously would be subject to a higher level of scrutiny.

An 11-mile segment of the Atigun River would be recommended for designation as a wild river. The cumulative effect of this action would be a positive effect for long-term protection of the Atigun River. The three suitable rivers not recommended for inclusion in the NWSRS would be managed using existing management tools under the Minimal Management and Wilderness Management categories. This alternative would result in a minor cumulative effect to the biophysical and human environments for the foreseeable future.

Cumulative effects as a result of management actions for the Kongakut River under this alternative would be minor as a result of increasing outreach, more proactively managing the area, and capping visitor use from commercial recreation guides until such time as a Refuge-wide VUMP is developed.

The effects of Alternative C would be cumulative to other effects in the planning region, including the effects of climate change, development activities, and management decisions made by others (such as the reasonably foreseeable future actions listed in Section 5.1.4). Cumulatively, Refuge management under Alternative C would have negligible to minor effects on the biophysical and human environments in the region.

5.6 Effects of Alternative D

This section evaluates the implication or impacts of Alternative D on resource categories for each major issue: Wilderness, wild and scenic rivers, and Kongakut River visitor management.

5.6.1 *Alternative D Introduction*

Wilderness – Alternative D recommends designating the qualified and suitable lands and waters in the Brooks Range WSA (5.82 million acres) and Porcupine Plateau WSA (4.92 million acres) as Wilderness. The administrative act of recommending these WSAs would have no effect on any resource category. However, the effects analysis here considers the effects of Wilderness designation on the resource categories should Congress choose to designate the Brooks Range and Porcupine Plateau WSAs as Wilderness.

Wild and Scenic Rivers – Alternative D recommends all four suitable rivers for inclusion in the National Wild and Scenic River System: Atigun, Marsh Fork Canning, Hulahula, and Kongakut. The Hulahula River would be segmented at the boundary of Refuge and KIC lands. Those portions of the Hulahula River on KIC lands would not be recommended. Rivers recommended for wild river status must be protected until Congress acts to designate or reject a recommendation for designation. Pending congressional action, the Service would use interim management prescriptions to manage each recommended river for the outstandingly remarkable values for which it was found eligible (see Appendix I, Section 4.4).

If Congress were to designate these four rivers as wild, the Refuge would prepare a CRMP for each river. The CRMPs would formalize the requirement to preserve each river's outstandingly remarkable and other values found through inventory, in perpetuity. These rivers would be part of the NWSRS and be afforded the protections of the Wild and Scenic Rivers Act (see Appendix I, Section 4.5). For wild rivers or river segments within designated Wilderness, the more restrictive provisions of the Wild and Scenic Rivers Act and the Wilderness Act would apply.

Kongakut River – Alternative D proposes Kongakut River management issues be addressed in a Visitor Use Management and/or Wilderness Stewardship step-down plan, that would, among other things, develop long-term monitoring protocols. Until the step-down plan(s) is completed, the Service would implement a variety of interim management actions to protect resources in the Kongakut River valley (see Chapter 3, Section 3.2.5.3).

5.6.2 *Effects on the Biophysical Environment from Alternative D*

Wilderness – If the Brooks Range and Porcupine Plateau WSAs were to be designated as Wilderness, restrictions on activities that could damage Refuge resources would be less likely to change over time and might be more likely to be enforced, which would provide greater certainty of long-term protection for wildlife and habitats. The Brooks Range and Porcupine Plateau WSAs are currently under Minimal Management, and this management category already affords a high degree of administrative protection to the biophysical environment. However, by protecting natural conditions, Wilderness designation could have minor, long-term, WSA-wide, positive effects on the value of the WSAs for ecological research and monitoring.

Resource categories that could be affected by Wilderness designation of the Brooks Range WSA include: permafrost and soils; water quality and aquatic habitats; vegetation and terrestrial habitats; fish populations and natural diversity; bird populations and natural diversity; and mammal populations and natural diversity. Research on the biophysical environment could also be affected due to the need to complete MRAs for all Refuge management activities (see “Refuge Operations” in Section 5.6.3).

Wild and Scenic Rivers – Alternative D recommends wild and scenic river designation for all four suitable rivers, but only those portions of the Hulahula River flowing through Refuge lands would be recommended. Implementing interim management prescriptions for the four suitable rivers would result in negligible, medium-term, site-specific, and positive effects on biophysical resources within these river corridors. If these rivers were to be designated as wild rivers by Congress, the effects would be minor, long-term, local, and positive because designation would require the Refuge to develop CRMPs for each river. The CRMPs would include an inventory and assessment of biophysical resources in the wild river corridor as well as a monitoring program for ongoing assessment and protection of these resources. Six of the biophysical resource categories would be affected, as described in this section.

Kongakut River – Alternative D recommends interim management tools to address biophysical resource concerns in the Kongakut River valley until such time as a VUMP and/or WSP are completed. These interim tools would have negligible to minor, long-term, site-specific to local, and positive effects on biophysical resources. Six of the biophysical resource categories would be affected, as follows.

Permafrost and Soils Under Alternative D

Wilderness – Wilderness designation would have indirect, negligible to minor, long-term, WSA-wide, and positive effects on permafrost and soils because of the additional statutory protection Wilderness management provides regarding natural conditions.

Wild and Scenic Rivers – Interim management prescriptions to protect the free-flowing character and outstandingly remarkable values for those rivers that are suitable and recommended would result in negligible, medium-term, site-specific, and positive impacts to permafrost and soils in these river corridors. The CRMPs that would be prepared for the Atigun, Marsh Fork Canning, Hulahula, and Kongakut Rivers, if they were to be designated as wild rivers by Congress, would include an inventory of current permafrost and soil conditions and a monitoring program for ongoing assessment and protection of these resources. The CRMPs would also establish protocols to prevent and/or repair damage caused by visitor use. The resultant effects would be minor, site-specific to local, long-term, and positive.

Kongakut River – Refuge visitors have the potential to damage soils and permafrost by trampling, particularly at campsites and access points such as landing areas. Enhanced management of visitor use in the Kongakut River area under Alternative D would decrease site-specific impacts. Site-specific disturbances from visitors occur extensively up and down the Kongakut River corridor, so enhanced management would also decrease impacts at the local scale. This alternative would have negligible to minor, long-term, site-specific to local, and positive impacts on permafrost and soils in the Kongakut River corridor.

Water Quality and Aquatic Habitats Under Alternative D

Wilderness – Wilderness designation of the Brooks Range and Porcupine Plateau WSAs would provide long-term, statutory protection for wilderness characteristics, including aquatic habitats. Designation would result in minor, long-term, WSA-wide, and positive effects.

Wild and Scenic Rivers – Interim management prescriptions to protect the free-flowing character and outstandingly remarkable values of the four recommended rivers would result in negligible, medium-term, site-specific, and positive impacts to water quality and aquatic habitats in these river corridors. If Congress were to include these four rivers in the NWSRS, CRMPs would be prepared for each river. The CRMPs would include an inventory of current water quality and aquatic habitat condition and a monitoring program for ongoing assessment and protection of these resources. The CRMP would also establish protocols to prevent and/or repair damage caused by visitor use. The effects of designation would be minor, long-term, site-specific to local, and positive on water quality and aquatic habitats.

Kongakut River – Water quality and aquatic habitats can be affected by increased visitor use through increased vegetation trampling and soil compaction, which increases the potential for runoff and sediment loading. Outreach about proper waste disposal and minimizing visitor impacts, along with monitoring the effectiveness of management actions, would have minor, long-term, local, and positive effects on water quality and aquatic habitats along the Kongakut River.

Vegetation and Terrestrial Habitats Under Alternative D

Wilderness – Although management strategies are similar for Wilderness Management and Minimal Management, Wilderness designation is a more permanent commitment to maintain natural conditions. Wilderness designation would likely have a negligible to minor, long-term, WSA-wide, and positive effects on vegetation and terrestrial habitats because of the long-term statutory protections designation would provide to Wilderness character.

Wild and Scenic Rivers – Interim management prescriptions to protect the free-flowing character and outstandingly remarkable values of the four suitable and recommended rivers would result in negligible to minor, medium-term, site-specific, and positive impacts to vegetation and terrestrial habitats in these river corridors. If Congress were to designate the four rivers as wild, CRMPs would be prepared for each river. The CRMPs would include an inventory of current vegetation and terrestrial habitat condition and a monitoring program for ongoing assessment and protection of these resources. The CRMP would also establish protocols to prevent and/or repair visitor use damage, which would result in minor, long-term, site-specific to local, and positive effects on vegetation and terrestrial habitats.

Kongakut River – Refuge visitors may damage vegetation and habitats, particularly at campsites and access points such as landing areas. Potential damage includes direct effects of trampling, breakage of trees and shrubs, the possible introduction of invasive plants, and the exclusion of wildlife from riparian and adjacent habitats on vegetation. Indirect effects include soil and snow compaction as a result of trampling. Most disturbances to vegetation are site-specific and restricted to areas receiving repeated use, such as hunting camps near fixed-wing aircraft-accessible sites and campsites used by floaters along major rivers. Disturbances are local in scale, as site-specific disturbances occur extensively along the Kongakut River corridor. The additional management proposed in Alternative D would have negligible to

minor, long-term, site-specific to local, and positive impacts on vegetation and terrestrial habitats in the Kongakut River drainage.

Fish Populations and Natural Diversity Under Alternative D

Wilderness – Wilderness designation provides long-term protections for fish populations and natural diversity through the statutory requirements of the Wilderness Act. Effects of designation of the Brooks Range and Porcupine Plateau WSAs on fish populations and natural diversity would therefore be minor, long-term, throughout the WSAs, and positive.

Wild and Scenic Rivers – The Service would use interim management prescriptions to manage each suitable and recommended river for its free-flowing character and the outstandingly remarkable values for which it was found eligible. This would result in negligible, medium-term, local, and positive impacts to fish populations and natural diversity. If Congress were to designate the recommended rivers, CRMPs would be prepared, resulting in minor, long-term, local, and positive effects to fish populations and natural diversity because of the assessment and monitoring programs that would be included in the CRMPs.

Kongakut River – Dolly Varden and grayling are popular fish sought by anglers on the Kongakut River. Harvest levels of these fish species are unknown and thought to be low. Providing outreach materials on proper catch-and-release techniques could lead to increased survival rates of released fishes, resulting in negligible, long-term, local, positive effects.

Bird Populations and Natural Diversity Under Alternative D

Wilderness – If Congress were to designate the Brooks Range and Porcupine Plateau WSAs as Wilderness, natural conditions would be maintained using the Wilderness Management category. This would have long-term, positive effects on bird populations in the two WSAs. Because most bird species are migratory, beneficial effects could be expressed over a larger area than the WSAs. Under current management, disturbance to birds and alteration of their habitats is minimal. However, Wilderness designation, with its long-term commitment to maintaining natural conditions, could have negligible to minor, long-term, regional or greater, and positive effects.

Wild and Scenic Rivers – There would be negligible, medium-term, local, and positive effects on bird populations and natural diversity under this alternative. The Service would use interim management prescriptions to manage each suitable and recommended river for the outstandingly remarkable values for which it was found eligible. Because riparian areas tend to have higher density and diversity of birds compared to surrounding habitats, maintaining river values should indirectly have positive effects on bird populations and natural diversity. If Congress were to include the four recommended rivers in the NWSRS, CRMPs would be prepared for each river, resulting in minor, long-term, local, and positive effects on bird populations and natural diversity in these river corridors because of the assessment and monitoring programs that are required in the CRMPs.

Kongakut River – Enhanced management of human use of the Kongakut River valley would have negligible to minor, long-term, site-specific to local, and positive effects on bird populations and natural diversity. Monitoring visitor impacts on bird habitats would lead to the development of conservation measures to mitigate visitor impacts on birds if adverse

effects are detected. Outreach materials would benefit birds by helping visitors reduce disturbance to nesting raptors and other species, and minimize impacts to bird habitats.

Mammal Populations and Natural Diversity Under Alternative D

Wilderness – Wilderness designation would result in minor to moderate, long-term, WSA-wide to regional, and positive effects for a variety of mammals including Dall's sheep, moose, grizzly bears, black bears, wolves, wolverines, and caribou because of the more permanent commitment to protect natural conditions in designated Wilderness, including mammal populations and habitats.

Wild and Scenic Rivers – There would be negligible, medium-term, local, and positive effects on mammal populations and natural diversity under this alternative. The Service would use interim management prescriptions to manage the free-flowing character of each suitable and recommended river and to maintain the outstandingly remarkable values for which each river was found eligible. This would indirectly affect mammal populations and natural diversity. If Congress were to designate recommended rivers, CRMPs would be prepared, resulting in minor, long-term, local, and positive effects to mammal populations and natural diversity in these river corridors because of the assessment and monitoring programs that would be included in the CRMPs.

Kongakut River – Enhanced management of human use of the Kongakut River valley would have negligible to minor, long-term, site-specific to local, and positive effects on mammal populations. Monitoring impacts to habitats by visitors would lead to the development of conservation measures to mitigate visitor impacts on mammals if adverse effects are detected. Outreach materials would benefit mammals by helping visitors reduce disturbance to resident and migratory species, and minimize impacts to mammal habitats.



5.6.3 Effects on the Human Environment from Alternative D

Wilderness – Under current management, public use of the Refuge is managed similarly in designated Wilderness and in areas under Minimal Management. Most regulations on public use are derived from the area's status as a refuge and by State law. Public use is subject to Federal regulations implementing Federal laws (e.g., ANILCA, Refuge Administration Act), State laws (e.g., Alaska Statute 19.40.210, which prohibits off-road vehicles from the Dalton Highway), and State regulations (e.g., the State of Alaska hunting and fishing regulations). However, by protecting wilderness characteristics (both biophysical and experiential), Wilderness designation could have negligible to minor, long-term, WSA-wide, positive effects on the human environment.

If the Brooks Range and Porcupine Plateau WSAs were to be designated as Wilderness, it would affect the following resource categories: local economy and commercial uses; cultural resources; subsistence; visitor services and recreational opportunities; wilderness characteristics; all three of the Refuge's designated wild rivers; Refuge operations; and Poker Flat.

Wild and Scenic Rivers – Alternative D recommends the Atigun, Marsh Fork Canning, and Kongakut Rivers, plus those portions of the Hulahula River managed by the Refuge, for inclusion in the NWSRS. Interim management prescriptions would be implemented for these rivers to maintain the outstandingly remarkable values associated with each river (see Appendix I, Section 4.4). If Congress were to designate any of the rivers as wild, CRMPs would be developed and implemented for the continued protection of the rivers and their associated values. CRMPs and interim management prescriptions would lay out strategies that might affect the following resource categories: local economy and commercial uses; subsistence; cultural resources; visitor services and recreational opportunities; special designations; and wilderness characteristics.

Kongakut River – Under Alternative D, a VUMP would be initiated immediately upon approval of the Revised Plan. Until the VUMP takes effect, interim management tools would be implemented. The interim management tools would result in minor to moderate, long-term, local, and positive effects on the human environment. Interim management tools would affect the following resource categories: local economy and commercial uses; cultural resources; subsistence; visitor services and recreational opportunities; wilderness characteristics; and Refuge operations.

Local Economy and Commercial Uses Under Alternative D

Wilderness – Designation of the Brooks Range and Porcupine Plateau WSAs as Wilderness could affect commercial uses. In designated Wilderness, the Wilderness Act of 1964 and Service Wilderness policy prohibit commercial enterprises with few exceptions. Commercial services that allow people to access the Refuge to realize the recreational or other wilderness purposes of the area, such as guides and transportation companies, are allowed. Other commercial enterprises, such as commercial filming, are limited in Wilderness by Service policy. Designation could potentially attract more wilderness-oriented visitors to the Refuge, resulting in increased business opportunities for recreation guides, commercial air operators, and other commercial service providers in local communities. Effects would be negligible to minor, long-term, WSA-wide, and positive for recreational service providers.

Big-game hunting guides in guide use areas within the Brooks Range and Porcupine Plateau WSA could have to comply with stricter guidelines in order to minimize the effect of activities on Wilderness character. Because guide use areas are competitively awarded, effects would vary, depending on the guide. Effects could range from no effect to negligible to minor, long-term, WSA-wide, and negative or positive.

Wild and Scenic Rivers – Interim management provisions for suitable and recommended rivers are based on available management tools. In general, there would be no change to the management of the four suitable and recommended rivers, and therefore there would be no effects on local economy and commercial uses. However, if Refuge staff was to determine that one or more of the outstandingly remarkable values of these rivers was threatened and changes or restrictions to commercial services would mitigate the threat, then the Refuge could impose interim restrictions on commercial services. These restrictions would likely result in negligible, short-term to long-term, local, and negative effects to the local economy and commercial uses. If Congress were to designate the suitable and recommended rivers under this alternative, CRMPs would be developed. If the CRMPs were to limit or reduce the level of commercial use in order to protect outstandingly remarkable or other river values, there could be minor, long-term, local, and negative effects on the local economy and commercial uses.

Kongakut River – A step-down VUMP would likely have effects on the local economy and commercial uses. Step-down planning would be done in conjunction with key stakeholders and the public. Depending on the nature of the changes and/or restrictions imposed by the VUMP, the effects could be minor to moderate, long-term, site-specific to Refuge-wide, and positive or negative for guides and air operators operating on the Refuge. Should the plan limit or reduce the level of commercial use, minor to moderate negative effects would be anticipated to those guides adversely affected by such limits, and this could indirectly result in negligible to minor effects on local economies.

Cultural Resources Under Alternative D

Wilderness – Wilderness designation could indirectly have negligible, long-term, WSA-wide, and positive effects on cultural resources. By protecting natural conditions and wilderness characteristics, Wilderness could provide long-term protection for cultural resources and traditional lands, waters, and resources used by local residents and serve to perpetuate the conditions in which their cultures evolved. However, the intentional and unintentional losses of cultural resources would likely continue even within designated Wilderness, primarily as a result of erosion and other natural forces, resulting in similar effects as under Alternative A.

Wild and Scenic Rivers – Public use would continue on those rivers determined suitable and recommended for inclusion in the NWSRS. The effects of public use on cultural resources would likely be minor, long-term, site-specific, and negative. Interim management prescriptions could mitigate these effects because the refuge would use the prescriptions to maintain river values. Under Alternative C, those portions of the Hulahula River that flow through Refuge-managed lands would be recommended for wild river designation. The Hulahula River has a Cultural outstandingly remarkable value, and the Refuge is required to manage the river to maintain this value. Therefore, this river would have a higher level of protection for cultural resources. If Congress were to designate the recommended rivers, CRMPs would be prepared, resulting in minor, long-term, local, and positive effects to

cultural resources because of the assessment and monitoring programs that would be included in the CRMPs.

Kongakut River – Under Alternative D, cultural resource losses (intentional or unintentional) would likely continue in the Kongakut River valley. However, outreach emphasizing stewardship of cultural resources in the Kongakut River drainage could minimize potential impacts. Additionally, the VUMP would include a better understanding of the cultural resources of the area and their condition, and it would provide appropriate cultural resource management. The VUMP should result in negligible to minor, long-term, local, and positive effects to cultural resources as compared to Alternative A.

Subsistence Under Alternative D

Wilderness – Designation of the Brooks Range and Porcupine Plateau WSAs would provide long-term, statutory protection to habitats and natural conditions, especially those found south of the Brooks Range, thus indirectly serving to perpetuate the subsistence resources upon which local residents are so dependent. In general, subsistence uses in Wilderness would continue as they have under Minimal Management, and the harvest of subsistence resources would continue. Designation would not restrict subsistence use of resources in the Refuge, and the right of subsistence users to conduct traditional activities using traditional modes of transportation would continue. Effects of Wilderness designation on subsistence opportunities and resources would be negligible, long-term, WSA-wide, and positive.

The subsistence use of cabins would continue, although requests for construction or location of new cabins would receive greater scrutiny. Wilderness designation could also increase visitor use near the south side village traditional and subsistence use areas, which could increase conflicts between locals and visitors. These effects would be expected to be negligible to minor, long-term, local, and negative.

Wild and Scenic Rivers – Under this alternative, interim management prescriptions combined with outreach regarding cultural and subsistence use in drainages recommended as wild rivers could improve understanding and reduce real and/or perceived conflict between local users and nonlocal visitors. The effects would likely be negligible, medium-term, local, and positive. If Congress were to designate the four suitable and recommended rivers, CRMPs would be developed that establish user capacities for each river. The Refuge could then limit or control visitor use to ensure outstandingly remarkable and other river values are maintained, and this could indirectly result in fewer conflicts between subsistence users and visitors. CRMPs could therefore result in minor, long-term, and local effects that would be positive for subsistence resources and uses.

Kongakut River – Outreach regarding cultural and subsistence use in the Kongakut River drainage could improve understanding and reduce real and/or perceived conflict between local users and nonlocal visitors. Voluntary actions by authorized guides and commercial air operators could also reduce the potential for conflicts among recreational visitors and subsistence users. The effects would likely be minor, long-term, local, and positive.

Visitor Services and Recreation Opportunities Under Alternative D

Wilderness – Congressional designation of the Brooks Range and Porcupine Plateau WSAs as Wilderness would affect visitor services and recreational opportunities. Statutory protection of the area from roads, facilities, and recreational improvements would positively affect recreational opportunities for solitude, exploration, and freedom. Wilderness designation would potentially result in fewer installations and less visitor contact, which would enhance wilderness-associated recreational opportunities and experiences. Dalton Highway road access to the Brooks Range WSA would make it possible for visitors to reach designated Wilderness in an economically feasible manner without requiring aircraft support. Minimal Management already affords a high degree of wilderness-associated recreational opportunities and experiences, and so the effects of Wilderness designation would be minor, long-term, WSA-wide to Refuge-wide, and positive.

Because roads, facilities, recreational improvements, and commercial enterprises are not typically allowed in designated Wilderness, some visitor services could be directly and negatively impacted by Wilderness designation. No new cleared landing areas would be allowed in designated Wilderness, motorized generators and water pumps would not be allowed, and transportation and utility systems could only be authorized by Congress. Additionally, the Refuge might need to consider imposing limits on the number and types of visitor services in certain areas of the Refuge in order to preserve Wilderness character (should the area be designated as Wilderness). This would indirectly result in the loss of some recreational opportunities dependent on the impacted visitor services. These impacts are likely to be minor, long-term, WSA-wide to Refuge-wide, and negative.

To preserve experiential opportunities associated with Wilderness character (such as opportunities for solitude), the Refuge may decide to have fewer routine law enforcement patrols and less visitor use monitoring on the ground in designated Wilderness areas. The resultant effects would likely be minor, temporary to short-term, local, and negative or positive, depending on the perception of the Refuge user. Fewer routine patrols and less on-the-ground visitor use monitoring could result in the failure to detect degraded or impaired sites in designated Wilderness, resulting in minor, long-term, site-specific, and negative effects.

Wild and Scenic Rivers – Interim management provisions for suitable and recommended rivers are based on available management tools. In general, there would be no change to the management of the four suitable and recommended rivers, and therefore there would be no effects on visitor services and recreational opportunities. However, if Refuge staff was to determine that one or more of the outstandingly remarkable values of these rivers was threatened and changes or restrictions to visitors would mitigate the threat, then the Refuge could impose interim restrictions on visitor services, which in turn could affect recreational opportunities. These restrictions would likely result in negligible, short-term to long-term, local, and negative effects to visitor services and recreational opportunities. If Congress were to designate any of the suitable and recommended rivers, the Refuge would be required to determine the user capacity of each designated river. If the number of visitors exceeds the determined user capacity, the Refuge might need to limit use. The effects would likely be minor to moderate, long-term, local, and positive or negative. Visitor experience could be enhanced by limiting use; however, some visitors might not be able to experience the river due to lack of river access. Any limitations on use of the designated rivers could potentially displace visitors to other rivers in the Refuge.

Kongakut River – This alternative proposes to adopt management strategies based on a Refuge-wide Visitor Use Management step-down plan. As the step-down plan unfolds, it is likely to affect visitor services and recreational opportunities. Through the VUMP, Refuge managers will consider levels of use, timing and distribution of use, and activities and behaviors of visitors. Managers may use education, site management, regulation, enforcement, and/or rationing/allocation to manage visitor use at Arctic Refuge. The effects would likely vary, depending on the visitor, ranging from no effect to minor to moderate, long-term, local, and positive or negative. The effects of proposed visitor use management will be fully evaluated as part the step-down planning process.

Developing outreach materials with preferred practices and strategies for minimizing impacts would likely raise the level of awareness of commercial and private users. In turn, this could lead to higher quality experiences for all users by reducing the amount of physical and experiential impacts occurring on the river, including those associated with human waste. The effects of outreach actions would likely be minor, long-term, local, and positive.

Improving monitoring programs for physical and social conditions could better inform management about areas of concern, thus allowing management to take appropriate responsive action before continued degradation occurs. The effects of improved monitoring on visitor services and recreational opportunities would be minor to moderate, long-term, local, and positive. However, site-specific monitoring and rehabilitation could result in Refuge staff contributing to crowding and other user impacts on the river. These effects are likely to be minor, short-term, local, and negative. Effects could be mitigated to some extent by timing Refuge activities to occur outside peak use.

Publishing schedules of past guided and non-guided visitor use (currently available from commercial permit client use reports) could increase visitor awareness regarding Kongakut River use periods but would likely do little to redistribute use across the season. Asking guides and commercial air operators to voluntarily limit their activities could have minor, short-term, local, and positive effects on visitor experiences.

Wilderness Characteristics Under Alternative D

Wilderness – Congressional designation of the Brooks Range and Porcupine Plateau WSAs as Wilderness would have a positive effect on wilderness characteristics. Wilderness areas are protected from roads, facilities, recreational improvements, commercial enterprises, helicopters, and installations. These protections would enhance wilderness characteristics and people's experiences in the area. Additionally, the Service would more closely consider our own Refuge management activities and their effects through the MRA process. The Brooks Range WSA is currently under Minimal Management, and this management category already affords a high degree of administrative protection to wilderness characteristics. Wilderness designation would offer statutory protection to these characteristics and would represent a more permanent commitment to their protection. These effects would likely be moderate, long-term, Refuge-wide, and positive.

Wild and Scenic Rivers – Implementing interim management prescriptions would have no effect to negligible, medium-term, local, and positive effects on wilderness characteristics. However, designation of additional wild rivers would result in minor to moderate, long-term, local, and positive effects because Wild and Scenic Rivers Act protections are complimentary to the protections of the Wilderness Act. For wild rivers or segments thereof in designated

Wilderness, the more restrictive provisions of the Wild and Scenic Rivers Act and the Wilderness Act would apply. In addition, the Refuge would have the ability to limit and control public use by establishing user capacities, which in turn would enhance wilderness characteristics. The effects would be minor to moderate, long-term, local, and positive.

Kongakut River – Working with operators to disperse flight paths could reduce air traffic, therefore improving wilderness experiences for visitors. Because Arctic Refuge does not have jurisdiction over airspace, compliance with this request could not be enforced. To the extent we are able to achieve voluntary compliance with air operators, the effects to wilderness characteristics would likely be minor to moderate, short-term, local, and positive. Similarly, asking guides and commercial air operators to minimize effects on Refuge visitors would have minor to moderate, short-term, local, and positive effects on wilderness characteristics, to the extent we are able to achieve compliance.

Improved monitoring of visitor experiences would: 1) tie observed conditions to management goals for biophysical resources; 2) help identify thresholds of acceptable changes in the biophysical environment; and 3) provide input on actions that could be taken to prevent negative Wilderness character indicator thresholds from being reached. Monitoring could result in improved management strategies for wilderness characteristics, and over the long-term, indirectly create moderate, local, and positive improvements to wilderness characteristics.

Visitors seeking solitude and other values associated with Wilderness might have already been displaced from the Kongakut River. Implementing interim Kongakut River visitor use management prescriptions and ultimately prescriptions from a VUMP could stop displacement and enhance wilderness characteristics enough that visitors seeking solitude would return to the Kongakut. Outreach efforts focused on minimal impact techniques and desired behaviors for visitors would likely result in minor, long-term, local, and positive effects on wilderness characteristics. Rehabilitating impacted sites could help restore the river to its natural condition, thus improving wilderness characteristics. The effects are likely to be minor, long-term, local, and positive.

Special Designations Under Alternative D

Wilderness – Wilderness designation would have negligible to minor, long-term, WSA-wide, and positive effects to the Refuge's existing three wild rivers as a result of Wilderness designation. The lower portion of the Sheenjek River, and all of the Ivishak, and Wind wild river corridors are in the Brooks Range and Porcupine Plateau WSAs. Wild and Scenic Rivers Act protections are complimentary to the protections of the Wilderness Act, and for wild rivers within designated Wilderness, the more restrictive provisions of the Wild and Scenic Rivers Act and the Wilderness Act would apply.

Wild and Scenic Rivers – The Shublik Springs RNA is downstream from the Marsh Fork Canning River. There would be negligible to minor, long-term, local, and positive effects for Shublik Springs if the Marsh Fork is designated as a wild river; the Marsh Fork would have added resource protections, and visitor experiences would be expected to improve. Similarly, protecting the free-flowing character and outstandingly remarkable and other values of the Hulahula and Kongakut Rivers would indirectly result in negligible, long-term, local, and positive effects on the MPA.

Kongakut River – There would be negligible, long-term, local, and positive effects to the MPA as a result of more proactive management of the Kongakut River.

Public Health and Safety Under Alternative D

Wilderness – Neither Wilderness recommendation nor designation would have any effect on public health and safety. Public health and safety would continue as under current management.

Wild and Scenic Rivers – Implementing interim management prescriptions or wild river designation would have no effect on public health and safety.

Kongakut River – Developing a Visitor Use Management step-down plan and providing targeted messages to Refuge visitors would have no effect to negligible, long-term, Refuge-wide, and positive effects on public health and safety issues.

Refuge Operations Under Alternative D

Wilderness – Congressional designation of the Brooks Range and Porcupine Plateau WSAs as Wilderness would affect overall Refuge operations, both in terms of paperwork and in terms of research. If the Brooks Range and Porcupine Plateau WSAs were designated as Wilderness, Refuge management activities would be subject to an MRA process, and normally prohibited uses would be approved only if they are determined to be the minimum necessary to manage the area as Wilderness. New Wilderness designation could therefore increase the paperwork burden for Refuge staff. These effects would likely be minor, long-term, WSA-wide, and negative.

Additionally, proposed research conducted as a Refuge management activity would be subject to an MRA to determine if it is necessary to accomplish the purposes of the Refuge, including Wilderness Act purposes, and that any normally prohibited uses are necessary to meet the minimum requirements for managing the area as Wilderness. The MRA process could negatively affect long-term research projects with established data collection protocols or research that might require permanent installations, such as climate change research. Decisions are made on a case-by-case basis, however, and it is possible that installations could be allowed. There is some uncertainty as to the extent that Wilderness designation would limit the ability to conduct research or monitoring necessary to affect conservation measures. We believe the effects would be negligible, long-term, WSA-wide to Refuge-wide, and negative.

Wilderness designation would not affect the jurisdiction or responsibilities of the State with respect to wildlife, although actions would need to be consistent with maintaining Wilderness character. For some State activities, an MRA might be required. We believe the effects would be negligible, long-term, WSA-wide, and negative.

Wild and Scenic Rivers – There would be no effect to negligible, medium-term, local, and negative effects to Refuge operations under interim management prescriptions. Overall, management of suitable and recommended rivers would continue as under current management. However, Refuge staff would likely conduct periodic monitoring and assessments of the river corridors to ensure outstandingly remarkable values are being maintained.

Should Congress designate the suitable and recommended rivers as wild rivers, there would be effects to Refuge operations. There would be an additional workload for preparing CRMPs in the short term; the effects would be moderate, short-term, Refuge-wide, and negative. In the medium term, monitoring and the potential for adjusting user limits would result in minor to moderate, Refuge-wide, and negative effects through the expenditure of staff time and budget. However, once the CRMPs are completed and monitoring protocols and a system for managing the rivers are in place, there should be less strain on Refuge staff dealing with day-to-day issues. Thus over the long-term, effects would be minor, Refuge-wide, and positive.

Kongakut River – This alternative would require additional staff time and budget to: 1) execute a revised monitoring program; 2) develop outreach materials; 3) compile and publish schedules of proposed launch dates; 4) conduct site-specific rehabilitation; and 5) develop and execute a step-down management plan. The effects are likely to be moderate, short- to medium-term, Refuge-wide, and negative. Over the long-term, however, there should be less strain on Refuge staff dealing with day-to-day river management concerns, resulting in minor, long-term, Refuge-wide, and positive effects.

5.6.4 Effects on Poker Flat Research Range from Alternative D

Impacts on the scientific return and economic inputs of the Sounding Rockets Program would be similar in type but likely greater in magnitude to those discussed under Alternative B. Although there have been no planned impacts within the Porcupine Plateau WSA within the past 10 years of Poker Flat launches, the potential cannot be discounted. Therefore, it is possible that a currently unquantified number of moderate range launches could be eliminated in addition to those affected by designation of the Brooks Range WSA. Accordingly, of all the alternatives under consideration, this alternative would likely have the greatest adverse effects on sounding rocket-provided scientific return and economic input.

Effects could be mitigated, however, if Congress were to include a special provision in any Wilderness establishing legislation that would allow the regulated use of the Wilderness area for rocket landings. The ROD for the Revised Plan will identify whether the Service supports such a provision, should the decision select an alternative that recommends additional Wilderness areas.

5.6.5 Cumulative Impacts of Alternative D

The qualified and suitable lands and waters of the Brooks Range WSA (5.82 million acres) and Porcupine Plateau WSA (4.92 million acres) would be recommended for designation as Wilderness. There would be no cumulative effects related to the administrative act of recommending Wilderness. Should the Brooks Range and Porcupine Plateau WSAs be designated Wilderness, the cumulative effects would be minor, long-term, WSA-wide, and positive because designated Wilderness provides more permanent statutory protection to the biophysical and human environments. Refuge management activities within Wilderness would be subject to MRAs, and certain activities as discussed previously would be subject to a higher level of scrutiny.

All four suitable rivers would be recommended for wild and scenic river designation: the Atigun, Marsh Fork Canning, and Kongakut Rivers, along with those portions of the Hulahula River that flow through Service-managed lands. If Congress were to include these rivers in the NWSRS, they would be afforded the protections of the Wild and Scenic Rivers Act. Permanent management prescriptions and river-specific CRMPs would be completed, which could include the ability to limit and control visitor use. The cumulative effects of these actions would present minor to moderate effects to the biophysical and human environments.

Cumulative effects as a result of management actions for the Kongakut River under this alternative would be minor as a result of increasing outreach and more proactively managing the area.

The effects of Alternative D would be cumulative to the effects of climate change, development activities, and management decisions made by others throughout the region (such as through the reasonably foreseeable future actions listed in Section 5.1.4). Cumulatively, Refuge management under Alternative D would have minor effects on the biophysical and human environments in the region.



5.7 Effects of Alternative E

This section evaluates the implication or impacts of Alternative E on resources categories for each major issue: Wilderness, wild and scenic rivers, and Kongakut River visitor management.

5.7.1 *Alternative E Introduction*

Wilderness – Alternative E recommends designating the qualified and suitable lands and waters in three Wilderness Study Areas (nearly 12.28 million acres) as Wilderness. The administrative act of recommending these WSAs would have no effect on any resource category. However, the effects analysis here considers the effects of Wilderness designation on the resource categories should Congress choose to designate the Brooks Range and Porcupine Plateau WSAs as Wilderness.

Wild and Scenic Rivers – Alternative E recommends all four of the Refuge's suitable rivers for inclusion in the NWSRS: Atigun, Marsh Fork Canning, Hulahula, and Kongakut. Rivers recommended for wild river status must be protected until Congress acts to designate or reject a recommendation for designation. Pending congressional action, the Service would use interim management prescriptions to manage each recommended river for the outstandingly remarkable values for which it was found eligible (see Appendix I, Section 4.4).

If Congress were to designate these four rivers as wild, the Refuge would prepare a CRMP for each river. The CRMPs would formalize the requirement to preserve each river's outstandingly remarkable and other values found through inventory, in perpetuity. These rivers would become part of the NWSRS and be afforded the protections of the Wild and Scenic Rivers Act (see Appendix I, Section 4.5). The lower portion of the Hulahula River is owned by KIC. Those portions of the Hulahula River that flow through KIC lands would be recommended for wild river designation, and the corridor would be managed in partnership with KIC. For wild rivers or river segments within designated Wilderness, the more restrictive provisions of the Wild and Scenic Rivers Act and the Wilderness Act would apply.

Kongakut River – Alternative E proposes Kongakut River management identical to that described in Alternative D (see Section 5.6.1).

5.7.2 *Effects on the Biophysical Environment from Alternative E*

Wilderness – If the three WSAs were to be designated as Wilderness, restrictions on activities that could damage Refuge resources would be less likely to change over time and might be more likely to be enforced, which would provide greater certainty of long-term protection for wildlife and habitats. The Brooks Range, Porcupine Plateau, and Coastal Plain WSAs are currently under Minimal Management, and this management category already affords a high degree of administrative protection to the biophysical environment. However, by protecting natural conditions, Wilderness designation could have minor, long-term, WSA-wide, positive effects on the value of the WSAs for ecological research and monitoring.

Resource categories that could be affected by Wilderness designation of the Brooks Range WSA include: permafrost and soils; water quality and aquatic habitats; vegetation and terrestrial habitats; fish populations and natural diversity; bird populations and natural diversity; and mammal populations and natural diversity. Research on the biophysical

environment could also be affected due to the need to complete MRAs for all Refuge management activities (see “Refuge Operations” in Section 5.7.3).

Wild and Scenic Rivers – Alternative E recommends wild river designation for all four of the Refuge’s suitable rivers. Implementing interim management prescriptions for the four suitable rivers would result in negligible, medium-term, site-specific, and positive effects on biophysical resources within these river corridors. If these rivers were to be designated as wild rivers by Congress, the effects would be minor, long-term, local, and positive because designation would require the Refuge to develop CRMPs for each river. The CRMPs would include an inventory and assessment of biophysical resources in the wild river corridor as well as a monitoring program for ongoing assessment and protection of these resources. Six of the biophysical resource categories would be affected, as described in this section.

Kongakut River – Alternative E recommends interim management tools to address biophysical resource concerns in the Kongakut River valley until such time as a VUMP and/or WSP are completed. These interim tools would have negligible to minor, long-term, site-specific to local, and positive effects on biophysical resources. Six of the biophysical resource categories would be affected, as follows.

Permafrost and Soils Under Alternative E

Wilderness – Wilderness designation would have indirect, negligible to minor, long-term, Refuge-wide, and positive effects on permafrost and soils because of the additional statutory protection Wilderness management provides regarding natural conditions.

Wild and Scenic Rivers – Interim management prescriptions to protect the free-flowing character and outstandingly remarkable values for those rivers that are suitable and recommended would result in negligible, medium-term, site-specific, and positive impacts to permafrost and soils in these river corridors. The CRMPs that would be prepared for each of the four suitable rivers (if they were to be designated as wild rivers by Congress) would include an inventory of current permafrost and soil condition and a monitoring program for ongoing assessment and protection of these resources. The CRMPs would also establish protocols to prevent and/or repair damage caused by visitor use. The resultant effects would be minor, long-term, site-specific to local, and positive.

Kongakut River – Refuge visitors have the potential to damage soils and permafrost by trampling, particularly at campsites and access points such as landing areas. Enhanced management of visitor use in the Kongakut River area under Alternative E would decrease these site-specific impacts. Site-specific disturbances from visitors occur extensively up and down the Kongakut River corridor, so enhanced management would also decrease impacts at the local scale. This alternative would have negligible to minor, long-term, site-specific to local, and positive impacts on permafrost and soils in the Kongakut River corridor.

Water Quality and Aquatic Habitats Under Alternative E

Wilderness – Wilderness designation of the three WSAs would provide long-term, statutory protection for wilderness characteristics, including aquatic habitats. Designation of the Brooks Range, Coastal Plain, and Porcupine Plateau WSAs would result in minor, long-term, Refuge-wide, and positive effects.

Wild and Scenic Rivers – Interim management prescriptions to protect the free-flowing character and outstandingly remarkable values of the four recommended rivers would result in negligible, medium-term, site-specific, positive effects to water quality and aquatic habitats in these river corridors. If Congress were to designate these four rivers as wild rivers, CRMPs would be prepared for each river. The CRMPs would include an inventory of current water quality and aquatic habitat condition and a monitoring program for ongoing assessment and protection of these resources. The CRMP would also establish protocols to prevent and/or repair damage caused by visitor use. The effects of designation would be minor, long-term, site-specific to local, and positive on water quality and aquatic habitats.

Kongakut River – Water quality and aquatic habitats can be affected by increased visitor use through increased vegetation trampling and soil compaction, which increases the potential for runoff and sediment loading. Outreach about proper waste disposal and minimizing other visitor impacts, along with monitoring the effectiveness of management actions, would have minor, long-term, local, and positive effects on water quality and aquatic habitats along the Kongakut River.

Vegetation and Terrestrial Habitats Under Alternative E

Wilderness – Although management strategies are similar for Wilderness Management and Minimal Management, Wilderness designation is a more permanent commitment to maintain natural conditions. Wilderness designation would likely have a negligible to minor, long-term, Refuge-wide, and positive effects on vegetation and terrestrial habitats because of the long-term statutory protections designation would provide to Wilderness character.

Wild and Scenic Rivers – Interim management prescriptions to protect the free-flowing character and outstandingly remarkable values of the four suitable and recommended rivers would result in negligible to minor, medium-term, site-specific, and positive impacts to vegetation and terrestrial habitats in these river corridors. If Congress were to include the four suitable and recommended rivers in the NWSRS, CRMPs would be prepared for each river. The CRMPs would include an inventory and assessment of current vegetation and terrestrial habitat condition and a monitoring program for ongoing assessment and protection of these resources. The CRMPs would also establish protocols to prevent and/or repair visitor use damage, which would result in minor, long-term, site-specific to local, and positive effects on vegetation and terrestrial habitats.

Kongakut River – Refuge visitors may damage vegetation and habitats, particularly at campsites and access points such as landing areas. Potential damage includes direct effects of trampling, breakage of trees and shrubs, the possible introduction of invasive plants, and the exclusion of wildlife from riparian and adjacent habitats. Indirect effects include soil and snow compaction as a result of trampling. Most disturbances to vegetation are site-specific and restricted to areas receiving repeated use, such as hunting camps near fixed-wing aircraft-accessible sites and campsites used by floaters along major rivers. Disturbances are local in scale, as site-specific disturbances occur extensively along the Kongakut River corridor. The additional management proposed in Alternative E would have negligible to minor, long-term, site-specific to local, and positive impacts on vegetation and terrestrial habitats in the Kongakut River drainage.

Fish Populations and Natural Diversity Under Alternative E

Wilderness – Many rivers and streams occur in the Coastal Plain WSA. While this WSA is smaller than the others, the concentration of fish populations and natural diversity are highest. Wilderness designation provides long-term protections for fish populations and natural diversity through the statutory requirements of the Wilderness Act. Effects of designation of the Brooks Range, Coastal Plain, and Porcupine Plateau WSAs on fish populations and natural diversity would therefore be minor to moderate, long-term, Refuge-wide, and positive.

Wild and Scenic Rivers – The Service would use interim management prescriptions to manage each suitable and recommended river for its free-flowing character and the outstandingly remarkable values for which it was found eligible. This would result in negligible, medium-term, local, and positive impacts to fish populations and natural diversity. If Congress were to designate the recommended rivers, CRMPs would be prepared, resulting in minor, long-term, local, and positive effects to fish populations and natural diversity because of the assessment and monitoring programs that would be included in the CRMPs.

Kongakut River – Dolly Varden and grayling are popular fish sought by anglers on the Kongakut River. Harvest levels of these fish species are unknown and thought to be low. Providing outreach materials on proper catch-and-release techniques could lead to increased survival rates of released fishes resulting in negligible, long-term, local, positive effects.

Bird Populations and Natural Diversity Under Alternative E

Wilderness – If Congress were to designate the Brooks Range, Coastal Plain, and Porcupine Plateau WSAs as Wilderness, natural conditions would be maintained using the Wilderness Management category. This would have long-term, positive effects on bird populations across the Refuge. Because most bird species are migratory, beneficial effects could be expressed over a larger area than the WSAs. Under current management, disturbance to birds and alteration of their habitats is minimal. However, Wilderness designation, with its long-term commitment to maintaining natural conditions, could have minor to moderate, long-term, regional or greater, and positive effects.

Wild and Scenic Rivers – There would be negligible, medium-term, local, and positive effects on bird populations and natural diversity under this alternative. The Service would use interim management prescriptions to manage each suitable and recommended river for the outstandingly remarkable values for which it was found eligible. Because riparian areas tend to have higher density and diversity of birds compared to surrounding habitats, maintaining river values should indirectly have positive effects on bird populations and natural diversity. If Congress were to designate the four suitable and recommended rivers as wild rivers, CRMPs would be prepared for each river, resulting in minor, long-term, local, and positive effects on bird populations and natural diversity in these river corridors because of the assessment and monitoring programs that are required in the CRMPs.

Kongakut River – Enhanced management of human use of the Kongakut River valley would have negligible to minor, long-term, site-specific to local, and positive effects on bird populations and natural diversity. Monitoring visitor impacts on bird habitats would lead to the development of conservation measures to mitigate visitor impacts on birds if adverse effects are detected. Outreach materials would benefit birds by helping visitors reduce disturbance to nesting raptors and other species, and minimize impacts to bird habitats.

Mammal Populations and Natural Diversity Under Alternative E

Wilderness – Wilderness recommendations would result in moderate, long-term, Refuge-wide to regional, and positive effects for a variety of mammals because of the more permanent commitment to protect natural conditions in designated Wilderness, including mammal populations and habitats.

Wild and Scenic Rivers – There would be negligible, medium-term, local, and positive effects on mammal populations and natural diversity under this alternative. The Service would use interim management prescriptions to manage the free-flowing character of each suitable and recommended river and to maintain the outstandingly remarkable values for which each river was found eligible. This would indirectly affect mammal populations and natural diversity. If Congress were to designate recommended rivers as wild, CRMPs would be prepared, resulting in minor, long-term, local, and positive effects to mammal populations and natural diversity in these river corridors because of the assessment and monitoring programs that would be included in the CRMPs.

Kongakut River – Enhanced management of human use of the Kongakut River valley would have negligible to minor, long-term, site-specific to local, and positive effects on mammal populations. Monitoring impacts to habitats by visitors would lead to the development of conservation measures to mitigate visitor impacts on mammals if adverse effects are detected. Outreach materials would benefit mammals by helping visitors reduce disturbance to resident and migratory species, and minimize impacts to mammal habitats.

5.7.3 Effects on the Human Environment from Alternative E

Wilderness – Under current management, public use of the Refuge is managed similarly in designated Wilderness and in areas under Minimal Management. Most regulations on public use are derived from the area's status as a refuge and by State law. Public use is subject to Federal regulations implementing Federal laws (e.g., ANILCA, Refuge Administration Act), State laws (e.g., Alaska Statute 19.40.210, which prohibits off-road vehicles from the Dalton Highway), and State regulations (e.g., the State of Alaska hunting and fishing regulations). However, by protecting wilderness characteristics (both biophysical and experiential), Wilderness designation could have negligible to minor, long-term, WSA-wide, positive effects on the human environment.

If the three WSAs were to be designated as Wilderness, it would affect the following resource categories: local economy and commercial uses; cultural resources; subsistence; visitor services and recreational opportunities; wilderness characteristics; all three of the Refuge's designated wild rivers; Refuge operations; and Poker Flat.

Wild and Scenic Rivers – Alternative E recommends the Refuge's four suitable rivers: Atigun, Marsh Fork Canning, Hulahula, and Kongakut Rivers. Interim management prescriptions would be implemented for these rivers to maintain the outstandingly remarkable values associated with each of the rivers (see Appendix I, Section 4.4). If Congress were to designate any of the rivers as wild, CRMPs would be developed and implemented for the continued protection of the rivers and their associated values. CRMPs and interim management prescriptions would lay out strategies that might affect the following resource categories: local economy and commercial uses; subsistence; cultural resources; visitor services and recreational opportunities; special designation; wilderness characteristics; and refuge operations.

Kongakut – Under Alternative E, a VUMP would be initiated immediately upon approval of the Revised Plan. Until the VUMP takes effect, interim management tools would be implemented. The interim management tools would result in minor to moderate, long-term, local, and positive effects on the human environment. Interim management tools would affect the following resource categories: local economy and commercial uses; cultural resources; subsistence; visitor services and recreational opportunities; public health and safety; special designation; wilderness characteristics; and Refuge operations.

Local Economy and Commercial Uses Under Alternative E

Wilderness – Designation of the Brooks Range, Coastal Plain, and Porcupine Plateau WSAs could affect commercial uses. In designated Wilderness, the Wilderness Act of 1964 and Service Wilderness policy prohibit commercial enterprises with few exceptions. Commercial services that allow people to access the Refuge to realize the recreational or other wilderness purposes of the area, such as guides and transportation companies, are allowed. Other commercial enterprises, such as commercial filming, are limited in Wilderness by Service policy. Designation could potentially attract more wilderness-oriented visitors to the Refuge, resulting in increased business prospects for recreation guides, commercial air operators, and other commercial service providers in local communities. Effects would be negligible to minor, long-term, Refuge-wide, and positive for recreational service providers.

Big-game hunting guides in guide use areas within the Refuge could have to comply with stricter guidelines in order to minimize the effect of activities on Wilderness character. Because guide use areas are competitively awarded, effects would vary, depending on the guide. Effects could range from no effect to negligible to minor, long-term, Refuge-wide, and negative or positive.

Wild and Scenic Rivers – Interim management provisions for suitable and recommended rivers are based on available management tools. In general, there would be no change to the management of the four suitable and recommended rivers, and therefore there would be no effects on local economy and commercial uses. However, if Refuge staff was to determine that one or more of the outstandingly remarkable values of these rivers was threatened and changes or restrictions to commercial services would mitigate the threat, then the Refuge could impose interim restrictions on commercial services. These restrictions would likely result in negligible, short-term to long-term, local, and negative effects to the local economy and commercial uses. If Congress were to designate the suitable and recommended rivers under this alternative, CRMPs would be developed. If the CRMPs were to limit or reduce the level of commercial use in order to protect outstandingly remarkable or other river values, there could be minor, long-term, local, and negative effects on the local economy and commercial uses.

Kongakut River – A step-down VUMP would likely have effects on the local economy and commercial uses. Step-down planning would be done in conjunction with key stakeholders and the public. Depending on the nature of the changes and/or restrictions imposed by the VUMP, the effects could be minor to moderate, long-term, site-specific to Refuge-wide, and positive or negative for guides and air operators operating on the Refuge. Should the plan limit or reduce the level of commercial use, minor to moderate negative effects would be anticipated to those guides adversely affected by such limits, and this could indirectly result in negligible to minor effects on local economies.

Cultural Resources Under Alternative E

Wilderness – Wilderness designation could indirectly have negligible, long-term, Refuge-wide, and positive effects on cultural resources. By protecting natural conditions and wilderness characteristics, Wilderness could provide long-term protection for cultural resources and traditional lands, waters, and resources used by local residents and serve to perpetuate the conditions in which their cultures evolved. However, the intentional and unintentional losses of cultural resources would likely continue even within designated Wilderness, primarily as a result of erosion and other natural forces, resulting in similar effects as under Alternative A.

Wild and Scenic Rivers – Public use would continue on those rivers determined suitable and recommended for inclusion in the NWSRS. The effects of public use on cultural resources would likely be minor, long-term, site-specific, and negative. Interim management prescriptions could mitigate these effects because the refuge would use the prescriptions to maintain river values. Under Alternative C, the entire extent of the Hulahula River would be recommended for wild river designation. The Hulahula River has a Cultural outstandingly remarkable value, and the Refuge is required to manage the river to maintain this value. Therefore, this river would have a higher level of protection for cultural resources. If Congress were to designate the recommended rivers, CRMPs would be prepared, resulting in minor, long-term, local, and positive effects to cultural resources because of the assessment and monitoring programs that would be included in the CRMPs.

Kongakut River – Under Alternative E, cultural resource losses (intentional or unintentional) would likely continue in the Kongakut River valley. However, outreach emphasizing stewardship of cultural resources in the Kongakut River drainage could minimize potential impacts. Additionally, the VUMP would include a better understanding of the cultural resources of the area and their condition, and it would provide appropriate cultural resource management. The VUMP should result in negligible to minor, long-term, local, and positive effects to cultural resources as compared to Alternative A.

Subsistence Under Alternative E

Wilderness – Designation of the three WSAs as Wilderness would provide long-term, statutory protection to habitats and natural conditions throughout the Refuge, thus indirectly serving to perpetuate the subsistence resources upon which local residents are so dependent. In general, subsistence uses in Wilderness would continue as they have under Minimal Management, and the harvest of subsistence resources would continue. Designation would not restrict subsistence use of resources in the Refuge, and the right of subsistence users to conduct traditional activities using traditional modes of transportation would continue. Effects of Wilderness designation on subsistence opportunities and resources would be negligible, long-term, Refuge-wide, and positive.

The subsistence use of cabins would continue, although requests for construction or location of new cabins would receive greater scrutiny. Wilderness designation could increase visitor use near traditional and subsistence use areas, which could increase conflicts between locals and visitors. These effects would be expected to be negligible to minor, long-term, local, and negative.

Wild and Scenic Rivers – Under this alternative, interim management prescriptions, combined with outreach regarding cultural and subsistence use in drainages recommended as wild rivers, could improve understanding and reduce real and/or perceived conflict between local users and nonlocal visitors. The effects would likely be negligible, medium-term, local,

and positive. If Congress were to designate the four suitable and recommended rivers as wild rivers, CRMPs would be developed that establish user capacities for each river. The Refuge could then limit or control visitor use to ensure outstandingly remarkable and other river values are maintained, and this could indirectly result in fewer conflicts between subsistence users and visitors. CRMPs could therefore result in minor, long-term, and local effects that would be positive for subsistence resources and uses.

If Congress were to designate the entire extent of the Hulahula River as a wild river, the Service would partner with KIC regarding river management where it flows through KIC lands. The effects on subsistence could change as the process unfolds. Effects could range from negligible to moderate, short- to long-term, site-specific to local, and positive to negative, depending on the process, perceptions, and levels of protection afforded cultural and subsistence resources in the river corridor.

Kongakut River – Outreach regarding cultural and subsistence use in the Kongakut River drainage could improve understanding and reduce real and/or perceived conflict between local users and nonlocal visitors. Voluntary actions by authorized guides and commercial air operators could also reduce the potential for conflicts among recreational visitors and subsistence users. The effects would likely be minor, long-term, local, and positive.

Visitor Services and Recreation Opportunities Under Alternative E

Wilderness – Congressional designation of the Brooks Range, Coastal Plain, and Porcupine Plateau WSAs as Wilderness would affect visitor services and recreational opportunities. Statutory protection of the area from roads, facilities, and recreational improvements would positively affect recreational opportunities for solitude, exploration, and freedom. Wilderness designation would potentially result in fewer installations and less visitor contact, which would enhance wilderness-associated recreational opportunities and experiences. Dalton Highway road access to the Brooks Range WSA would make it possible for visitors to reach designated Wilderness in an economically feasible manner without requiring aircraft support. Minimal Management already affords a high degree of wilderness-associated recreational opportunities and experiences, and so the effects of Wilderness designation would be minor, long-term, Refuge-wide, and positive.

Because roads, facilities, recreational improvements, and commercial enterprises are not typically allowed in designated Wilderness, some visitor services could be directly and negatively impacted by Wilderness designation. No new cleared landing areas would be allowed in designated Wilderness, motorized generators and water pumps would not be allowed, and transportation and utility systems could only be authorized by Congress. Additionally, the Refuge might need to consider imposing limits on the number and types of visitor services in certain areas of the Refuge in order to preserve Wilderness character (should the area be designated as Wilderness). This would indirectly result in the loss of some recreational opportunities dependent on the impacted visitor services. These impacts are likely to be moderate, long-term, Refuge-wide to regional, and negative.

To preserve experiential opportunities associated with Wilderness character (such as opportunities for solitude), the Refuge may decide to have fewer routine law enforcement patrols and less visitor use monitoring on the ground in designated Wilderness areas. The resultant effects would likely be minor, temporary to short-term, local, and negative or positive, depending on the perception of the Refuge user. Fewer routine patrols and less on-the-ground

visitor use monitoring could result in the failure to detect degraded or impaired sites in designated Wilderness, resulting in minor, long-term, site-specific, and negative effects.

Wild and Scenic Rivers – Interim management provisions for suitable and recommended rivers are based on available management tools. In general, there would be no change to the management of the four suitable and recommended rivers, and therefore there would be no effects on visitor services and recreational opportunities. However, if Refuge staff was to determine that one or more of the outstandingly remarkable values of these rivers was threatened and changes or restrictions to visitors would mitigate the threat, then the Refuge could impose interim restrictions on visitor services, which in turn could affect recreational opportunities. These restrictions would likely result in negligible, short-term to long-term, local, and negative effects to the local economy and commercial uses. If Congress were to include any of the suitable and recommended rivers in the NWSRS, the Refuge would be required to determine the user capacity of each designated river. If the number of visitors exceeds the determined user capacity of a specific river corridor, the Refuge might need to limit use. The effects would likely be minor to moderate, long-term, local, and positive or negative. Visitor experience could be enhanced by limiting use; however some visitors might not be able to experience the river due to lack of river access. Any limitations on use of the designated rivers could potentially displace visitors to other rivers in the Refuge.

Kongakut River – This alternative proposes to adopt management strategies based on a Refuge-wide Visitor Use Management step-down plan. As the step-down plan unfolds, it is likely to affect visitor services and recreational opportunities. Through the VUMP, Refuge managers will consider levels of use, timing and distribution of use, and activities and behaviors of visitors. Managers may use education, site management, regulation, enforcement, and/or rationing/allocation to manage visitor use at Arctic Refuge. The effects would likely vary, depending on the visitor, ranging from no effect to minor to moderate, long-term, local, and positive or negative. The effects of proposed visitor use management will be fully evaluated as part the step-down planning process.

Developing outreach materials with preferred practices and strategies for minimizing impacts would likely raise the level of awareness of commercial and private users. In turn, this could lead to higher quality experiences for all users by reducing the amount of physical and experiential impacts occurring on the river, including those associated with human waste. The effects of outreach actions would likely be minor, long-term, local, and positive.

Improving monitoring programs for physical and social conditions could better inform management about areas of concern, thus allowing management to take appropriate responsive action before continued degradation occurs. The effects of improved monitoring on visitor services and recreational opportunities would be minor to moderate, long-term, local, and positive. However, site-specific monitoring and rehabilitation could result in Refuge staff contributing to crowding and other user impacts on the river. These effects are likely to be minor, short-term, local, and negative. Effects could be mitigated to some extent by timing Refuge activities to occur outside peak use.

Publishing schedules of past guided and non-guided visitor use (currently available from commercial permit client use reports) could increase visitor awareness regarding Kongakut River use periods but would likely do little to redistribute use across the season. Asking guides and commercial air operators to voluntarily limit their activities could have minor, short-term, local, and positive effects on visitor experiences.

Wilderness Characteristics Under Alternative E

Wilderness – Congressional designation of the three WSAs as Wilderness would have a positive effect on wilderness characteristics. Wilderness areas are protected from roads, facilities, recreational improvements, commercial enterprises, helicopters, and installations. These protections would enhance wilderness characteristics and people's experiences in the area. Additionally, the Service would more closely consider our own Refuge management activities and their effects through the MRA process. The Brooks Range WSA is currently under Minimal Management, and this management category already affords a high degree of administrative protection to wilderness characteristics. Wilderness designation would offer statutory protection to these characteristics and would represent a more permanent commitment to their protection. These effects would likely be moderate, long-term, Refuge-wide, and positive.

Wild and Scenic Rivers – Implementing interim management prescriptions for suitable and recommended rivers would have no effect to negligible, medium-term, local, and positive effects on wilderness characteristics. If Congress were to designate the Atigun, Marsh Fork Canning, Hulahula, and Kongakut as wild rivers, a CRMP would be prepared for each river, resulting in minor to moderate, long-term, local, and positive effects to wilderness characteristics because of the assessment and monitoring programs that would be included in the CRMPs. In addition, the Refuge would establish user capacities and protect the outstandingly remarkable and other river values in the wild river corridor, which would have minor to moderate, long-term, local, and positive effects on wilderness characteristics. Beneficial effects on wilderness characteristics would also be realized for those portions of the Hulahula and Kongakut Rivers in designated Wilderness because the more restrictive provisions of the Wild and Scenic Rivers Act and the Wilderness Act would be applied to the management of these rivers.

Kongakut River – Working with operators to disperse flight paths could reduce air traffic, therefore improving wilderness experiences for visitors. Because Arctic Refuge does not have jurisdiction over airspace, compliance with this request could not be enforced. To the extent we are able to achieve voluntary compliance with air operators, the effects to wilderness characteristics would likely be minor to moderate, short-term, local, and positive. Similarly, asking guides and commercial air operators to minimize effects on Refuge visitors would have minor to moderate, short-term, local, and positive effects on wilderness characteristics, to the extent we are able to achieve compliance.

Improved monitoring of visitor experiences would: 1) tie observed conditions to management goals for biophysical resources; 2) help identify thresholds of acceptable changes in the biophysical environment; and 3) provide input on actions that could be taken to prevent negative Wilderness character indicator thresholds from being reached. Monitoring could result in improved management strategies for wilderness characteristics, and over the long-term, indirectly create moderate, local, and positive improvements to wilderness characteristics.

Visitors seeking solitude and other values associated with Wilderness might have already been displaced from the Kongakut River. Implementing interim Kongakut River visitor use management prescriptions and ultimately prescriptions from a VUMP could stop displacement and enhance wilderness characteristics enough that visitors seeking solitude would return to the Kongakut. Outreach efforts focused on minimal impact techniques and desired behaviors for visitors would likely result in minor, long-term, local, and positive effects

on wilderness characteristics. Rehabilitating impacted sites could help restore the river to its natural condition, thus improving wilderness characteristics. The effects are likely to be minor, long-term, local, and positive.

Special Designations Under Alternative E

Wilderness – Wilderness designation of the Coastal Plain WSA would have minor, long-term, WSA-wide, and positive effects on those portions of the MPA in the WSA because Wilderness designation would provide statutory protection to the Wilderness character of the MPA.

Wilderness designation of the Brooks Range and Porcupine Plateau WSAs would have negligible to minor, long-term, WSA-wide, and positive effects to the Refuge's existing three wild rivers as a result of Wilderness designation. The lower portion of the Sheenjek River, and all of the Ivishak, and Wind wild river corridors are in these two WSAs. Wild and Scenic Rivers Act protections are complimentary to the protections of the Wilderness Act, and for wild rivers within designated Wilderness, the more restrictive provisions of the Wild and Scenic Rivers Act and the Wilderness Act would apply.

Wild and Scenic Rivers – The Shublik Springs RNA is downstream from the Marsh Fork Canning River. There would be negligible to minor, long-term, local, and positive effects for Shublik Springs if the Marsh Fork is designated as a wild river; the Marsh Fork would have added resource protections, and visitor experiences would be expected to improve. Similarly, protecting the free-flowing character and outstandingly remarkable and other values of the Hulahula and Kongakut Rivers would result in indirect, negligible, long-term, local, and positive effects on the MPA.

Kongakut River – There would be negligible, long-term, local, and positive effects to the MPA as a result of more proactive management of the Kongakut River.

Public Health and Safety Under Alternative E

Wilderness – Neither Wilderness recommendation nor designation would have any effect on public health and safety. Public health and safety would continue as under current management.

Wild and Scenic Rivers – Implementing interim management prescriptions or wild river designation would have no effect on public health and safety.

Kongakut River – Developing a Visitor Use Management step-down plan and providing targeted messages to Refuge visitors would have no effect to negligible, long-term, Refuge-wide, and positive effects on public health and safety issues.

Refuge Operations Under Alternative E

Wilderness – Congressional designation of the Brooks Range, Coastal Plain, and Porcupine Plateau WSAs as Wilderness would affect overall Refuge operations, both in terms of paperwork and in terms of research. If the Brooks Range WSA is designated as Wilderness, Refuge management activities would be subject to an MRA process, and normally prohibited uses would be approved only if they are determined to be the minimum necessary to manage the area as Wilderness. New Wilderness designation could

therefore increase the paperwork burden for Refuge staff. These effects would likely be minor, long-term, Refuge-wide, and negative.

Additionally, proposed research conducted as a Refuge management activity would be subject to an MRA to determine if it is necessary to accomplish the purposes of the Refuge, including Wilderness Act purposes, and that any normally prohibited uses are necessary to meet the minimum requirements for managing the area as Wilderness. The MRA process could negatively affect long-term research projects with established data collection protocols or research that might require permanent installations, such as climate change research. Decisions are made on a case-by-case basis, however, and it is possible that installations could be allowed. There is some uncertainty as to the extent that Wilderness designation would limit the ability to conduct research or monitoring necessary to affect conservation measures. We believe the effects would be negligible to minor, long-term, regional, and negative.

Wilderness designation would not affect the jurisdiction or responsibilities of the State with respect to wildlife, although actions would need to be consistent with maintaining Wilderness character. For some State activities, an MRA might be required. We believe the effects would be negligible, long-term, Refuge-wide, and negative.

Wild and Scenic Rivers – There would be no effect to negligible, medium-term, local, and negative effects to Refuge operations under interim management prescriptions. Overall, management of suitable and recommended rivers would continue as under current management. However, Refuge staff would likely conduct periodic monitoring and assessments of the river corridors to ensure outstandingly remarkable values are being maintained.

Should Congress designate the suitable and recommended rivers as wild rivers, there would be effects to Refuge operations. There would be an additional workload for preparing CRMPs in the short term; the effects would be moderate, short-term, Refuge-wide, and negative. In the medium term, monitoring and the potential for adjusting user limits would result in minor to moderate, Refuge-wide, and negative effects through the expenditure of staff time and budget. However, once the CRMPs are completed and monitoring protocols and a system for managing the rivers are in place, there should be less strain on Refuge staff dealing with day-to-day issues. Thus over the long-term, effects would be minor, Refuge-wide, and positive.

Kongakut River – This alternative would require additional staff time and budget to: 1) execute a revised monitoring program; 2) develop outreach materials; 3) compile and publish schedules of proposed launch dates; 4) conduct site-specific rehabilitation; and 5) develop and execute a step-down management plan. The effects are likely to be moderate, short- to medium-term, Refuge-wide, and negative. Over the long-term, however, there should be less strain on Refuge staff dealing with day-to-day river management concerns, resulting in minor, long-term, Refuge-wide, and positive effects.

5.7.4 Effects on Poker Flat Research Range from Alternative E

Impacts on the Sounding Rockets Program would be the same as under Alternative D. It is not expected that the additional designation of the Coastal Plain WSA provided under this alternative would have a measurable positive effect on the program given that all rocket configurations having the capability to either overfly or land within the vicinity of the coastal plain (e.g., Black Brant X and XII) would also require authorization for spent rocket motors to impact within one of the lower latitude WSAs, thereby precluding their flight.

Effects could be mitigated, however, if Congress were to include a special provision in any Wilderness establishing legislation that would allow the regulated use of the Wilderness area for rocket landings. The ROD for the Revised Plan will identify whether the Service supports such a provision, should the decision select an alternative that recommends additional Wilderness areas.

5.7.5 Cumulative Impacts of Alternative E

The qualified and suitable lands and waters in the Brooks Range WSA (5.82 million acres), Porcupine Plateau WSA (4.92 million acres), and Coastal Plain WSA (1.55 million acres) would be recommended for designation as Wilderness. There would be no cumulative effects related to the administrative act of recommending Wilderness. Should the three WSAs be designated Wilderness, the cumulative effects would be minor, long-term, Refuge-wide, and positive because designated Wilderness provides more permanent statutory protection to the biophysical and human environments. Refuge management activities within Wilderness would be subject to MRAs, and certain activities as discussed previously would be subject to a higher level of scrutiny.

All four suitable rivers would be recommended for wild and scenic river designation: the Atigun, Marsh Fork Canning, Hulahula, and Kongakut Rivers. If Congress were to include these rivers in the NWSRS, they would be afforded the protections of the Wild and Scenic Rivers Act. Permanent management prescriptions and river-specific CRMPs would be completed, which could include the ability to limit and control visitor use. The cumulative effects of these actions would present minor to moderate effects to the biophysical and human environments.

Cumulative effects as a result of management actions for the Kongakut River under this alternative would be minor as a result of increasing outreach and more proactively managing the area.

The effects of Alternative E would be cumulative to the effects of climate change, development activities, and management decisions made by others throughout the region (such as through the reasonably foreseeable future actions listed in Section 5.1.4). Cumulatively, Refuge management under Alternative E would have minor effects on the biophysical and human environments in the region.

5.8 Effects of Alternative F

This section evaluates the implication or impacts Alternative F on resources categories for each major issue: Wilderness, wild and scenic rivers, and Kongakut River visitor management.

5.8.1 *Alternative F Introduction*

Wilderness – Under this alternative, approximately 7.16 million acres of the Refuge would continue to be managed under the Wilderness Management category, and no new areas would be recommended for Wilderness designation.

Wild and Scenic Rivers – Under this alternative, no new rivers would be recommended for inclusion in the NWSRS. The suitability study (Appendix I) preliminarily determined four of the Refuge's rivers are suitable for wild river designation: Atigun, Marsh Fork Canning, Hulahula, and Kongakut Rivers. Even without a recommendation for designation, the outstandingly remarkable values for the four suitable rivers would be protected by using existing management tools under the Minimal Management and Wilderness Management categories, and using tools from the goals, objectives, management policies, and guidelines (see Chapter 2).

Kongakut River – Alternative F proposes Kongakut River management issues be addressed in a Visitor Use Management and/or Wilderness Stewardship step-down plan, that would, among other things, develop long-term monitoring protocols. Until the step-down plan(s) is completed, the Service would implement a variety of interim management actions to protect resources in the Kongakut River valley (see Chapter 3, Section 3.2.5.3).

5.8.2 *Effects on the Biophysical Environment from Alternative F*

Wilderness – Under this alternative, none of the WSAs would be recommended for Wilderness designation, and these areas would continue to be managed under the Minimal Management category. Minimal Management already affords a high degree of administrative protection to the biophysical environment, and there would be no effect to any of the biophysical resource categories if additional Wilderness is not recommended. However, Minimal Management in combination with the goals, objectives, management policies, and guidelines that would be adopted under Alternative F would have negligible, long-term, Refuge-wide, positive effects on the value of the WSAs for ecological research and monitoring.

Wild and Scenic Rivers – Although the four suitable rivers are not recommended for wild river designation under this alternative, their outstandingly remarkable values would be protected by using management tools under Minimal Management, Wilderness Management, the goals and objectives, and the management policies and guidelines. In general, these protections would have negligible, long-term, local, and positive effects on the biophysical environment. Six of the biophysical resource categories would be affected, as described in this section.

Kongakut River – Alternative F recommends interim management tools to address biophysical resource concerns in the Kongakut River valley until such time as a VUMP and/or WSP are completed. These interim tools would have negligible to minor, long-term, site-specific to local, and positive effects on biophysical resources. Six of the biophysical resource categories would be affected, as follows.

Permafrost and Soils Under Alternative F

Wilderness – No effects on permafrost and soils would occur if no new wilderness recommendations are made.

Wild and Scenic Rivers – Protecting the values associated with suitable rivers using existing management tools would result in negligible, long-term, site-specific, and positive effects to permafrost and soils. However, ongoing visitor use could still damage soils and permafrost in the corridors of suitable rivers (at heavily used campsites, for example), resulting in negligible to minor, short- to medium-term, site-specific, and negative effects.

Kongakut River – Refuge visitors have the potential to damage soils and permafrost by trampling, particularly at campsites and access points such as landing areas. Enhanced management of visitor use in the Kongakut River area under Alternative F would decrease these site-specific impacts. Site-specific disturbances from visitors occur extensively up and down the Kongakut River corridor, so enhanced management would also decrease impacts at the local scale. This alternative would have negligible to minor, long-term, site-specific to local, and positive impacts on permafrost and soils in the Kongakut River corridor.

Water Quality and Aquatic Habitats Under Alternative F

Wilderness – There would be no effect on water quality and aquatic habitats from not recommending new Wilderness areas. Water bodies in both Minimal Management and designated Wilderness would continue to benefit from the habitat protections these management categories afford.

Wild and Scenic Rivers – Protecting the values associated with suitable rivers using existing management tools would result in negligible, long-term, site-specific, and positive effects to water quality and aquatic habitats. Ongoing visitor use could still damage aquatic habitats in the corridors of suitable rivers, however, resulting in negligible to minor, short- to medium-term, site-specific, and negative effects.

Kongakut River – Water quality and aquatic habitats can be affected by increased visitor use through increased vegetation trampling and soil compaction, which increases the potential for runoff and sediment loading. Outreach about proper waste disposal and minimizing other visitor impacts, along with monitoring the effectiveness of management actions, would have negligible to minor, long-term, local, and positive effects on water quality and aquatic habitats along the Kongakut River.

Vegetation and Terrestrial Habitats Under Alternative F

Wilderness – No effects on vegetation and terrestrial habitats would occur if no new wilderness recommendations are made.

Wild and Scenic Rivers – Protecting the values associated with suitable rivers using existing management tools would result in negligible to minor, long-term, site-specific, and positive effects to vegetation and terrestrial habitats. Ongoing visitor use, however, could still damage vegetation and terrestrial habitats in the corridors of suitable rivers (at heavily used campsites, for example), resulting in negligible to minor, short- to medium-term, site-specific, and negative effects.

Kongakut River – Refuge visitors may damage vegetation and habitats, particularly at campsites and access points such as landing areas. Potential damage includes direct effects of trampling, breakage of trees and shrubs, the possible introduction of invasive plants, and the exclusion of wildlife from riparian and adjacent habitats. Indirect effects include soil and snow compaction as a result of trampling. Most disturbances to vegetation are site-specific and restricted to areas receiving repeated use, such as hunting camps near fixed-wing aircraft-accessible sites and campsites used by floaters along major rivers. Disturbances are local in scale, as site-specific disturbances occur extensively along the Kongakut River corridor. The additional management proposed in Alternative F would have negligible to minor, long-term, site-specific to local, and positive impacts on vegetation and terrestrial habitats in the Kongakut River drainage.

Fish Populations and Natural Diversity Under Alternative F

Wilderness – No effects on fish populations and natural diversity would occur if no new Wilderness recommendations are made.

Wild and Scenic Rivers – Protecting the values associated with suitable rivers using existing management tools would result in negligible, long-term, local, and positive effects to fish populations and natural diversity.

Kongakut River – Dolly Varden and grayling are popular fish sought by anglers on the Kongakut River. Harvest levels of these fish species are unknown and thought to be low. Providing outreach materials on proper catch-and-release techniques could lead to increased survival rates of released fishes resulting in negligible, long-term, local, positive effects.

Bird Populations and Natural Diversity Under Alternative F

Wilderness – No effects on bird populations and natural diversity would occur if no new Wilderness recommendations are made.

Wild and Scenic Rivers – There would be negligible, long-term, local, and positive effects on bird populations and natural diversity under this alternative. Riparian areas tend to have higher density and diversity of birds compared to surrounding habitats, and river values would be protected using existing management tools.

Kongakut River – Enhanced management of human use of the Kongakut River valley would have negligible to minor, long-term, site-specific to local, and positive effects on bird populations and natural diversity. Monitoring visitor impacts on bird habitats would lead to the development of conservation measures to mitigate visitor impacts on birds if adverse effects are detected. Outreach materials would benefit birds by helping visitors reduce disturbance to nesting raptors and other species, and minimize impacts to bird habitats.

Mammal Populations and Natural Diversity Under Alternative F

Wilderness – No effects on mammal populations and natural diversity would occur if no new Wilderness recommendations are made.

Wild and Scenic Rivers – There would be negligible, long-term, local, and positive effects on mammal populations and natural diversity under this alternative because river values would be protected using existing management tools.

Kongakut River – Enhanced management of human use of the Kongakut River valley would have negligible to minor, long-term, site-specific to local, and positive effects on mammal populations. Monitoring impacts to habitats by visitors would lead to development of conservation measures to mitigate visitor impacts on mammals if adverse effects are detected. Outreach materials would benefit mammals by helping visitors reduce disturbance to resident and migratory species, and minimize impacts to mammal habitats.

5.8.3 Effects on the Human Environment from Alternative F

Wilderness – Under current management, public use of the Refuge is managed similarly in designated Wilderness and in areas under Minimal Management. Most regulations on public use are derived from the area's status as a refuge and by State law. Public use is subject to Federal regulations implementing Federal laws (e.g., ANILCA, Refuge Administration Act), State laws (e.g., Alaska Statute 19.40.210, which prohibits off-road vehicles from the Dalton Highway), and State regulations (e.g., the State of Alaska hunting and fishing regulations).

General efforts to maintain wilderness characteristics and/or manage the Refuge as a naturally functioning ecosystem through the proposed goals, objectives, management policies, and guidelines would have negligible, long-term, Refuge-wide, and positive effects on the human environment.

Wild and Scenic Rivers – Although the four suitable rivers are not recommended for wild river designation under this alternative, their outstandingly remarkable values would be protected by using the management tools under Minimal Management, Wilderness Management, the goals and objectives, and the management policies and guidelines. In general, these protections would have negligible, long-term, local, and positive effects on the human environment. The following resource categories would be affected: cultural resources; visitor services; special designation; public health; wilderness characteristics; and Refuge operations.

Kongakut river – Under Alternative F, a VUMP would be initiated immediately upon approval of the Revised Plan. Until the VUMP takes effect, interim management tools would be implemented. The interim management tools would result in minor to moderate, long-term, local, and positive effects on the human environment. Interim management tools would affect the following resource categories: local economy and commercial uses; cultural resources; subsistence; visitor services and recreational opportunities; wilderness characteristics; and Refuge operations.

Local Economy and Commercial Uses Under Alternative F

Wilderness – There would be no effect to the local economy or commercial uses. Commercial services would continue as they have and would not be restricted in any way.

Wild and Scenic Rivers – While no rivers would be recommended for inclusion in the NWSRS, the Refuge would protect outstandingly remarkable values using available management tools. There should be no measurable effect on local economy and commercial uses.

Kongakut river – A step-down VUMP would likely have effects on the local economy and commercial uses. Step-down planning would be done in conjunction with key stakeholders and the public. Depending on the nature of the changes and/or restrictions imposed by the VUMP, the effects could be minor to moderate, long-term, site-specific to Refuge-wide, and positive or negative for guides and air operators operating on the Refuge. Should the plan limit or reduce the level of commercial use, minor to moderate negative effects would be anticipated to those guides adversely affected by such limits, and this could indirectly result in negligible to minor effects on local economies.

Cultural Resources Under Alternative F

Wilderness – Not recommending additional Wilderness areas would not change ongoing effects to cultural resources. Ongoing damage or loss of cultural resources would continue, primarily as a result of erosion and other natural forces, and would be minor to major, long-term, site-specific, and negative, as under Alternative A.

Wild and Scenic Rivers – Public use would continue on the four rivers determined suitable for inclusion in the NWSRS but not recommended under this alternative. The effects of public use on cultural resources would likely be minor, long-term, site-specific, and negative. The Refuge could use Minimal Management and Wilderness Management categories as well as tools from the goals, objectives, management policies, and guidelines to mitigate these effects. To comply with the Wild and Scenic Rivers Act, the Refuge would protect the Cultural outstandingly remarkable value on the Hulahula River. An increased management focus on cultural resources in this river corridor would result in minor, long-term, site-specific to local, and positive effects.

Kongakut River – Under Alternative F, cultural resource losses (intentional or unintentional) would likely continue in the Kongakut River valley. However, outreach emphasizing stewardship of cultural resources in the Kongakut River drainage could minimize potential impacts. Additionally, the VUMP would include a better understanding of the cultural resources of the area and their condition, and it would provide appropriate cultural resource management. The VUMP should result in negligible to minor, long-term, local, and positive effects to cultural resources as compared to Alternative A.

Subsistence Under Alternative F

Wilderness – There would be no effect to subsistence opportunities, uses, or resources under Alternative F. Traditional access and subsistence uses would continue to be allowed according to current regulations and policies.

Wild and Scenic Rivers – There would be no anticipated effect to subsistence opportunities, uses, or resources. Traditional access and subsistence uses would continue to be allowed according to current regulations and policies.

Kongakut River – Outreach regarding cultural and subsistence use in the Kongakut River drainage could improve understanding and reduce real and/or perceived conflict between local users and nonlocal visitors. Voluntary actions by authorized guides and commercial air operators could also reduce the potential for conflicts among recreational visitors and subsistence users. The effects would likely be minor, long-term, local, and positive.

Visitor Services and Recreation Opportunities Under Alternative F

Wilderness – Visitor services and recreational opportunities outside the Refuge’s designated Wilderness area would continue to be managed via Minimal Management, and the Refuge would continue to provide a variety of recreational opportunities for Refuge visitors. Continuing current management practices could affect visitor services and recreational opportunities in specific high use areas (e.g., the Atigun River area). With no active restoration of impaired sites or management of visitor experiences, visitors seeking certain recreational opportunities such as solitude and natural conditions could be displaced, indirectly resulting in the differential availability of certain visitor services. This could result in negligible to minor, long-term, site-specific to local, and negative effects to visitor services and recreational opportunities focused on solitude and natural conditions. However, the goals and objectives that would be adopted under this alternative calls for the restoration of wilderness characteristics at impaired and degraded sites. Additionally, Refuge staff could administratively decide to limit the number and types of visitor services in certain areas of the Refuge in order to preserve wilderness characteristics or improve recreational opportunities, thus minimizing impacts to visitors seeking wilderness-associated recreation.

No statutory protections from roads, facilities, installations, and recreational improvements, nor any statutory requirements to manage for wilderness characteristics, could result in negligible, long-term, local to Refuge-wide, negative effects to visitor services that cater to solitude and wilderness-associated opportunities and experiences. However, Refuge staff could administratively decide to limit the number and types of visitor services in certain areas of the Refuge in order to preserve wilderness characteristics or improve recreational opportunities, thus minimizing impacts to visitors seeking wilderness-associated recreation.

Minimal Management in concert with the goals, objectives, management policies, and guidelines would not be expected to affect recreational opportunities for solitude, independence, self-reliance, freedom, exploration, adventure, challenge, exploration, and discovery. Additionally, routine law enforcement patrols and visitor use monitoring would continue on the Refuge as under current management, and there would be no effect to these programs under Alternative F.

Wild and Scenic Rivers – There would be no effect on visitor services and recreation opportunities under this alternative.

Kongakut River – This alternative proposes to adopt management strategies based on a Refuge-wide Visitor Use Management step-down plan. As the step-down plan unfolds, it is likely to affect visitor services and recreational opportunities. Through the VUMP, Refuge managers will consider levels of use, timing and distribution of use, and activities and behaviors of visitors. Managers may use education, site management, regulation, enforcement, and/or rationing/allocation to manage visitor use at Arctic Refuge. The effects would likely vary, depending on the visitor, ranging from no effect to minor to moderate, long-term, local, and positive or negative. The effects of proposed visitor use management will be fully evaluated as part the step-down planning process.

Developing outreach materials with preferred practices and strategies for minimizing impacts would likely raise the level of awareness of commercial and private users. In turn, this could lead to higher quality experiences for all users by reducing the amount of physical and experiential impacts occurring on the river, including those associated with human waste. The effects of outreach actions would likely be minor, long-term, local, and positive.

Improving monitoring programs for physical and social conditions could better inform management about areas of concern, thus allowing management to take appropriate responsive action before continued degradation occurs. The effects of improved monitoring on visitor services and recreational opportunities would be minor to moderate, long-term, local, and positive. However, site-specific monitoring and rehabilitation could result in Refuge staff contributing to crowding and other user impacts on the river. These effects are likely to be minor, short-term, local, and negative. Effects could be mitigated to some extent by timing Refuge activities to occur outside peak use.

Publishing schedules of past guided and non-guided visitor use (currently available from commercial permit client use reports) could increase visitor awareness regarding Kongakut River use periods but would likely do little to redistribute use across the season. Asking guides and commercial air operators to voluntarily limit their activities could have minor, short-term, local, and positive effects on visitor experiences.

Wilderness Characteristics Under Alternative F

Wilderness – Lands and waters outside designated Wilderness would not receive the protections afforded by the Wilderness Act. Non-Wilderness areas would continue to be managed under the administrative Minimal Management category, which includes most of the protections and prohibitions of designated Wilderness. Short-term, impacts are likely to be negligible to minor, Refuge-wide, and positive. However, Minimal Management is an administrative management category subject to change and does not have the enduring statutory protections afforded by designated Wilderness. Therefore, in the long-term, effects would be negligible to minor, Refuge-wide, and negative.

Wild and Scenic Rivers – Protecting outstandingly remarkable values on the Refuge's four suitable rivers using existing Minimal and Wilderness Management categories would have no effect to negligible, long-term, local, and positive effects on wilderness characteristics.

Kongakut River – Working with operators to disperse flight paths could reduce air traffic, therefore improving wilderness experiences for visitors. Because Arctic Refuge does not have jurisdiction over airspace, compliance with this request could not be enforced. To the extent we are able to achieve voluntary compliance with air operators, the effects to wilderness characteristics would likely be minor to moderate, short-term, local, and positive. Similarly, asking guides and commercial air operators to minimize effects on Refuge visitors would have minor to moderate, short-term, local, and positive effects on wilderness characteristics, to the extent we are able to achieve compliance.

Improved monitoring of visitor experiences would: 1) tie observed conditions to management goals for biophysical resources; 2) help identify thresholds of acceptable changes in the biophysical environment; and 3) provide input on actions that could be taken to prevent negative Wilderness character indicator thresholds from being reached. Monitoring could result in improved management strategies for wilderness characteristics, and over the long-term, indirectly create moderate, local, and positive improvements to wilderness characteristics.

Visitors seeking solitude and other values associated with Wilderness might have already been displaced from the Kongakut. Implementing interim Kongakut River visitor use management prescriptions and ultimately prescriptions from a VUMP could stop displacement and enhance wilderness characteristics enough that visitors seeking solitude would return to the Kongakut.

Outreach efforts focused on minimal impact techniques and desired behaviors for visitors would likely result in minor, long-term, local, and positive effects on wilderness characteristics. Rehabilitating impacted sites could help restore the river to its natural condition, thus improving wilderness characteristics. The effects are likely to be minor, long-term, local, and positive.

Special Designations Under Alternative F

Wilderness – There would be no effects to any special designations under this alternative.

Wild and Scenic Rivers – There would be no effects to any of the Refuge's special designation areas under this alternative.

Kongakut River – There would be negligible, long-term, local, and positive effects to the MPA as a result of more proactive management of the Kongakut River.

Public Health and Safety Under Alternative F

Wilderness – Maintaining the current extent of designated Wilderness would have no effect on public health and safety.

Wild and Scenic Rivers – There would be no effect on public health and safety.

Kongakut River – Developing a Visitor Use Management step-down plan and providing targeted messages to Refuge visitors would have no effect to negligible, long-term, Refuge-wide, and positive effects on public health and safety issues.

Refuge Operations Under Alternative F

Wilderness – Under this alternative, there would be no effect on Refuge operations because there would be no additional administrative tasks regarding designated Wilderness.

Wild and Scenic Rivers – Protecting the outstandingly remarkable values for the Refuge's four suitable rivers using existing Minimal and Wilderness Management categories would have from no effect to negligible, short- to medium-term, local, and negative effects on staff and Refuge operations. To maintain river values, staff would periodically conduct site assessments and monitoring in the corridors of the four suitable rivers.

Kongakut River – This alternative would require additional staff time and budget to: 1) execute a revised monitoring program; 2) develop outreach materials; 3) compile and publish schedules of proposed launch dates; 4) conduct site-specific rehabilitation; and 5) develop and execute a step-down management plan. The effects are likely to be moderate, short- to medium-term, Refuge-wide, and negative. Over the long-term, however, there should be less strain on Refuge staff dealing with day-to-day river management concerns, resulting in minor, long-term, Refuge-wide, and positive effects.

5.8.4 Effects on Poker Flat Research Range from Alternative F

Implementing Alternative F would not be expected to affect the continued launch of sounding rockets from Poker Flat nor their scientific return. NASA would continue to conduct its missions such that there are no planned impacts within Mollie Beattie Wilderness, and through the University of Alaska Fairbanks, secure permission for landing and recovery of rocket hardware within the remaining areas of Arctic Refuge on an as-needed basis. NASA would continue to follow the specific terms and conditions governing launch and recovery operations included in Refuge-issued authorizations.

Economic Input – Poker Flat’s continued operations under this alternative would result in the same economic inputs to the Fairbanks North Star Borough as under Alternative A (see Table 5-1). The value added from Poker Flat operations accounts for less than one-tenth of 1 percent of the total gross domestic product, and approximately 1.3 percent of the professional, scientific, and technical services industry gross domestic product for the Fairbanks area of Alaska.

5.8.5 Cumulative Impacts of Alternative F

Under Alternative F, no new areas of the Refuge would be recommended for designation as Wilderness. There would be no foreseeable cumulative effects to the biophysical and human environments as a result of this alternative.

Four rivers would be suitable for wild river designation but would not be recommended for inclusion in the NWSRS. There would be negligible cumulative effects to the biophysical and human environments. Continuing current management under Minimal Management and Wilderness categories, in combination with the goals, objectives, management policies, and guidelines, would protect the outstandingly remarkable values identified for these rivers.

Cumulative effects as a result of management actions for the Kongakut River under this alternative would be minor as a result of increasing outreach and more proactively managing the area.

The effects of Alternative F would be cumulative to the effects of climate change, development activities, and management decisions made by others throughout the region (such as through the reasonably foreseeable future actions listed in Section 5.1.4). Cumulatively, Refuge management under Alternative F would have minor effects on the biophysical and human environments in the region.



5.9 Summary of Environmental Consequences

The following table provides a summary and comparison of impacts across the alternatives in each resource category for the major issues: Wilderness, Wild and Scenic Rivers, and Kongakut River visitor management. The effects are described by intensity, duration, scale, and nature of the impacts. The table does not include effects common across all the alternatives or those common across all the action alternatives (i.e., effects of the new management policies and guidelines or the goals and objectives).

Table 5-2. Environmental effects

Issues	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Resource Category: Permafrost and Soils						
Wilderness	No effect	Negligible to minor, long-term, WSA-wide, positive	Negligible to minor, long-term, WSA-wide, positive	Negligible to minor, long-term, WSA-wide, positive	Negligible to minor, long-term, Refuge-wide, positive	No effect
Wild and Scenic Rivers	Negligible to minor, short- to medium-term, site-specific, negative	<u>Interim Management:</u> Negligible, medium-term, site-specific, positive	<u>Interim Management:</u> Negligible, medium-term, site-specific, positive	<u>Interim Management:</u> Negligible, medium-term, site-specific, positive	<u>Interim Management:</u> Negligible, medium-term, site-specific, positive	<u>Management Tools:</u> Negligible, long-term, site-specific, positive
		<u>Designated (CRMPs):</u> Minor, long-term, site-specific to local, positive	<u>Designated (CRMPs):</u> Minor, long-term, site-specific to local, positive	<u>Designated (CRMPs):</u> Minor, long-term, site-specific to local, positive	<u>Designated (CRMPs):</u> Minor, long-term, site-specific to local, positive	<u>Ongoing Visitor Use:</u> Negligible to minor, short- to medium-term, site-specific, negative
Kongakut	Negligible to minor, short-term, site-specific, negative	Negligible to minor, long-term, site-specific to local, positive	Negligible to minor, long-term, site-specific to local, positive	Negligible to minor, long-term, site-specific to local, positive	Negligible to minor, long-term, site-specific to local, positive	Negligible to minor, long-term, site-specific to local, positive
Resource Category: Water Quality and Aquatic Habitats						
Wilderness	No effect	Negligible to minor, long-term, WSA-wide, positive	Minor, long-term, WSA-wide, positive	Minor, long-term, WSA-wide, positive	Minor, long-term, Refuge-wide, positive	No effect

Issues	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Wild and Scenic Rivers	Negligible to minor, short- to medium-term, site-specific, negative	<u>Interim Management:</u> Negligible, medium-term, site-specific, positive <u>Designated (CRMPs):</u> Minor, long-term, site-specific to local, positive	<u>Interim Management:</u> Negligible, medium-term, site-specific, positive <u>Designated (CRMPs):</u> Minor, long-term, site-specific to local, positive	<u>Interim Management:</u> Negligible, medium-term, site-specific, positive <u>Designated (CRMPs):</u> Minor, long-term, site-specific to local, positive	<u>Interim Management:</u> Negligible, medium-term, site-specific, positive <u>Designated (CRMPs):</u> Minor, long-term, site-specific to local, positive	<u>Management Tools:</u> Negligible, long-term, site-specific, positive <u>Ongoing Visitor Use:</u> Negligible to minor, short- to medium-term, site-specific, negative
Kongakut	Negligible, short-term, site-specific, negative	Minor, long-term, local, positive	Minor, long-term, local, positive	Minor, long-term, local, positive	Minor, long-term, local, positive	Negligible to minor, long-term, local, positive
Resource Category: Vegetation and Terrestrial Habitat						
Wilderness	No effect	Negligible to minor, long-term, WSA-wide, positive	Negligible to minor, long-term, WSA-wide, positive	Negligible to minor, long-term, WSA-wide, positive	Negligible to minor, long-term, Refuge-wide, positive	No effect
Wild and Scenic Rivers	Negligible to minor, short- to medium-term, site-specific, negative	<u>Interim Management:</u> Negligible to minor, medium-term, site-specific, positive <u>Designated (CRMPs):</u> Minor, long-term, site-specific to local, positive	<u>Interim Management:</u> Negligible to minor, medium-term, site-specific, positive <u>Designated (CRMPs):</u> Minor, long-term, site-specific to local, positive	<u>Interim Management:</u> Negligible to minor, medium-term, site-specific, positive <u>Designated (CRMPs):</u> Minor, long-term, site-specific to local, positive	<u>Interim Management:</u> Negligible to minor, medium-term, site-specific, positive <u>Designated (CRMPs):</u> Minor, long-term, site-specific to local, positive	<u>Management Tools:</u> Negligible to minor, long-term, site-specific, positive <u>Ongoing Visitor Use:</u> Negligible to minor, short- to medium-term, site-specific, negative

Issues	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Kongakut	Negligible to minor, short-term, site specific, negative	Negligible to minor, long-term, site-specific to local, positive	Negligible to minor, long-term, site-specific to local, positive	Negligible to minor, long-term, site-specific to local, positive	Negligible to minor, long-term, site-specific to local, positive	Negligible to minor, long-term, site-specific to local, positive
Resource Category: Fish Populations and Natural Diversity						
Wilderness	No effect	Minor, long-term, WSA-wide, positive	Minor to moderate, long-term, WSA-wide, positive	Minor, long-term, WSA-wide, positive	Minor to moderate, long-term, Refuge-wide, positive	No effect
Wild and Scenic Rivers	Negligible, long-term, local, positive	<u>Interim Management:</u> Negligible, medium-term, local, positive <u>Designated (CRMPs):</u> Minor, long-term, local, positive	<u>Interim Management:</u> Negligible, medium-term, local, positive <u>Designated (CRMPs):</u> Minor, long-term, local, positive	<u>Interim Management:</u> Negligible, medium-term, local, positive <u>Designated (CRMPs):</u> Minor, long-term, local, positive	<u>Interim Management:</u> Negligible, medium-term, local, positive <u>Designated (CRMPs):</u> Minor, long-term, local, positive	Negligible, long-term, local, positive
Kongakut	<u>Fish Harvest:</u> Negligible, short-term, site-specific to local, negative <u>Other Visitor Use:</u> Negligible, short-term, site-specific to local, negative	<u>Outreach:</u> Negligible, long-term, local, positive <u>Interim Cap:</u> Negligible, short-term, local, positive	<u>Outreach:</u> Negligible, long-term, local, positive <u>Interim Cap:</u> Negligible, short-term, local, positive	<u>Outreach:</u> Negligible, long-term, local, positive	<u>Outreach:</u> Negligible, long-term, local, positive	<u>Outreach:</u> Negligible, long-term, local, positive
Resource Category: Bird Populations and Natural Diversity						
Wilderness	No effect	Negligible, long-term, regional or greater, positive	Minor to moderate, long-term, regional or greater, positive	Negligible to minor, long-term, regional or greater, positive	Minor to moderate, long-term, regional or greater, positive	No effect

Issues	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Wild and Scenic Rivers	Negligible, long-term, local, positive	<u>Interim Management:</u> Negligible, medium-term, local, positive <u>Designated (CRMPs):</u> Minor, long-term, local, positive	<u>Interim Management:</u> Negligible, medium-term, local, positive <u>Designated (CRMPs):</u> Minor, long-term, local, positive	<u>Interim Management:</u> Negligible, medium-term, local, positive <u>Designated (CRMPs):</u> Minor, long-term, local, positive	<u>Interim Management:</u> Negligible, medium-term, local, positive <u>Designated (CRMPs):</u> Minor, long-term, local, positive	Negligible, long-term, local, positive
Kongakut	Negligible, short-term, site-specific, negative	Negligible to minor, long-term, site-specific to local, positive	Negligible to minor, long-term, site-specific to local, positive	Negligible to minor, long-term, site-specific to local, positive	Negligible to minor, long-term, site-specific to local, positive	Negligible to minor, long-term, site-specific to local, positive
Resource Category: Mammal Populations and Natural Diversity						
Wilderness	No effect	Minor, long-term, WSA-wide to regional, positive	Minor to moderate, long-term, WSA-wide to regional, positive	Minor to moderate, long-term, WSA-wide to regional, positive	Moderate, long-term, Refuge-wide to regional, positive	No effect
Wild and Scenic Rivers	Negligible, long-term, local, positive	<u>Interim Management:</u> Negligible, medium-term, local, positive <u>Designated (CRMPs):</u> Minor, long-term, local, positive	<u>Interim Management:</u> Negligible, medium-term, local, positive <u>Designated (CRMPs):</u> Minor, long-term, local, positive	<u>Interim Management:</u> Negligible, medium-term, local, positive <u>Designated (CRMPs):</u> Minor, long-term, local, positive	<u>Interim Management:</u> Negligible, medium-term, local, positive <u>Designated (CRMPs):</u> Minor, long-term, local, positive	Negligible, long-term, local, positive
Kongakut	Minor, short-term, site-specific to local, negative	Negligible to minor, long-term, site-specific to local, positive	Negligible to minor, long-term, site-specific to local, positive	Negligible to minor, long-term, site-specific to local, positive	Negligible to minor, long-term, site-specific to local, positive	Negligible to minor, long-term, site-specific to local, positive

Issues	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Resource Category: Local Economy and Commercial Uses						
Wilderness	No effect	<u>Recreation Services:</u> Negligible to minor, long-term, WSA-wide, positive	<u>Recreation Services:</u> Negligible to minor, long-term, WSA-wide, positive	<u>Recreation Services:</u> Negligible to minor, long-term, WSA-wide, positive	<u>Recreation Services:</u> Negligible to minor, long-term, Refuge-wide, positive	No effect
		<u>Big-Game Hunt Guides:</u> No effect to negligible to minor, long-term, WSA-wide, negative or positive	<u>Big-Game Hunt Guides:</u> No effect to negligible to minor, long-term, WSA-wide, negative or positive	<u>Big-Game Hunt Guides:</u> No effect to negligible to minor, long-term, WSA-wide, negative or positive	<u>Big-Game Hunt Guides:</u> No effect to negligible to minor, long-term, Refuge-wide, negative or positive	
Wild and Scenic Rivers	No effect	<u>Interim Management:</u> No effect to negligible, short- to long-term, local, negative	<u>Interim Management:</u> No effect to negligible, short- to long-term, local, negative	<u>Interim Management:</u> No effect to negligible, short- to long-term, local, negative	<u>Interim Management:</u> No effect to negligible, short- to long-term, local, negative	No effect
		<u>Designated (CRMPs):</u> Minor, long-term, local, negative	<u>Designated (CRMPs):</u> Negligible to minor, long-term, local, negative	<u>Designated (CRMPs):</u> Minor, long-term, local, negative	<u>Designated (CRMPs):</u> Minor, long-term, local, negative	

Issues	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Kongakut	<u>In short-term:</u> Minor, local, negative <u>In long-term:</u> Moderate, local to Refuge-wide, negative	<u>Step-down Planning:</u> Minor to moderate, long-term, site-specific to Refuge-wide, positive or negative <u>Interim Cap:</u> Minor, short-term, local, negative	<u>Step-down Planning:</u> Minor to moderate, long-term, site-specific to Refuge-wide, positive or negative <u>Interim Cap:</u> Minor, short-term, local, negative	<u>Step-down Planning:</u> Minor to moderate, long-term, site-specific to Refuge-wide, positive or negative	<u>Step-down Planning:</u> Minor to moderate, long-term, site-specific to Refuge-wide, positive or negative	<u>Step-down Planning:</u> Minor to moderate, long-term, site-specific to Refuge-wide, positive or negative
Resource Category: Cultural Resources						
Wilderness	Minor to major, long-term, site-specific, negative ¹	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
Wild and Scenic Rivers	Minor to major, long-term, site-specific to local, negative ¹ <u>Hulahula River:</u> Minor, long-term, site-specific to local, positive	Same as Alternative A <u>Hulahula River:</u> Minor, long-term, local, positive	Same as Alternative A <u>Hulahula River:</u> No effect to negligible to minor, long-term, site-specific, positive	Same as Alternative A <u>Hulahula River:</u> Minor, long-term, local, positive	Same as Alternative A <u>Hulahula River:</u> Minor, long-term, local, positive	Same as Alternative A <u>Hulahula River:</u> Minor, long-term, site-specific to local, positive

¹ These effects are largely due to erosion and other natural forces, not human use. For more information, please see Chapter 4, Section 4.4.1, and “Cultural Resources Under All Alternatives” in Chapter 5, Section 5.2.2.2.

Issues	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Kongakut	Minor to major, long-term, site-specific to local, negative ²	Same as Alternative A <u>Step-down Planning:</u> Negligible to minor, long-term, local, positive <u>Interim Cap:</u> Negligible, short-term, local, positive	Same as Alternative A <u>Step-down Planning:</u> Negligible to minor, long-term, local, positive <u>Interim Cap:</u> Negligible, short-term, local, positive	Same as Alternative A <u>Step-down Planning:</u> Negligible to minor, long-term, local, positive	Same as Alternative A <u>Step-down Planning:</u> Negligible to minor, long-term, local, positive	Same as Alternative A <u>Step-down Planning:</u> Negligible to minor, long-term, local, positive
Resource Category: Subsistence						
Wilderness	No effect	<u>Use and Resources:</u> Negligible, long-term, WSA-wide, positive <u>Related Concerns:</u> Negligible to minor, long-term, local, negative	<u>Use and Resources:</u> Negligible, long-term, WSA-wide, positive <u>Related Concerns:</u> Negligible to minor, long-term, local, negative	<u>Use and Resources:</u> Negligible, long-term, WSA-wide, positive <u>Related Concerns:</u> Negligible to minor, long-term, local, negative	<u>Use and Resources:</u> Negligible, long-term, Refuge-wide, positive <u>Related Concerns:</u> Negligible to minor, long-term, local, negative	No effect

² These effects are largely due to erosion and other natural forces, not human use. For more information, please see Chapter 4, Section 4.4.1, and “Cultural Resources Under All Alternatives” in Chapter 5, Section 5.2.2.2.

Issues	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Wild and Scenic Rivers	No effect	<u>Interim Management:</u> Negligible, medium-term, local, positive <u>Designated (CRMPs):</u> Minor, long-term, local, positive <u>Joint Management of Hulahula River:</u> Negligible to moderate, short- to long-term, site-specific to local, positive to negative	<u>Interim Management:</u> Negligible, medium-term, local, positive <u>Designated (CRMPs):</u> Minor, long-term, local, positive	<u>Interim Management:</u> Negligible, medium-term, local, positive <u>Designated (CRMPs):</u> Minor, long-term, local, positive	<u>Interim Management:</u> Negligible, medium-term, local, positive <u>Designated (CRMPs):</u> Minor, long-term, local, positive <u>Joint Management of Hulahula River:</u> Negligible to moderate, short- to long-term, site-specific to local, positive to negative	No effect
Kongakut	No effect	Minor, long-term, local, positive	Minor, long-term, local, positive	Minor, long-term, local, positive	Minor, long-term, local, positive	Minor, long-term, local, positive

Issues	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Resource Category: Visitor Services and Recreation Opportunities						
Wilderness	<u>Recreation Opportunities:</u> Negligible to minor, long-term, site-specific to local, negative	<u>Recreation Opportunities:</u> Negligible to minor, long-term, WSA-wide, positive	<u>Recreation Opportunities:</u> Negligible to minor, long-term, WSA-wide, positive	<u>Recreation Opportunities:</u> Minor, long-term, WSA-wide to Refuge-wide, positive	<u>Recreation Opportunities:</u> Minor, long-term, Refuge-wide, positive	<u>Recreation Opportunities:</u> Negligible to minor, long-term, site-specific to local, negative
	<u>Visitor Services:</u> Negligible, long-term, local to Refuge-wide, negative	<u>Visitor Services:</u> Minor, long-term, WSA-wide, negative	<u>Visitor Services:</u> Minor to moderate, long-term, WSA-wide, negative	<u>Visitor Services:</u> Minor, long-term, WSA-wide to Refuge-wide, negative	<u>Visitor Services:</u> Moderate, long-term, Refuge-wide to regional, negative	<u>Visitor Services:</u> Negligible, long-term, local to Refuge-wide, negative
	<u>Law Enforcement and Monitoring:</u> No effect	<u>Law Enforcement and Monitoring:</u> Minor, temporary to short-term, local, negative or positive	<u>Law Enforcement and Monitoring:</u> Minor, temporary to short-term, local, negative or positive	<u>Law Enforcement and Monitoring:</u> Minor, temporary to short-term, local, negative or positive	<u>Law Enforcement and Monitoring:</u> Minor, temporary to short-term, local, negative or positive	<u>Law Enforcement and Monitoring:</u> No effect
Wild and Scenic Rivers	No effect	<u>Interim Management:</u> No effect to negligible, short- to long-term, local, negative	<u>Interim Management:</u> No effect to negligible, short- to long-term, local, negative	<u>Interim Management:</u> No effect to negligible, short- to long-term, local, negative	<u>Interim Management:</u> No effect to negligible, short- to long-term, local, negative	No effect
		<u>Designated (CRMPs):</u> Minor to moderate, long-term, local, positive or negative	<u>Designated (CRMPs):</u> Minor to moderate, long-term, local, positive or negative	<u>Designated (CRMPs):</u> Minor to moderate, long-term, local, positive or negative	<u>Designated (CRMPs):</u> Minor to moderate, long-term, local, positive or negative	

Issues	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Kongakut	<u>Management Tools:</u> Moderate, short- and long-term, local to Refuge-wide, negative	<u>Step-Down Planning:</u> No effect to minor to moderate, long-term, local, positive or negative	<u>Step-Down Planning:</u> No effect to minor to moderate, long-term, local, positive or negative	<u>Step-Down Planning:</u> No effect to minor to moderate, long-term, local, positive or negative	<u>Step-Down Planning:</u> No effect to minor to moderate, long-term, local, positive or negative	<u>Step-Down Planning:</u> No effect to minor to moderate, long-term, local, positive or negative
	<u>Aircraft Landings:</u> Minor to moderate, long-term, site-specific, negative	<u>Outreach:</u> Minor, long-term, local, positive	<u>Outreach:</u> Minor, long-term, local, positive	<u>Outreach:</u> Minor, long-term, local, positive	<u>Outreach:</u> Minor, long-term, local, positive	<u>Outreach:</u> Minor, long-term, local, positive
	<u>Visitor Experiences:</u> Moderate, long-term, site-specific to local, negative	<u>Monitoring:</u> Minor to moderate, short-term or long-term, local, positive or negative	<u>Monitoring:</u> Minor to moderate, short-term or long-term, local, positive or negative	<u>Monitoring:</u> Minor to moderate, short-term or long-term, local, positive or negative	<u>Monitoring:</u> Minor to moderate, short-term or long-term, local, positive or negative	<u>Monitoring:</u> Minor to moderate, short-term or long-term, local, positive or negative
		<u>Publishing Schedules:</u> Minor, short-term, local, positive	<u>Publishing Schedules:</u> Minor, short-term, local, positive	<u>Publishing Schedules:</u> Minor, short-term, local, positive	<u>Publishing Schedules:</u> Minor, short-term, local, positive	<u>Publishing Schedules:</u> Minor, short-term, local, positive
		<u>Interim Cap:</u> Minor, short-term, local, positive or negative	<u>Interim Cap:</u> Minor, short-term, local, positive or negative			
Resource Category: Wilderness Characteristics						
Wilderness	<u>In short-term:</u> Negligible to minor, Refuge-wide, positive	Minor, long-term, WSA-wide, positive	Minor, long-term, WSA-wide, positive	Moderate, long-term, Refuge-wide, positive	Moderate, long-term, Refuge-wide, positive	<u>In short-term:</u> Negligible to minor, Refuge-wide, positive
	<u>In long-term:</u> Negligible to minor, Refuge-wide, negative					<u>In long-term:</u> Negligible to minor, Refuge-wide, negative

Issues	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Wild and Scenic Rivers	No effect to negligible, long-term, local, positive	<u>Interim Management:</u> No effect to negligible, medium-term, local, positive	<u>Interim Management:</u> No effect to negligible, medium-term, local, positive	<u>Interim Management:</u> No effect to negligible, medium-term, local, positive	<u>Interim Management:</u> No effect to negligible, medium-term, local, positive	No effect to negligible, long-term, local, positive
		<u>Designated (CRMPs):</u> Minor to moderate, long-term, local, positive	<u>Designated (CRMPs):</u> Minor to moderate, long-term, local, positive	<u>Designated (CRMPs):</u> Minor to moderate, long-term, local, positive	<u>Designated (CRMPs):</u> Minor to moderate, long-term, local, positive	
Kongakut	Minor to moderate, long-term, local, negative	<u>Working with Operators:</u> Minor to moderate, short-term, local, and positive	<u>Working with Operators:</u> Minor to moderate, short-term, local, and positive	<u>Working with Operators:</u> Minor to moderate, short-term, local, and positive	<u>Working with Operators:</u> Minor to moderate, short-term, local, and positive	<u>Working with Operators:</u> Minor to moderate, short-term, local, and positive
		<u>Monitoring:</u> Moderate, long-term, local, positive	<u>Monitoring:</u> Moderate, long-term, local, positive	<u>Monitoring:</u> Moderate, long-term, local, positive	<u>Monitoring:</u> Moderate, long-term, local, positive	<u>Monitoring:</u> Moderate, long-term, local, positive
		<u>Outreach:</u> Minor, long-term, local, positive	<u>Outreach:</u> Minor, long-term, local, positive	<u>Outreach:</u> Minor, long-term, local, positive	<u>Outreach:</u> Minor, long-term, local, positive	<u>Outreach:</u> Minor, long-term, local, positive
		<u>Rehabilitation:</u> Minor, long-term, local, positive	<u>Rehabilitation:</u> Minor, long-term, local, positive	<u>Rehabilitation:</u> Minor, long-term, local, positive	<u>Rehabilitation:</u> Minor, long-term, local, positive	<u>Rehabilitation:</u> Minor, long-term, local, positive
		<u>Interim Cap:</u> Minor, short-term, local, positive	<u>Interim Cap:</u> Minor, short-term, local, positive			

Issues	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Resource Category: Special Designations						
Wilderness	<u>PUNA</u> : No effect	<u>PUNA</u> : No effect	<u>PUNA</u> : No effect	<u>PUNA</u> : No effect	<u>PUNA</u> : No effect	<u>PUNA</u> : No effect
	<u>Shublik RNA</u> : No effect	<u>Shublik RNA</u> : No effect	<u>Shublik RNA</u> : No effect	<u>Shublik RNA</u> : No effect	<u>Shublik RNA</u> : No effect	<u>Shublik RNA</u> : No effect
	<u>Firth RNA</u> : No effect	<u>Firth RNA</u> : No effect	<u>Firth RNA</u> : No effect	<u>Firth RNA</u> : No effect	<u>Firth RNA</u> : No effect	<u>Firth RNA</u> : No effect
	<u>MPA</u> : No effect	<u>MPA</u> : No effect	<u>MPA</u> : Minor, long-term, WSA-wide, positive	<u>MPA</u> : No effect	<u>MPA</u> : Minor, long-term, WSA-wide, positive	<u>MPA</u> : No effect
	<u>Wild Rivers</u> : No effect	<u>Wild Rivers</u> : Negligible to minor, long-term, WSA-wide, positive	<u>Wild Rivers</u> : No effect	<u>Wild Rivers</u> : Negligible to minor, long-term, WSA-wide, positive	<u>Wild Rivers</u> : Negligible to minor, long-term, WSA-wide, positive	<u>Wild Rivers</u> : No effect
Wild and Scenic Rivers	<u>PUNA</u> : No effect	<u>PUNA</u> : No effect	<u>PUNA</u> : No effect	<u>PUNA</u> : No effect	<u>PUNA</u> : No effect	<u>PUNA</u> : No effect
	<u>Shublik RNA</u> : No effect	<u>Shublik RNA</u> : Negligible to minor, long-term, local, positive	<u>Shublik RNA</u> : No effect	<u>Shublik RNA</u> : Negligible to minor, long-term, local, positive	<u>Shublik RNA</u> : Negligible to minor, long-term, local, positive	<u>Shublik RNA</u> : No effect
	<u>Firth RNA</u> : No effect	<u>Firth RNA</u> : No effect	<u>Firth RNA</u> : No effect	<u>Firth RNA</u> : No effect	<u>Firth RNA</u> : No effect	<u>Firth RNA</u> : No effect
	<u>MPA</u> : No effect	<u>MPA</u> : Negligible, long-term, local, positive	<u>MPA</u> : No effect	<u>MPA</u> : Negligible, long-term, local, positive	<u>MPA</u> : Negligible, long-term, local, positive	<u>MPA</u> : No effect
	<u>Wild Rivers</u> : No effect	<u>Wild Rivers</u> : No effect	<u>Wild Rivers</u> : No effect	<u>Wild Rivers</u> : No effect	<u>Wild Rivers</u> : No effect	<u>Wild Rivers</u> : No effect

Issues	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Kongakut	<u>PUNA</u> : No effect	<u>PUNA</u> : No effect to negligible, short-term, local, negative	<u>PUNA</u> : No effect to negligible, short-term, local, negative	<u>PUNA</u> : No effect	<u>PUNA</u> : No effect	<u>PUNA</u> : No effect
	<u>Shublik RNA</u> : No effect	<u>Shublik RNA</u> : No effect to negligible, short-term, local, negative	<u>Shublik RNA</u> : No effect to negligible, short-term, local, negative	<u>Shublik RNA</u> : No effect	<u>Shublik RNA</u> : No effect	<u>Shublik RNA</u> : No effect
	<u>Firth RNA</u> : No effect	<u>Firth RNA</u> : No effect to negligible, short-term, local, negative	<u>Firth RNA</u> : No effect to negligible, short-term, local, negative	<u>Firth RNA</u> : No effect	<u>Firth RNA</u> : No effect	<u>Firth RNA</u> : No effect
	<u>MPA</u> : No effect	<u>MPA</u> : Negligible, long-term, local, positive	<u>MPA</u> : Negligible, long-term, local, positive	<u>MPA</u> : Negligible, long-term, local, positive	<u>MPA</u> : Negligible, long-term, local, positive	<u>MPA</u> : Negligible, long-term, local, positive
	<u>Wild Rivers</u> : No effect	<u>Wild Rivers</u> : No effect to negligible to minor, short- to medium-term, local, negative	<u>Wild Rivers</u> : No effect to negligible to minor, short- to medium-term, local, negative	<u>Wild Rivers</u> : No effect	<u>Wild Rivers</u> : No effect	<u>Wild Rivers</u> : No effect
Resource Category: Public Health and Safety						
Wilderness	No effect	No effect	No effect	No effect	No effect	No effect
Wild and Scenic Rivers	No effect	No effect	No effect	No effect	No effect	No effect
Kongakut	No effect	No effect to negligible, long-term, Refuge-wide, positive	No effect to negligible, long-term, Refuge-wide, positive	No effect to negligible, long-term, Refuge-wide, positive	No effect to negligible, long-term, Refuge-wide, positive	No effect to negligible, long-term, Refuge-wide, positive

Issues	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Resource Category: Refuge Operations						
Wilderness	No effect	<u>Paperwork:</u> Negligible, long-term, WSA-wide, negative <u>Research:</u> Negligible, long-term, WSA-wide, negative <u>State Operations:</u> Negligible, long-term, WSA-wide, negative	<u>Paperwork:</u> Minor, long-term, WSA-wide, negative <u>Research:</u> Negligible to minor, long-term, WSA-wide, negative <u>State Operations:</u> Negligible, long-term, WSA-wide, negative	<u>Paperwork:</u> Minor, long-term, WSA-wide, negative <u>Research:</u> Negligible to minor, long-term, WSA-wide to Refuge-wide, negative <u>State Operations:</u> Negligible, long-term, WSA-wide, negative	<u>Paperwork:</u> Minor, long-term, Refuge-wide, negative <u>Research:</u> Negligible to minor, long-term, Refuge-wide to regional, negative <u>State Operations:</u> Negligible, long-term, Refuge-wide, negative	No effect
Wild and Scenic Rivers	No effect to negligible, short- to medium-term, local, negative	<u>Interim Management:</u> No effect to negligible, medium-term, local, negative <u>Designation – in short term:</u> Moderate, Refuge-wide, negative <u>Designation – in long term:</u> Minor, Refuge-wide, positive	<u>Interim Management:</u> No effect to negligible, medium-term, local, negative <u>Designation – in short term:</u> Moderate, Refuge-wide, negative <u>Designation – in long term:</u> Minor, Refuge-wide, positive	<u>Interim Management:</u> No effect to negligible, medium-term, local, negative <u>Designation – in short term:</u> Moderate, Refuge-wide, negative <u>Designation – in long term:</u> Minor, Refuge-wide, positive	<u>Interim Management:</u> No effect to negligible, medium-term, local, negative <u>Designation – in short term:</u> Moderate, Refuge-wide, negative <u>Designation – in long term:</u> Minor, Refuge-wide, positive	No effect to negligible, short- to medium-term, local, negative

Issues	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F
Kongakut	No effect	<u>In short-term:</u> Moderate, short- to medium-term, Refuge-wide, negative	<u>In short-term:</u> Moderate, short- to medium-term, Refuge-wide, negative	<u>In short-term:</u> Moderate, short- to medium-term, Refuge-wide, negative	<u>In short-term:</u> Moderate, short- to medium-term, Refuge-wide, negative	<u>In short-term:</u> Moderate, short- to medium-term, Refuge-wide, negative
		<u>In long-term:</u> Minor, Refuge-wide, positive	<u>In long-term:</u> Minor, Refuge-wide, positive	<u>In long-term:</u> Minor, Refuge-wide, positive	<u>In long-term:</u> Minor, Refuge-wide, positive	<u>In long-term:</u> Minor, Refuge-wide, positive
Poker Flat Research Range						
Wilderness	<u>Scientific Return:</u> No effect	<u>Scientific Return:</u> Major, long-term, regional, negative	<u>Scientific Return:</u> Negligible, long-term, regional, positive	<u>Scientific Return:</u> Major, long-term, regional, negative (Alternative with greatest impacts)	<u>Scientific Return:</u> Major, long-term, regional, negative	<u>Scientific Return:</u> No effect
	<u>Economic Input:</u> No effect	<u>Economic Input:</u> Minor, long-term, regional, negative	<u>Economic Input:</u> No effect	<u>Economic Input:</u> Minor, long-term, regional, negative	<u>Economic Input:</u> Minor, long-term, regional, negative	<u>Economic Input:</u> No effect
Wild and Scenic Rivers	No effect	No effect	No effect	No effect	No effect	No effect
Kongakut	No effect	No effect	No effect	No effect	No effect	No effect

5.10 Section 810 Evaluation

ANILCA Section 810 requires that when the Refuge contemplates “whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands,” it must evaluate the effects of such uses on subsistence uses and needs. If the Refuge determines that a significant restriction is likely to occur, they must follow the Section 810 notice and hearing requirements. The Refuge may proceed with an action that would significantly restrict subsistence uses only if it first determines:

- such a significant restriction of subsistence uses is necessary, and consistent with sound management principles for the utilization of the public lands;
- the proposed activity would involve the minimal amount of public lands necessary to accomplish the purposes of such use, occupancy, or other disposition; and
- reasonable steps would be taken to minimize adverse effects upon subsistence uses and resources resulting from such actions.

A finding that the proposed action or other alternatives may significantly restrict subsistence uses imposes additional requirements, including provisions for notices to the State and appropriate regional and local subsistence committees, a hearing in the vicinity of the area involved, the making of a determination as required by ANILCA Section 810(a)(3), or prohibition of the action.

The evaluation and findings required by ANILCA Section 810 are considered in this analysis. To determine if a significant restriction of subsistence uses and needs may result from any one of the alternatives discussed in this Plan, including their cumulative effects, the following three factors were considered:

- A reduction in subsistence uses due to factors such as direct impacts on the resource, adverse impacts on habitat, or increased competition for the resources.
- A reduction in the subsistence uses due to changes in availability of resources caused by an alteration in their distribution, migration, or location.
- A reduction in subsistence uses due to limitations on the access to harvestable resources such as physical or legal barriers.

This Plan and its alternatives do not propose any types of uses or developments that would pose risks to subsistence resources or subsistence uses of the Refuge. No proposed or foreseen significant restriction of subsistence uses and needs is envisioned for any of the alternatives. Referring to the goals, objectives, management policies, and guidelines in Chapter 2, the various subsistence activities or uses currently allowed will not change from present management under any of proposed alternatives. Fishing, hunting, trapping, and berry picking is allowed under all land management categories (i.e., Wilderness Management, Wild River Management, Minimal Management, Moderate Management, and Intensive Management). Collection of house logs and firewood and collection of plant materials is also allowed under all five management categories (see Chapter 2, Sections 2.3, 2.4, and 2.5).

The establishment and use of temporary facilities directly related to the taking of fish and wildlife may be allowed under each of the five management categories as they have been since the 1988 Plan was implemented. Caches, camps, shelters, lean-tos, and other temporary facilities will be allowed in either Wilderness or Minimal Management lands. Subsistence users will not need a special use permit for use of temporary facilities, with the exception of tent platforms left in place for more than a year; such tent platforms have required a special use permit since the 1988 Plan was implemented. Tent platforms left in place for more than

one year by subsistence users may be authorized under a five-year renewable permit in which no administrative processing fees will be required.

The legislated purposes of the Refuge require maintaining high-quality habitats and healthy populations and natural diversity of fish and wildlife; maintaining water quality; fulfilling international treaty obligations; and providing a continued opportunity for subsistence use. While the alternatives contain slightly different approaches to meeting these purposes, none favor activities or projects that would have direct negative impacts or would disproportionately impose adverse cumulative effects on subsistence uses. The management policies and guidelines that would be adopted under Alternatives B-F direct the Service to generally avoid intervening with resources in the Refuge in response to climate change or naturally occurring events, unless the event is determined to be a management emergency. This approach could result in the gradual loss or decline of subsistence resources, or result in them changing through time. The effects would likely be minor, long-term, and Refuge-wide to regional, and they could be mitigated according to our management emergency policy (see Chapter 2, Section 2.4.2). Climate change is not part of any of the proposed management actions in the Revised Plan, and there would be limits to what the Service could do to minimize resultant effects.

There would be no effect to subsistence uses or resources, and traditional access and subsistence use opportunities would continue according to current regulations and policies. Current traditional methods and patterns of motorized and non-motorized access would not be affected by Wilderness designation. On Refuge lands in Alaska, including Wilderness areas, Section 811(b) of ANILCA authorizes the use of snowmobiles, motorboats, dog teams, and other means of surface transportation traditionally employed by local rural residents engaged in subsistence activities. Subsistence uses in designated Wilderness and wild river corridors would continue as they have under current Minimal Management, and the Refuge's subsistence purpose would continue to be met.

Chapter 4 describes the environment of Arctic Refuge in detail, including subsistence and other human uses. Chapter 5 (this chapter) describes anticipated effects of each alternative on the environment, including effects to subsistence and other uses. This Plan and its alternatives propose a number of future step-down management plans, monitoring programs, and other proposed activities. As required by ANILCA Section 810 and NEPA, the Refuge will continue to evaluate the effects of each proposed action or activities on subsistence activities or uses to ensure compliance with ANILCA and NEPA.

The Refuge will also continue to work with the Federal Subsistence Board, Federal Subsistence Regional Advisory Councils, local fish and game advisory committees, the Alaska Department of Fish and Game, local tribes and Native organizations, local Native corporations, and other appropriate local sources to determine whether a proposed activity would significantly restrict subsistence activities or uses. If the Refuge determines that a proposal or activity would likely result in adverse effects to subsistence activities or uses, the Refuge would follow the requirements identified in Section 810 and the Service's tribal consultation policies before making a final decision on the proposed action.

The United States, Alaska Native tribes, and Alaska Native Claims Settlement Act (ANCSA) Native corporations have a unique legal and political relationship to provide regular and meaningful involvement in the decision making process regarding issues affecting cultural and subsistence resources, subsistence and traditional uses, or other activities that may have implications to tribes or Native corporations. In recognition of this special relationship, we

added Objective 4.1 Formal Consultation (Chapter 2, Section 2.1.4) and embedded language requiring either formal or informal consultation, or collaboration, or cooperation with local Native communities in all of the subsistence, cultural and other objectives which may have tribal or Native corporation implications. In addition to formal consultation with federally recognized tribal governments and ANCSA Native corporations, the Refuge will, whenever practicable and reasonable, collaborate and partner with Native organizations, subsistence advisory groups, and universities to accomplish agreed upon subsistence and cultural projects and studies.

The Service has determined in this Section 810(a) evaluation that none of the alternatives or the cumulative effects of the Revised Plan would significantly restrict subsistence use or the availability of resources in Arctic Refuge, nor would they increase competition for resources or restrict access to harvestable resources. Opportunities for continued subsistence use would be maintained.

5.11 Environmental Justice

A Federal agency is required to identify and address, as appropriate, any disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations (Executive Order 12898, February 11, 1994, amended January 30, 1995, by Executive Order 12948). This includes health risks and other impacts for people who rely principally on fish or wildlife for subsistence. Subsistence activities are a way of obtaining food or natural materials and an important mechanism for maintaining cultural values, family traditions, kinships, sharing practices, and relationships to the land.

Iñupiat and Gwich'in people and their ancestors have maintained this connection to the land for thousands of years. Much of Arctic Refuge's legacy exists today largely because they have nurtured it so well. ANILCA recognizes this important connection between Native people and the land for continued cultural and subsistence purposes. Arctic Refuge's vision and management goals also share this Native perspective and values towards the land and nature (see Chapter 1, Section 1.6).

As described in Chapter 4, Section 4.4.3, communities associated with Arctic Refuge are rural, contain many low-income households, and maintain subsistence lifestyles in a mixed, subsistence cash-income economy with high levels of unemployment. Continued traditional and cultural uses of the land and waters contribute to the physical and spiritual well-being of individuals and communities helping to maintain their close relationship to the land and sustain their profound "sense of place." The nature of the proposed action (the revision of the Refuge's management plan), is very different from the proposals often associated with environmental justice issues (such as the siting of pollution-causing facilities). None of the alternatives evaluated in the Revised Plan would place a disproportionate weight of any adverse effects on low-income and/or minority populations.

Maintaining high-quality habitats and healthy populations and natural diversity of fish and wildlife; maintaining water quality; fulfilling international treaty obligations; and providing opportunities for subsistence are legislated purposes of the Refuge. The Service cannot compromise these values and their associated uses under any management alternative. While the alternatives contain slightly different approaches to meeting Refuge purposes, none favor activities or projects that would have direct negative impacts toward low-income and/or minority populations, and none of the alternatives evaluated in this Revised Plan would disproportionately impose adverse cumulative effects on communities in or adjacent to Arctic Refuge. The management policies and guidelines that would be adopted under Alternatives B-F direct the Service to generally avoid intervening with resources in the Refuge in response to climate change or naturally occurring events, unless the event is determined to be a management emergency. This approach could result in the gradual loss, decline, or change in subsistence resources upon which local low-income and minority residents depend. However, the effects could be mitigated according to our management emergency policy (see Chapter 2, Section 2.4.2). Climate change is not part of any of the proposed management actions in the Revised Plan, and there would be limits to what the Service could do to minimize resultant effects. None of the alternatives, management prescriptions, or objectives would increase the pathways of potential contaminants entering into the water supply and subsistence food resources.



5.11.1 Effects of Alternative A

Alternative A does not propose any changes to current management. No new areas would be recommended for Wilderness designation, and no new wild rivers would be recommended for designation. Visitor use management along the Kongakut River would continue under current management. Recreation-related commercial services are allowed across the entire Refuge with the exception of the big-game guide use area ARC 12 that surrounds Arctic Village. This commercial hunting guide use area would remain vacant to reduce potential user conflict with subsistence users. Private and commercial activities would continue to be reviewed, managed, and regulated with respect to ANILCA, Refuge establishing purposes, and other existing laws, regulations, and policies.

Arctic Refuge covers a vast area that is very remote and rugged, making visitor access into and out of the area quite challenging. Visitor access is primarily by commercial air operators or private aircraft and is further limited by the number of suitable landing sites. All commercial service providers are required to obtain special use permits, which contain stipulations to protect resources in the Refuge and minimize conflicts with subsistence users and other Refuge visitors. Although subsistence activities take place throughout wide areas of the Refuge, they tend to be concentrated along the coast and coastal plain regions in the north, and near Arctic Village and Venetie and several major rivers drainages in the south. Subsistence access is primarily by boat in the summer and snowmachine in the winter.

Commercial service providers and visitors operating in areas of high subsistence use could result in a perception of conflict or competition for resources with subsistence users. Simultaneous visits by general hunters (nonlocal), commercially guided hunters, and recreation groups in some high-use areas have led to reported erosion of visitor

experiences, increases in user conflicts, and physical impacts such as human waste accumulations, trash, and site-hardening at commonly used campsites. To minimize perceived crowding, user conflicts, and impacts to resources, commercial recreational river guides are required to limit their trip frequency to one trip per river drainage at a time, as well as commercial guided group size limits of seven for land activities and 10 for water-based activities. The number of commercial hunting guides, and the areas they are authorized to provide services in, are also limited, as are the number of hunting clients they may guide. For subsistence users, These management actions are viewed as favorable for subsistence users because they would minimize impacts to resources, crowding, user conflicts, and potential competition for important subsistence resources.

To minimize potential impacts from contaminants to resources, Refuge users resources, Refuge staff requires commercial service providers to bury human waste at least six to eight inches deep and at least 200 feet away from springs, lakes, and streams, and the Service recommends non-guided Refuge users and visitors do the same. Temporary fuel caches are only allowed in designated areas from May 1 through September 30 and must be approved in advance by the Refuge manager with the specific location identified. Approved fuel caches must be located above the high water line of any water course, be less than 60 gallons, be stored in containers approved for gasoline, and be labeled with the permittee's name, address, and type of fuel. These visitor use management actions are generally viewed favorably for reducing potential impacts to resources by visitors and subsistence users.

The number of big-game hunting guide units would remain the same, as would limits on the number of hunting clients authorized for each guide area. Big-game hunting guide unit ARC 12 that surrounds Arctic Village would remain vacant; this includes the Arctic Village Sheep Management Area that is reserved for local federally qualified subsistence users. In recognizing the importance of Native and non-Native rural residents subsistence needs, ANILCA established a rural priority for the subsistence uses of fish and wildlife over other consumptive users in times of scarcity. These provisions are viewed favorably by subsistence users in helping to ensure continued subsistence opportunities on Federal lands.

In addition, and weather permitting, commercial air operators are asked to follow the FAA advisory to maintain a minimum altitude of 2,000 feet above the ground whenever possible, to avoid intentional low flights over camps, people, or wildlife, and to minimize interference with Refuge visitors or subsistence users. Federal law also prohibits all aircraft operations from harassing wildlife. Subsistence users support these management actions, which help reduce user conflict and ensure subsistence opportunity.

To further minimize potential conflicts with subsistence users, commercial service providers are required to: a) review Refuge land status maps to determine the location of private lands and avoid these lands or obtain permission to use these lands from the landowner; b) warn clients that they cannot trespass or camp on any patented or selected Native allotments or conveyed Native corporation lands; c) inform clients that general sheep hunting in the Arctic Village Sheep Management Area is closed to all sheep hunting except for subsistence use; and d) encourage clients hunting on the coastal plain to avoid the coastal areas frequented by subsistence hunters.

These management stipulations were incorporated to conserve resources on the Refuge, reduce crowding, reduce potential visitor and local user conflicts, and ensure Refuge purposes (including the continued opportunity for subsistence use) are being met. This

alternative does not propose any new changes to how visitors, commercially supported users, or non-commercially supported users currently visit the Refuge. Therefore, no changes in effects to the local economy, commercial uses, cultural resources, visitor services, recreational opportunities, wilderness characteristics, public health and safety, or Refuge operations are expected. Under current management actions and visitor use trends, guided commercial use on the Refuge is expected to continue near current levels. Non-guided use on the Refuge is expected to continue to gradually increase. The popularity and levels of recreational visitor use on the Refuge is expected to continue into the future with associated site-specific minor impacts to local physical resources. No new impacts to subsistence activities are expected to occur. There will continue to be a potential for trespass on Native allotments and Native corporation lands, and a potential for conflict with visitors and local users at important high use subsistence areas. However, with current management stipulations and increased education and outreach to all users, the overall impact to subsistence resources and subsistence activities would likely be local, long-term, and minor in scale.

This alternative does not impose any disproportionately high or adverse human health or environmental effects on minority populations and low-income populations. This alternative does not include health risks and other impacts for people who rely principally on fish or wildlife for subsistence.

5.11.2 Effects of Alternative B

The general management stipulations stated in Alternative A would continue in Alternative B. Alternative B would recommend the Brooks Range WSA for Wilderness designation. If approved by Congress, this designation would provide further long-term protection for the lands and waters, wildlife, and other resources in this region of the Refuge on which subsistence users depend. Wilderness designation would serve to perpetuate the natural conditions so essential for continuing a subsistence way of life. However, should the population of a subsistence species decline, Wilderness status would require a stronger justification for consideration of some management actions such as predator control. This could be viewed as a negative effect if an important subsistence wildlife population were to decline substantially; however, the effects could be mitigated according to our management emergency policy (see Chapter 2, Section 2.4.2). In recognizing the importance of Native and non-Native rural residents' subsistence needs, ANILCA established a rural priority for the subsistence uses of fish and wildlife over other consumptive users in times of scarcity. These provisions are viewed favorably by subsistence users in helping to ensure continued subsistence opportunities on Federal lands.

Current traditional methods and patterns of motorized and non-motorized access would not be affected by Wilderness designation. The use of temporary structures such as tent camps, tent frames, and fish drying racks would continue. Subsistence use of cabins would continue, although requests for construction or location of new cabins would receive greater scrutiny. Some subsistence users would view Wilderness designation on their homeland as complementary to their subsistence and cultural perspective; others would view Wilderness designation as a foreign concept and at variance with their traditional beliefs. The subsistence user groups most affected by the Brooks Range WSA-wide designation would be the south side Gwich'in villages of Arctic Village and Venetie. The Gwich'in Nation, through a resolution adopted at their Arctic Village meeting in 1988 and reaffirmed at biannual meetings ever since, continues to support wilderness review and designation for the 1002 Area of Arctic

Refuge. This resolution stresses the importance of protecting the land, waters, and traditional and customary ways of life for future generations. In 2010, the Gwich'in Steering Committee supported a wilderness review for all Refuge lands not yet designated as Wilderness.

In the Brooks Range WSA, there are 29 conveyed Native allotments, each 40–160 acres in size, for a total of 3,658.92 acres. The Native allotments were selected and conveyed based on their subsistence importance. Current and foreseeable subsistence-related use is consistent with Refuge purposes and the purposes of Wilderness. Sales to private parties could potentially result in commercial or other development that could detract from the wilderness characteristics and subsistence use of the immediate area. The Refuge would continue its policy of offering to purchase inholdings when owners have decided to sell and acquisition funds are available. If acquired, the Service would manage these lands in accordance with Refuge purposes and ANILCA, including the continued opportunity for subsistence use. The continued use of these lands for all subsistence users would be viewed as a positive effect.

In the Brooks Range WSA, 190,000 acres around Arctic Village, Old John Lake, and adjacent high use areas were found not suitable for Wilderness recommendation. This determination was made after conducting Wilderness eligibility and suitability reviews and consulting with leaders from the Native Village of Venetie Tribal Government and the Arctic Village Council. The area would be difficult to manage as Wilderness because of its proximity to an active village with supporting infrastructure such as a busy airport and the community electrical generation complex. The area also has a high concentration of private inholdings, frequent use of motorized vehicles such as motorboats and snowmachines, and includes the village's high use areas for activities such as firewood and house log cutting. These boundaries were determined in consultation with Native leaders and elders in Venetie and Arctic Village who support excluding the 190,000 acres from wilderness recommendations.

Designation of the Brooks Range WSA could potentially increase visitor interest and use for this region of the Refuge, which includes large portions of Arctic Village's and Venetie's traditional and subsistence use areas. This could increase competition for local resources between local subsistence users and visitors. However, as in Alternative A, the number of big-game guides and use areas would remain the same, as would the limits on the number of hunting clients authorized for each guide area. Big-game guide use area ARC 12 that surrounds Arctic Village would remain vacant; this includes the Arctic Village Sheep Management Area where hunting is reserved for local federally qualified subsistence users. Continuing these management stipulations and increasing education and outreach to all users would minimize potential and perceived conflicts and competition with local subsistence users.

Alternative B recommends wild river designation for the Hulahula, Kongakut, and Marsh Fork Canning rivers. Of these suitable rivers, only the Hulahula River has a cultural outstandingly remarkable value. If Congress were to designate any of the recommended rivers in this alternative, a CRMP would be developed for each river, and the river plan would identify strategies to provide protection for the river's outstandingly remarkable and other river-related values. These river plans might affect commercial services, visitor services, cultural resources, local economies, recreational opportunities, and wilderness opportunities. Overall, there would be a positive effect for further protection of the cultural outstandingly remarkable value for the Hulahula River, and traditional access and subsistence use opportunities would continue to be permitted according to current regulations and policies. However, effects on subsistence could vary as the CRMP process unfolds. If Congress were to designate the entire extent of the Hulahula River as a wild river, the Service would partner with KIC regarding river management where it flows through KIC lands. KIC and the

Service could have different perceptions as to what is needed in the CRMP to protect cultural and subsistence resources on the lower extent of the river. The Service and KIC would need to work together to achieve effective protections.

In general, subsistence uses in designated Wilderness and along wild river corridors would continue as they have under Minimal Management, and the subsistence purpose would continue to be met. Pathways of potential contaminants into water supplies and subsistence foods resources by human waste accumulation or fuel caches would be mitigated by ongoing management practices and current regulations. No new impacts to subsistence activities are expected to occur under this alternative. However, there will continue to be a potential for trespass on Native allotments and Native corporation lands as well as a potential for conflict with visitors and nonlocal users at important high use subsistence use areas. With current management stipulations and increased education and outreach to all users, the overall impact to cultural and subsistence resources and subsistence activities would likely be minor, long-term, local, and positive.

Alternative B proposes that Kongakut River visitor use management issues be addressed in a Visitor Use Management and/or Wilderness Stewardship step-down plan (i.e., VUMP and/or WSP). It would also establish several new programs to protect resources in the Kongakut River valley. An interim cap would be set on commercial recreation guides running from 2013 until 2016, or when the required VUMP is completed. The Service would develop outreach materials for the public with targeted messages explaining preferred visitor practices and strategies for minimizing impacts, such as proper waste disposal, avoiding wildlife impacts, and alleviating crowding among groups. The Service would provide the public with schedules of proposed guided trip launch dates and past visitor use activity patterns. Rehabilitation of heavily impacted sites would be conducted when necessary. The Service would revise the current monitoring program of physical and social conditions to evaluate the effectiveness of management actions. Efforts would be increased to enforce compliance of special use permit conditions and existing visitor use regulations. We would work with commercial guides to encourage them to voluntarily modify their use of the river throughout the season, especially during heavy use periods (late June and mid-August). We would also work with commercial air operators to disperse commuting flight paths in and out of the Kongakut valley, subject to safe aircraft operation, inclement weather conditions, and takeoff and landing approach requirements. More proactive management of commercial and visitor use, including recreational and commercially guided hunting, would be beneficial to subsistence users and would potentially minimize conflicts and competition for subsistence related resources.

This alternative does not impose any disproportionately high and adverse human health or environmental effects on minority populations or low-income populations. This alternative does not include health risks and other impacts for people who rely principally on fish or wildlife for subsistence.

5.11.3 Effects of Alternative C

The general management stipulations stated in Alternative A would continue in Alternative C. This alternative would recommend the Coastal Plain WSA be designated as Wilderness. If approved by Congress, Wilderness designation would provide further long-term protection for the lands, wildlife, and other resources in this region of the Refuge on which subsistence users depend. Wilderness designation would serve to perpetuate the current natural conditions so important for a subsistence way of life. However, should the population of a subsistence

species decline, Wilderness status would require a stronger justification for consideration of some management actions such as predator control. This could be viewed as a negative effect if an important subsistence wildlife population were to decline substantially; however, the effects could be mitigated according to our management emergency policy (see Chapter 2, Section 2.4.2). In recognizing the importance of Native and non-Native rural residents subsistence needs, ANILCA established a rural priority for the subsistence uses of fish and wildlife over other consumptive users in times of scarcity. These provisions are viewed favorably by subsistence users in helping to ensure continued subsistence opportunities on Federal lands.

Current traditional methods and patterns of motorized and non-motorized access would not be affected by Wilderness designation. The use of temporary structures such as tent camps, tent frames, and fish drying racks would continue. Subsistence use of cabins would continue, although requests for construction or location of new cabins would receive greater scrutiny. Some subsistence users would view Wilderness designation on their homeland as complementary to their subsistence and cultural perspective; others would view Wilderness designation as a foreign concept and at variance with their traditional beliefs. The subsistence user group that would be most affected by the Wilderness designation of the Coastal Plain WSA would be the north side Iñupiat village of Kaktovik.

Comments received from several members of the Native Village of Kaktovik Tribal Government, representatives of Arctic Slope Regional Corporation (ASRC), and various public speakers during public scoping meetings and public hearings on the Revised Plan opposed Wilderness designation for the Coastal Plain WSA. They believe future economic development opportunities, such as oil and gas development in the 1002 Area (if opened by Congress) would be impacted. Other Native representatives recommended designation of the coastal plain as Wilderness because of its importance for a variety of subsistence resources, including the calving and nursery grounds for the Porcupine caribou herd. The Gwich'in Nation, through a resolution adopted at Arctic Village in 1988 and reaffirmed at biannual meetings ever since, continues to support Wilderness review and designation for the 1002 Area of Arctic National Wildlife Refuge. The Gwich'in Nation's resolution stresses the importance of protecting the land and waters and the traditional and customary ways of life for future generations. Gwich'in elders and tribal leaders describe the caribou calving and nursery ground of Arctic Refuge's coastal plain as a "Sacred Place Where Life Begins."

Several members from the Native Village of Kaktovik and ASRC opposed Wilderness designation because they believe it would impact subsistence use and access, particularly regarding all-terrain vehicle use for access to resources and to Native allotments. Current traditional methods and patterns of motorized and non-motorized access would not be affected by Wilderness designation. Traditional access and subsistence uses would continue to be permitted according to ANILCA and current regulations and policies.

The Coastal Plain WSA contains 28 Native allotments, each 40–160 acres in size, for a total of 1,359.55 acres. These allotments were selected and conveyed due to their important past subsistence use. Current and foreseeable subsistence-related use is consistent with Refuge purposes and the purposes of Wilderness. Sales to private parties could potentially result in commercial or other development that could detract from the wilderness characteristics and subsistence uses of the immediate area. The Refuge would continue its policy of offering to purchase inholdings where the owners have decided to sell and acquisition funds become available. If acquired, the Service would manage these lands in accordance with Refuge purposes and ANILCA, including the continued opportunity for subsistence use.

There is a 30,000-acre area of lagoon waters near Kaktovik that is not being recommended for Wilderness designation due to its proximity to an active village. The lagoon is heavily used by village residents and is near supporting village infrastructure such as a busy airport, community electrical generation complex, the military Barter Island Long Range Radar Site, and a Borough landfill. A number of Native allotments are in the area around the lagoon, and frequently there are motorized vehicles such as motorboats and snowmachines in and around the lagoon. The exclusion area boundaries were determined in consultation with Native leaders and elders from the Native Village of Kaktovik Tribal Government who support excluding this area from wilderness recommendation.

Alternative C recommends wild river designation for Atigun River. If Congress were to designate this river, a CRMP would be developed that would identify strategies to provide protection for the river's outstandingly remarkable and other river-related values. This could result in impacts to commercial services, visitor services, cultural resources, local economies, recreational opportunities, and wilderness opportunities. There would be no anticipated effect to subsistence uses or resources. Traditional access and subsistence use opportunities would continue to be permitted according to current regulations and policies.

In general, subsistence uses in designated Wilderness and wild river corridors would continue as they have under Minimal Management, and the Refuge's subsistence purpose would continue to be met. Pathways of potential contaminants into water supplies and subsistence foods resources by human waste accumulation or fuel caches would be mitigated by ongoing management practices and current regulations. No new impacts to subsistence activities are expected to occur. However, there will continue to be a potential for trespass on Native allotments and Native corporation lands, as well as a potential for conflict with visitors and nonlocal users at important high use subsistence use areas. With current management stipulations and increased education and outreach to all users, the overall impact to cultural and subsistence resources and subsistence activities would likely be minor, long-term, local, and positive.

Alternative C proposes that Kongakut River visitor use management issues be addressed in a Visitor Use Management and/or Wilderness Stewardship step-down plan (i.e., VUMP and/or WSP). It would also establish several new programs to protect resources in the Kongakut River valley. An interim cap would be set on commercial recreation guides running from 2013 until 2016, or when the required VUMP is completed. The Service would develop outreach materials for the public with targeted messages explaining preferred visitor practices and strategies for minimizing impacts, such as proper waste disposal, avoiding wildlife impacts, and alleviating crowding among groups. The Service would provide the public with schedules of proposed guided trip launch dates and past visitor use activity patterns. Rehabilitation of heavily impacted sites would be conducted when necessary. The Service would revise the current monitoring program of physical and social conditions to evaluate the effectiveness of management actions. Efforts would be increased to enforce compliance of special use permit conditions and existing visitor use regulations. We would work with commercial guides to encourage them to voluntarily modify their use of the river throughout the season, especially during heavy use periods (late June and mid-August). We would also work with commercial air operators to disperse commuting flight paths in and out of the Kongakut valley, subject to safe aircraft operation, inclement weather conditions, and takeoff and landing approach requirements. More proactive management of commercial and visitor use, including recreational and commercially guided hunting, would be beneficial to subsistence users and would potentially minimize conflicts and competition for subsistence related resources.

This alternative does not impose any disproportionately high or adverse human health or environmental effects on minority populations and low-income populations. This alternative would not impose any disproportional economic effects on minority or low-income populations because neither Wilderness designation nor oil and gas development of the 1002 Area are reasonably foreseeable future actions. This alternative does not include health risks and other impacts for people who rely principally on fish or wildlife for subsistence.

5.11.4 Effects of Alternative D

The general management stipulations stated in Alternative A would continue in Alternative D. This alternative would recommend Wilderness designation of the Brooks Range and Porcupine Plateau WSAs. If approved by Congress, Wilderness designation would provide further long-term protection for the lands, wildlife, and other resources on which subsistence users depend. Wilderness designation would serve to perpetuate the natural conditions in which subsistence cultures evolved. However, should the population of a subsistence species decline, Wilderness status would require a stronger justification for consideration of some management actions such as predator control. This could be viewed as a negative effect if an important subsistence wildlife population were to decline substantially; however, the effects could be mitigated according to our management emergency policy (see Chapter 2, Section 2.4.2). In recognizing the importance of Native and non-Native rural residents subsistence needs, ANILCA established a rural priority for the subsistence uses of fish and wildlife over other consumptive users in times of scarcity. These provisions are viewed favorably by subsistence users in helping to ensure continued subsistence opportunities on Federal lands.

Current methods and patterns of motorized and non-motorized access would not be affected. The use of temporary structures such as tent camps, tent frames, and fish drying racks would continue. Subsistence use of cabins would continue, although requests for construction or location of new cabins would receive greater scrutiny. Some subsistence users would view the Wilderness designation on their homeland as complementary to their cultural perspective; others would view Wilderness as a foreign concept and at variance with their traditional beliefs. The subsistence user groups most affected by the Brooks Range and Porcupine WSA designations would be the south side Gwich'in communities of Arctic Village, Venetie, Fort Yukon, and Chalkyitsik.

The Gwich'in Nation, through a resolution adopted at Arctic Village in 1988 and reaffirmed at biannual meetings ever since, continues to support Wilderness review and designation for the 1002 Area of Arctic Refuge. The resolution stresses the importance of protecting the land and traditional and customary ways of life for future generations. In 2010, the Gwich'in Steering Committee supported a wilderness review for all Refuge lands not yet designated as Wilderness. Alternative D would provide further long-term protection for a large portion of their traditional homelands in Arctic Refuge boundaries south of the Brooks Range, which would be viewed as a positive subsistence and cultural benefit. However, there would be no further protection for the Porcupine caribou herd's calving and nursery grounds on the coastal plain associated with the 1002 Area, which would be viewed as a negative effect for the Gwich'in people.

In the Brooks Range and Porcupine WSAs, there are 41 conveyed Native allotments, each 40–160 acres in size, for a total of 4,738.54 acres. The Native allotments were selected and conveyed based on their past subsistence importance. Current and foreseeable

subsistence-related use is consistent with Refuge purposes and the purposes of Wilderness. Sales to private parties could potentially result in commercial or other development that could detract from the wild character and subsistence use of the immediate area. The Refuge would continue its policy of offering to purchase inholdings when owners have decided to sell and acquisition funds are available. If acquired, the Service would manage these lands in accordance with Refuge purposes and ANILCA, including the continued opportunity for subsistence use.

Under Alternative D, 190,000 acres around Arctic Village, Old John Lake, and adjacent high use areas were found not suitable for Wilderness recommendation. This determination was made after conducting Wilderness eligibility and suitability reviews and consulting with leaders from the Native Village of Venetie Tribal Government and the Arctic Village Council. The area would be difficult to manage as Wilderness because of its proximity to an active village with supporting infrastructure such as a busy airport and the community electrical generation complex. The area also has a high concentration of private inholdings, frequent use of motorized vehicles such as motorboats and snowmachines, and includes the village's high use areas for activities such as firewood and house log cutting. These boundaries were determined in consultation with Native leaders and elders in Venetie and Arctic Village who support excluding this area from wilderness recommendations.

Alternative D recommends wild river designation for the Kongakut, Hulahula, Marsh Fork Canning, and Atigun rivers. Only those portions of the Hulahula River on Refuge lands would be recommended for designation. The Hulahula River was identified as having outstandingly remarkable cultural values. If Congress were to designate any of the recommended rivers in this alternative, a CRMP would be developed for each river, and the river plans would identify strategies to provide further protection for each river's outstandingly remarkable and other river-related values. This could result in impacts to commercial services, visitor services, cultural resources, local economies, recreational opportunities, and wilderness opportunities. There would be no anticipated effect to subsistence uses or resources. Traditional access and subsistence use opportunities would continue to be permitted according to current regulations and policies.

In general, subsistence uses in designated Wilderness and wild river corridors would continue as they have under Minimal Management, and the subsistence purpose would continue to be met. Pathways of potential contaminants into water supplies and subsistence foods resources by human waste accumulation or fuel caches would be mitigated by ongoing management practices and current regulations. No new impacts to subsistence activities are expected to occur. However, there will continue to be a potential for trespass on Native allotments and Native corporation lands, as well as a potential for conflict with visitors and nonlocal users at important high use subsistence use areas. With current management stipulations and increased education and outreach to all users, the overall impact to cultural and subsistence resources and subsistence activities would likely be minor, long-term, local, and positive.

Alternative D proposes that Kongakut River management issues be addressed through step-down planning (i.e., a VUMP and/or WSP). Among other things, the step-down plan(s) would develop long-term monitoring protocols. Until the step-down plan(s) is completed, the Service would revise the river's current monitoring program of physical and social conditions to evaluate the effectiveness of management actions. Alternative D would also establish several new interim programs to protect resources in the Kongakut River valley. The Service would

work with commercial guides to encourage them to voluntarily modify their use of the river throughout the season, especially during heavy use periods (late June and mid-August). We would also work with commercial air operators to disperse commuting flight paths in and out of the Kongakut valley, subject to safe aircraft operation, inclement weather conditions, and takeoff and landing approach requirements. The Service would develop outreach materials for the public with targeted messages explaining preferred visitor practices and strategies for minimizing impacts, such as proper waste disposal, avoiding wildlife impacts, and alleviating crowding among groups. The Service would also provide the public with schedules of proposed guided trip launch dates and past visitor use activity patterns. Rehabilitation of heavily impacted sites would be conducted when necessary, and efforts would be increased to enforce compliance of special use permit conditions and existing visitor use regulations. More proactive management of commercial and visitor use, including recreational and commercially guided hunting, would be beneficial to subsistence users and would potentially minimize conflicts and competition for subsistence related resources.

This alternative does not impose any disproportionately high or adverse human health or environmental effects on minority populations and low-income populations. This alternative does not include health risks and other impacts for people who rely principally on fish or wildlife for subsistence.

5.11.5 Effects of Alternative E

The general management stipulations stated in Alternative A would continue in Alternative E. This alternative would recommend the Brooks Range, Porcupine Plateau, and the Coastal Plain WSAs for Wilderness designation. If approved by Congress, Wilderness designation would provide further long-term protection for the lands, wildlife, and other resources on which subsistence users depend. Wilderness designation would serve to perpetuate the natural conditions in which subsistence cultures evolved. However, should the population of a subsistence species decline, Wilderness status would require a stronger justification for consideration of some management actions such as predator control. This could be viewed as a negative effect if an important subsistence wildlife population were to decline substantially; however, the effects could be mitigated according to our management emergency policy (see Chapter 2, Section 2.4.2). In recognizing the importance of Native and non-Native rural residents subsistence needs, ANILCA established a rural priority for the subsistence uses of fish and wildlife over other consumptive users in times of scarcity. These provisions are viewed favorably by subsistence users in helping to ensure continued subsistence opportunities on Federal lands.

Current methods and patterns of motorized and non-motorized access would not be affected. The use of temporary structures such as tent camps, tent frames, and fish drying racks would continue. Subsistence use of cabins would continue, although requests for construction or location of new cabins would receive greater scrutiny. Some subsistence users would view Wilderness designation on their homeland as complementary to their cultural perspective; others would view Wilderness as a foreign concept and at variance with their traditional beliefs. In general, subsistence uses in Wilderness would continue as they have under Minimal Management, and the subsistence purpose would continue to be met. The subsistence user groups most affected by this alternative would be the Iñupiat village of Kaktovik in the northern region and the Gwich'in communities of Arctic Village, Venetie, Fort Yukon, and Chalkyitsik to the south.

Including the coastal plain in the Wilderness recommendations would be viewed as having a negative effect by Iñupiat tribal leaders, ASRC, KIC, and some members of the Native community because it would impact future economic development opportunities such as oil and gas development in the 1002 Area. Gwich'in Nation representatives recommend designation of the coastal plain as Wilderness because of its importance for a variety of subsistence resources, including the calving and nursery grounds for the Porcupine caribou herd. They describe the Refuge's coastal plain as a "Sacred Place Where Life Begins."

The Gwich'in Nation, through a resolution adopted at Arctic Village in 1988 and reaffirmed at biannual meetings ever since, continues to support Wilderness review and designation for the 1002 Area of Arctic Refuge. The resolution stresses the importance of protecting the land and traditional and customary ways of life for future generations. In 2010, the Gwich'in Steering Committee supported a wilderness review for all Refuge lands not yet designated as Wilderness. This alternative would have a positive effect for the Gwich'in people, providing the most long-term protection over the greatest portion of their traditional homelands in Arctic Refuge and helping to perpetuate the natural conditions and subsistence resources so essential to the Gwich'in way of life. Iñupiat leaders, while supporting continued protection of subsistence resources and subsistence use, view Wilderness designation of the 1002 Area as being detrimental to future economic development opportunities and traditional subsistence use opportunities.

In the Brooks Range, Porcupine Plateau, and Coastal Plain WSAs, there are 69 conveyed Native allotments, each 40–160 acres in size, for a total of 6,098.09 acres. The Native allotments were selected and conveyed based on their past subsistence importance. Current and foreseeable subsistence-related use is consistent with Refuge purposes and the purposes of Wilderness. Sales to private parties could potentially result in commercial or other development that could detract from the wilderness characteristics and subsistence use of the immediate area. The Refuge would continue its policy of offering to purchase inholdings when owners have decided to sell and acquisition funds are available. If acquired, the Service would manage these lands in accordance with Refuge purposes and ANILCA, including the continued opportunity for subsistence use.

Under Alternative E, 190,000 acres around Arctic Village, Old John Lake, and adjacent high use areas, and a 30,000-acre area of lagoon waters near Kaktovik, would not be recommended for Wilderness designation. These areas were determined to be not suitable for Wilderness after conducting Wilderness eligibility and suitability reviews and consulting with leaders from the Native Village of Venetie Tribal Government and the Arctic Village Council, as well as with Native leaders and elders from the Native Village of Kaktovik Tribal Government. These areas would be difficult to manage as Wilderness because of their proximities to active villages with supporting infrastructure such airports and community electrical generation complexes. These areas also have a high a concentration of private inholdings and motorized vehicles such as motorboats and snowmachines frequently are used in these areas.

Alternative E recommends wild river designation for the Kongakut, Hulahula, Marsh Fork, and Atigun rivers. The Hulahula River was identified as having an outstandingly remarkable cultural value. If Congress were to designate any of the recommended rivers in this alternative, a CRMP would be developed for each river. The river plans would identify strategies to protect each river's outstandingly remarkable and other river-related values. This could result in impacts to commercial services, visitor services, cultural resources, local economies, recreational opportunities, and wilderness opportunities. Overall, there would be a

positive effect for further protection of the cultural outstandingly remarkable value for the Hulahula River, and traditional access and subsistence use opportunities would continue to be permitted according to current regulations and policies. However, effects on subsistence could vary as the CRMP process unfolds. If Congress were to designate the entire extent of the Hulahula River as a wild river, the Service would partner with KIC regarding river management where it flows through KIC lands. KIC and the Service could have different perceptions as to what is needed in the CRMP to protect cultural and subsistence resources on the lower extent of the river. The Service and KIC would need to work together to achieve effective protections.

In general, subsistence uses in designated Wilderness and wild river corridors would continue as they have under Minimal Management, and the subsistence purpose would continue to be met. Pathways of potential contaminants into water supplies and subsistence foods resources by human waste accumulation or fuel caches would be mitigated by ongoing management practices and current regulations. No new impacts to subsistence activities are expected to occur. However, there will continue to be a potential for trespass on Native allotments and Native corporation lands, as well as a potential for conflict with visitors and nonlocal users at important high use subsistence use areas. With current management stipulations and increased education and outreach to all users, the overall impact to cultural and subsistence resources and subsistence activities would likely be minor, long-term, local, and positive.

Alternative E proposes that Kongakut River management issues be addressed through step-down planning (i.e., a VUMP and/or WSP). Among other things, the step-down plan(s) would develop long-term monitoring protocols. Until the step-down plan(s) is completed, the Service would revise the river's current monitoring program of physical and social conditions to evaluate the effectiveness of management actions. Alternative E would also establish several new interim programs to protect resources in the Kongakut River valley. The Service would work with commercial guides to encourage them to voluntarily modify their use of the river throughout the season, especially during heavy use periods (late June and mid-August). We would also work with commercial air operators to disperse commuting flight paths in and out of the Kongakut valley, subject to safe aircraft operation, inclement weather conditions, and takeoff and landing approach requirements. The Service would develop outreach materials for the public with targeted messages explaining preferred visitor practices and strategies for minimizing impacts, such as proper waste disposal, avoiding wildlife impacts, and alleviating crowding among groups. The Service would also provide the public with schedules of proposed guided trip launch dates and past visitor use activity patterns. Rehabilitation of heavily impacted sites would be conducted when necessary, and efforts would be increased to enforce compliance of special use permit conditions and existing visitor use regulations. More proactive management of commercial and visitor use, including recreational and commercially guided hunting, would be beneficial to subsistence users and would potentially minimize conflicts and competition for subsistence related resources.

This alternative does not impose any disproportionately high or adverse human health or environmental effects on minority populations and low-income populations. This alternative would not impose any disproportional economic effects on minority or low-income populations because neither Wilderness designation nor oil and gas development of the 1002 Area are reasonably foreseeable future actions. This alternative does not include health risks and other impacts for people who rely principally on fish or wildlife for subsistence.

5.11.6 Effects of Alternative F

The general management stipulations stated in Alternative A would continue in Alternative F. No new areas would be recommended for Wilderness designation, and no new wild rivers would be recommended for designation.

Alternative F proposes that Kongakut River management issues be addressed through step-down planning (i.e., a VUMP and/or WSP). Among other things, the step-down plan(s) would develop long-term monitoring protocols. Until the step-down plan(s) is completed, the Service would revise the river's current monitoring program of physical and social conditions to evaluate the effectiveness of management actions. Alternative F would also establish several new interim programs to protect resources in the Kongakut River valley. The Service would work with commercial guides to encourage them to voluntarily modify their use of the river throughout the season, especially during heavy use periods (late June and mid-August). We would also work with commercial air operators to disperse commuting flight paths in and out of the Kongakut valley, subject to safe aircraft operation, inclement weather conditions, and takeoff and landing approach requirements. The Service would develop outreach materials for the public with targeted messages explaining preferred visitor practices and strategies for minimizing impacts, such as proper waste disposal, avoiding wildlife impacts, and alleviating crowding among groups. The Service would also provide the public with schedules of proposed guided trip launch dates and past visitor use activity patterns. Rehabilitation of heavily impacted sites would be conducted when necessary, and efforts would be increased to enforce compliance of special use permit conditions and existing visitor use regulations. More proactive management of commercial and visitor use, including recreational and commercially guided hunting, would be beneficial to subsistence users and would potentially minimize conflicts and competition for subsistence related resources.

In general, subsistence uses would continue as they have under Minimal Management, and the Refuge's subsistence purpose would continue to be met. Pathways of potential contaminants into water supplies and subsistence foods resources by human waste accumulation or fuel caches would be mitigated by ongoing management practices and current regulations. No new impacts to subsistence activities are expected to occur. However, there will continue to be a potential for trespass on Native allotments and Native corporation lands, and a potential for conflict with visitors and nonlocal users at important high use subsistence use areas. With current management stipulations and increased education and outreach to all users, overall impacts to cultural and subsistence resources and subsistence activities would likely be minor, long-term, local, and positive.

This alternative does not impose any disproportionately high or adverse human health or environmental effects on minority populations and low-income populations. This alternative does not include health risks and other impacts for people who rely principally on fish or wildlife for subsistence.

5.11.7 Conclusion

Neither current management, nor any of the actions proposed in alternatives B–F, would significantly affect subsistence resources, subsistence access, or subsistence use. These alternatives do not impose any disproportionately high or adverse human health or environmental effects on minority or low-income populations. This analysis does not include a health risk assessment for people who rely principally on subsistence resources.

5.12 Irreversible and Irretrievable Commitment of Resources

The irreversible commitment of resources means that nonrenewable resources are consumed or destroyed. Examples would be the destruction of cultural resources by management activities and mineral extraction that consumes nonrenewable minerals.

The irretrievable commitment of resources represents tradeoffs (opportunities forgone) in the use and management of natural resources. Irretrievable commitment of resources can include the expenditure of funds, loss of production, or restrictions on resource use.

None of the actions proposed in any of the alternatives would constitute an irreversible or irretrievable commitment of resources. The only resources likely to continue to be lost under any alternative are those cultural resources that are being damaged or destroyed due to natural processes, including erosion. Those actions proposed that would result in gathering more cultural resources information through working cooperatively with partners and actual surveys of areas of the Refuge subject to frequent human use (e.g., along the Kongakut River) would result in lessening of these effects through better protection of known resources and/or documenting resources before they are lost.

In Alternatives C and E, there is a recommendation for the Coastal Plain WSA to be designated as Wilderness. If this area were to be designated as Wilderness by Congress, there would be a loss of potential oil and gas production. As oil and gas development is currently not allowed by law, there would be no change in the current status of the legal opportunity to exploit the resource. Under a Wilderness designation, the oil and gas resources would remain and could be available if needed at some time in the future.

5.13 Relationship Between Local Short-term Uses and Maintenance and Enhancement of Long-term Productivity

Based on current management (Alternative A) and Alternatives B–F, the Refuge would be managed for its four ANILCA purposes and, in areas encompassed by the former Range, the original purpose of preserving unique wildlife, wilderness, and recreational values.

Alternatives B–E recommend designating progressively more Wilderness and wild rivers, ensuring long-term preservation of lands and waters in the Refuge through statutory protections. Wilderness recommendations would have no effects. Should lands or rivers be designated, there could be minor positive effects to the biophysical and human environments over the planning period of this Revised Plan.

Alternatives C and E recommend designating the Coastal Plain WSA as Wilderness. This would enhance the long-term productivity of Refuge lands for the purposes for which the Refuge was established. While designation could result in precluding future oil and gas development and its attendant impacts, it might not. Congress has the authority and legal flexibility to designate Wilderness, open the 1002 Area to oil and gas production, or do both; it depends on the action Congress takes.

5.14 Unavoidable Adverse Effects

Management actions proposed in Alternatives A–F would not result in any unavoidable adverse effects. As noted, cultural resources would continue to degrade due to natural processes and, to a much lesser extent, unintentional or intentional damage by Refuge users. Those actions proposed that would result in gathering more cultural resources information through working cooperatively with partners and actual surveys of areas of the Refuge subject to frequent human use (e.g., along the Kongakut River) would result in lessening these effects through better protection of known resources and/or documenting resources before they are lost.

Wilderness and wild river recommendations or designation would cause no unavoidable adverse effects. More proactively managing the Kongakut River would produce no unavoidable adverse effects.



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