

1. Introduction

Arctic National Wildlife Refuge (Arctic Refuge, Refuge) encompasses approximately 19.64 million acres¹ of land and water in northeastern Alaska (Map1-1) and is administered by the U.S. Fish and Wildlife Service (Service) as a unit of the National Wildlife Refuge System (Refuge System). This Comprehensive Conservation Plan (Plan, Revised Plan) is a revision of the 1988 Plan currently used to manage Arctic Refuge. The Revised Plan describes six alternatives for Refuge management and assesses the effects of implementing each of the alternatives. The Revised Plan, when finalized, will replace management direction described in the 1988 Plan (Service 1988a) and associated record of decision (Service 1988b). The Revised Plan covers all of Arctic Refuge, including the Refuge's coastal plain.

The question of oil and gas development on Arctic Refuge, particularly development of the Refuge's coastal plain (also known as the "1002 Area"), is of special interest to many groups. Neither the Service nor the Department of the Interior (DOI) has any legal authority under current law to allow oil and gas exploration, leasing, development, or production in Arctic Refuge. Section 1003 of ANILCA specifically prohibits oil and gas leasing, development, and production anywhere in the Refuge. Congressional authorization to conduct an exploration program in the 1002 Area expired when, on June 1, 1987, DOI provided Congress with a report and record of decision (ROD) on the future management of the 1002 Area of the Refuge in compliance with ANILCA 1002(h). The report and decision have remained with Congress ever since. Until Congress takes action to change the provision of ANILCA 1003 or to implement the 1987 report, the Service will not and cannot permit oil and gas leasing in the Refuge under any of the alternatives in the Plan. When Congress makes a management decision, that action will be incorporated into the Plan and implemented.

Chapter 1 provides background information on the framework used to develop this Plan, including the reason the Service revised the 1988 Plan; legal and policy guidance for Refuge management; an overview of the purposes for establishing the Refuge and the special values of Arctic Refuge; the Refuge's vision and goals; and an explanation of the planning process, including how the public is involved, what planning issues were identified by the public and Refuge staff, and how these issues are addressed in the Plan.

1.1 Purpose and Need for Action

Comprehensive conservation plans are dynamic documents requiring periodic review and updating, and much has changed since the initial Arctic Plan was completed in 1988. Revision of the Plan is also prescribed by Section 304(g) of the Alaska National Interest Lands Conservation Act of 1980 (ANILCA), as amended, which directs the Secretary of the Interior to prepare and, from time to time, revise a comprehensive conservation plan for each refuge in Alaska.

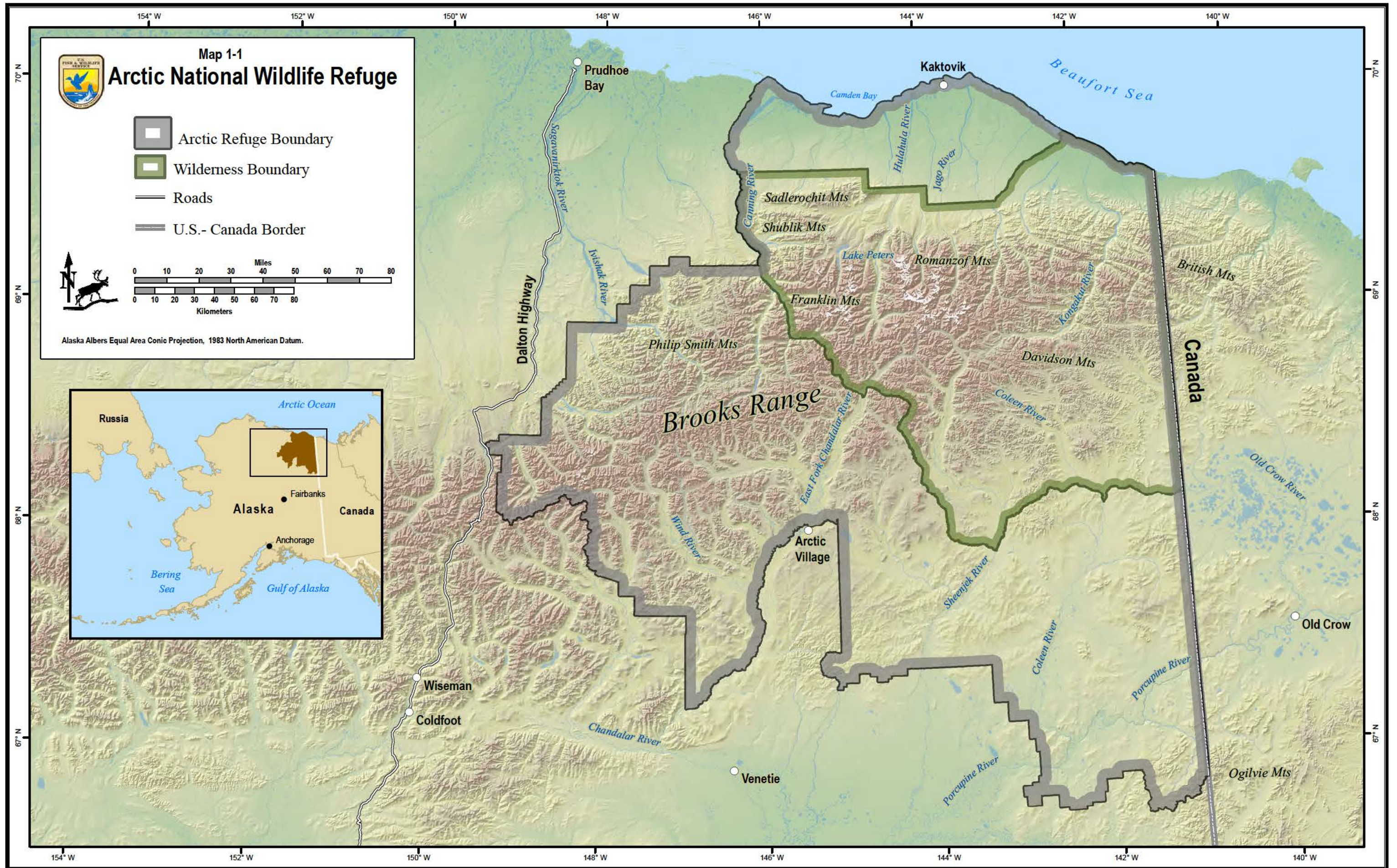
The purpose of this planning process is to develop a Revised Plan for Arctic Refuge to provide management direction for the next 15 years. The revision follows guidance found in

¹ Acreages in this Plan are derived from many sources and may not agree with previously published values, including the draft Revised Plan. For more information, please refer to "A Note about Acreages" in the front pages of this volume.

ANILCA and other Federal laws, primarily the National Wildlife Refuge System Administration Act of 1966 (Refuge Administration Act), as amended by the National Wildlife Refuge System Improvement Act of 1997, and the National Environmental Policy Act of 1969 (NEPA), as amended.

Revising the Comprehensive Conservation Plan allows the Service to do the following:

- Update management direction related to national and regional policies and guidelines used to implement Federal laws governing Refuge management
 - The National Wildlife Refuge System Improvement Act became law in 1997 and includes new requirements for Refuge management.
 - National policies put in place since 1988 provide direction for Wilderness stewardship, public use, wildlife conservation, and ecosystem management.
- Describe and maintain the resources and special values of Arctic Refuge
- Incorporate new scientific information on resources of the Refuge and surrounding areas
 - New information about fish, wildlife, and habitats is available as more has been learned about the status of wildlife populations and how these populations use the Refuge.
 - Climate change has emerged as a factor potentially affecting all aspects of the Refuge environment; while future effects are uncertain, climate change scenarios must be considered in management decisions.
 - Cumulative effects of industrial development and other uses of lands outside of Refuge boundaries could potentially affect the fish, wildlife, and habitats of the Refuge. Uses of adjacent lands and human demographics have changed since the last Plan was completed, and they must be considered when developing the new Plan.
- Evaluate current Refuge management direction based on changing public use of the Refuge and its resources
 - Public use of the Refuge has changed, contributing to cumulative impacts, potential conflicts, and concerns about the quality of people's experiences.
 - A Federal Subsistence Management Program was initiated in 1990 in cooperation with the State of Alaska (State) to ensure federally qualified subsistence users have a priority opportunity for consumptive use of fish and wildlife resources on Federal public lands.
 - The Dalton Highway was opened to the public in 1994, providing new ways to access the Refuge and changing patterns of use.
- Ensure the purposes of the Refuge and the mission of the Refuge System are being fulfilled
- Ensure opportunities are available for interested parties to participate in the development of management direction



- Provide a systematic process for making and documenting resource management decisions
- Establish broad management direction for Refuge programs and activities
- Provide continuity in Refuge management
- Establish a long-term vision for the Refuge
- Establish management goals and objectives
- Define compatible uses
- Provide additional guidance for budget requests
- Provide additional guidance for planning work and evaluating accomplishments



1.2 Planning Context

Arctic Refuge is part of a diverse system of 556 wildlife refuges stretching across the nation. The Refuge is administered to meet its purposes and to serve the broad mission of the National Wildlife Refuge System.

Vast, natural, and wild, Arctic Refuge serves a distinctive function in the Refuge System. The Refuge offers the opportunity to protect a range of tangible and intangible values in addition to the traditional fish, wildlife, and habitat values and focal species conservation found on most refuges. In making decisions affecting the future of Arctic Refuge, we remain mindful not only of the Refuge's purposes and the System's mission, but also of the need to sustain the special values that inspired the Refuge's establishment. We honor our vision that this is a place deserving respect, and we will manage it with humility and restraint.

1.2.1 The U.S. Fish and Wildlife Service

Part of the DOI, the Service is the principal Federal agency responsible for conserving, protecting, and enhancing the nation's fish, wildlife, plants, and their habitats. In addition to the Refuge System, the Service operates national fish hatcheries, fishery resource offices, and ecological services field stations. The Service enforces Federal wildlife laws, administers the Endangered Species Act, manages migratory bird populations, restores nationally important fisheries, conserves and restores wildlife habitats such as wetlands, and helps foreign governments with their conservation efforts. It oversees the Federal Aid in Wildlife Restoration Program, which distributes to State fish and wildlife agencies hundreds of millions of dollars derived from excise taxes on fishing and hunting equipment.

The mission of the U.S. Fish and Wildlife Service is:

“Working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people.”

1.2.2 The National Wildlife Refuge System

The National Wildlife Refuge System comprises approximately 150 million acres of Federal lands, encompassing 556 national wildlife refuges, six national monuments, thousands of small wetlands, and other special management areas. Refuge System lands are located in all 50 states and the territories of the United States.

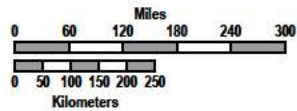
The Refuge System was created to conserve fish, wildlife, plants, and their habitats. This conservation mission provides Americans with opportunities to participate in compatible wildlife-dependent recreation, including fishing and hunting, on Refuge System lands and to better appreciate the value of and need for fish and wildlife conservation.

There are 16 national wildlife refuges in Alaska (Map 1-2). These refuge lands contain a wide range of habitats with varied terrain, including mountains, glaciers, tundra, grasslands, wetlands, lakes, woodlands, rivers, and coastlines. Together, the 16 refuges comprise 83.35 million acres of land and water, and constitute approximately 56 percent of the Refuge System.



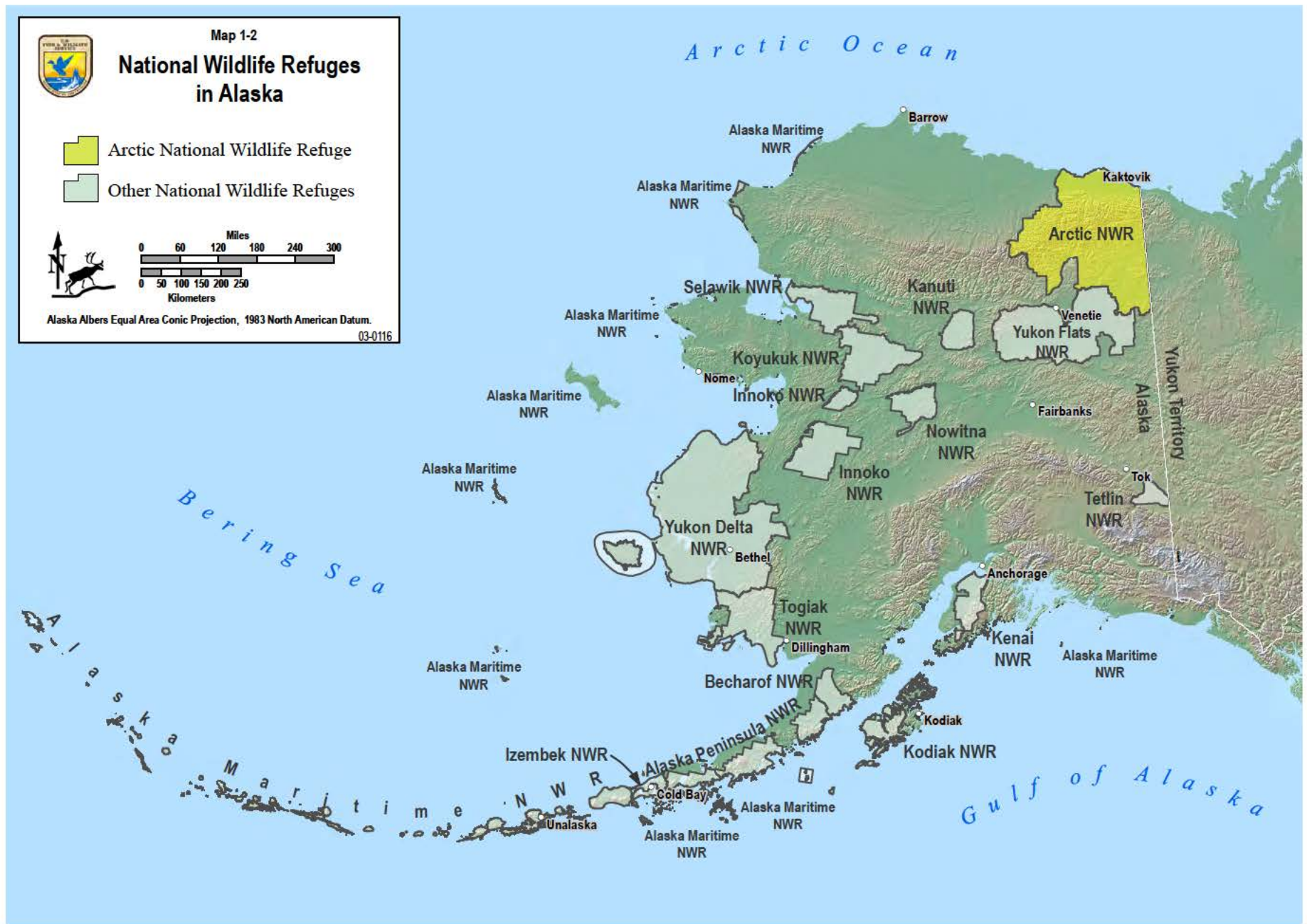
Map 1-2
**National Wildlife Refuges
in Alaska**

- Arctic National Wildlife Refuge
- Other National Wildlife Refuges



Alaska Albers Equal Area Conic Projection, 1983 North American Datum.

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The mission of the National Wildlife Refuge System is:

“To administer a national network of lands and waters for the conservation, management, and, where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.” (National Wildlife Refuge System Administration Act of 1966, as amended)

1.2.3 Principles for Managing the National Wildlife Refuge System

The Refuge Administration Act, as amended, states that each refuge shall be managed to fulfill both the purposes for which the individual refuge was established and the mission of the Refuge System. When there is a conflict between refuge purposes and the mission, the purposes of the refuge shall take priority. The act requires that any refuge use support the purposes of the refuge and not materially interfere with or detract from the purposes of the refuge or fulfillment of the mission of the System. The 1997 amendments to the Refuge Administration Act identified a number of principles to guide management of the Refuge System. They include the following:

- Conserve fish, wildlife, and plants, and their habitats within the Refuge System
- Maintain the biological integrity, diversity, and environmental health of the Refuge System
- Carry out the mission of the Refuge System and the purposes of each refuge (except that if a conflict exists, refuge purposes are protected first)
- Coordinate, interact, and cooperate with adjacent landowners and State fish and wildlife agencies
- Maintain adequate water quantity and water quality to meet refuge and Refuge System purposes and acquire necessary water rights under State law
- Maintain hunting, fishing, wildlife observation and photography, and environmental education and interpretation as the priority general public uses of the Refuge System
- Provide opportunities for compatible wildlife-dependent public uses within the Refuge System
- Provide enhanced consideration for wildlife-dependent uses over other public uses in planning and management within the Refuge System
- Provide increased opportunities for families to experience compatible wildlife-dependent recreation, particularly traditional outdoor activities such as fishing and hunting; and
- Monitor the status and trends of fish, wildlife, and plants within each refuge

To maintain the health of individual refuges and the Refuge System as a whole, managers must anticipate future conditions. Managers must endeavor to avoid adverse impacts and ensure that Refuge purposes, goals and objectives are met. Effective management also depends on acknowledging resource relationships and acknowledging that refuges are parts of larger ecosystems. Refuge managers work together with partners—including other refuges, Federal and State agencies, tribal and other governments, Native organizations, and non-governmental organizations and groups—to protect, conserve, enhance, or restore native fish, wildlife, plants, and their habitats.

1.3 Legal and Policy Context

Most refuges are created by legislation or executive action that defines the purpose for creating the unit and largely dictates how the refuge will be managed. However, management is also guided by other laws, regulations, and policies, and in the case of Alaska refuges, agreements with the State of Alaska. This section identifies the laws and the policy guidance that are integral in the development of this Plan.

1.3.1 Legal Guidance

Operation and management of refuges throughout the Refuge System are directed by a wide array of laws, treaties, and executive orders. Among the most important are the Refuge Administration Act, as amended by the National Wildlife Refuge System Improvement Act; the Refuge Recreation Act; and the Endangered Species Act. In Alaska, ANILCA provides specific direction to the management of refuges and, in some instances, supersedes provisions of the Refuge Administration Act and Refuge System Improvement Act. Brief descriptions of these and other pertinent legal documents that influence management of Arctic Refuge are included in Appendix A.

For national wildlife refuges in Alaska, the Alaska Native Claims Settlement Act of 1971 (ANCSA) and ANILCA, as amended, provide key management direction. ANILCA defined provisions for refuge planning and management, and authorized studies and programs related to wildlife and wildland resources, subsistence opportunities, and recreation and economic uses. ANILCA also provided specific direction for the management of designated Wilderness areas and wilderness study areas in the State of Alaska.

Arctic National Wildlife Range (Arctic Range, Range) was created in 1960 by Public Land Order (PLO) 2214. In 1980, ANILCA re-designated the Range as part of Arctic National Wildlife Refuge and provided four purposes that guide management of the entire Refuge (see Section 1.4 for more information on the history and purposes of the Range and the Refuge).

ANILCA also designated 7.16 million acres² of the Refuge as Wilderness. The Wilderness Act of 1964 established the National Wildlife Preservation System and prescribed policy for management of designated Wilderness areas. The purposes of the Wilderness Act are within and supplemental to the purposes of the Refuge, subject to the exceptions found in ANILCA.

The Wild and Scenic Rivers Act of 1968 established the National Wild and Scenic Rivers System and designated certain rivers as wild, scenic, or recreational. It authorized the Secretary of the Interior to study areas and submit proposals to the President and the Congress for additions to the system. This document includes a review of Refuge rivers and their potential for inclusion in the National Wild and Scenic Rivers System.

² Acreages in this Plan are derived from many sources and may not agree with previously published values, including the draft Revised Plan. For example, in 1980 ANILCA stated eight million acres of Wilderness were designated in the Refuge. However, newer technologies, such as Geographic Information Systems (GIS), estimate the size of the designated Wilderness area as 7.16 million acres. The boundaries did not change, just the estimated measurement of the area within the boundary. For more information, please refer to “A Note about Acreages” in the front pages of this volume.

1.3.2 Policy Guidance

Programmatic guidance and policy documents provide additional direction for management of national wildlife refuges. These documents include:

- U.S. Fish and Wildlife Service Manual
- Director's orders
- National policies
- Handbooks
- Director's memoranda
- Regional directives

Although it is not practical to provide information about all of these documents in this Plan, they are critical to management of the Refuge. Much of the management direction described in Chapter 2 and in other parts of this Plan is influenced by guidance from these programmatic and policy documents.

Several of these documents direct that an ecosystem approach be used in Refuge management. In other words, we must consider the health of the entire ecosystem when managing Arctic Refuge. This concept requires close coordination with other stakeholders. Appendix B describes the coordination and consultation conducted during the planning process, and Appendix C provides a brief description of the national and regional management plans and programs considered during development of this Plan.

By Refuge System policy, wilderness reviews are required elements of comprehensive conservation plans. The purpose of the wilderness review is to identify and recommend to Congress lands and waters that merit inclusion as part of the National Wilderness Preservation System. The Service is conducting a wilderness review as part of this Revised Plan (see Appendix H). Each alternative in this document includes a recommendation for new or no new Wilderness based on this evaluation and the management directions of the alternative.

1.3.3 Planning Requirements

Section 304(g) of ANILCA directs that comprehensive conservation plans be developed for each refuge. It also specifies procedures for developing these plans. The following must be identified and described prior to developing a plan for any refuge:

- The populations and habitats of the fish and wildlife resources of the refuge
- The special values of the refuge and any other archaeological, cultural, ecological, geological, historical, paleontological, scenic, or wilderness values of the refuge
- Areas in the refuge suitable for use as administrative sites or visitor facilities, or for visitor services, as provided for in ANILCA sections 1305 and 1306
- Present and potential future requirements for access with respect to the refuge, as provided for in ANILCA Title XI
- Significant problems that may adversely affect the populations and habitats of fish and wildlife

The Service uses refuge-specific comprehensive conservation plans to:

- Designate areas in the refuge according to their respective resources and values
- Specify the programs for conserving fish and wildlife and the programs related to maintaining the special values of the refuge that are proposed in each area

- Specify the uses in each area that may be compatible with the major purposes of the refuge
- Set forth those opportunities provided in the refuge for fish- and wildlife-oriented recreation, ecological research, environmental education, and interpretation of refuge resources and values, if such recreation, research, education, and interpretation is compatible with purposes of the refuge.

According to ANILCA, the National Wildlife Refuge System Improvement Act of 1997, Service planning policy (602 FW 3), and NEPA, the Service must ensure adequate and effective interagency coordination and public participation during the planning process. Interested and affected parties such as State agencies, tribal governments, Native organizations, non-governmental organizations, and local and national residents who may be affected by decisions in the Plan must be provided meaningful opportunities to present their views. Prior to adopting the Plan, the Service will publish a notice of its availability in the Federal Register, make copies available in regional offices of the Service throughout the United States, and provide opportunities for public review and comment.

1.3.4 Coordination with the State of Alaska

This Plan was developed in consultation with the Alaska Department of Fish and Game (ADFG) and the Alaska Department of Natural Resources (ADNR). The Service routinely consulted with ADFG and ADNR personnel during the planning process, and representatives from these agencies were on the planning team.

ADFG has primary responsibility for managing Alaska's resident fish and wildlife populations. On Refuge lands, the Service and ADFG share responsibility for managing fish and wildlife resources in their natural diversity and both are engaged in fish and wildlife conservation, management, and protection programs. In 1982, the Service and ADFG signed a Master Memorandum of Understanding that defines the cooperative management roles of each agency and sets the framework for cooperation between the two agencies (Appendix B). The Service and ADFG recommitted to this formal agreement in 2006.

The State of Alaska establishes fishing, hunting, and trapping regulations at the direction of the Alaska Boards of Fisheries and Game. These regulations apply to Federal public lands unless found to be inconsistent with Refuge purposes, goals, and objectives and they are superseded by Federal regulations. In consultation with the State, if the Service determines restrictions on hunting or fishing are needed, they are implemented through a rule making or through closures or restrictions under 50 CFR 36.42 or through Federal Subsistence Board regulations in 50 CFR 100.10(d)(4).

The State is divided into 26 game management units (GMUs), most of which are further divided into subunits. Management objectives are developed for game populations in each GMU. ADFG management objectives for the Refuge's big-game and fish populations are described in Chapter 4.

ADNR, a key management partner, manages all State-owned land, water, and surface and subsurface resources except fish and wildlife.³ ADNR's Division of Mining, Land, and Water

³ See Chapter 4, Section 4.1 (especially Sections 4.1.2.7 and 4.1.2.8), and Appendix E, for more information about State-owned land, water, and surface and subsurface resources within the boundaries of Arctic Refuge.

manages the State's water and land interests in the Refuge, including water rights, navigable waters, submerged lands under navigable waters, and rights-of-way over Refuge lands. The division is also responsible for developing management plans for State lands. Appendix B provides additional information about key State programs.

1.3.5 Coordination with Tribes

The United States has a unique legal and political relationship with Alaska Native tribal governments. The United States recognizes Alaska Native tribes as sovereign governments that are self-governing under Federal law. Under its “trust responsibility” to tribes, the Federal government has an obligation to protect tribal resources and uphold the rights of indigenous peoples to govern themselves on tribal lands. In recognition of this relationship, and pursuant to Executive Order 13175 (November 6, 2000), the DOI's Alaska Policy on Government-to-Government Relations (January 18, 2001), the President's Executive Memorandum on Tribal Consultation (November 5, 2009), and DOI Policy on Consultation with Indian Tribes published in 2011, the Refuge has sought to engage in regular and meaningful consultation and collaboration with tribal officials in the development of the Revised Plan. We have consulted with nine tribes having geographic or cultural ties to Arctic Refuge. For detailed information on tribal coordination conducted as part of this planning effort, see Appendix B.

1.3.6 Coordination with ANCSA Corporations

On August 10, 2012, the Secretary of the Interior supplemented the 2011 DOI Policy on Consultation with Indian Tribes with a requirement to consult with ANCSA corporations on actions or activities that may have a substantial direct effect on Alaska Native corporations, including corporation lands, waters, or resources. Please refer to Appendix B for more information on Native corporation coordination conducted as part of this planning effort.

1.3.7 Coordination with Cooperating Agencies

The Council on Environmental Quality (CEQ) regulations (40 CFR parts 1500–1508) and DOI NEPA implementing regulations (43 CFR Part 46) require lead agencies to request participation of cooperating agencies early in the NEPA process. Cooperating agencies are any Federal, State, tribal, or local government, including Native corporations, that have jurisdiction by law or special expertise, such as relevant capabilities or knowledge. Arctic Refuge is surrounded by lands and waters managed by other Federal agencies or non-Federal authorities, including State, tribal, and Canadian governments (Map 1-3). We contacted 11 of these agencies and governments to ask whether they would be interested in cooperating agency status. The National Aeronautics and Space Administration became a cooperating agency on the Revised Plan in January 2012. Appendix B provides details about cooperating agency coordination.

1.4 Arctic Refuge Establishment and Purposes

Refuge purposes provide the foundation for determining the future conditions of the Refuge, the opportunities it provides, and related administrative provisions. The Refuge's special values, vision statement, goals, and objectives are rooted in these purposes.

1.4.1 *Initial Establishment of Arctic Range and the Purposes Set Forth*

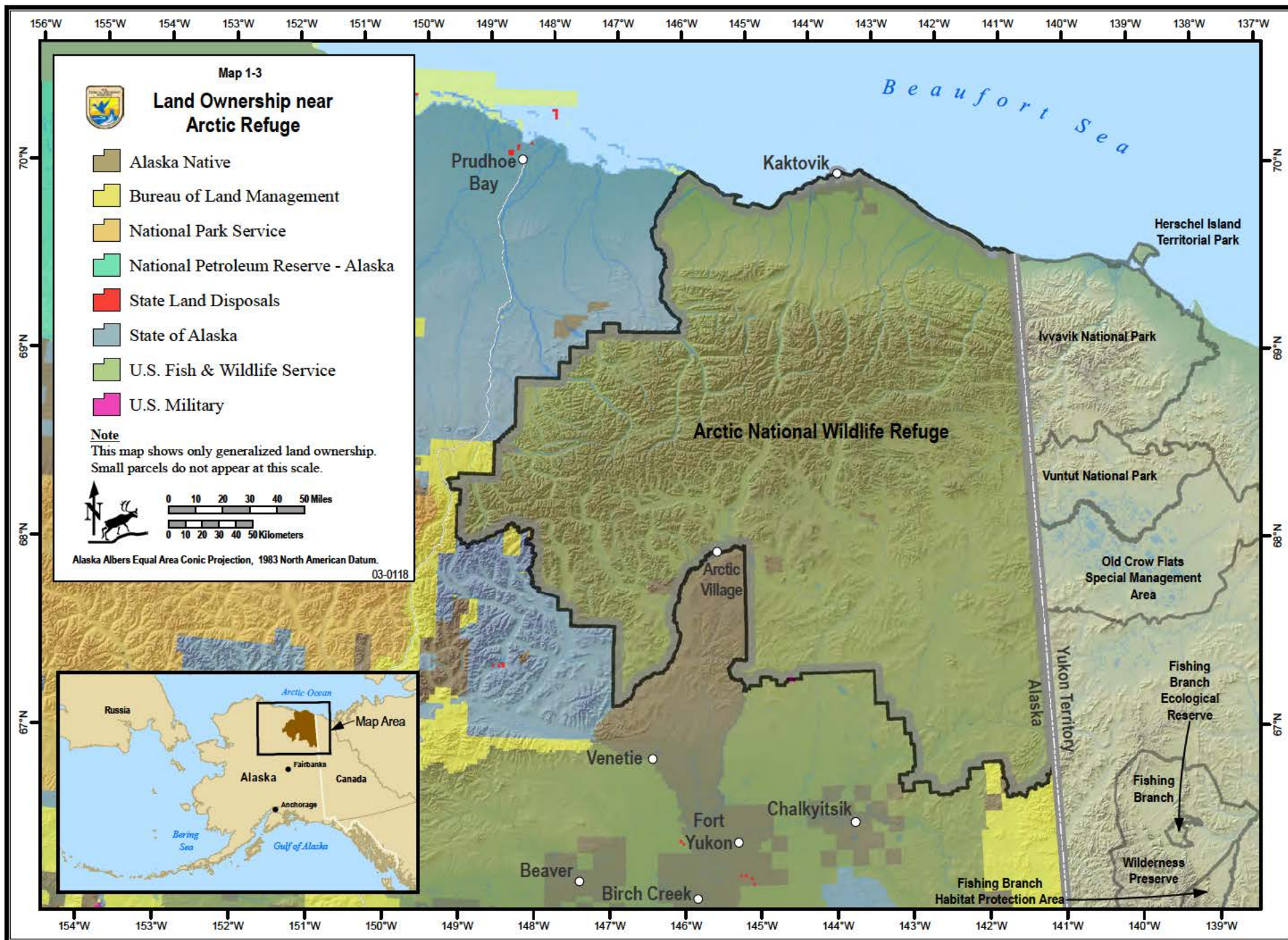
In the mid-1950s, national and Alaskan conservationists and sportsmen embarked on a long, hard-fought campaign to preserve the northeast corner of Alaska, initially referred to as “The Last Great Wilderness” (Collins and Sumner 1953). Concerned by the rapid loss of wildlands in the lower 48 states following World War II, proponents sought to establish a vast ecosystem-scale conservation unit, intended to be unprecedented not only in size, but also in the range of values and opportunities its preservation would perpetuate.

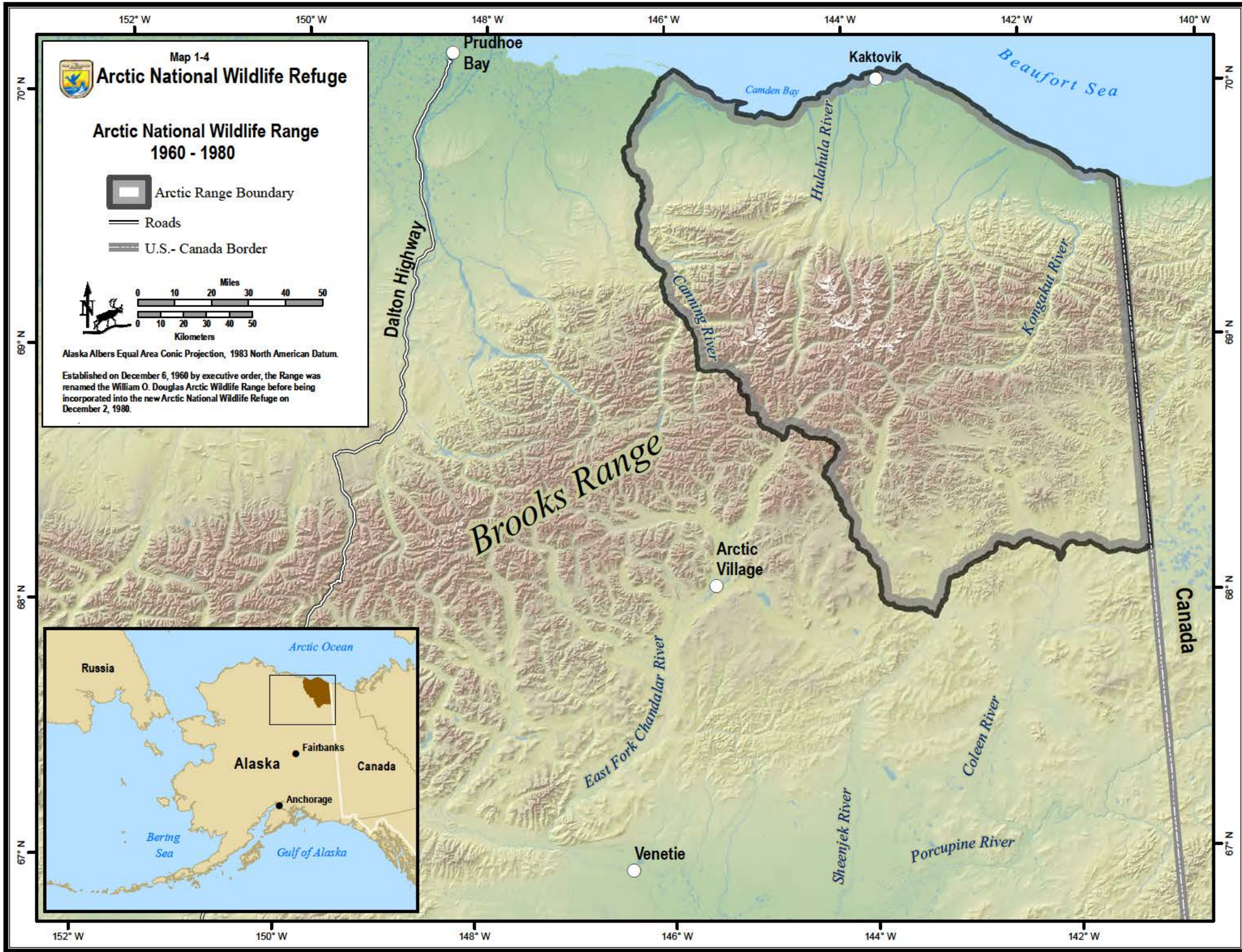
The area was initially examined by the National Park Service and proposed as an Arctic Wilderness International Park. However, Olaus and Margaret Murie of the Wilderness Society, and other leaders of the effort, decided that status as a national wildlife range, administered by the Service, would be most politically feasible and most likely to protect the area's special values and opportunities. In 1957, the Fairbanks-based Tanana Valley Sportsmen's Association petitioned DOI to establish Arctic Range. Their proposal requested perpetuation of the area's “primeval features,” “maintenance of undisturbed ecological conditions,” and “preservation of wilderness conditions” (Tanana Valley Sportsmen's Association 1959). Innumerable conservation, civic, scientific, and sportsmen's organizations joined in lobbying for the area's preservation.

Although there was widespread support for the proposal, there were many opponents as well, and the issue was hotly debated in Alaska and elsewhere. The Alaska Department of Fish and Game and Mines, the Anchorage Chamber of Commerce, and both of Alaska's senators were among those that voiced their opposition. Critics argued the proposal would hinder development of the area and limit game management options, among other concerns.

On December 6, 1960, the Eisenhower administration established the 8.83-million-acre Arctic National Wildlife Range through Public Land Order (PLO) 2214 (Map 1-4). In its brief statement of purpose, PLO 2214 proclaimed the Range was established “to preserve unique wildlife, wilderness, and recreational values.” The second clause of the PLO, while not a Range purpose, authorized the Secretary of the Interior to permit hunting and trapping in the Range.

Never before had a wildlife range or refuge been established to “preserve . . . values.” An extensive body of congressional testimony, numerous historic reports and records, and secondary source materials provide understanding of Range establishment and the three founding values (Kaye 2006). These sources provide the context for preserving these values where they still apply—to the lands and waters of the old Range (see Section 1.4.2.2). Research in the fields of biology, ecology, and wilderness and recreation management guide our development of policies, practices, and specific provisions for meeting Range purposes.





1.4.1.1 Wildlife Purpose

One purpose of the Arctic Range was to protect wildlife and its habitats. The leaders of the campaign to establish the Range intended the word “wildlife” to refer to all indigenous species and that natural behavior, interactions, and cycles would continue without human manipulation. In the words of campaign leader Olaus Murie, the intention was to maintain “the whole assemblage of living things which go to make up the rich life of that piece of country” (Murie 1958).

In the context of the emerging science of ecology, “wildlife value” emphasized the interrelatedness of all life forms and their environments, and the integrity of the underlying ecological and evolutionary processes. The area’s “great scientific value,” as characterized by plant ecologist Leslie Viereck (1959), was that it could serve “as a basis for understanding changes that take place in other areas disturbed by man.” For many, caribou became the symbol of an untrammelled landscape—a wilderness free of the human intent to alter, control, and subjugate nature for utilitarian purposes.

1.4.1.2 Wilderness Purpose

The wilderness purpose of the Range encompassed tangible and intangible values, including but not limited to preservation of the area’s natural and scenic condition and the wild character of its creatures and natural processes. The Range was to serve as a natural laboratory—a place to study how nature functions when left alone. Also inherent in the wilderness purpose was a cultural heritage value. This was to be a living legacy, a remnant of the American wilderness that helped shape our national character and identity and the sense of a “great beyond” that people feared was vanishing. The Range’s wilderness qualities were to be timeless and its benefits enduring.

There were also symbolic, less tangible existence values associated with wilderness. The Range was perceived as having value in itself and value to those who would never visit but might find satisfaction and inspiration in just knowing it existed. The Range’s wilderness purpose reflected the values and attitudes toward nature that its founders were concurrently working to place in what became the Wilderness Act of 1964. As Range proponent and Wilderness Act author Howard Zahniser (1956) wrote, “To know the wilderness is to know a profound humility, to recognize one’s littleness, to sense dependence and interdependence, indebtedness, and responsibility.” This was to be a place of humility and restraint for managers and visitors.

1.4.1.3 Recreation Purpose

The Range was intended to offer a special kind of recreation, an authentic wildlands experience of a type increasingly hard to find elsewhere. The recreation purpose provided for a range of activities, including backpacking, river floating, hunting, fishing, wildlife watching, photography, and base-camping. But it was the natural, undeveloped character of the setting that was seen to afford a unique experience. The Range’s extreme remoteness, natural condition, and wild character, unsurpassed anywhere on American soil, were to provide a degree of physical and psychological separation from the reminders of modern civilization. As Range proponent Margaret Murie (1979) wrote, “It was a world that compelled all of our interest and put everything else out of mind.”

The Range was also to be an adventuring ground, the antithesis of the commercial and convenience oriented tourism that national parks were promoting at the time. Many agreed with Olaus Murie that Americans needed areas where enjoyment was earned through effort. Here the sense of freedom, exploration, and discovery were to prevail; the opportunity to encounter challenge and experience true independence and self-reliance were to be perpetuated.

1.4.2 The Alaska National Interest Lands Conservation Act

On December 2, 1980, President Carter signed ANILCA into law, establishing new Federal conservation units across the State, enlarging several existing units, and designating Wilderness areas and wild and scenic rivers. ANILCA also provided provisions specifying how these areas were to be managed, protected, and made available for public use.

ANILCA established Arctic National Wildlife Refuge. The boundaries of the Refuge encompassed approximately 19.64 million acres and incorporated the Arctic Range⁴ into Arctic Refuge. ANILCA designated 7.16 million acres of the Refuge as Wilderness, designated three wild rivers, and established four purposes for Refuge management (see Section 1.4.2.1).

ANILCA designation offered more protection to the area than was afforded by the original Arctic Range (PLO 2214). Under ANILCA, Arctic Refuge was closed to all forms of appropriation under the public land laws, including the mineral leasing and mining laws. In addition, congressional designation as a unit of the National Wildlife Refuge System meant that any proposed changes to the Refuge's boundaries or to Refuge uses would require congressional authorization.

Section 101(b) of ANILCA summarizes the general intent of all conservation system units in Alaska by stating:

"It is the intent of Congress in this Act to preserve unrivaled scenic and geological values associated with natural landscapes; to provide for the maintenance of sound populations of, and habitat for, wildlife species of inestimable value to the citizens of Alaska and the Nation, including those species dependent on vast relatively undeveloped areas; to preserve in their natural state extensive unaltered arctic tundra, boreal forest, and coastal rainforest ecosystems; to protect the resources related to subsistence needs; to protect and preserve historic and archeological sites, rivers, and lands, and to preserve wilderness resource values and related recreational opportunities, including but not limited to hiking, canoeing, fishing, and sport hunting, within large arctic and subarctic wild lands and on free-flowing rivers; and to maintain opportunities for scientific research and undisturbed ecosystems."

⁴ On February 29, 1980, about nine months before passage of ANILCA, the Arctic National Wildlife Range was renamed the William O. Douglas Arctic Wildlife Range by Presidential Proclamation 4729.

1.4.2.1 Arctic Refuge's Purposes

Section 303(2)(B) of ANILCA set forth the following purposes for Arctic Refuge. ANILCA purposes are shown in italics.

- (i) *to conserve fish and wildlife populations and habitats in their natural diversity including, but not limited to, the Porcupine caribou herd (including participation in coordinating the Western Arctic caribou herd), polar bears, grizzly bears, muskox, Dall sheep, wolves, wolverines, snow geese, peregrine falcons and other migratory birds, and Arctic char and grayling*

Consistent with the Refuge's original intent to be inclusive of all species, ANILCA Section 102(17) clarifies, "The term 'fish and wildlife' means any member of the animal kingdom..."

- (ii) *to fulfill the international treaty obligations of the United States with respect to fish and wildlife and their habitats*

This purpose recognizes the role the Refuge plays in meeting several treaty obligations related to conservation of the fish and polar bears that inhabit both Alaska and Canada, and the migratory birds shared by many nations (See Appendices A and F).

- (iii) *to provide, in a manner consistent with the purposes set forth in subparagraphs (i) and (ii), the opportunity for continued subsistence uses by local residents*

ANILCA Title VIII provides a number of provisions to ensure that, consistent with other Refuge purposes, rural residents have the continued opportunity to use Refuge lands and resources to meet their physical, economic, traditional, and other needs (see Chapter 4, Section 4.4.4).

- (iv) *to ensure, to the maximum extent practicable and in a manner consistent with the purposes set forth in paragraph (i), water quality and necessary water quantity within the refuge*

This purpose recognizes the protection of water resources is central to conservation of fish and wildlife and their encompassing ecological systems and processes. This purpose establishes an explicit, but unquantified, Federal reserved water right for surface waters and groundwater in the Refuge.

1.4.2.2 Relationship of Range and Refuge Purposes

According to ANILCA Section 305, the 1960 establishing purposes of the Range continue to guide management of lands in the original Range "except to the extent that they are inconsistent with this Act [ANILCA] or the Alaska Native Claims Settlement Act and, in any such case, the provisions of such Acts shall prevail." In light of ANILCA Sections 101(b) and 305, we believe the Range purposes are consistent with the ANCSA, ANILCA, and the Refuge purposes set forth in ANILCA. Therefore, the Range purposes still apply to the lands and waters that were part of the original Range.

1.4.2.3 Designated Wilderness

ANILCA Section 702(3) designated 7.16 million acres, most of the original Range, as Wilderness. Section 102(13) of the act clarifies the term “wilderness” has “the same meaning as when used in the Wilderness Act.” Although ANILCA recognized the unique conditions in Alaska and provided a number of exceptions to the Wilderness Act’s provisions, the basic purposes of the Wilderness Act continue to apply. The Refuge’s designated Wilderness is to remain “an area where the earth and its community of life are untrammelled by man.” The area is to remain natural and undeveloped, “retaining its primeval character and influence,” and to provide “opportunities for solitude or a primitive and unconfined type of recreation, and be devoted to the public purposes of recreational, scenic, scientific, educational, conservation and historical use” (The Wilderness Act of 1964).

The purposes of the Wilderness Act are additional purposes of the designated Wilderness portion of the Refuge. The purposes of the Wilderness Act are to:

“Secure an enduring resource of wilderness; protect and preserve the wilderness character of areas within the National Wilderness Preservation System (NWPS); administer the NWPS for the use and enjoyment of the American people in a way that will leave these areas unimpaired for future use and enjoyment as wilderness; and gather and disseminate information regarding the use and enjoyment of wilderness areas.”

1.4.2.4 Wild Rivers

ANILCA Sections 602(39)(42)(43) and 605(a) designated those portions of the Ivishak, Sheenjek, and Wind rivers within the boundaries of the Refuge as wild rivers pursuant to the Wild and Scenic Rivers Act, as amended by ANILCA Section 606. The purposes of the Wild and Scenic Rivers Act (1968) are to ensure:

“certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations.”

1.5 Special Values of Arctic Refuge

Section 304(g)(2)(B) of ANILCA requires that prior to developing a comprehensive conservation plan, the Secretary of the Interior “shall identify and describe the special values of the refuge, as well as any other archeological, cultural, ecological, historical, paleontological, scenic, or wilderness value of the refuge.” To meet this requirement, the Service drew upon a variety of sources that reflect the range of values the Refuge holds for the American public. These sources included: documents related to the original and ANILCA Refuge purposes; comments received from the public during previous planning processes; meetings with stakeholders; a review of media accounts of the Refuge; two studies of Refuge visitors; a study examining national interest in the Refuge; and scientific reports. The following special values summarize the most prominent Refuge values that emerged from examination of these sources.

1.5.1 *Wilderness Characteristics*

Arctic Refuge exemplifies the idea of wilderness—to leave some remnants of this nation’s natural heritage intact, wild, and free of the human intent to control, alter, or manipulate the natural order. Embodying tangible and intangible values, the Refuge’s wilderness characteristics include natural conditions, natural quiet, wild character, and exceptional opportunities for solitude, adventure, and emersion in the natural world.

1.5.2 *Ecological Values*

The distinguishing ecological aspect of the Refuge—and a major reason for its establishment—is that this single protected area encompasses a wide range of arctic and subarctic ecosystems, their unaltered landforms, and native flora and fauna. The Refuge is a place of free-functioning ecological and evolutionary processes, exhibiting a high degree of biological integrity, natural diversity, and environmental health. Bordered on the east by two Canadian national parks and on the south by the Yukon Flats National Wildlife Refuge, the Refuge preserves the core of what is one of the world’s largest trans-boundary protected areas.

1.5.3 *Wildlife Values*

The Refuge’s diverse fauna includes at least 47 species of terrestrial mammals, including several high-profile and special-status species: polar and grizzly bears, wolf, wolverine, Dall’s sheep, moose, muskox, and two free-roaming caribou herds. Some species, like the Alaska marmot, occur in few other places. At least 42 species of fish inhabit waters in the Refuge. At least 201 species of birds depend upon the Refuge for at least some portion of their lifecycles, their migrations reaching remote corners of the earth. Of central importance is the ecological context in which these species occur, with their natural behavior, interactions, cycles, and ecological roles continuing.

1.5.4 Rivers

About 160 named rivers and streams, and several hundred unnamed waterways, flow through the Refuge. The large number of unmodified, free-flowing rivers is noteworthy. Three are designated as part of the National Wild and Scenic Rivers System—the Sheenjek, Wind, and Ivishak—but the Refuge ensures perpetuation of the remote, undeveloped, primeval nature of all rivers within its boundaries. Some tranquil, some tumultuous, their character is as varied as the spruce forests, ramparts, canyons, gorges, and open tundra through which they flow. They play an important role in shaping the landscape and delivering energy and elements to downstream ecosystems. Ancient travel corridors for wildlife and Native people, they also provide diverse opportunities for today's seekers of adventure, solitude, and escape.

1.5.5 Landscape Scale and Features

From its southern forests across the precipitous mountain divide to its coastal lagoons and islands along the Beaufort Sea, this unfragmented 19.64-million-acre Refuge—the size of South Carolina—spans six major physiographic zones. Its vastness encompasses wetlands and lakes, warm springs, aufeis fields, pingos, the highest peaks and largest glaciers in the Brooks Range, broad valleys, steep river canyons and ravines, waterfalls, fossil beds, caverns and sheer walls of folded and faulted rock, mesas, pinnacles, and spires. They represent the unending variety of this landscape's physical features—many dramatically scenic, others quietly sublime, many remaining nameless, and some perhaps undiscovered.

1.5.6 Scientific Values

As intended, the Refuge has become a natural laboratory of international importance. The ecological processes, natural diversity, and free function of natural communities in the Refuge provide unsurpassed opportunities for scientific understanding of wildlife, ecology, geophysics, and the changing climate. Numerous long-term investigations provide insights into the natural world, both as it functions naturally and as it responds to large-scale, human-caused influences, such as global climate change. These studies also provide a basis for evaluating and minimizing impacts in developed areas.

1.5.7 Native Culture and Subsistence

Arctic Refuge encompasses the traditional homeland of Iñupiat and Gwich'in peoples and perpetuates opportunities for their continuing traditional subsistence uses, skills, and relationships with the land. Their contemporary use sites are often shared with millennia-old archeological sites—part of the living link between the past and present. This land provides opportunities for us all to understand and respect the diversity of human history, culture, and lifeways.

1.5.8 Historic and Heritage Values

While the story of the Refuge's establishment chronicles the emergence of an ecology-based approach to landscape management and protection, it also reveals the nation's desire to perpetuate part of its cultural heritage. The Refuge represents deep-rooted American cultural values about frontiers, open spaces, and wilderness. It is one of the finest representations of the wilderness that helped shape our national character and identity and has always been part of the American psyche.

1.5.9 Recreational Values

The Refuge is renowned for the opportunities it provides for adventure, exploration, independence, and solitude. Whether visitors come to hunt, view, or photograph wildlife, for the challenge of an arduous backpacking trek or river float, or just to enjoy the area's stark beauty from the comfort of a base camp, they can find themselves immersed in a world apart, free from the distractions of modern civilization. The Refuge remains a place where a sense of adventure, mystery, and discovery still prevails.

1.5.10 Hunting Values

Hunters played a critical role in establishing the original Range, advocating a place for the adventurous pursuit of game "in the tradition of the highest form of the sport" (Murie 1956). This setting rewards those seeking to challenge themselves under primitive conditions. The Refuge's remote expanses can test a hunter's skill, fortitude, and self-reliance. It perpetuates opportunities for a kind of adventurous hunting experience that is becoming increasingly rare.

1.5.11 A Symbolic Value

Since the first efforts to establish a "Last Great Wilderness," most people who value this landscape have been less interested in how it can be used than in what its continued preservation represents. Millions who will never set foot in the Refuge find satisfaction, inspiration, and even hope in just knowing it exists. The Refuge represents the hope of a past generation that one of the finest remnants of our natural inheritance will be passed on, undiminished, to future generations. For many people, the question of the Refuge's future has now come to symbolize daunting questions the nation faces regarding energy policy, sustainability, and our effect upon the larger biosphere we jointly inhabit.

1.6 Arctic Refuge Vision and Goals

1.6.1 Refuge Vision Statement

Arctic Refuge staff developed the following statement about their vision for the Refuge's future, drawing upon its purposes, special values, and the unique role it serves in the Refuge System:

This untamed arctic landscape continues to sustain the ecological diversity and special values that inspired the Refuge's establishment. Natural processes continue and traditional cultures thrive with the seasons and changing times; physical and mental challenges test our bodies, minds, and spirit; and we honor the land, the wildlife and the native people with respect and restraint. Through responsible stewardship, this vast wilderness is passed on, undiminished, to future generations.



1.6.2 Refuge Goals

Goals are descriptive, open-ended, and often broad statements of desire for a refuge's future. They convey a purpose but do not define measurable units. Goals for Arctic Refuge are directed towards carrying out the Refuge's mandates and achieving its purposes. Goals are derived from the Refuge's purposes, special values, vision statement, and various other laws, policies, and guidance. Refuge management must work toward meeting all these goals:

- Goal 1:** Ecological processes continue to shape the Refuge, and to the greatest degree possible, these processes remain free of the intent to alter the natural order, including the dynamics of fish and wildlife populations and their relationships with natural habitats.
- Goal 2:** The Refuge preserves its wilderness values and characteristics, maintains its natural state in unaltered condition, and designated Wilderness is managed consistent with the intent of the Wilderness Act and ANILCA.
- Goal 3:** The ecological functions and natural flow regimes of the Refuge's aquatic ecosystems, including headwater streams, rivers, springs, wetlands, lakes, and lagoons, are documented and protected, and designated Wild Rivers and the Marine Protected Area are managed in a manner consistent with their special designations.
- Goal 4:** The Refuge, in consultation with appropriate parties, addresses concerns about proposed actions that may substantially or directly affect subsistence or cultural resources, rural subsistence or cultural uses, or the rights of tribes.

- Goal 5:** The Refuge provides a range of opportunities for wildlife-dependent and wilderness-associated recreational activities that emphasize adventure, independence, self-reliance, exploration, and solitude or primitive and unconfined recreation while protecting the Refuge's natural conditions and special values.
- Goal 6:** The effects of climate change on Refuge resources are evaluated through research, monitoring, and local traditional knowledge, and these effects are considered in Refuge management decisions.
- Goal 7:** Refuge staff and partners conduct research and monitoring in support of the Refuge's role as an internationally recognized benchmark for naturally functioning arctic and subarctic ecosystems.
- Goal 8:** In consultation with appropriate parties, the Refuge documents, conserves, and protects cultural resources, both historic and prehistoric, to allow visitors and community members to appreciate the interconnectedness of the people of the region and their environment.
- Goal 9:** Refuge staff provides outreach information to distant audiences, individuals who enter the Refuge, and people in gateway communities, to enhance their understanding, appreciation, and stewardship of Refuge lands and resources.

1.7 The Planning Process

This section describes the process used to develop this Revised Plan and environmental impact statement (EIS). The process is consistent with the planning requirements specified in Section 304(g) of ANILCA; the Refuge System Administration Act, as amended by the National Wildlife Refuge System Improvement Act; the Service's planning policy (602 FW 1 and 3); the National Environmental Policy Act (42 U.S.C. 4321-4347); and the Council on Environmental Quality's Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR 1500-1508). The Service used an eight-step planning process to revise the Plan for Arctic Refuge (Figure 1-1):

- 1) Design the planning process (preplanning)
- 2) Initiate public involvement and scoping
- 3) Identify significant issues
- 4) Develop and analyze alternatives
- 5) Prepare draft Plan
- 6) Prepare a final EIS and adopt the Revised Plan
- 7) Implement, monitor, and evaluate the Plan
- 8) Review and revise the Plan as necessary



Figure 1-1. The Planning process

1.7.1 Design the Process

During the fall of 2009, the Service began reviewing the 1988 Arctic Refuge Plan to determine how it should be revised. The Service found that, in most cases, on-the-ground management actions were meeting Refuge purposes. However, some management direction needed to be updated. New laws, such as the Refuge System Improvement Act, new regulations and policies, and other changes, such as Federal management of subsistence harvests of fish and wildlife on Alaska refuges, needed to be included in the Plan.

The Service identified all relevant laws, regulations, policies, and other direction that would be considered during revision of the Plan. These are discussed in the legal and policy context sections earlier in this chapter (Section 1.3), and additional detail can be found in Appendix A. The Service formed a planning team to review the available data on Refuge resources and human uses; the team also identified areas that would require additional work.

1.7.2 Initiate Public Involvement and Scoping

This step informed people that the Plan revision process was beginning and that the Service was soliciting ideas on what issues should be addressed in the Revised Plan. Formal scoping began with publication of the Notice of Intent to revise the Arctic Refuge Comprehensive Conservation Plan and prepare an EIS, which was published in the Federal Register on April 7, 2010 (75 FR 17763).



In April 2010, a planning update announcing the Plan revision and seeking comments was mailed to more than 2,000 individuals; local businesses; local, State and Federal agencies; and organizations nationwide. The planning update contained information about the Refuge, the planning process, and some preliminary issues identified by Refuge staff. The mailing included a comment form so the public could make suggestions or identify other issues or concerns that should be addressed during the revision of the Plan.

An Arctic Refuge planning website was developed during fall 2009 to keep the public informed about planning efforts, involvement opportunities, and decisions. The website was periodically updated with key documents and information about the Plan, including a link to the Notice of Intent, press releases, the April 2010 planning update, and all posters and materials developed for public meetings. The intent was to provide the same information to internet users as to those people attending meetings or receiving mailings. Through the website, the public could request inclusion on the Plan mailing list or submit an electronic version of the April comment form.

Eight public open house meetings were held—five in communities adjacent to or within the boundaries of Arctic Refuge; one in Washington, DC; one in Anchorage; and one in Fairbanks (Table 1-1).

Table 1-1. Location, dates, and attendance of scoping meetings

Community	Meeting Date	Attendance
Fort Yukon	April 20, 2010	59
Arctic Village	April 26, 2010	32
Venetie	April 29, 2010	56
Washington, DC	May 4, 2010	44
Anchorage	May 11, 2010	149
Fairbanks	May 13, 2010	168
Kaktovik	May 20, 2010	26
Barrow	June 4, 2010	12

Attendance at these meetings ranged from 12 to 168 individuals. A total of 94,061 individuals and organizations provided written and oral comments during the scoping process. An independent contractor reviewed, coded, and analyzed the responses over a three-month period during the summer of 2010. Appendix J summarizes the scoping comments.

1.7.3 Identify Significant Issues

The planning team reviewed the issues raised by the public, Refuge staff, other Service divisions and Federal agencies, tribal governments, and the State to identify the significant planning issues to be addressed in the Revised Plan. Significant issues are those the Refuge can control and may be handled differently in each of the alternatives. Sections 1.8 and 1.9 further describe planning issues. Chapter 3 describes the identified significant planning issues in detail.

1.7.4 Develop and Analyze Alternatives

After the significant planning issues were identified in August 2010, the planning team met and developed a set of six draft alternatives that would meet the Refuge's purposes and goals and comply with the Service and Refuge System missions. In April 2011, a planning update was sent to interested individuals and to State, Federal, and local government agencies in the affected area summarizing the draft alternatives and announcing the Plan's availability for public review and comment. Chapter 3 describes the six alternatives, and Chapter 5 provides an analysis of the potential environmental, social, and economic impacts of each alternative.

1.7.5 Prepare Draft Plan and Environmental Impact Statement

The draft EIS described six alternatives (including a "No Action" alternative) for managing Arctic Refuge during the next 15 years or until the next Plan revision. It included an analysis of the potential impacts of implementing each alternative and a description of management actions common to all alternatives. The Service provided a 90-day public review and comment period on the draft Plan and EIS. During the public review period, the Service hosted public meetings and formal public hearings, as outlined in Table 1-2.

Three types of public meetings were held, and the type held in a given community is identified in Table 1-2. The definitions for each meeting type are:

- Open House = posters on display, PowerPoint presentation played on loop, and Service staff available to answer questions.
- Community Meeting = posters on display, PowerPoint presentation given at meeting, and public question and answer session between Service staff and attendees, during which comments were captured on flip chart paper.
- Public Hearing = formal testimony recorded and transcribed.

In Arctic Village, Fort Yukon, Kaktovik, and Venetie, posters were set up, and Service staff was available to answer questions informally before the public was given the opportunity to provide recorded testimony. A translator was available in Arctic Village, Fort Yukon, Kaktovik, and Venetie.

At each meeting, copies of the draft EIS and the separately bound "Planning Update Number 3: Summary of Draft CCP, June 2011," were made available for the public to review and take home. At all meetings, written communications were accepted. Additionally, writing materials were provided at each meeting for attendees to use to submit communications on site.

1.7.6 Prepare and Adopt a Revised Plan

The planning team reviewed and analyzed all public comments received on the draft Revised Plan and EIS. The draft was modified as needed to develop the Revised Plan and final EIS. Following a 30-day public review of the Revised Plan, the regional director will issue a record of decision (ROD) that describes the alternative that will be implemented and the rationale the regional director used to make the decision. The Service will publish a Notice of Availability in the Federal Register and distribute the Revised Plan and ROD to interested parties.

Table 1-2. Meeting locations, date, types, and attendance for the draft Plan and EIS

Location	Type/Date/Time	Number of Non-Speakers ¹	Number of Speakers ²	Total Attendees
Anchorage				
US Fish and Wildlife Service Regional Office	Open House: 9/20/2011	39	n/a	39
Wilda Marston Theatre	Public Hearing: 9/21/2011	75	71	146
Fairbanks				
Pioneer Park Civic Center	Open House: 8/24/2011	51	n/a	51
Carlson Center	Public Hearing: 10/19/2011	59	102	161
Arctic Village				
Community Hall	Community Meeting ³ : 10/4/2011	67	n/a	67
Community Hall	Public Hearing: 11/14/2011	6	4	10
Fort Yukon				
Tribal Hall	Community Meeting & Public Hearing ³ : 10/28/2011	23	11	34
Kaktovik				
City Hall	Community Meeting ³ : 10/25/2011	22	n/a	22
City Hall	Public Hearing: 11/3/2011	24	6	30
Venetie				
Community Hall	Community Meeting: 9/1/2011	20	n/a	20
Community Hall	Public Hearing: 11/15/2011	1	3	4
Totals		387	197	584

¹ This represents the number of people who signed in at the welcome table but did not speak. This number may be underestimated because not everybody signed in.

² The number of speakers was collected only for meetings where a court reporter transcribed proceedings (Public Hearings).

³ These dates represent rescheduled dates.

1.7.7 Implement, Monitor, and Evaluate Plan

After distributing the ROD and Revised Plan, Refuge staff will begin implementing any management changes called for in the Plan (Chapter 6). Monitoring—measuring resource and social conditions to ensure progress is being made toward meeting Refuge purposes, goals, and objectives—is a critical component of management. Monitoring helps determine if management actions are effectively meeting the objectives. The Refuge will use an adaptive management approach in which information gained from monitoring will be used to evaluate and, as needed, modify Refuge management actions.

1.7.8 Review and Revise Plan

Service policy directs Arctic Refuge staff to review the Revised Plan yearly to assess any need for change in management direction. The Refuge will revise the Plan when important new information becomes available, when ecological conditions change, or when the need for revision is identified during a review. If major changes are proposed, public meetings may be held, and a new environmental analysis may be needed. The Service will consult with appropriate State agencies, Native governments, and others during future revisions. Full review and revision of the Plan is scheduled to occur every 15 years, or more often, if deemed necessary. Arctic Refuge staff will continue to inform and involve the public through the appropriate means, mainly on the Refuge website and through community meetings, mailings, and email alerts.



1.8 Planning Issues

The Service defines an “issue” as any unsettled matter that requires a management decision, such as an initiative, opportunity, resource management problem, threat to a Refuge resource, conflict in use, public concern, or presence of an undesirable resource condition. In December 2009, Refuge staff began identifying issues. The public identified additional issues at open houses and hearings; through comment forms distributed with the first planning update and available on the Refuge’s website; and through visits with local residents and community leaders. By August 2010, 37 issues had been identified for consideration during revision of the Plan. These are identified in Appendix D, Table D-1.

Some of the 37 identified issues have been, or could be, addressed through existing laws, regulations, or policies. Others were best addressed in the Refuge’s goals and objectives (see Chapter 2) and/or through step-down planning (see Chapter 6). Other issues were determined to be outside the scope of the Plan (see Chapter 3, Section 3.1.2). Those issues that remained were considered significant. Significant issues are: (1) issues in our jurisdiction to address, (2) issues for which we can suggest different actions or alternatives, and/or (3) issues that will influence the ROD. These issues were addressed through the development of the alternatives, presented in Chapter 3. The Refuge’s role in identifying and analyzing significant issues was to consider objectively a wide range of approaches that could be taken to address each issue.

1.9 Significant Planning Issues

Three planning issues were identified for consideration during revision of the Arctic Plan. The Revised Plan provides Arctic Refuge the opportunity to address the planning issues in a variety of ways (alternatives). They are:

1. Should one or more areas of the Refuge be recommended for Wilderness designation?
2. Should additional wild and scenic rivers be recommended for inclusion in the National Wild and Scenic Rivers System?
3. How will the Refuge manage Kongakut River visitor use to protect resources and visitor experience?

These issues are discussed in detail in Chapter 3. The environmental analysis presented in Chapter 5 discusses the effects to the significant planning issues of implementing each alternative.

1.10 Concerns Affecting Fish, Wildlife and Habitats

Section 304(g)(2)(E) of ANILCA directs the Service to identify and describe in comprehensive conservation plans the significant problems that may adversely affect fish and wildlife populations and habitats. This section highlights concerns identified by the public and by Refuge staff regarding fish, wildlife, and habitats on Arctic Refuge. This write-up refers the reader to other sections of the Revised Plan where they can find more detailed descriptions of the concerns.

1.10.1 Climate Change

Scientific evidence confirms the earth is undergoing a change in climate. Climate analyses suggest that warming in the 20th century was greater than warming during any other century in the past 1,000 years, and the 1990s were likely the warmest decade in 1,000 years (Mann et al. 1999, Folland et al. 2001). The arctic climate has warmed rapidly during the past 50 years, with annual average temperatures increasing nearly twice as fast as the rest of the world (Arctic Climate Impact Assessment 2005). Warming in Alaska rose sharply beginning in 1977, concurrent with large scale arctic atmosphere and ocean regime shifts (Parson et al. 2000). The greatest warming has occurred during winter and spring.

The documented and projected changes in northern Alaska as a result of a warming climate affect nearly every aspect of the environment. Evidence to date suggests the Refuge will experience less predictable weather, thawing permafrost, increased thermokarst events, increased coastal erosion, more groundwater flow, earlier break-up and delayed freeze-up, increased water temperature and alkalinity of lakes, decline in soil moisture, earlier snowmelt, increased shrub cover, longer growing season, diminishing sea ice, and advancing tree line (Hinzman et al. 2005). Climate change research predicts Alaska's northern region will experience a decline in wetlands, increased fire frequency and intensity, shifts in the distribution and composition of plant communities, change in the ranges and breeding behavior of wildlife species, increased likelihood for the establishment of invasive species, and the increased possibility of wildlife disease and insect outbreaks (Karl et al. 2009). These changes may affect fish, wildlife, and habitats through increased mortality, increased sediment in rivers, changes in water chemistry and river flow, a longer open water season, changes in aquatic ecology, changes in vegetation, increased insect activity, and increased nesting periods and range extensions for birds. Changes in habitat and wildlife due to climate warming will, in turn, affect arctic and subarctic people who rely on natural resources for food, transportation, and cultural identity (Arctic Climate Impact Assessment 2005).

The arctic system, as we currently know it, could be very different in the future. Whether and how plants and animals might adapt to and survive these changes is difficult to predict for most species. According to the Refuge's management policies and guidelines, the Refuge will generally adopt a non-intervention approach to climate change (Chapter 2, Section 2.4.10.1). Refuge staff will allow natural systems to adapt and evolve, and we will accept that some species may be replaced by others more suited to the changing climate. Goal 6 and its associated objectives (see Chapter 2, Section 2.1.6) commit Refuge staff to monitor biological components vulnerable to climate change, evaluate the effects of climate change on resources in the Refuge, collaborate with others on studying climate change effects, consider climate change and non-climate stressors when making management decisions, and avoid actions that resist the effects of climate change.

For more on climate change, please refer to Chapter 4. Section 4.2.3.1 describes observed temperature and precipitation trends in Arctic Refuge, and Section 4.2.3.2 discusses current projections for future climate in the Refuge. Section 4.2.6.1 identifies observed and projected permafrost trends. A discussion of the impacts of climate change was added to each of the following topic areas: water resources (Section 4.2.9), vegetation (Sections 4.3.3 and 4.3.4), fish (Section 4.3.5.4), birds (Section 4.3.6.11), and mammals (scattered across the various species descriptions in Section 4.3.7).

1.10.2 Non-native, Invasive, and Pest Species

Invasive species are non-native species that, when introduced, have the potential to cause substantial amounts of harm to the environment, human health, or economic well-being. Pests are those organisms (vertebrates, invertebrates, plants, and microorganisms and their vectors) that are detrimental to fish, wildlife, human health, or fish and wildlife habitats. Pests also include noxious weeds and other organisms, which are classified as pests by law (Administrative Manual 30 AM 12).

Non-native and invasive plant and animal species have been reported and documented in Alaska (Hébert 2001, McClory and Gotthardt 2008). Most invasive plants occur in and adjacent to major population centers in the southeast, southcentral, and interior regions of the State or are distributed along the ferry, road, and railway systems (AKEPIC 2011). Non-native plants are currently uncommon on the North Slope (McKendrick 2000), and Arctic Refuge has few documented non-native plants (see Chapter 4, Section 4.3.3.5).

Invasive species and pests have the potential to adversely affect wildlife populations and habitats and cause harm to threatened or endangered species, natural diversity, or subsistence resources, and the Service is concerned that invasive species or pests could become established on the Refuge. The effects of accelerating climate change could result in pests or non-native mammal, birds, or insects expanding their ranges into the Refuge as vegetation, temperature, and precipitation change. Future development of natural resources or transportation and utility corridors in northern and northeastern Alaska could increase risk of invasion by non-native species because many invasive plants tend to colonize disturbed sites. Visitors to the Refuge might inadvertently introduce or spread pests or invasive plant species or animals to Refuge lands via their clothing, footwear, recreational gear, and other equipment or materials.

In Chapter 2, Section 2.4.12.8, the Plan explains how the Service would manage Arctic Refuge in the case of non-native, invasive, or pest species. To reduce the potential introduction or spread of invasive plants in Arctic Refuge, pelletized weed-free feed is the only allowable food for pack animals, and straw and hay is prohibited as bedding for dogs. The Refuge will include weed inventories as part of all habitat inventories, and if invasive plants are detected, control measures will be considered. Should a non-native species become established on the Refuge, or a species that occurs naturally in areas adjacent to the Refuge moves into the Refuge as a result of climate change, that species could be managed as part of the Refuge environment provided it does not materially interfere with nor detract from fulfilling the mission of the Refuge System or the purposes of Arctic Refuge. In general, however, the presence of non-native species on Arctic Refuge is not consistent with Refuge purposes or with Refuge System policies.

1.10.3 Diseases

Certain disease organisms, viruses, or vectors of disease (e.g., rabies or parasites) may threaten human health or the health and survival of native wildlife or plant species. Disease may already have played a role in the decline of some animal populations on Arctic Refuge. Disease or copper deficiency, exacerbated by long winters and short growing seasons, are factors that may have caused the decline of moose populations along the Canning River (Lenart 2008). Diseases and parasites may be affecting rates of successful production and adult survival in muskoxen (K. Beckmen, veterinarian, ADFG, pers. comm.)

Climate change could result in intensified disease effects. Stress caused by temperature-induced drought could make trees and shrubs more susceptible to disease and pathogens. Warming water temperatures could increase the incidence of disease and parasites in fish (Reist et al. 2006). Dall's sheep in Arctic Refuge could become vulnerable to an increased incidence of existing or novel diseases and parasites. Warmer and longer summers could increase the incidence of diseases such as lungworm, which would negatively affect muskox populations (Kutz et al. 2004).

In an effort to control disease in Arctic Refuge, the Service will implement domestic animal restrictions. Domestic sheep, goats, and camelids (e.g., llamas and alpacas) will be prohibited on the Refuge to prevent the transmission of disease, especially to Dall's sheep. Regulations will be promulgated by the Refuge for non-commercial uses of these domestic animals (see Chapter 2, Section 2.4.12.9).



1.10.4 Wildlife Harvest and Predator Control

The State of Alaska currently conducts predator control in some parts of Alaska to increase populations of certain species for human harvest (e.g., moose) or to achieve population management targets. Game Management Unit (GMU) 26B contains both State-owned land and a portion of Arctic Refuge. The Alaska Board of Game authorized intensive management of brown bear in GMU 26B, with the exception of Refuge lands, in an attempt to lessen predatory pressure on the GMU's muskox population. Because bears may wander widely, this action may impact wildlife populations on Arctic Refuge, and serves as an example of how intensive management could run contrary to the goals, objectives, management policies, and guidelines for Arctic Refuge.

On Arctic Refuge, all native species are considered integral and interdependent members of a natural community of life. According to the Refuge's management policies and guidelines (see Chapter 2, Section 2.4.12.7), Refuge management will strive to enable the natural behavior, interactions, and population dynamics of all species to continue. Except in emergencies, the Refuge will not employ or allow any management technique intended to interfere with natural wildlife dynamics by reducing the abundance of some species to increase the abundance of others. Separate refuge compatibility determinations addressing specific proposals will be required for State management activities that propose predator management, fish and wildlife control (with the exception of emergency removal of animals posing an immediate threat to human health and safety), or any other un-permitted activity that could alter ecosystems on the Refuge (Chapter 2, Section 2.4.9.1).

In the last two decades, caribou, sheep, muskoxen, and moose populations have fluctuated in Arctic Refuge, with some showing prolonged periods of decline (see Chapter 4, Section 4.3.7.4). Dall's sheep, which are valued for subsistence, general hunting and viewing on Arctic Refuge, is at the northern extent of its range and is vulnerable to overharvest. Similarly, moose is another species upon which local subsistence hunters are heavily reliant, and moose populations could be overharvested if there is insufficient data for managers to make well-informed decisions. Understanding the full range of factors that drive ungulate populations is essential for understanding and predicting population trends, and for managing subsistence and other harvests. It will also be necessary to develop an improved understanding of local predator-prey relationships that impact ungulate populations, and to this end, monitoring of grizzly bears and wolves will be necessary. Additionally, the assessment of the effects of hunting on the demographics and genetics of wildlife populations are inconsistent in the scientific literature, and Refuge staff believes additional and more definitive studies need to be done. Monitoring species status and trends is a priority for the Refuge, and specific work investigating potential causes of population declines and other population-level changes will be appropriately described through the Refuge's Inventory and Monitoring step-down plan, which will include a Research Plan (see Chapter 2, Section 2.1.1, and Chapter 6, Section 6.3.3).

The Refuge staff continues to participate in cooperative studies with ADFG, the Yukon Territory government, and others to ensure that species will be conserved now and into the future.

1.10.5 Land Development Adjacent to the Refuge

Private, State-owned, and federally-managed lands near and adjacent to Arctic Refuge have the potential to be developed for minerals, energy, transportation, infrastructure, and recreational access. Interest in energy and resource development remains particularly high in northern and northeastern Alaska, including in the 1002 Area of the Refuge.

Potential concerns for fish, wildlife, and habitats from land and resource development projects include fuel spills, contaminants, noise, dust, and loss or fragmentation of habitat from road building and support facilities. Such developments could degrade water quality; reduce instream flows; alter water tables; increase pressure on fishery and wildlife resources; displace animals from nesting, birthing, and rearing sites; disrupt migration patterns; and/or increase conflicts between users and with local subsistence activities.

Information on projects and plans in the vicinity of the Refuge are included in Appendix C. Coordinated planning efforts among agencies, lease-holders, and private landowners is critically necessary to help address regional impacts and mitigate the potential effects to fish, wildlife, and habitats in Arctic Refuge.

1.10.6 Effects of Visitor Access and Activities

Arctic Refuge is renowned as a premiere wilderness that provides unsurpassed opportunities for adventure, exploration, independence, and solitude. The Refuge is also internationally recognized as a place for the study of naturally functioning arctic and subarctic ecosystems. The Refuge's reputation attracts people from around the world. While visitation is relatively low compared to some other refuges and federally-managed lands in Alaska (i.e., those with road access), habitats such as wetlands and tundra are particularly sensitive to disturbance given the Refuge's high-latitude location and corresponding short growing season. Additionally, wildlife species such as Dall's sheep that are at the northern extent of their range may be especially sensitive to disturbances and small changes to habitat conditions.

Refuge visitors have the potential to damage fish and wildlife habitats, particularly at campsites and access points such as landing areas (see Chapter 5). Damage can include destruction of soil structure, removal of the uppermost organic layers of soil, soil erosion, melting of permafrost, and ground subsidence due to melting of buried ice and permafrost. Water quality and aquatic habitats can be affected by increased runoff and sediment loading at heavily used sites. Visitors can trample vegetation, break trees and shrubs, and potentially introduce invasive plants. Most disturbances to vegetation and soils are site-specific and restricted to areas receiving repeated use, such as airplane landing areas, hunting camps near fixed-wing aircraft-accessible sites, and campsites used by floaters. Visitors may also displace and disturb wildlife, especially those with young, and exclude animals from travel corridors such as riparian areas and adjacent habitats. Hunting, trapping, and other consumptive uses could affect the demographics and genetics of wildlife populations, although more definitive studies need to be done.

The Refuge is committed to addressing impacts from visitors and other Refuge users, and the goals and objectives in the Revised Plan outline several programs (see Chapter 2, Section 2.1). Refuge management programs will protect and maintain the biological integrity, diversity, and environmental health of the Refuge. Data on abundance, distribution, and population trends for the fish, wildlife, and plants of the Refuge will provide baseline knowledge of Refuge resources and help guide adaptive management for the conservation of natural

diversity. Sites that have been degraded or impaired will be restored, and a variety of monitoring programs, such as for water quality and quantity, will be implemented. In addition, the Refuge's visitor management and biological programs will coordinate on future step-down plans, including the Visitor Use Management Plan. The Refuge's management policies and guidelines provide direction for fish, wildlife, habitat, and ecosystem management as well as management of visitor use and access (Chapter 2, Section 2.4).

1.10.7 Coastal Resource Management

Coastal areas of Arctic Refuge provide key habitats to a range of fish and wildlife species. Many of these species are associated with cultural or subsistence values and are sensitive to environmental change. Chapter 4, Sections 4.2.1.7 and 4.2.9.3 provide detailed descriptions of the Refuge's coastal areas. The Refuge's coastal lagoons are generally shallow and are wholly or partially sheltered by barrier islands. However, substantial increases in air temperature and storm frequency, combined with decreases in summer sea ice in recent decades, have increased erosion along the southern Beaufort Sea coastline (Wendler et al. 2010).

In 2009, all marine waters located within the Refuge's boundaries were designated as part of the National Marine Protected Area System. There are no special conditions for managing the Refuge's Marine Protected Area (MPA), but designation provides the Service with an opportunity to study and better understand the ecological quality and function of the Refuge's coastal areas (see Chapter 2, Section 2.1.3). The MPA may be affected by loss of sea ice, changes in freshwater input, increased rates of coastal erosion or accretion, increased shipping activity, offshore development, oil spills, and introduction of invasive species associated with marine shipping. We know relatively little about near shore marine ecosystems of the Refuge and their relationships with terrestrial ecosystems.

It is important to the Service to sustain healthy coastal habitats, particularly given the potential influence of future off-Refuge development. Species that depend on healthy nearshore marine systems include shorebirds, waterfowl, marine and anadromous fishes, and polar bears. Lagoons and large river deltas are particularly biologically important. Refuge staff will conduct inventory and monitoring activities that support management of the MPA to protect and enhance its natural heritage. We will work with others to ensure adequate spill response capabilities; develop proactive measures for limiting introduction of invasive species; investigate relationships between terrestrial, coastal, and marine environments; and develop environmental education and outreach programs that focus on the Refuge's marine ecosystem.

1.10.8 Polar Bear Viewing

In the past eight years, polar bear viewing activity on Refuge lands and private lands within the boundaries of Arctic Refuge has been increasing. In the fall, polar bears are attracted to the remains of bowhead whales harvested by residents of Kaktovik, and this provides opportunities for visitors and residents to see these large carnivores. Commercial interests and enterprises have started catering to members of the public who want to see polar bears in the wild.

The Service's Marine Mammals Management division and Arctic Refuge staff cooperate to monitor the fall influx of bears near Kaktovik and assist the community in developing guidelines for polar bear viewing. To minimize potential disturbance to polar bears, the Service has intensified public education and outreach about polar bear safety. The cooperative

management program is designed to achieve conservation goals for the species, reduce human-bear conflicts, and educate the community and visitors about human-bear safety. Managers at Arctic Refuge share concerns about potential future developments for polar bear viewing in the region that could include the use of tour ships, helicopters, and other methods used in other parts of the circumpolar north where polar bear viewing occurs. More information is included in Chapter 4, Section 4.3.7 (Polar bears) and Section 4.4.5.10.

1.10.9 International Treaty Obligations

ANILCA requires the Refuge to fulfill international treaty obligations of the United States with respect to fish, wildlife, and their habitats. As part of a larger network of conservation authorities in the U.S., Canada, and the circumpolar north, the Refuge plays an important role in meeting treaty and agreement obligations related to conservation of the fish, wildlife, marine mammals, and migratory birds shared by many nations. Among these are migratory bird treaties with Canada, Mexico, Japan, and Russia, and the Convention on Nature Protection and Wildlife Conservation in the Western Hemisphere. The Agreement on the Conservation of Polar Bears is an agreement between the governments of Canada, Denmark, Norway, the former USSR, and the United States. In 1987, the U.S. and Canadian governments signed an agreement concerning the conservation of the Porcupine caribou herd, and in 2002, these nations signed the Yukon River Salmon Agreement. Please refer to Appendix A, Section A.1.1 for more information about these treaties and agreements.

The Service and Refuge staff work directly with groups such as the Porcupine Caribou Management Board, International Porcupine Caribou Board, Vuntut and Ivavik National Parks, Old Crow Management Area, Arctic Borderlands Ecological Knowledge Cooperative, Northwest Territories Department of Environment and Natural Resources, Environment Yukon, the Canadian Wildlife Service, and Conservation of Arctic Flora and Fauna to address international concerns regarding fish, wildlife, and habitats. The Refuge is committed to continuing this work and to collaborating with land management units, resource management agencies, and conservation organizations on mutual fish and wildlife resource issues, fish and wildlife resource inventory and monitoring efforts, and climate change documentation (see Chapter 2, Section 2.1.7).

