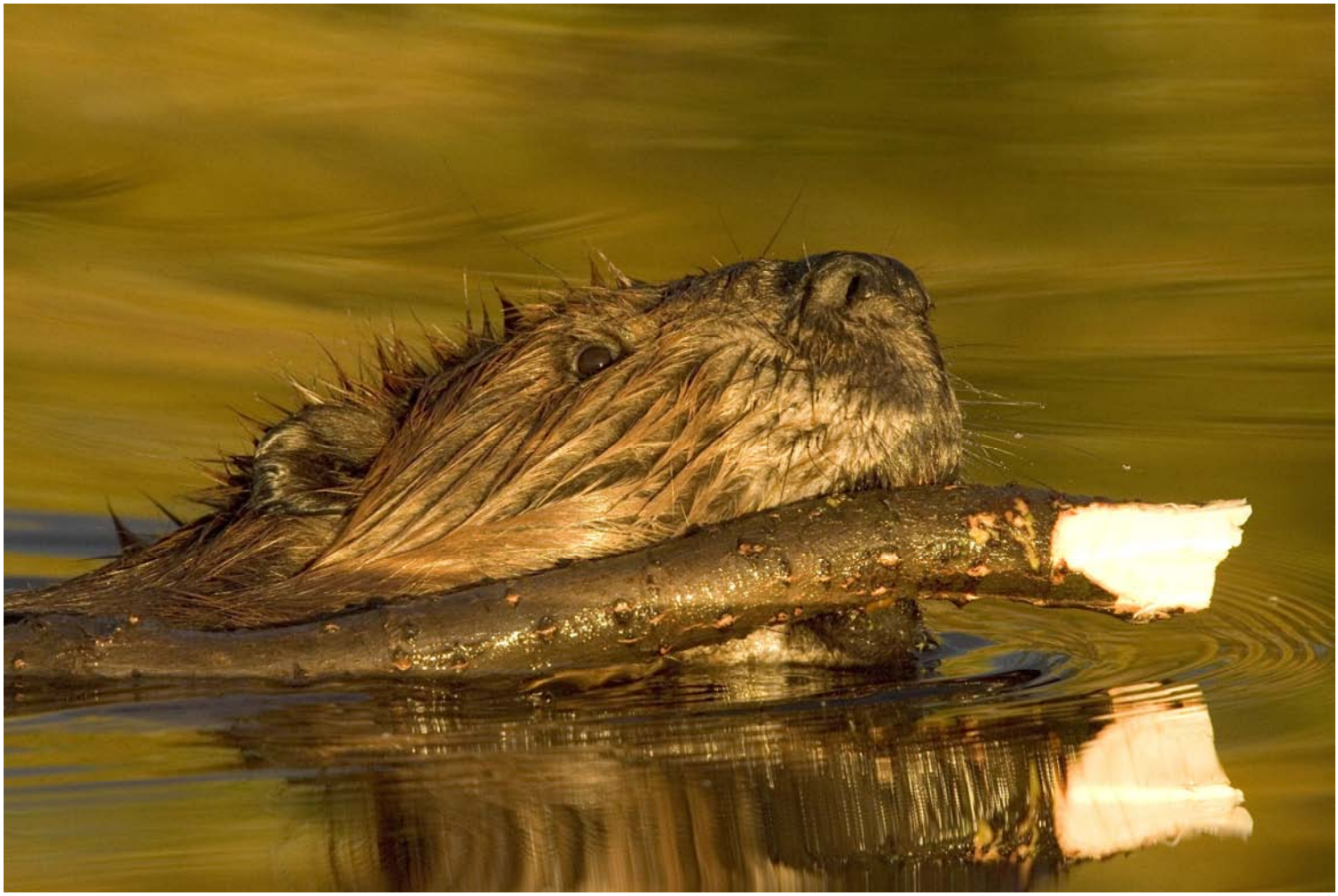
U.S. Fish & Wildlife Service

Revised Comprehensive Conservation Plan

Kanuti National Wildlife Refuge



September 2008

U.S. Fish and Wildlife Service Mission Statement

The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people.

Refuge Mission Statement

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 Improvement Act of 1997

The comprehensive conservation plan details program planning levels that are substantially greater than current budget allocations and, as such, is for strategic planning and program prioritization purposes only. This plan does not constitute a commitment for staffing increases or funding for future refuge-specific land acquisitions, construction projects, or operational and maintenance increases.

Revised
Comprehensive Conservation Plan

for the

Kanuti National Wildlife Refuge

September 2008

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Dear Reader:

This Revised Comprehensive Conservation Plan (plan) for Kanuti National Wildlife Refuge will guide management of the Refuge for the next 15 years. This plan provides a vision, goals, and objectives for future management of the refuge. It addresses the issues raised during public scoping and comments received during public review of the draft plan. Based upon comments received our management will be based on a modified Alternative C (Preferred Alternative) from the draft.

Comments received during public review of the draft plan and our responses to them are included in this document in Appendix N. The environmental assessment and draft plan are on file with our offices in Fairbanks and Anchorage.

Draft compatibility determinations for Kanuti National Wildlife Refuge were included in the draft revised comprehensive conservation plan and comments were accepted as part of the review of that plan. Our responses to comments on those draft compatibility determinations are also addressed in Appendix N. A discussion of compatibility determinations can be found in Appendix J, section 2.4. More information on the compatibility process and the complete text of each compatibility determination can be found at the refuge office or at http://alaska.fws.gov/nwr/planning/completed.htm.

You may obtain a copy of the final plan, a summary, or a compact disk containing both at the offices listed below. You may also view the plan online at: http://alaska.fws.gov/nwr/planning/plans.htm.

Requests for copies of the plan, CD-ROMs, or further information should be directed to:

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Thank you for your interest

Kanuti National Wildlife Refuge

Revised Comprehensive Conservation Plan



"Kk'oonootne" ***is the Koyukon Athabascan name that led to an early mapmaker assigning "Kanuti" to the Refuge's namesake river. Kk'oonootne means "well-traveled river by both man and animals." Another possible meaning is "fish roe river." The Kanuti River has also been called "Old Man River." Native place names and their meanings in Kanuti Refuge and the areas around the villages of Allakaket and Alatna were gathered by Koyukuk River resident and elder Eliza Jones in the late 1980's and early 1990. Eliza Jones worked closely with then Refuge Information Technician Johnson B. Moses, an Allakaket elder with extensive local knowledge of Refuge resources. Place names used in this plan were based on their report (Jones and Arundale 1997). The translations of animal and plant names come from the Koyukon Athabascan language dictionary (Jetté and Jones, 2000). (Photo B. Raften, USFWS)***

Acknowledgements

We would like to thank the numerous people who helped with this document but were not listed as official preparers. Many were involved in editing specific sections or reading and commenting on the entire plan. Without their efforts, this plan would be a far inferior document.

Bill Diel, Bureau of Land Management

Michael Whalen, University of Alaska Fairbanks

Eliza Jones, Koyukon linguist

The tribes of Allakaket, Alatna, and Evansville

Glenn Stout, Galena Management Area Biologist, Alaska Department of Fish & Game

Members of the public, agencies, and non-governmental organizations who attended scoping meetings and provided comments

And finally, all the Fish and Wildlife Service Employees, too numerous to thank individually and ranging geographically from Alaska to Washington, D.C., who provided comments and text.

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Acronyms and Abbreviations

AD	after date (anno Domini)
ADF&G	Alaska Department of Fish and Game
ADOT	Alaska Department of Transportation and Public Facilities
AEIS	Alaska Economic Information System
AFS	Alaska Fire Service
AIVC	Arctic Interagency Visitor Center
Alaska DCED	Alaska Department of Community and Economic Development
Alaska RAPIDS	Alaska Division of Community Advocacy, Rural Alaska Project Identification and Delivery System
ALMS	Alaska Landbird Monitoring Survey
ANCSA	Alaska Native Claims Settlement Act
ANHA	Alaska Natural History Association
ANILCA	Alaska National Interest Lands Conservation Act of 1980
AP&T	Alaska Power and Telephone Company
BBS	Breeding Bird Survey
BCR	Bird Conservation Region
BLM	Bureau of Land Management
Boreal PRISM	Boreal Program for Regional and International Shorebird Monitoring
CCP	Comprehensive Conservation Plan
CFR	Code of Federal Regulations
cfs	cubic feet per second
CI	confidence interval
Dalton Highway	aka Trans-Alaska Pipeline Haul Road north of Livengood
DEC	Alaska Department of Environmental Conservation
DNR	Alaska Department of Natural Resources
EA	Environmental Assessment
EE&I	Environmental Education and Interpretation
e.g.	exemplia gratia – for example
Et al.	et alia – and others
Etc.	et cetera – and others, especially of the same kind
et seq	et sequens – and the following one
F	Fahrenheit
FONSI	Finding of No Significant Impact
Fig.	figure
FMO	fire management officer
FMP	Kanuti Fisheries Management Plan
FSB	Federal Subsistence Board
ft.	foot/feet (per context)
FW	Fish and Wildlife Service Manual

FY	fiscal year
GAAR	Gates of the Arctic National Park and Preserve
GMU	Game Management Unit
HMP	Habitat Management Plan
I&M	Inventory and Monitoring
i.e.	id est – that is
in.	inch(es)
Inc.	Incorporated
IRA	Federal Indian Reorganization Act
JFOP	joint facility operation plan
KCUA	Kanuti Controlled Use Area
km	kilometer
KRMMP	Koyukuk River Moose Management Plan
Ltd.	Limited Liability Corporation
m	meter
m^2	square meter
max.	maximum
min.	minimum
n	number
n = 2	number of samples equals 2
NABCI	North American Bird Conservation Initiative
NAWBPS	North American Waterfowl Breeding Pair Survey
NEPA	National Environmental Policy Act of 1969
No.	Number
NPS	National Park Service
NRCS	Natural Resource Conservation Service
NW	northwest, reference NW Alaska white-front population
NWR	National Wildlife Refuge
ORV	off-road vehicle
OSM	Office of Subsistence Management, U.S. Fish & Wildlife Service
pers. comm.	personal communication
pgs.	Pages
Plan	Kanuti National Wildlife Refuge Comprehensive Conservation Plan
PUMP	Public Use Management Plan
R7	U.S. Fish & Wildlife Service Region 7 Office

RAC	Federal Subsistence Regional Advisory Council
Refuge	Kanuti National Wildlife Refuge (also Kanuti Refuge)
Refuge System Administration Act	National Wildlife Refuge System Administration Act of 1966 (also in places as Refuge Administration Act)
Refuge System Improvement Act	National Wildlife Refuge System Improvement Act of 1997 (also in places as Refuge Improvement Act)
RONS	Refuge Operational Needs System
RS-2477	Revised Statute 2477 (codified as U.S.C. 932); refers to potential established rights-of-way for construction of highways over public lands not reserved for public use
RV	recreational vehicle
Service/USFWS/FWS	U.S. Fish and Wildlife Service
stat	statute
System	National Wildlife Refuge System (also seen as Refuge System)
T.A.P.S.	Trans Alaska Pipeline System
TCC	Tanana Chiefs Conference, Inc
UAF	University of Alaska-Fairbanks
U.S.	United States
U.S.C.	United States Code
USDA	United States Department of Agriculture
USGS	U.S. Geological Survey
Vol.	Volume
VOR	Very-high-frequency Omni-directional Range (aviation term)
WH	Wildlife and Habitat; from Fulfilling the Promise, Recommendation WH1
White-fronts	Greater White-fronted Geese
WIP	wildlife inventory plan

1. Introduction

This document revises the 1987 Kanuti National Wildlife Refuge Final Comprehensive Conservation Plan (Plan), Environmental Impact Statement, and Wilderness Review (USFWS 1987b) and the associated Record of Decision.

The U.S. Fish and Wildlife Service (Service) administers approximately 1.3 million acres as the Kanuti National Wildlife Refuge (Kanuti Refuge, refuge). This chapter provides background information that establishes the framework used to develop this plan, including the purpose of and need for the Plan; an overview of the refuge, including historical perspective and refuge establishment; purposes, vision, and goals of the refuge; the environmental setting; the legal context of refuge management; and the planning process, including the identification of significant planning issues addressed in the plan.



Figure 1-1: Refuge location within Alaska

1.1 Purpose and Need for Action

This is a revision of the refuge's 1987 Comprehensive Conservation Plan. Comprehensive Conservation Plans provide broad policy guidance and establish management direction for a refuge. They define long-term goals and objectives toward which refuge management activities are directed and identify which uses may be compatible with the purposes of the refuge and mission of the National Wildlife Refuge System (System). Comprehensive Conservation Plans are dynamic documents, requiring periodic review and updating.

Federal statutes, specifically Section 304 (g) of the Alaska National Interest Lands Conservation Act of 1980 (ANILCA) as amended, directs the Secretary of the Interior to prepare, and from time to time revise, a "…comprehensive conservation plan…for each refuge (in Alaska)…"

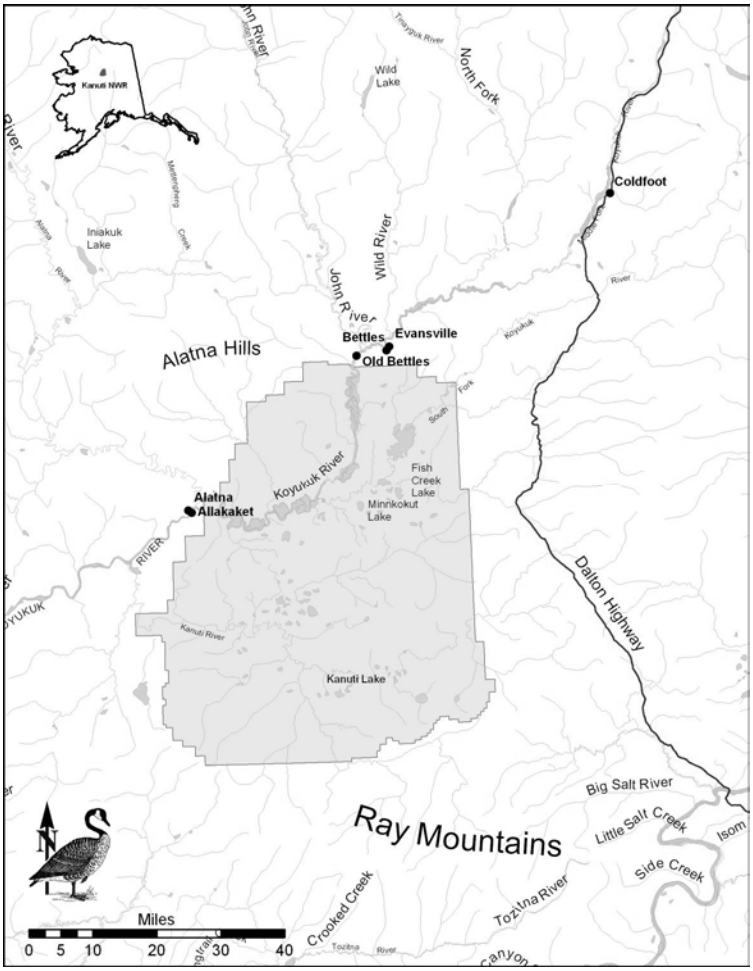


Figure 1-2: Refuge location within region

The Service revised this Comprehensive Conservation Plan for the Kanuti National Wildlife Refuge to provide direction for management of the refuge for the next 15 years. This revision follows guidance found in ANILCA and other Federal laws—primarily the National Wildlife Refuge System Administration Act of 1966 (Refuge System Administration Act), as amended by the National Wildlife Refuge System Improvement Act of 1997 (Refuge System Improvement Act); and the National Environmental Policy Act of 1969 (NEPA) as amended. Revising the Comprehensive Conservation Plan allows the Service to:

- Update management direction related to national and regional policies and guidelines implementing Federal laws governing refuge management;
- Incorporate new scientific information on refuge resources; and
- Reevaluate current refuge management direction based on changing public demands for use of the refuge and its resources, including public use management direction.

In addition to the preceding requirements, a comprehensive conservation plan serves to:

- Ensure that the purposes of the refuge and the mission of the System are fulfilled

- Ensure that national policy is incorporated into management of the refuge
- Ensure that all interested parties have an opportunity to participate in the development of management direction
- Provide a systematic process for making and documenting decisions about refuge resources
- Establish broad management direction for refuge programs and activities
- Provide continuity in refuge management
- Provide a basis for budget requests
- Provide a basis for evaluating accomplishments

1.2 Planning Context

The Kanuti National Wildlife Refuge is part of a national system of more than 545 refuges. The Service places an emphasis on managing individual refuges in a manner that reflects national priorities of the National Wildlife Refuge System and the purposes for which the refuge was established. As a result, the revised Plan must contribute to meeting the mission and goals of the entire System while adhering to the purposes of the individual refuge.

1.2.1 The U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service is the principal Federal agency responsible for conserving, protecting, and enhancing fish, wildlife, plants, and their habitats. In addition to the National Wildlife Refuge System, the Service also 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 significant fisheries, conserves and restores wildlife habitat 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 & Wildlife Service is:

> *working with others to conserve, protect, and enhance fish, wildlife, 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 more than 96 million acres of Federal lands, encompassing more than 545 national wildlife refuges, thousands of small wetlands, and other special management areas. System lands are located in all 50 states and the territories of the United States. The System was created to conserve fish, wildlife, plants, and their habitats. This conservation mission includes providing Americans with opportunities to participate in compatible wildlife-dependent recreation on System lands, including fishing and hunting, and to better appreciate the value of and need for fish and wildlife conservation.

Alaska contains 16 national wildlife refuges. These refuge lands contain a wide range of habitats with varied terrain, including mountains, glaciers, tundra, grasslands, wetlands, lakes, woodlands, and rivers. Together, the 16 refuges comprise 76.8 million acres and constitute about 80 percent of the National Wildlife Refuge System.

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, as amended).*



Figure 1-3: Wetlands along the Kanuti River

These wetlands contain a diverse assortment of wildlife and fish habitats. Many waterbodies are connected to the river system at high water levels; others are more isolated boggy lakes. Intervening uplands are a mixture of open shrublands or forest in various stages of succession. (Photo S. Hillebrand, USFWS)

1.3 Refuge Establishment

Interest in conserving large areas of Alaska began in the 1930s when explorer Dr. Robert Marshall proposed that most of northern Alaska be set aside as a wilderness preserve. In the late 1960s, it became apparent that much of the public lands in Alaska would likely be transferred to Alaska Natives or the State of Alaska, or would otherwise be made available for development. An urgency to settle Native land claims was prompted by a national energy crisis, the Arab oil embargo, and an industry-sponsored proposal to construct a Trans-Alaska Oil pipeline. Conservationists recognized that these events would begin to divide Alaska's lands and its intact and pristine ecosystems.

In 1971, the Alaska Native Claims Settlement Act (ANCSA) was passed to settle Alaska Native land claims. Section 17(d)(2) of ANCSA required that the Secretaries of Interior and Agriculture propose to Congress the designation of national parks, refuges, forests, wilderness, and wild and

scenic rivers in Alaska. Official agency proposals and final environmental impact statements were completed in 1974, and congressional debate ensued. On December 2, 1980, President Jimmy Carter signed into law the Alaska National Interest Lands Conservation Act (ANILCA). Section 302 of this act established the Kanuti National Wildlife Refuge as part of the National Wildlife Refuge System (Nash 1982, Nelson 2004, Scott 2004, Kaye 2006).

The overarching purposes of ANILCA (ANILCA section 101) are to: "preserve unrivaled scenic and geological values associated with natural landscapes…Maintenance of sound populations of wildlife…Dependent on vast relatively undeveloped areas; to preserve in their natural state extensive unaltered arctic tundra, boreal forest and coastal rainforest ecosystems…To preserve wilderness resource values and related recreational opportunities…Within large arctic and subarctic wildlands and on free-flowing rivers and to maintain opportunities for scientific research and undisturbed ecosystems."

1.4 Refuge Purposes, Vision, and Goals

Mission statements of the Service and system along with refuge purposes, vision statements, and goals lay the foundations upon which plans are developed.

1.4.1 Refuge Purposes

Section 302(4)(B) of ANILCA sets forth the following major purposes for which Kanuti Refuge was established and shall be managed:

i. To conserve fish and wildlife populations and habitats in their natural diversity, including but not limited to white-fronted geese and other waterfowl and migratory birds, moose, caribou (including participation in coordinated ecological studies and management of the Western Arctic caribou herd), and furbearers

ii. To fulfill the international treaty obligations of the United States with respect to fish and wildlife and their habitats

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

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

1.4.2 Refuge Vision

For the benefit of present and future generations and in partnership with others, stewards of Kanuti National Wildlife Refuge will conserve fish and wildlife populations and their habitats in their natural diversity, focusing on the refuge's wild and natural character, biological integrity, and scientific value, as driven by biological and physical processes throughout time.

1.4.3 Refuge Goals

These goals, associated objectives, and rationales are presented in detail in chapter 2, section 2.4.10.

Goal 1:

Conserve the refuge's diversity of wildlife, fish, and habitats, while allowing natural processes, including wildland fire and the natural hydrologic cycle, to shape the environment.

Goal 2:

Ensure the natural function and condition of water resources necessary to conserve fish and wildlife populations and habitats in their natural diversity.

Goal 3:

Provide opportunities for local residents to pursue their subsistence lifestyle.

Goal 4:

Provide opportunities for quality public use and enjoyment of refuge resources through compatible wildlife dependent recreation activities, including hunting, fishing, wildlife observation, photography, and environmental education and interpretation.

Goal 5:

Provide outreach, environmental education, and interpretive programs to develop and/or increase a sense of stewardship for wildlife, cultural resources, and the environment, and to enhance visitor experiences on the refuge.

Goal 6:

Foster an appreciation for the cultural resources of the refuge through conservation and interpretation.

1.5 Refuge Overview

1.5.1 Physical Environment

The refuge is roadless and lies on the Arctic Circle between the Brooks Range and the Ray Mountains in a broad basin formed by the Koyukuk and Kanuti rivers. It extends from 65 degrees 59 minutes to 66 degrees 53 minutes north latitude, and from 150 degrees 58 minutes to 152 degrees 58 minutes west longitude. The lands and waters within the refuge are linked to the Bering Sea through the Koyukuk River, which drains into the Yukon River and then into the Bering Sea.

The Dalton Highway and Alyeska pipeline lie within eight miles of the eastern boundary. The refuge's external boundaries encompass approximately 1.6 million acres (an area larger than the State of Delaware) of Federal, State, and private lands. The landscape consists primarily of rolling hills, wetlands, ponds, and streams. Elevations range from 500 feet to over 3,000 feet.

The area has a continental climate and receives slightly more precipitation than other areas in interior Alaska. Summers are short with moderate temperatures; winters are long and cold. Temperatures span some of the widest extremes on earth, ranging from over 90 degrees

Fahrenheit in summer to 70 degrees below zero Fahrenheit in winter. Spring and fall are brief seasons that begin and end abruptly.

1.5.2 Biological Resources

The refuge lies within the boreal forest zone. This zone circles the earth at high latitudes and, in North America, lies between the Arctic Ocean and southern Canada. The boreal forest includes vegetation communities of spruce, taiga, and muskeg. These grow in a mosaic, or mixture, of diverse plant communities which are affected primarily by fire, ice, and flooding. Predominant plant communities include closed forests of white spruce and paper birch on the uplands, and white spruce and cottonwood along the rivers. Poorly drained areas generally support open black spruce forests with sphagnum moss, sedge, and grass growing below the trees. Muskeg covers much of the lower elevation valleys. As areas become wetter, muskeg transitions into bogs dominated by small shrubs. Tall shrub thickets occur along water courses and on some upland sites.

The refuge provides habitats for wildlife, including some 133 species of birds, 37 species of mammals, and 17 species of fish. Nesting birds such as white-fronted geese, Arctic terns, and Swainson's thrushes migrate from the refuge to wintering areas throughout the world. Chum and Chinook salmon travel upstream over 1,000 miles from the sea to spawn within the refuge.

1.5.3 Human Uses

The vast majority of public use occurring within the refuge is by local people from the four nearby communities. Many of these people depend for their livelihood on the natural resources in the area. Visitation from outside the local area is minimal.

The refuge lies within the traditional hunting and fishing areas for the once-nomadic Koyukon Athabascans and Nunamiut Eskimos who still depend on its resources for subsistence.



Figure 1-4: The Kanuti Canyon
The Kanuti Canyon (Kk'oonootne Tlaalooł Yeet, which means "in the throat of rocks or canyon") has cliffs rising up to 400 feet. During summer low water, only canoes, rafts, or small jet-drive outboard boats can pass; during high water, the currents can be swift. South-facing sides of the canyon are warm and dry in summer and contain plant and bird communities not found elsewhere on the refuge. (Photo S. Hillebrand, USFWS)

1.6 Special Values

Section 304(g) of ANILCA directs the Secretary of the Interior to identify and describe "special values of the refuge, as well as any other archeological, cultural, ecological, geological, historical, paleontological, scenic, or wilderness values of the refuge." The refuge staff has determined that the following areas, values, or characteristics are of special value.

1.6.1 Kanuti Canyon

This canyon is tremendously scenic, with cliffs rising 100 to 400 feet. The river is easily floatable by raft in midsummer, and gravel bars provide places to stop or camp. The north-facing slopes are covered with a wet taiga community, whereas the south-facing slopes maintain an arid community that includes juniper, a species that is rare or possibly absent elsewhere on the refuge. The cliffs of Kanuti Canyon provide nesting habitats unique to the area for birds of prey, including peregrine falcons and rough-legged hawks. Additionally, the Canyon is the only place on the refuge where Townsend's solitaires have been found. This is likely due to the presence of juniper, a plant they are often associated with in other portions of their range.

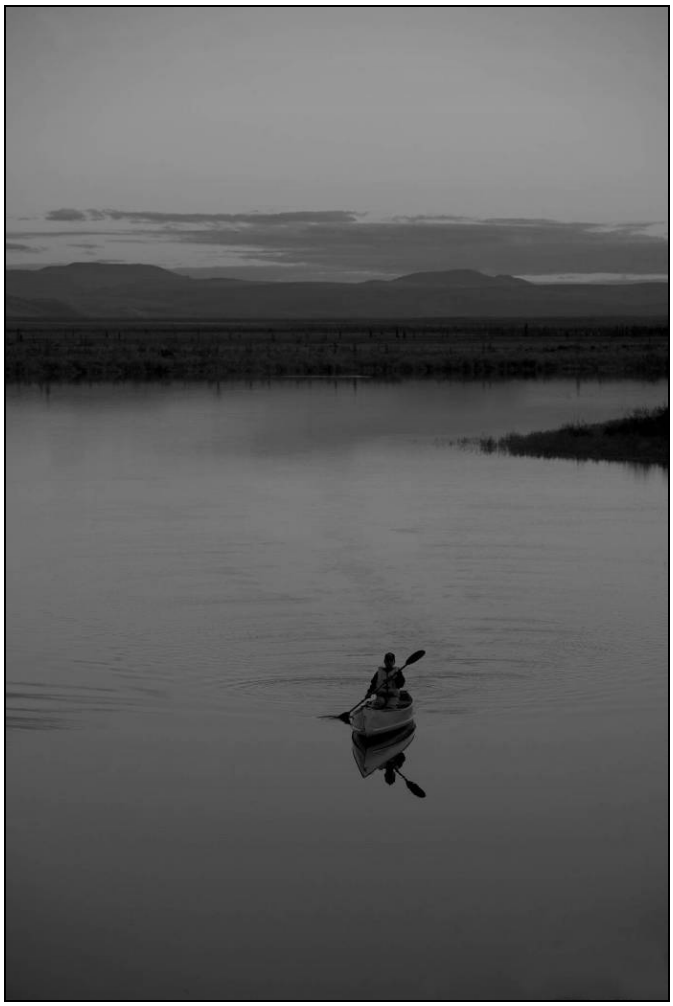


Figure 1-5: Solitude
The refuge receives very little visitation due to its remoteness and inaccessibility, which provides unique opportunities for those seeking a remote wilderness experience and solitude. (Photo S. Hillebrand, USFWS)

1.6.2 Wild Character

The refuge does not have roads or communities within its boundaries, and most of its habitats are essentially pristine. Visitation is low, and most use is by local people from communities just outside of the refuge boundaries who are pursuing their subsistence way of life. For these reasons, the refuge offers outstanding opportunities for visitors to experience solitude. It is a place where visitors can find a remote wilderness experience with few, if any, visible signs of human manipulation or a permanent human presence. The refuge also offers outstanding opportunities for primitive recreation—use that is dispersed and does not require on-site facilities.

The Kanuti Flats, Kanuti Canyon, and Ray Mountains units of the refuge all have special features that meet the definitions of wilderness as defined by the Wilderness Act (being undeveloped, untrammeled, highly natural, and offering outstanding opportunities for solitude or a primitive and unconfined type of recreation). However, the Service has not recommended any areas on the refuge for Wilderness designation. During the previous planning cycle, the Service established criteria for evaluation in addition to those in the Wilderness Act. At that time, the Service only

proposed for designation areas where 1) a boundary adjustment was necessary, or 2) "outstanding resource values" may have been overlooked during the original wilderness review. (USFWS 1987a) We will continue to follow that decision with this plan. See section 3.5 for additional discussion of the wilderness values of the refuge.

Refuge lands provide a mosaic of habitats driven by natural forces, including wildland fire, flooding, and ice. Biological and physical processes shape the environment of the refuge and allow natural biodiversity to persist.



Figure 1-6: Hulgothen Bluffs

Hulgothen Bluffs (Hutaatlaa Denh or Hutotlaa Denh, which means "Place where the rocks have chop marks," or "place where the rocks were roughly hewed") border Fish Creek near the eastern border of Kanuti Refuge. (Photo L. Saperstein, USFWS)

1.6.3 Hulgothen Bluffs

Composed of glacial lake deposits, Hulgothen Bluffs in the northeast corner of the refuge are thought to be a rich repository of Pleistocene fossils. Bones are gradually exposed as the waters of Fish Creek erode its banks.

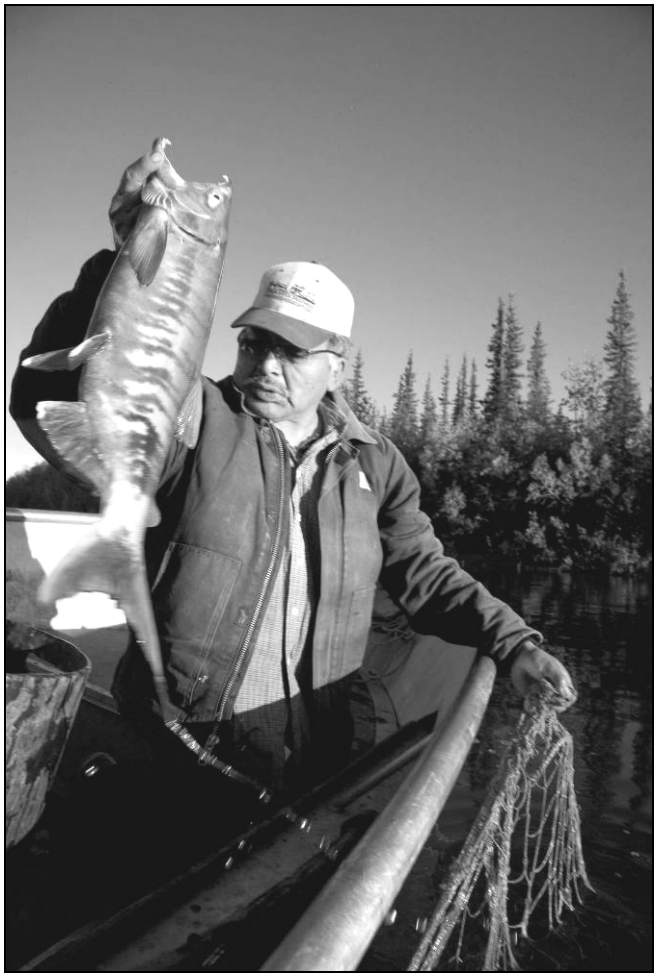


Figure 1-7: Chum salmon

Chum salmon are an important subsistence resource for people of Allakaket and Alatna. The nearby Henshaw Creek supports an important summer chum run, while the South Fork Koyukuk River has a major fall chum run. (Photo S. Hillebrand, USFWS)

1.6.4 Subsistence Way of Life

The subsistence way of life affects kinship, group cohesion, and personal identity, and provides local residents with a buffer against rapid social, economic, and political changes over which they have little control. Many local people depend on the natural resources of the refuge for their sustenance and livelihoods.



Figure 1-8: Pump and pulleys at the Union City Townsite. (Photo USFWS)

1.6.5 Cultural Resources

Pre-Athabascan and Athabascan sites and remnants of turn-of-the-century mining activities are located on refuge lands. Twenty-three sites are listed in the State of Alaska Heritage Resources Survey. Alaska Native sites include village and hunting sites. Four mining camps on the refuge were active from 1897 to 1906. At the peak of activity, approximately 1,500 people lived in the camps.



Figure 1-9: Sidescraper

This artifact, a sidescraper (possibly 'daa'oghe), was found on the refuge in 2006. Sidescrapers were used to clean hides and carve wood and bone. This type of tool was used during several eras, so it is not possible to determine its precise age. This example is small (approximately 1½ inches), and it may have been used for fine skin work by the ancestors of the Koyukon people roughly 1,000 years ago (Corbett 2006a). (Photo A. Kokx, USFWS)

1.6.6 Sithylemenkat Lake

The area surrounding Sithylemenkat Lake, with its rocky outcrops and sand beaches, is one of the most scenic places within the external boundaries of the refuge. It may also provide nesting habitat for peregrine falcons and other birds that nest on outcrops and open habitat.

Though the area surrounding the lake has been conveyed and is now private property, the Service has a site easement and trail easement that provide access between the lake and refuge lands.



Figure 1-10: Sithylemenkat Lake

Sithylemenkat Lake (Seł Yee Benkk'e, which means "Lake in the mountain, mountain lake"), is situated on private land within the refuge boundary at the northern edge of the Ray Mountains. (Photo USFWS)

1.7 Planning Requirements

Section 304(g) of ANILCA directs that comprehensive conservation plans be developed for each refuge. It also specifies procedures to follow while developing these plans.

Prior to developing a plan for any refuge, the following must be identified and described:

A) The populations and habitats of the fish and wildlife resources of the refuge

B) The special values of the refuge, and any other archeological, cultural, ecological, geological, historical, paleontological, scenic, or wilderness values of the refuge

C) Areas within the refuge suitable for use as administrative sites or visitor facilities, or for visitor services, as provided for in ANILCA Sections 1305 and 1306

D) Present and potential requirements for access with respect to the refuge, as provided for in ANILCA title XI

E) Significant problems that may adversely affect the populations and habitats of fish and wildlife identified and described under subparagraph (A)

Each comprehensive conservation plan shall:

A) Be based upon the identifications and the descriptions developed in A, B, and C.

(i) Designate areas within the refuge according to their respective resources and values.

(ii) Specify the programs for conserving fish and wildlife and the programs related to maintaining the special values of the refuge that are proposed to be implemented within each such area.

(iii) Specify the uses within each such area that may be compatible with the major purposes of the refuge.

B) Set forth those opportunities that will be provided within 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 the purposes of the refuge.

While preparing the plans, adequate opportunities for interagency coordination and public participation are required. Any interested and affected parties, such as State agencies, Native corporations, local residents, and residents of political subdivisions that would be affected by decisions in the plan must be provided meaningful opportunities to present their views. Prior to adopting a plan, a notice of its availability in the Federal Register is issued, copies are made available in regional offices of the U.S. Fish and Wildlife Service throughout the United States, and there is an opportunity for public review and comment.

1.8 The Planning Process

This section describes the process used to develop the Comprehensive Conservation Plan. The process (Figure 1-11) is consistent with planning requirements specified in section 304(g) of ANILCA; the Refuge System Administration Act, as amended; 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 Kanuti Comprehensive Conservation Plan:

1) Design the planning process (preplanning).

2) Initiate public involvement and scoping.

3) Determine significant issues.

4) Develop and analyze alternatives.

5) Prepare draft Comprehensive Conservation Plan and Environmental Assessment.

6) Prepare and adopt a final plan.

7) Implement the plan and monitor and evaluate it.

8) Review and revise the plan.

1.8.1 Design the Process

Comprehensive Conservation Plans are to be revised every 15 years, and the Kanuti Plan had been finalized in 1987. In late 2003, the Service began reviewing the Kanuti Plan to determine what would be necessary in the revision. We found that refuge management actions generally met refuge objectives but that some management direction needed to be updated. New laws (such as the National Wildlife Refuge System Improvement Act), new regulations and policies, and other changes (such as Service management of the Federal subsistence program within Alaska refuges) needed to be incorporated into the Comprehensive Conservation Plan.

1.8.2 Public Involvement and Scoping

This step informed people that we were beginning to revise the Plan and solicited ideas on what should be addressed. Formal public scoping began with publication of a Notice of Intent to revise the plan and prepare an Environmental Impact Statement (EIS) in the *Federal Register* on November 26, 2003 (Vol. 68, No. 228, pages 66475 and 66476).

In the spring of 2004, we mailed a planning update to nearly 1,000 individuals and organizations to announce the revision and seek comments. This planning update contained information about the refuge, described issues identified by the refuge staff, and provided an opportunity for the public to suggest other issues to be addressed during revision of the Plan.

Public meetings to gather input were held in the communities of Allakaket, Alatna, Bettles, Evansville, Coldfoot, Wiseman, and Fairbanks.

Following this initial scoping, we determined that an environmental impact statement was not needed and that an Environmental Assessment (EA) would fulfill all requirements of the National Environmental Policy Act. A notice explaining the decision to conduct the plan revision with an EA instead of an EIS was published in the *Federal Register* on July 25, 2006.

Public involvement continued throughout the planning process.

1.8.3 Determine Significant Issues

The planning team reviewed the issues raised by the public, refuge staff, and other Service divisions to determine the significant planning issues to be addressed in the revised Plan. Significant planning issues are important issues that are within the purview of the refuge and could be handled differently in the various alternatives. Section 1.9 provides more detail on the process used to identify the significant planning issues and what those issues involve.

1.8.4 Develop and Analyze Alternatives

In March 2005, preliminary alternatives for management of the refuge were presented in a planning update sent to the public for review and comment.

The planning team developed a set of draft alternatives. These alternatives were presented to the regional director, other members of the Service leadership, and the public in an August 2005 planning update.



Figure 1-11: The planning process

1.8.5 Prepare Draft Plan and Environmental Assessment

This step produced a draft plan for public review. The draft plan described three alternatives (including current management) for managing the refuge over the next 15 years. It included an analysis of the potential impacts of implementing each alternative and described how the Service selected the preferred alternative. It included a description of management common to all alternatives: those management actions that would remain the same no matter which alternative was implemented. During a public review and comment period, the Service held public meetings in Fairbanks and communities near the refuge.

1.8.6 Prepare and Adopt a Final Plan

The planning team reviewed and analyzed all comments received on the draft plan, developed a fourth management alternative (described in section 1.12), then developed the Revised Comprehensive Conservation Plan. A Finding of No Significant Impact (FONSI) was signed by the regional director. Following this approval, a Notice of Availability was published in the *Federal Register* and the plan and FONSI will be distributed.

1.8.7 Implement Plan, Monitor, and Evaluate

After the FONSI and Revised Comprehensive Conservation Plan are approved, refuge staff will begin implementing any management changes called for in the revised Plan. A critical component of management is monitoring—measuring resource and social conditions to make sure that progress is being made toward meeting refuge purposes, goals, and objectives. Monitoring

includes determining if the refuge is implementing the Plan and if actions being taken are effective in meeting the objectives. The refuge will use an adaptive management approach, which means that information gained from monitoring will be used to evaluate and modify refuge objectives as needed.

1.8.8 Review and Revise Plan

Service policy directs that the refuge review the Comprehensive Conservation Plan annually to assess the need for change. The Service will revise the Plan when important new information becomes available, when ecological conditions change, or when the need to do so is identified during a review. A full review and revision of the Plan will occur approximately every 15 years. If major changes are proposed, the National Environmental Policy Act (NEPA) process (including public involvement) will be initiated. We will continue to inform and involve the public through appropriate means throughout the implementation and monitoring process.

1.9 Issues

The Service defines an issue as any unsettled matter (e.g., an initiative, opportunity, resource management problem, threat to refuge resources, conflict in uses, public concern, or presence of an undesirable resource condition) that requires a management decision.

To identify issues of importance to the public, responses were obtained from the public at meetings, at planning updates, and during visits with community elders and leaders. Issues were also developed based on opportunities and concerns observed by Service staff.

Scoping initially identified a broad range of topics that became focused as information was gathered. Issues identified during the first round of public involvement were refined and clarified during later rounds. Several issues were raised that were outside the scope of this revision process (categories 1–3 in subsequent text). To identify issues that could be addressed in the Plan versus those outside the scope of this Plan, each preliminary issue was assigned to one of the following categories.

1. The issue is addressed by existing laws and policies or is not within the purview of the refuge.

Example: A number of local residents expressed concern about the potential for impacts to the refuge originating from the Trans-Alaska Pipeline Corridor. They questioned the danger of a chemical or oil spill and the adequacy of a response plan. Several people were concerned about the potential for introduction of invasive species on boats and other equipment.

Example: Several local residents expressed concerns about illegal bow hunting from the Dalton Highway and hazards associated with hunters blocking the road.

Example: Some local residents expressed concern that the Bettles Winter Road is sometimes blocked by hunters parking near Gordon's Gulch.

Example: Some members of the public expressed concern that hunting is occurring within five miles of the Dalton highway.

Example: Some people wondered if the refuge could be managed by a Native Corporation or if refuge work could be contracted to a Native corporation.

2. The issue is addressed in arenas outside this revision process.

Example: Several people expressed the desire that development on private lands within the refuge be limited, particularly in the Sithylemenkat Lake area. (The acquisition of additional lands in Kanuti Refuge was addressed in the 2002 Kanuti Land Protection Plan).

3. The issue is already being addressed or will be addressed similarly regardless of management alternative selected.

Example: Several people were concerned about declining numbers of game animals and the need to provide for subsistence hunting. Abundance of predators and prey were frequently brought to the attention of refuge staff at annual subsistence meetings. Several other people opposed all single-species management. As a result, we will focus on determining the appropriateness of individual predator control proposals in a subsequent detailed step-down plan and environmental assessment. (See section 2.4.5 and Appendix P.)

Example: A number of people opposed development of Revised Statute 2477 (RS 2477) right-of-way corridors on the refuge. Several people proposed limiting access to the Bettles Winter Road, while others supported further development of the road.

Example: Several comments expressed concern that subsistence harvests of white-fronted geese, caribou, fish, and white spruce logs (for home building) are above sustainable levels.

Example: Several people requested that refuge visitation be kept low in order to protect the wild character of the refuge. Many expressed concern for the impacts that visitors might have on wildlife.

Example: Staff expressed the opinion that there is a need to collect baseline information on the refuge to understand key ecosystem processes and natural biodiversity of the refuge.

Example: Some people wondered whether exploration for oil and gas would be compatible with refuge purposes.

Example: Some of the public questioned whether this revised Plan should recommend additional areas for Wilderness designation or rivers for inclusion in the National System of Wild and Scenic Rivers. In accordance with departmental direction, this issue was addressed in the 1987 Kanuti Comprehensive Conservation Plan and Wilderness Review. (See section 2.4.)

4. The issue is a significant planning issue, and the Plan revision will develop alternative ways of addressing it.

Some of the issues raised can be addressed by more than one management approach. These types of issues can be addressed in different alternatives and are within the jurisdiction of the refuge. These issues, presented in the following text, were described and addressed in chapter 2 of the draft plan.

1.10 Significant Planning Issues

Significant issues reflect problems, opportunities, or points of discussion that the Plan can address. Two significant issues were encountered during scoping. These were incorporated into the alternatives and analysis presented in the draft plan.

In addition to identifying the significant planning issues, this section includes a brief summary of the public comments received pertaining to issue 1. (Issue 2 did not generate public comment.) It is important to recognize that public comments are not considered "votes." Following issue 1 are examples of people's comments on that issue in their own words, which provides a greater understanding of how people view this issue. These comments were selected to demonstrate the range of approaches and opinions people brought to the issue, not to represent the proportion of each type of comment received.

Sometimes important topics are identified by only a few people familiar with a specific area or problem. Other issues are of national interest and generate a large number of comments from across the country. Certainly strong public support or opposition is an important consideration, but the decision must also consider how to best meet the purposes of the refuge and the mission of the System.

1.10.1 Issue 1: Conservation of the Natural, Unaltered Character of the Refuge

Many people expressed the desire that the refuge remain in a natural, wild state. They want minimal intrusion on natural systems and want the refuge to remain wild for the future. Wild character can mean a place of solitude where a visitor might not expect to encounter another human during a visit. It can also mean the absence of roads, trails, and towns or villages. Kanuti Refuge is one of the few refuges in Alaska that is both roadless and without communities inside its boundaries. These characteristics help maintain the wild character of Kanuti Refuge.

Summary of Comments: Comments regarding preservation of the natural, unaltered character of the refuge varied from requests to keep it wild to the protection provided by inclusion in the wilderness system. Several requests focused on continued absence of roads and visitor facilities within refuge boundaries. Others expressed concerns that management was interfering too much with natural processes and that the use of intrusive research techniques should be reduced.

Representative Comments:

"It is best to keep it wild."

"We want the country to stay the same for the next generations."

"We make our livings off the rivers."

"Your 15-year focus should be on preservation and conservation in a balance that will keep this place remote and isolated for the years to come."

"The entire southern portions of Kanuti, including Kanuti River, Sithylemenkat Lake, and Kilolitna River Valley, have outstanding wilderness qualities and should be recommended for designation according to the Wilderness Act of 1964. This area was in the Bill passed by the House of Representatives as Wilderness in 1978 and 1979."

"I would like to see you keep Kanuti wild with minimum facilities. Have something for visitors in Bettles but not on the refuge. Wildlife should come first. Isn't that why the refuge was established?"

"Take a long look and include the refuge in the wilderness system."

"I would like to see you have the opportunity to give Kanuti wilderness protection and status. These bio-reserves where ecological processes are still allowed to shape the environment have important implications for the world. I like the fact that you have included their importance to the world in your vision statement. I like the inclusion of the word 'wild' in your vision statement. Protecting the habitat should have the highest priority for planning for the refuge; it is more important than hunting, although there should always be a balance between consumptive and non-consumptive use…limit recreational activities when necessary; protection of the land and wildlife should be the number one priority."

"I value Kanuti's wildness most—no roads, no facilities."

"I am concerned about the statement in the draft vision statement—'the role of Kanuti…will be the focal point of research and management efforts.' To me, management involves too much interference and control. I would rather the focus be on stewardship and preservation of the natural biodiversity of Kanuti. I would like to see that part of the vision statement edited to emphasize stewardship rather than 'management'."

"Your vision statement sounds like something written by the Park Service. Refuge management in our changing world needs to be much more active to compensate for uncontrolled change elsewhere. Learning to enhance wetland habitat, without losing the wild characteristics of the land, is the most exciting challenge for your refuge."

1.10.2 Issue 2: Acceptance and Integration of New Management Policies and Guidelines into the Plan

Management of National Wildlife Refuges in Alaska is governed by Federal law (i.e., the National Wildlife Refuge System Administration Act of 1966 [Refuge Administration Act] as amended by the National Wildlife Refuge System Improvement Act of 1997 [Refuge Improvement Act; 16 U.S.C. 668dd] and the Alaska National Interest Lands Conservation Act of 1980), by regulations implementing these laws, by intergovernmental treaties, by Service policy, and by principles of sound resource management, all of which establish standards for resource management or limit the range of potential activities that may be allowed on refuges.

The management policies and guidelines described in Appendix J were developed as common management direction for national wildlife refuges in the Alaska Region of the U.S. Fish and Wildlife Service. These policies and guidelines are essentially the same for all refuges in this region.

This direction provides a common base upon which each of the alternatives were built and represents the typical level of management necessary to comply with existing law, regulation, and policy.

1.11 How Management Will Address the Issues

1.11.1 Issue 1: Preserve the Wild Character of the Refuge.

A majority of the refuge (86 percent) will be designated as Minimal Management to preserve the refuge's wild character. Portions of the refuge (14 percent) in the north and west will remain or become designated as Moderate Management. (Insert 2-1) The Service recognizes that these Moderate Management areas are contiguous with large parcels of private lands and that the Koyukuk River and Allakaket-Bettles trail are surface transportation corridors where a higher degree of human use is anticipated. The Service believes that this management strikes a needed balance in maintaining the wild character over the majority of the refuge while allowing for more intensive human uses in areas near the communities. The new management policies and guidelines are more restrictive, or more explicit, than the 1987 plan regarding fish and wildlife introductions, subsistence harvesting of firewood and house logs, motorized vehicle use, oil and gas leasing, commercial fishing, gathering, navigational aids, and facilities (Appendix J). The new management policies and guidelines are less restrictive than the 1987 direction regarding habitat management, construction of primitive airstrips, extraction of sand and gravel, micro-hydroelectric power, and transmission lines and pipelines.

Activities that may be allowed or permitted by regional guidelines will not necessarily be allowed on the Kanuti Refuge. Activities not proposed in this plan will not occur on the refuge.

1.11.2 Issue 2: Integrate new common management direction into refuge management.

The new management policies and guidelines will be integrated into refuge management.

1.12 Changes Made from the Draft Plan

1.12.1 Introduction

A number of comments were received from the public suggesting modifications to the management category status proposed in the preferred alternative. In response to those comments, the preferred alternative was modified and will be adopted as the management direction. See section 2.4 for a complete description of the proposed management direction.

Two areas were reclassified to Moderate Management near Bettles, and an area in the upper Henshaw Creek area was reclassified to Minimal Management.

1.12.2 Response to Public Comment

These revisions are in response to comments received from the public. Generally, local residents and community leaders preferred that refuge lands adjoining private lands near their communities be in the Moderate Management category. Conversely, non-locals preferred to see more of the refuge in the Minimal Management category.

Of the commenters who preferred a particular alternative, a majority indicated that they preferred Alternative B because the entire refuge would be in Minimal Management. Slightly fewer commenters supported Alternative C. People commented that they liked the flexibility of what may be allowed in Moderate Management and one noted that although he/she preferred Minimal Management, the mixture of Federal and private land warranted Moderate Management. A few additional comments suggesting changes to Alternative C were mixed, with some people wanting more Minimal Management and others wanting more Moderate Management.

1.12.3 Revisions

In the northwestern portion of the refuge, an area currently in the Moderate Management category was changed to Minimal Management. This area includes the upper reaches of Henshaw Creek. The northwestern boundary of the Moderate Management zone is offset two miles to the north side of the Allakaket-Bettles trail. The lower boundary, offset two miles to the southeastern side of the Koyukuk River, remains the same as in the draft plan.

Two areas of Minimal Management, south and southwest of Evansville and Bettles and surrounded by private lands, were changed to Moderate Management.

1.12.4 Acreage

These changes result in a reclassification of 14,432 acres in Moderate Management to Minimal Management (Table 1). With these changes, 13.6 percent of Federal lands within the refuge boundary (or 10.7 percent of the total area) are in Moderate Management. Prior to these changes, the Moderate Management area comprised 14.7 percent of Federal land (or 11.6 percent of the total area) within the refuge boundary.

Table 1: Acreage changes by management category

	Alternative C Previous Preferred Alternative		Alternative C1 Proposed Management Direction	
	Moderate	**Minimal**	**Moderate**	**Minimal**
Acres by Management Category	189,357	1,100,261	174,925	1,114,693
Percent of Federal Lands	14.7%	85.3%	13.6%	86.4%
Percent of Lands Within Boundary	11.6%	67.2%	10.7%	68.1%
Acreages derived from Service geographic information system analysis. *Acreage of Federal lands=1,289,618.*				

1.12.5 Rationale

The proposed changes will provide additional protection to the upper portion of Henshaw Creek, an important salmon spawning stream. While the State of Alaska provides conservation oversight due to the creek's status as an anadromous fish stream, designating this area in Minimal Management will further assist in maintaining the natural environment with little evidence of human-caused change. This new Minimal Management area northwest of the Bettles-Allakaket trail includes important wildlife and fish habitat.

Two parcels of refuge lands near Bettles and Evansville will be changed from the Minimal to the Moderate Management category. The larger parcel is a low-lying area of open spruce woodland completely surrounded by private lands. The smaller parcel is bounded by private lands on three sides and by Moderate Management on the other. These changes were in response to public comments.

Due to their importance as transportation routes, the Bettles-Allakaket winter trail and the Koyukuk River were included within the Moderate Management category. These transportation corridors receive more intensive use, and their classification in Moderate Management reflects

that. Therefore, a two-mile buffer northeast of the trail and southeast of the river was established to allow room for potential activities associated with the trail and river.

1.12.6 Conclusion

We believe that this proposed revision provides a realistic response balanced between public comments and the conservation needs of the refuge. The amount of Minimal Management was increased to better maintain the natural environment in one area. Two areas were re-categorized to Moderate Management in parcels surrounded by private lands to allow for more compatible and intensive uses by local residents. These changes constitute a minor revision of Alternative C, with a net change in the ratio of Moderate to Minimal of about one percent.

2. Refuge Management Direction

2.1 Introduction

This chapter presents the underlying goals and objectives, and general management direction for the Kanuti National Wildlife Refuge. Appendix J contains the revised management policies and guidelines that were developed to provide uniform management direction for national wildlife refuges in the Alaska Region of the U.S. Fish and Wildlife Service (Service). This plan adopts those management policies and guidelines.

The management direction presented in Appendix J was derived from the laws governing the National Wildlife Refuge System (System) and the regulations, policies, and other guidance, both national and regional, developed to implement these laws. Further information regarding this standard management direction for refuges in Alaska can be found at the regional planning web site.

Alternatives that were considered but eliminated from study are described in section 2.3.

2.2 Principles of Refuge Management

The National Wildlife Refuge System Administration Act, as amended, states that each refuge shall be managed to fulfill both the mission of the National Wildlife Refuge System and the purposes for which the individual refuge was established. It requires that any use of a refuge be compatible with refuge purposes. Therefore, any use of a refuge will not materially interfere with nor detract from fulfillment of the mission of the System or the purposes of the refuge.

The 1997 amendments to the National Wildlife Refuge System Administration Act identified a number of principles to guide management of the System, including:

- Conserve fish, wildlife, and plants, and their habitats within the System
- Maintain the biological integrity, diversity, and environmental health of the System
- Coordinate, interact, and cooperate with adjacent landowners and State fish and wildlife agencies
- Maintain adequate water quantity and water quality to meet refuge and System purposes, and acquire necessary water rights
- Maintain hunting, fishing, wildlife observation, wildlife photography, interpretation, and environmental education as the priority public uses of the System
- Provide opportunities for compatible priority wildlife-dependent public uses within the System
- Provide enhanced consideration for priority wildlife-dependent public uses over other public uses in planning and management
- Provide increased opportunities for families to experience priority public uses, especially traditional outdoor activities such as fishing and hunting
- Monitor the status and trends of fish, wildlife, and plants in each refuge

To maintain the health of individual refuges, and the National Wildlife Refuge System as a whole, managers must anticipate future conditions. Managers must endeavor to avoid adverse impacts and take positive actions to conserve and protect refuge resources. 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 entities, and nongovernmental organizations and groups—to protect, conserve, enhance, or restore all native fish, wildlife (including invertebrates), plants, and their habitats.

2.3 Alternatives and Actions Considered but Eliminated from Detailed Study

Actions and strategies considered in preliminary alternatives but subsequently eliminated from detailed consideration include the following:

2.3.1 Recommending Rivers for Inclusion in the National Wild and Scenic Rivers System

Because of concerns expressed by the State of Alaska and subsequent analysis of those concerns by the Service, alternatives that would have recommended Congress consider rivers for inclusion in the National Wild and Scenic Rivers System were considered but eliminated from detailed consideration. In compliance with Section 304(g) of ANILCA, river-related special values of the refuge are discussed in this plan (section 3.6); however, recommendations for designations are not included in the alternatives. Current and proposed management direction may provide adequate protection for all river-related values.

2.3.2 Recommending Lands for Designation as Wilderness

No Kanuti Refuge lands were recommended for Wilderness designation in the original Comprehensive Conservation Plan. (USFWS 1987a, USFWS 1987b) For the same reasons described in the previous section, alternatives that would have recommended Congress consider areas of the refuge for inclusion in the National Wilderness Preservation System were eliminated from detailed consideration. In compliance with Section 304(g) of ANILCA, wilderness values of the refuge are discussed in this plan (section 3.5); however, recommendations for designations are not included in the alternatives. Current and proposed management direction may provide adequate protection for wilderness values.

2.4 Refuge Management Direction

Management of the refuge will generally continue to follow the same courses of action that it has previously. The new vision statement and goals, developed specifically with low impact management as a philosophy, will be incorporated. The regional management direction (see Appendix J) will be incorporated.

There are two management categories applied to Kanuti Refuge. *Minimal Management* maintains the ecological integrity of the refuge with little evidence of human-caused change. Habitat will generally be allowed to change through natural processes (with one exception, see Fire Management, Section 2.4.4, below). Disturbance to resources resulting from public uses, economic activities, and facilities will be minimized. *Moderate Management* allows actions and uses that may result in temporary or permanent changes to the environment but are small in scale and do not disrupt natural processes. The natural landscape will remain the dominant feature, though there may be signs of human activity.

Because activities that could have been allowed under Moderate Management in the 1987 Plan were never implemented, the public will see little or no change compared to the existing situation despite changes in land classification placing most of the refuge into Minimal Management (see Section 2.4.1, below). More habitat manipulation could be allowed in Moderate Management areas than under Minimal Management, and permanent facilities could be constructed.

In both management categories existing wildlife values and natural diversity within the refuge will be protected and maintained. Opportunities to pursue traditional subsistence activities, and recreational hunting, fishing, and other wildlife-dependent activities will be maintained and encouraged when conducted sustainably. Methods of access currently allowed will continue to be allowed. Opportunities to pursue research will be maintained.

Wildlife and habitat management will consist primarily of research, inventory, and monitoring projects rather than manipulative management. Management will generally focus on natural processes, using the least intrusive methods on a majority of the refuge. This management will cause minimal disturbance to wildlife, habitat, and the visiting public. To preserve the wild character of the refuge, no roads, hardened trails, or visitor facilities will be developed on the refuge unless needed to prevent degradation of resources.

Existing private and commercial uses of the refuge will likely be unchanged. Refuge management will continue to reflect existing laws, executive orders, regulations, and policies governing Service administration and operation of the National Wildlife Refuge System.

All selected lands within the refuge will be managed in the same manner as they were prior to selection until their status is finalized. Lands acquired will be placed in the same management category as the refuge lands they are within or adjacent to unless otherwise specified in conveyance documents. Where lands are adjacent to both Minimal Management and Moderate Management lands, a determination will be made during acquisition.

2.4.1 Management Category Changes

A portion of the refuge lands previously in Moderate Management were reclassified as Minimal Management, and two parcels in Minimal Management were reclassified as Moderate Management. (see section 1.12)

Lands previously designated as Moderate Management in the central and south-central portions of the refuge (Kanuti Chalatna Creek and central Kanuti River areas) were reclassified as Minimal Management. An area of Moderate Management in the northwestern portion of the refuge was reclassified to Minimal Management. This Minimal Management area includes the upper reaches of Henshaw Creek. The boundaries of this area are offset two miles to the north side of the Allakaket-Bettles trail and two miles southeast of the Koyukuk River to buffer those areas. (Insert 2-1)

Two areas of Minimal Management south and southwest of Evansville and Bettles and surrounded by private lands were changed to Moderate Management.

Eighty-six percent of the refuge will be in Minimal Management.

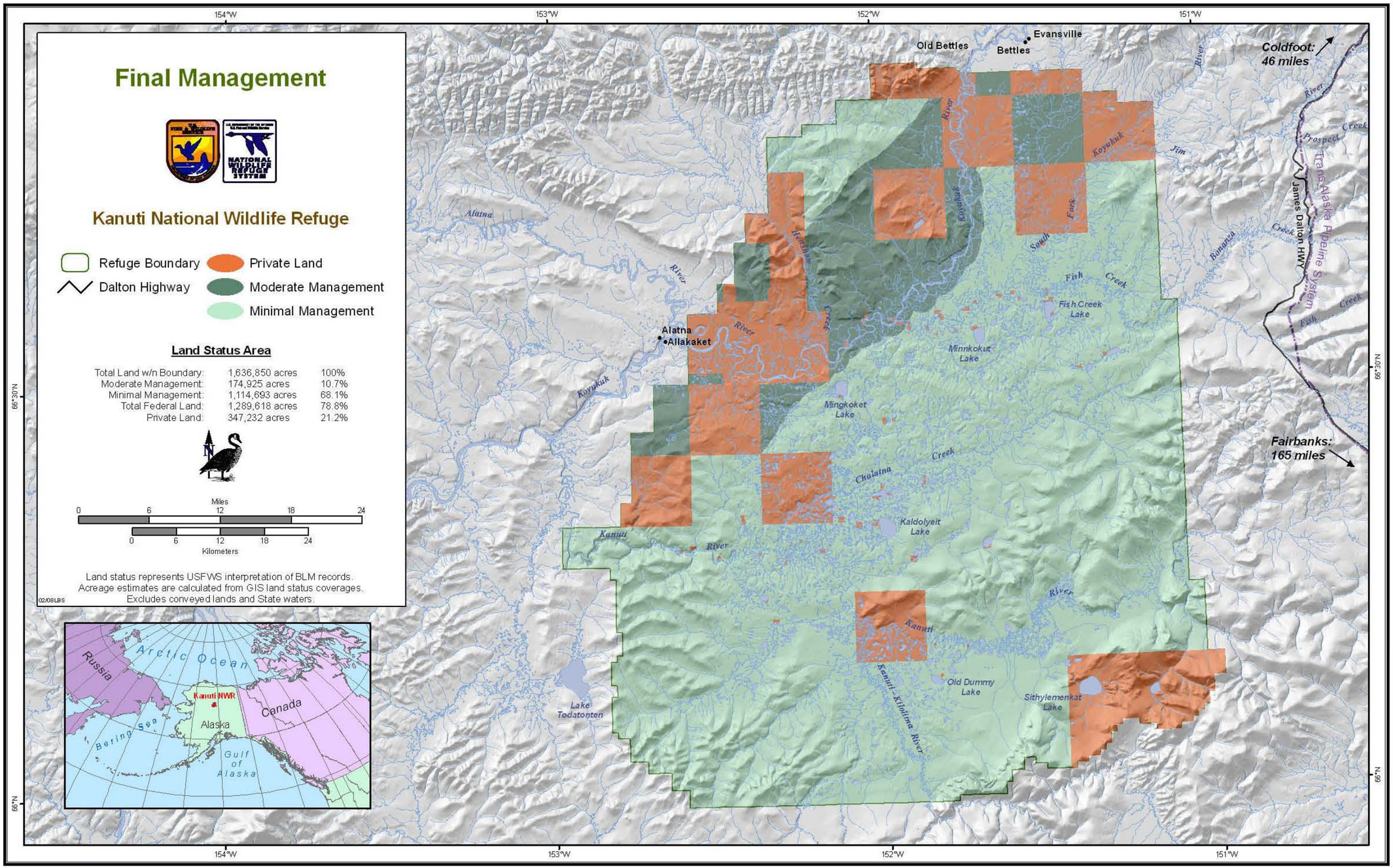
Fourteen percent of the refuge will be in Moderate Management.

2.4.2 Fish, Wildlife, and Habitat Management

The wildlife objectives under Goal 1 are directed toward conserving and monitoring the refuge's natural diversity of species and habitats. Management will allow for continued inventory and monitoring activities to provide information necessary to understand and protect fish and wildlife resources on the refuge. As funding and resources permit, proactive inventory and monitoring, and targeted research will be conducted to expand knowledge of fish, wildlife, and habitat resources. Fish, wildlife, and habitat research and management activities would emphasize maintenance of the natural environment.

Management will focus on understanding and monitoring natural systems rather than manipulating system components. Active management will emphasize protecting systems, such as removing non-native plant species using manual treatments or chemicals.

Mechanical treatment of habitat may be allowed under Moderate Management, including activities such as cutting, crushing, or mowing of vegetation to improve wildlife habitat; erecting water control structures to enhance waterfowl habitat or mitigate potential wetland loss due to climate change; and constructing fencing and artificial nest structures. Chemical and manual treatment of habitat may be allowed in Minimal Management, but mechanical treatment is generally not allowed. Native fish reintroductions may be allowed in all management categories under certain circumstances (see Appendix J, section 2.10.6). Facilities and structures required for fish, wildlife, and habitat management may be permanent under Moderate Management, though there will be an attempt to minimize visual impact. Such facilities in Minimal Management areas should be temporary and follow other guidelines described in Appendix J.



Insert 2-1: Final Management

Table 2-1: How management will address the issues

Issue 1: Preserve the wild character of the refuge. A majority of the refuge (86 percent) will be designated as Minimal Management to preserve the refuge's wild character. Portions of the refuge (14 percent) in the north and west will remain or become designated as Moderate Management. (Insert 2-1) The Service recognizes that these Moderate Management areas are contiguous with large parcels of private lands and that the Koyukuk River and Allakaket-Bettles trail are surface transportation corridors where a higher degree of human use is anticipated. The Service believes that this management strikes a needed balance in maintaining the wild character over the majority of the refuge while allowing for more intensive human uses in areas near the communities. The new management policies and guidelines are more restrictive, or more explicit, than the 1987 plan regarding fish and wildlife introductions, subsistence harvesting of firewood and house logs, motorized vehicle use, oil and gas leasing, commercial fishing, gathering, navigational aids, and other facilities (Appendix J). The new management policies and guidelines are less restrictive than the 1987 direction regarding habitat management, construction of primitive airstrips, extraction of sand and gravel, micro-hydroelectric power, and transmission lines and pipelines. Activities that may be allowed or permitted by regional guidelines will not necessarily occur within the Kanuti Refuge. Activities that are not proposed in this plan are not anticipated to occur on the refuge within the 15-year life of this plan.
Issue 2: Integrate new common management direction into refuge management. The new management policies and guidelines will be integrated into refuge management.

Table 2-2: Acreage distribution (Federal lands)

Management Category	Acres	Percentage of Refuge
Minimal Management	1,114,693	86
Moderate Management	174,925	14
Total	1,289,618	100

2.4.3 Subsistence Management

ANILCA (title VIII) stipulates that rural Alaska residents who are engaged in subsistence lifestyles will have priority use of refuge resources for traditional purposes. The opportunity for continued subsistence use is one of the refuge's purposes and will continue to be a management priority.

Rural Alaska residents will be afforded the opportunity to hunt, fish, and trap in accordance with State and Federal regulations. Plant material and dead standing or downed timber can be gathered without a special use permit. However, gathering live standing timber greater than six inches diameter at breast height (4 ½ feet above ground level) for house logs, firewood, or other uses will require a special use permit. Snowmobiles (with adequate snow cover) and other traditional means of access will continue to be allowed, subject to reasonable regulation.

Many aspects of subsistence management are not within the purview of the refuge and are thus beyond the scope of this Plan. The refuge will work with the State and other Federal agencies in harvest and resource monitoring programs to insure the health and viability of wildlife populations.

Promulgating subsistence harvest regulations is outside the refuge's jurisdiction. However, refuge staff will continue to work with the regulating authorities and stakeholders throughout the public process to insure resource conservation.

2.4.4 Fire Management

The primary objectives of fire management on Service lands are to conserve, protect, or enhance habitats and to maintain ecosystems for the benefit of fish and wildlife. Additionally, fire management activities must meet the goals of protecting human health and safety and protection of structures. Fire management activities on the refuge include research, preparedness, wildland fire suppression, wildland fire use[1], prescribed fire, outreach, education and prevention, monitoring, emergency stabilization and rehabilitation of burned areas, fuels management, smoke management, and prevention and enforcement of fire trespass. Appendix M presents a more detailed discussion of these fire management activities. All activities will be conducted in accordance with refuge, Service, and departmental policies and approved interagency and refuge-specific fire management plans. Fire management decisions are based on values warranting protection, protection capabilities, firefighter safety, and/or land and resource management needs.

The Kanuti Refuge Fire Management Plan (USFWS 2007) provides specific information regarding the use and management of fire on the refuge. Additionally, the Alaska Interagency Wildland Fire Management Plan[2] (Alaska Wildland Fire Coordination Group 1998) provides a cooperative framework and operational guidelines for the management of wildland fires. Natural-caused wildland fires, prescribed fires, and suppression of human-caused and unwanted wildland fires are important management tools for the refuge. Fire management options range from Limited Suppression (fires are allowed to burn to benefit wildlife habitat) to Modified Suppression to Full Suppression (most fires are suppressed). All of these fire management options could be applied in either the Minimal or Moderate Management categories.

ANILCA (section 302 (4)(B)(i)) requires that the refuge be managed for its natural diversity of both wildlife and habitat. Interpreting this as refuge-wide, the Service will, in the next 10-15 years, manage wildland fire as a natural process that is essential in maintaining the natural variety of vegetation developmental stages typical of Kanuti Refuge and interior Alaska (Figure 2-1). This habitat diversity benefits many wildlife species that utilize "younger" habitats within the spectrum of post-burn succession (USFWS 1995a). For example, research has shown that maintenance of a natural fire regime can benefit moose because of their preference for early

[1] Where natural ignitions are allowed to burn for resource benefits.

[2] Developed by the Bureau of Land Management, Alaska Fire Service, State of Alaska, U.S. Fish and Wildlife Service, and others.

successional shrub and deciduous habitats that occur 10–30 years after an area is burned (Maier et al. 2005). Certain songbird and small mammal species also tend to prefer these early- and middle-stage successional habitats (section 3.3.2).

We will also manage fire to maintain a higher proportion of habitats at the older end of the post-burn vegetation succession. Specifically, on a portion of the Kanuti Refuge, an attempt will be made to manage fire more precisely to limit the percentage of old growth lichen-spruce vegetation consumed by wildland fire each year. The Kanuti Refuge Fire Management Plan designates approximately 290,000 acres in the center of the refuge as a "special area" where refuge management intends to limit wildland fire through a change in the fire management option from Limited Management to Modified Management. By suppressing more fire starts early in the fire season, management hopes to reduce the potential of large fires and rapid fire growth in the latter part of the fire season, especially during dry summers (USFWS 2007).

One objective for the next 20 years is to maintain an area of old growth lichen-spruce habitat while allowing some natural fire disturbance in the area. Following the extensive 1990–1991 and 2004–2005 fires we set an objective of allowing no more than five percent of the special area to burn in any given year, which will allow vegetation succession within and along a small buffer surrounding the special area to continue. The "special area" is intended to provide habitat for wildlife species that prefer areas that have not burned for more than 80–100 years. For example, lichen-woodland areas that have not burned in 80–100 years are important to caribou (Joly et al. 2003, Rupp et al. 2006, Joly et al. 2007). We will assess the effectiveness of this fire management strategy periodically to determine if objectives are being achieved and will consider pertinent changes to the Kanuti Refuge Fire Management Plan whenever warranted. Revision of the Kanuti Fire Management Plan would likely occur well in advance of any future revision of the Kanuti Comprehensive Conservation Plan but would similarly involve partners, neighboring landowners, and land managers.

The Service recognizes that climate change presents a significant challenge to meeting our fire management goals. It has been projected that climate change will cause an increased frequency of extreme burning conditions (Chapin et al. 2005; Rupp et al. 2007). We realize that in some years burning conditions throughout Alaska and the western states could be such that all fire protection resources will be directed towards the higher priority considerations of human health and safety. Under these conditions our ability to manage wildfire to meet our wildlife and habitat objectives would be limited due to lack of resources.

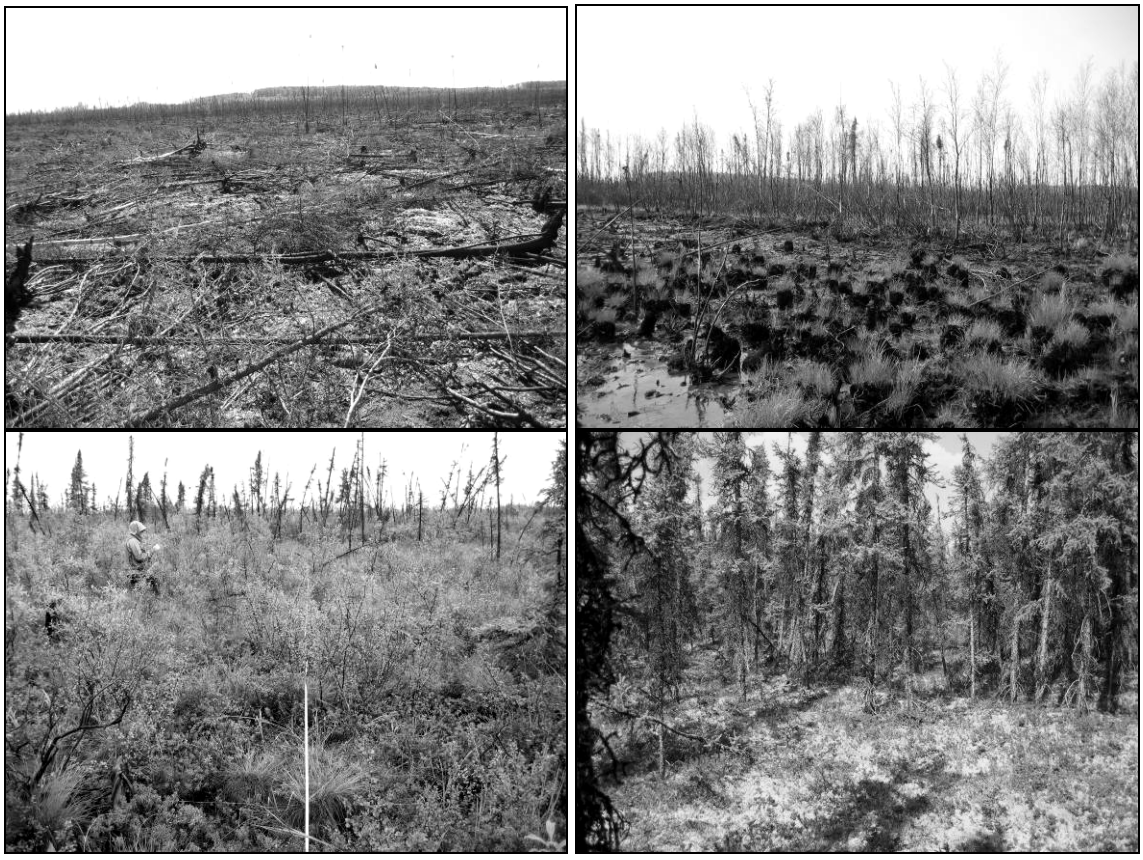


Figure 2-1: Post-fire vegetation succession

Different stages of post-fire succession provide habitat for a variety of wildlife but pose serious challenges to anyone who attempts crossing them on foot. (Photos L. Saperstein, USFWS)

2.4.5 Predator Management

Concerns about the status of moose and caribou populations have prompted requests and proposals for predator control to the State, to the Federal Subsistence Board (FSB), and to individual refuges. These requests and proposals are usually to reduce wolf and/or bear populations as a means to increase moose and caribou numbers for subsistence use. Other groups have protested actions by the State that authorize control of wolves or bears outside of normal hunting and trapping regulations. The FSB declined to adopt proposals to reduce predators as a way to increase prey populations. Under a 2004 policy, the Board will consider proposals for the non-wasteful taking of predators for direct personal or family consumption, but it will not consider proposals solely to reduce predator populations. The FSB's position is that it does not have the authority to adopt predator control regulations and that predator control is within the authority of the State and Federal land managing agencies.

As the responsible land manager for national wildlife refuges, the U.S. Fish and Wildlife Service acknowledges that wolves and bears can significantly affect ungulate prey population levels and that hunter success can be lowered in areas with reduced prey populations. The Service considers predator control a legitimate management tool provided it is scientifically justified, used in a prudent and ecologically sound manner, and consistent with the laws and policies governing

refuge management. If such predator control proposals or actions are in conformance with laws, regulations, and agency policies that govern management of national wildlife refuges, they would be considered by the U.S. Fish and Wildlife Service. Public involvement in this process would take place through a separate step-down planning process and environmental assessment. (See section 1.8 and Appendix N for further discussion.)

2.4.6 Biological Integrity Policy

The Policy on Maintaining Biological Integrity, Diversity, and Environmental Health of the National Wildlife Refuge System (USFWS 2001a; Service Manual 601 FW 3) provides guidance on how to implement the Refuge Improvement Act. Biological integrity is defined as the "biotic composition, structure, and functioning at genetic, organism, and community levels comparable with historic conditions, including the natural biological processes that shape genomes, organisms, and communities." Unlike most refuges in the United States that are concerned with restoring biological diversity and integrity, refuges in Alaska generally support intact ecosystems. Section 3.19 of the policy discusses the relationship between the policy and the comprehensive conservation planning process. It states that the principles of the policy will be integrated into all aspects of comprehensive conservation planning. While the refuge's establishing purposes and the System mission serve as the basis for the goals and objectives, maintenance and restoration of biological integrity, diversity, and environmental health of the refuge are to be included in these goals and objectives. The overarching purpose of the refuge is to conserve fish and wildlife populations and habitats in their natural diversity. Because the biological diversity on this refuge is believed to be intact and functioning in a healthy manner, within the natural range of variability, actions that support the refuge's first purpose also uphold the biological integrity policy.



Figure 2-2: Bull and cow moose

The Koyukon Athabascan word for moose is deneege. Moose are an important subsistence resource and are also sought by recreational hunters visiting the refuge. The estimated moose density on the refuge ranged from 0.22–0.76 moose per square mile from 1989 through 2007. (Photo A. Kokx, USFWS).



Figure 2-3: Wolf

Wolves (teekkone) prey on moose, particularly during the winter months, and on other smaller mammals throughout the year. It is estimated that 4–11 wolf packs use refuge lands for at least part of their territories; about 5 packs spend most of their time within refuge boundaries. (Photo USFWS)

2.4.7 Public Use

The remoteness, limited accessibility, hunting restrictions, and lack of roads or developed trails within the refuge affect its desirability by non-local visitors. However, the refuge does provide year-round opportunities for visitors who seek wildlife-dependent recreation in a remote environment. The refuge will allow, and where possible facilitate, the priority public uses of hunting, fishing, wildlife viewing and photography, and environmental education and interpretation (as identified in the Refuge Improvement Act) if those activities remain compatible with refuge purposes. Recreational public use will be managed to provide opportunities for quality experiences and to retain and protect the special values of the refuge, including its wild character (section 1.6).



Figure 2-4: Wildlife observation

The Kanuti Refuge, particularly on waterways like the Kanuti River, offers superb opportunities for wildlife observation and photography. (Photo USFWS)

State regulations will govern the harvest of fish and game unless those activities are further regulated by the Federal Subsistence Board. For instance, the State Board of Game established the Kanuti Controlled Use Area (KCUA) in 1981. Within this area, access by airplane for moose hunting is prohibited. In 1992, the Federal Subsistence Board further restricted moose hunting on Federal lands within the KCUA (Insert 3-4) to residents of Game Management Unit (GMU) 24 and the villages of Koyukuk, Galena, and Anaktuvuk Pass. This prohibits people who do not reside within GMU 24 or the three villages from moose hunting in the western two-thirds of the refuge. This closure periodically comes under review, and it is possible that it may be lifted during the life of this plan. The entire refuge will still be accessible by visitors using airplanes to hunt caribou, black and grizzly bear, and small game.

2.4.8 Access

The refuge is vast, remote, and inaccessible by road. However, depending on the season and the weather, it can be accessed by boat, float or ski-equipped airplane, snowmobile, or dog team. Visitors can also access the refuge by foot, but as the terrain is very wet with no trails, it is not ideal for hiking (Figure 2-1 and Figure 2-5).

Access to the refuge from outside the local area is most frequently by chartered airplane. Visitors can charter flights to the refuge with permitted commercial operators in Bettles, Coldfoot, or Fairbanks, or can access the refuge via private airplane. Fixed wing airplanes can land in many areas of the refuge—on water in summer and on ice or snow in winter. Airplane landings will be allowed throughout the refuge and will not be limited.

The use of off-road vehicles (ORVs), other than on established roads and parking areas, is prohibited except on designated routes or areas or with a valid permit under 43 CFR 36.11. Currently there are no roads, parking areas or designated routes or areas on the refuge. Designated routes and areas could only be allowed in Moderate and Intensive Management areas. The definition of ORV in 50 CFR 36.2 excludes snowmobiles; it includes airboats, air cushion vehicles, and other motorized vehicles.

ANILCA section 811(b) allows appropriate use of snowmobiles, motorboats and other means of surface transportation traditionally employed for subsistence purposes. There is no documented history of subsistence use of ORVs on the refuge (see Appendix K). Should new information become available that establishes ORVs as a traditional mode of access for subsistence purposes on the refuge, the use will be managed in accordance with 50 CFR 36.12, including promulgating refuge-specific regulations if closures or restrictions are needed to protect refuge resources.

ANILCA section 1110(a) allows for the use of snowmobiles (during periods of adequate snow cover), motorboats, airplanes and non-motorized surface transportation methods for traditional activities (where such activities are permitted by ANILCA or other law), and for travel to and from villages and homesites, subject to reasonable regulation. In winter, snowmobiles, and (less frequently) dog teams, are used for traveling between communities and to maintain traplines.

Restrictions to off-road vehicle travel within the Dalton Highway corridor north of the Yukon River make it difficult for visitors to access the refuge from the highway except by boat. Alaska Statute 19.40.210 prohibits the use of off-road vehicles (including snowmobiles) within five miles of the right-of-way of the Dalton Highway (figure 3-53). Exceptions to this regulation allow ORV use for petroleum exploration, access to mining claims, and transit from one side of the corridor to the other. The refuge can be accessed from the highway by non-motorized forms of transportation, such as foot, ski, or dog team. Additionally, water levels permitting, visitors can access the refuge by motorized or non-motorized boat via rivers that cross the Dalton Highway upstream of the refuge. Under all alternatives, all rivers and lakes within the refuge would remain open to motorized and non-motorized boat access.

No roads exist on Federal lands within the refuge boundaries, and no roads are proposed to be built by the Service. Any proposal for development of a road or other transportation corridor on the refuge under section 1102 of ANILCA would trigger a National Environmental Policy Act (NEPA) analysis and plan amendment as described in Appendix J, section 2.12.7.



Figure 2-5: Lakes

Numerous lakes within the refuge offer good opportunities for landing small airplanes equipped with floats. (Photo Steve Hillebrand, USFWS)

2.4.9 Refuge Infrastructure and Administration

Refuge headquarters is located in the Federal Building in Fairbanks. A 1.89-acre administrative site is located directly west of the Federal Building. The refuge houses an airplane in the Service hangar at the Fairbanks International Airport and maintains a storage shed, fuel storage, and airplane slip at the airport float pond.

In 2005, the refuge acquired a three-bedroom house in Bettles that was used as a temporary field office and bunkhouse. This replaced a combined bunkhouse, office, and visitor center that was destroyed by fire in 2004. That facility was operated jointly with the Gates of the Arctic National Park and Preserve. In 2008 the Service completed the construction of a replacement bunkhouse, visitor center and administrative office in Bettles in cooperation with the National Park Service (NPS). The temporary field office and bunkhouse acquired in 2004 will be converted to a residence for a permanent Bettles-based refuge employee.

The refuge maintains a hangar, workshop, boatyard, and fuel storage in Bettles and a dock, storage shed, and fuel storage for floatplane use at VOR Lake near Bettles. A field cabin is located within the refuge at Kanuti Lake. Another cabin, used as housing for summer employees working at the Arctic Interagency Visitor Center, is located at the Bureau of Land Management Marion Creek Administrative Site five miles north of Coldfoot on the Dalton Highway. Both cabins are low impact with solar electrical power. The Service has no plans for infrastructure projects on refuge lands.

2.4.10 Refuge Goals and Objectives

The refuge vision and purposes (chapter 1, section 1.4) and draft preferred alternative provided a framework for developing goals and objectives for managing the refuge.

The objectives beneath each goal are often applicable to more than one goal. To avoid unnecessary duplication, each objective is listed only under the goal that represents the clearest connection. The ordering of the objectives is not intended to imply prioritization; rather, the many objectives listed beneath Goal 1 have been clustered into rough categories of wildlife, habitat, and fish. Following each objective is the rationale for developing that objective. Biological objectives were identified as high or medium-high priorities during the 2002 review of the refuge's biological program. The refuge's Inventory and Monitoring step-down plan, which will be completed by 2009, will address prioritization and provide details on inventory and monitoring activities. The full range of objectives is presented here to provide the reader with an overview of the topics that are currently being addressed or might be addressed during the life this Plan. Funding and personnel issues will play a large role in determining how many and which objectives are undertaken.

Many of the objectives that are important for managing subsistence activities and public use of the refuge require monitoring or improving knowledge of the natural resources linked to these activities. Objectives addressing baseline knowledge of refuge natural resources are mainly listed under Goal 1 and Goal 2. Most of the objectives for subsistence or public use are listed beneath Goal 3 or Goal 4, which are focused on improving knowledge of the public's use of the refuge's resources.

Cooperation with State and Federal agencies and other organizations is a critical component to successfully meeting most of the objectives. This cooperation can take a variety of forms, ranging from reviewing and revising study plans and reports to cooperating on data collection and report completion.

Goal 1:

Conserve the refuge's diversity of wildlife, fish, and habitats, while allowing natural processes, including wildland fire and the natural hydrologic cycle, to shape the environment.

1. Collaborate with staff of other refuges, agencies, and research institutes to gain a better understanding of boreal forest ecosystems.

   Rationale: Cooperating on projects is a cost-effective strategy to address research needs during times of shrinking budgets. Many ecological questions are best studied on a regional scale and cannot be adequately addressed by working within a single land management unit (e.g., effects of climate change). Cooperative research enables the refuge staff to obtain information they would not normally be able to collect and provides an opportunity for the refuge to contribute to regional investigations. Results of such studies can facilitate management of resources on refuge lands, and it behooves the refuge to be included in these efforts by serving as a study site. Such cooperative endeavors also allow participants to learn more about their partners' organizations.

2. By 2009, complete the Inventory and Monitoring step-down plan to integrate and direct inventory and monitoring of plants, fish, and wildlife.

Rationale: An Inventory and Monitoring (I&M) step-down plan is required by Service policy (701 FW 2). The I&M plan will document the rationale, techniques, and schedule for routinely conducted inventories and monitoring efforts, and ensure that information is collected in a biologically and statistically sound manner. It will translate the goals and objectives from this Revised Comprehensive Conservation Plan into specific, achievable activities to be carried out as part of the refuge's biological program. It will also facilitate incorporation of refuge information into regional and national databases.

3. Within 20 years of adoption of the plan, complete an inventory of breeding birds and their habitats, vascular plants, fire history, and terrestrial insects within the refuge using an integrated plot-based approach.

   Rationale: The refuge is mandated by ANILCA to conserve fish and wildlife populations and habitats in their natural diversity, yet data are lacking to adequately describe this diversity. A basic biological inventory was recommended by a panel of experts during a 2002 review of the refuge's biological program (Heglund et al. 2005).

   Previous biological work on the refuge concentrated on particular species or specific areas. A systematic, plot-based inventory of resources on refuge lands will provide baseline information about habitat and select wildlife with a concentration on migratory birds that are trust species for the U.S. Fish and Wildlife Service. While specifics for inventories will be laid out in a step-down plan, data on the following will be collected: breeding birds, habitat, vascular flora, terrestrial insects, and tree age. Co-locating inventories of wildlife and habitat on the same plots will allow the refuge staff to model species-habitat associations and make inferences about areas of the refuge that are not sampled.

   The inventory will increase knowledge about breeding birds on the refuge and in interior Alaska. A pilot survey in 2004 resulted in the first detection of a palm warbler exhibiting breeding behavior in northern Alaska. The inventory will also provide previously unavailable floristic data, provide insights into fire history, detect the presence of invasive plant species within survey plots, and provide baseline data for future comparisons. Bird and vegetation sampling methods will be derived from methods developed for monitoring programs in national parks and preserves in interior Alaska and by the U.S. Geological Survey (USGS) for statewide monitoring of bird populations, allowing comparison of results among study areas. Little is known about terrestrial insects in Alaska, so basic collections from inventory plots will expand the information on species occurrence. For example, a prairie bluet damselfly collected on the refuge in 2004 was the first detection of this species in Alaska, and it represents a large extension of the known range for this species. These baseline data are particularly important as species composition and distribution could change under a warming climate scenario, resulting in new incidences of insect outbreaks and disease.

4. At intervals of 1–3 years, obtain a moose population estimate for the refuge, including age and sex ratios, by conducting aerial surveys in cooperation with neighboring State and Federal land managers.

   Rationale: Moose are important to the refuge in both ecological and human terms. They are an important subsistence species and most non-local visitors that currently come to the refuge do so to hunt moose.

   It is a challenge to obtain a precise refuge population estimate (e.g. a 90 percent confidence interval that is below ±30%). Given current budgets, the refuge staff can expect to conduct such surveys at about 2-3 year intervals. To address specific resource issues the refuge staff may conduct surveys annually if funding is available.

5. Obtain baseline information about late winter availability and use of moose forage species.

   Rationale: As previously mentioned, moose are an important resource on the refuge, and considerable effort is expended to monitor their population. It is difficult to predict how many moose an area can support because of complex and changing interactions among habitat, weather, predation, and hunting pressure. Some of these factors (e.g., moose numbers, human harvest, wolf numbers, snow depth, fire history) are currently monitored, but relatively little information on the availability and use of forage species, primarily willows, exists. Data on moose forage are often collected in late winter (late March into early April) when snow depth is at its peak, forage availability is limited due to earlier browsing or is buried under the snow, and moose are physiologically stressed. Browse information will enable a better understanding about the potential for the habitat to support growth in the moose population. Recent work in other areas of interior Alaska (Seaton 2002) will also enable comparison of habitat characteristics on the refuge to areas with differing densities of moose.

6. Implement the refuge's Fire Management Plan within the first two years of its approval.

   Rationale: Fire is one of the main drivers of the ecosystems within the Kanuti Refuge. Modern fire management practices need to be integrated into refuge habitat management. The Fire Management Plan provides management strategies that enable the Service to conserve, protect, or enhance habitats. Objectives within the plan concern ecological relationships as well as human health and safety issues. Because of fire's importance to the boreal forest ecosystem, implementation of the Fire Management Plan will be a fundamental step in addressing Goal 1.

7. Document fire history patterns on the refuge by collecting data on tree age annually, in association with inventory plots (see Objective 1), and by participating in research on Alaskan fire regimes during the life of this plan.

Rationale: Fire is the primary cause of habitat disturbance and subsequent vegetation regrowth on the refuge and is, therefore, a key determinant of how the ecosystem changes. Current knowledge of fire history patterns is insufficient to manage for natural fire regimes or adapt to potential habitat or population changes caused by climate change. Documentation of the fire history patterns on the refuge was identified as a high priority activity during a 2002 review of the refuge's biological program. Though methods used in the refuge's integrated inventory (see Objective 1) will provide some information about fire history, it will be necessary to conduct additional sampling that targets trees with fire scars in burns of known age. The refuge staff also will participate in localized or regional fire ecology research during the life of this plan.

8. Conduct surveys to determine if non-native, invasive plant species are becoming established on the refuge.

   Rationale: Non-native, invasive plants can colonize extensive areas and are a huge problem in much of the country. They can out-compete native plants and often have little or no value for wildlife. There are currently no known populations of invasive plants on the refuge, but non-native white sweetclover (*Melilotus alba*) is now a common plant along the Dalton Highway, often covering both shoulders of the road. There is concern that seeds of this species could disperse along rivers crossed by the highway and thrive on the similar habitats along river gravel bars, eventually establishing populations on the refuge. Burns and other disturbed sites are also vulnerable to invasive species and will be given priority for surveying, particularly if they are near a seed source such as an established population or area that receives frequent human use.

9. Determine the seasonal distribution (spawning and wintering areas) and migratory patterns of select species of whitefish (broad whitefish, humpback whitefish, and least cisco) within five years of adoption of this plan and assess the potential for similar studies of other resident fish such as pike and grayling.

   Rationale: The Kanuti Fisheries Management Plan (USFWS 1993) documents issues and concerns regarding fisheries resources on the refuge, and includes as one of its objectives "to determine resident fish abundance and distribution in three major drainages of the Kanuti Refuge." A telemetry study of whitefish distribution and movement began in 2003 but will not address other fish such as pike and grayling. Determination of seasonal distribution of whitefish and pike, and mapping of spawning areas of non-anadromous and resident fish, is a high priority for the refuge.

10. Map spawning areas of anadromous fish and assess escapement of salmon within 10 years of adoption of this plan.

    Rationale: This objective addresses data needs identified in the Kanuti Fisheries Management Plan (USFWS 1993). Since 2000, valuable information on abundance and run timing of salmon has been collected at a resistance board fish weir operated in Henshaw Creek, a tributary of the Koyukuk River above Allakaket and Alatna. Information gathered at the

weir does not address spawning areas on the Koyukuk River above Henshaw Creek (e.g., South Fork Koyukuk River) or in tributaries of the Kanuti River (e.g., Kanuti Kilolitna River). If airboat or jetboat use on rivers increases significantly, work with partners in cooperative studies to determine if these uses affect fish spawning.

11. Monitor snow depth and density at six snow markers on a monthly basis (December–May).

    Rationale: The official weather station closest to the refuge is in Bettles; however, data from this station are not representative of the entire refuge. The amount and duration of snowfall on the refuge can affect a variety of factors, including distribution and overwinter survival of wildlife, timing of spring bird migration, spring flooding and nutrient input to lakes, and the timing and probability of fire the following spring.

12. Monitor the beaver population on the refuge by conducting fall aerial surveys of beaver food caches at 5 to 10 year intervals.

    Rationale: Beaver are an important species on the refuge. People rely on them for food and fur, their foraging and water manipulation activities influence aquatic and terrestrial habitats of fish and wildlife, and they are a prey species for large predators. Previous surveys indicated a high density of beaver on the refuge. A technique for estimating the number of caches was tested with good results in 2002 and 2003, and this technique will become part of the refuge's normal monitoring activities.

13. Estimate the number of wolves on the refuge in late winter at three to five year intervals.

    Rationale: Many residents of the communities adjacent to the refuge are concerned that wolves are reducing moose populations and that the number of wolves on and near the refuge is increasing. Although wolf trapping and hunting are allowed, some residents have requested that predator control programs be implemented. Service policy is to manage populations for natural densities and levels of variation, and there is no evidence to indicate that the wolf population within the refuge is outside of these bounds. Monitoring wolf numbers will help the refuge address management concerns by documenting the normal fluctuations in population size and distribution and assessing the potential effect of wolves on prey populations.

14. Document winter abundance and distribution of caribou through monthly reconnaissance flights.

    Rationale: Caribou are periodic winter migrants onto the refuge. When present, they provide hunting opportunity for humans and are prey for wolves. The refuge monitors their abundance and distribution during monthly snow survey flights. Survey data are provided to the Alaska Department of Fish and Game (ADF&G) and to local tribal councils.

15. During the life of the plan or until results indicate that the population and habitat has stabilized, continue long-term studies of fire effects on small mammals and vegetation to document changes through different stages of forest succession.

    Rationale: Following large wildland fires in the early 1990s, long-term projects were initiated to monitor the regeneration of vegetation on permanent transects and to track changes in the abundance and species composition of small mammals on permanent trapping grids. Vegetation monitoring uses methods consistent with similar projects throughout interior Alaska, and transects are revisited at 5–10 year intervals following initial, rapid recovery stages. Small mammals were originally monitored annually but are currently monitored every two years. Both projects contribute to the understanding of fire effects on vegetation and wildlife populations in interior Alaska.

16. Investigate and assess the feasibility of conducting surveys to index bear abundance in select refuge locations.

    Rationale: Little is known about the number of black and grizzly bears on the refuge. Recent proposals to liberalize bear hunting regulations have generated concern about bear populations. Current methods for estimating the bear populations within the refuge are cost-prohibitive, but new techniques sometimes emerge, and less rigorous survey protocols may satisfy the need for information. Refuge staff will assess existing and emerging techniques for monitoring bears to determine if there is a cost-effective, repeatable method that would suit its needs.

17. Assess the feasibility of monitoring the distribution and abundance of snowshoe hares and other furbearers using aerial surveys of tracks.

    Rationale: Little is known about snowshoe hares and other furbearers on the refuge. Snowshoe hares are of particular interest due to their cyclical nature, their role as a prey species, and their effect on vegetation. Other furbearers represent part of the natural diversity within the refuge and have economic and cultural importance to trappers. Population estimates for furbearers are cost-prohibitive and not necessary given current trapping activity, but data on general distribution and relative abundance are desirable. New techniques, such as aerial videography of tracks in winter, should be assessed as tools to provide baseline data about snowshoe hares and furbearers and to monitor them over time.

18. Contribute to continental, statewide, and bioregional monitoring efforts to establish trends in migratory landbird populations. This will be done through annual participation in scientifically-defensible, peer-recognized programs such as the continental Breeding Bird Survey (BBS) and Alaska Landbird Monitoring Survey (ALMS). Participation in these programs would include implementation and assistance in the refinement and testing of procedures.

Rationale: Refuge purpose (i) is to "conserve…wildlife populations… in their natural diversity including…*migratory birds"* (see section 1.4.1). Migratory birds are also Trust species of the Service. Successful monitoring of landbird trends on a refuge-specific scale, however, is generally cost-prohibitive because the necessary level of effort is comparable to that of a regional approach. Additionally, given the refuge's size, the scale of inference from monitoring at a refuge-specific level may be too narrow to be useful (i.e., a regional decline is more meaningful than a local decline). Recommendation WH1 in Fulfilling the Promise (USFWS 1999) advocates pursuit of population goals not only at the refuge level, but also at the System, regional, and ecosystem levels.

19. Continue to assist in annual monitoring of the Alaska mid-continent greater white-fronted goose population.

    Rationale: Greater white-fronted geese are a trust species and are specifically mentioned in the refuge's purposes (section 1.4). Data suggest that numbers of greater white-fronted geese nesting in interior Alaska declined through the 1990's (Lowe and Spindler 1996, Martin 1998a, Ely and Schmutz 1999, Spindler and Hans 2005). This segment of the Mid-Continent population is unique because it nests in boreal forest and taiga habitat. A multi-faceted approach is being used to address the decline. Refuge participation in the conservation effort should mirror the proportion of the population that breeds and/or stages on the refuge.

20. Assist U.S. Fish and Wildlife Service Migratory Bird Management in statewide programs, including but not limited to swan censuses.

    Rationale: Migratory waterfowl, including swans, are Trust species and are specifically mentioned for conservation in the refuge's purposes (section 1.4). Conducted every five years, the swan survey provides a refuge census of swans and contributes to a statewide census. With increasing concern for boreal forest-breeding diving and sea ducks like Lesser Scaup, Surf, and White-winged Scoters, the refuge may be poised to contribute to studies involving these species or species groups of interest.

21. Determine current species composition of swans on the refuge.

    Rationale: Swans found nesting in the interior boreal forest and taiga are generally presumed to be trumpeters (Conant et al. 2001). In 1989, refuge personnel censused the refuge and located 60 individuals, including 58 percent trumpeter swans and 42 percent tundra swans (Wilk 1993). Trumpeter swans, in particular, have increased markedly in the last 15 years. Continued censusing of swans will demonstrate whether swan populations on the refuge have paralleled the increase statewide. An intensive survey of nesting swans will determine if the species representation occurs in the same proportions as it did 20 years ago.

22. Within the life of the this plan, replicate (and where necessary, modify) the 1997 expanded aerial waterfowl breeding pair survey, in cooperation with U.S. Fish and Wildlife Service Migratory Bird Management. The survey should be conducted regularly (e.g.,

every five years) thereafter. Survey(s) should ensure adequate sampling for the three main groups of ducks: dabblers, divers, and sea ducks.

Rationale: Waterfowl are a Trust species specifically mentioned in the refuge's purposes (section 1.4). Aerial line transect surveys of breeding waterfowl have been conducted annually on the refuge since 1957 as part of the North American Waterfowl Breeding Pair Survey (NAWBPS). Waterfowl and waterbird distribution and abundance data based on the two NAWBPS transects that fall within the refuge are likely not representative of the refuge, given the available wetland habitat not covered by the survey lines. The best data on distribution and abundance of breeding waterfowl and waterbirds on or near the refuge are derived from a 1997 aerial survey (Platte 1999). Regular replication of this survey (e.g., every five years) would provide a continuing picture of distribution and serve as a basis for monitoring. Because a single survey targeting dabbling, diving, and sea ducks would likely be better timed for one group than the other (or perhaps be mistimed for both groups), two "within-year" surveys, targeting dabbling ducks and then the later-nesting diving ducks and sea ducks, would increase accuracy of estimates.

23. For those species of migratory birds that regularly breed on the refuge and are demonstrating long-term population declines, continue collaboration towards conservation, including monitoring, research, and outreach.

    Rationale: Boreal forest breeders that regularly occur on the refuge and are experiencing continental declines include Horned Grebe, Lesser Yellowlegs, Solitary Sandpiper, Olive-sided Flycatcher, Blackpoll Warbler, and Rusty Blackbird. Refuge support could include providing study sites for projects, testing methods, and participating in working groups (e.g., Rusty Blackbird Working Group), etc.

24. Collaborate with the Boreal Program for Regional and International Shorebird Monitoring (Boreal PRISM) to help design and implement appropriate inventory and monitoring techniques for breeding and migrant shorebirds.

    Rationale: A) While shorebird usage of coastal habitats for migration is well documented (e.g., Copper River Delta, Kachemak Bay), the value of ephemeral migratory habitats (e.g., spring flooding of meadows, late summer drying of wetlands) for inland migrants and/or breeders has been essentially overlooked in Alaska. Investigations of these habitats in the non-breeding seasons will contribute to a more complete inventory of shorebirds and their habitats within the refuge.

    B) Boreal forest-breeding shorebird species that occur on the refuge, such as Lesser Yellowlegs and Solitary Sandpiper, are showing steep continental population declines. Techniques to effectively monitor them are being developed and will require testing in areas such as interior Alaska refuges.

25. Design and implement a long-term waterfowl and waterbird production survey of the refuge.

    Rationale: Production of waterfowl and waterbirds on the refuge has not been investigated since 1993. A long-term study could provide information on relative abundance, productivity, survival, mortality, and habitats of waterfowl and other waterbirds. Waterfowl and waterbird production may serve in part as bio-indicators of ecosystem health, especially in light of potential threats such as drying wetlands and other factors associated with climate change.

Goal 2:

Ensure the natural function and condition of water resources necessary to conserve fish and wildlife populations and habitats in their natural diversity.

26. Within the life of this plan, develop a water resource inventory and assessment study plan in conjunction with the Service's Water Resources Branch.

    Rationale: A Water Resources Inventory and Assessment will be conducted to identify and coordinate water research and data collection efforts on the refuge. It will provide baseline water quality and quantity information, and support the Regional Instream Flow Program. The refuge staff will work closely with the Service's Water Resources Branch in selecting locations for long-term monitoring. The initial inventory will provide resource managers with 5–6 years of streamflow data and water quality information at select locations on or near the refuge. This assessment will be aimed at understanding the ecological significance of the hydrologic cycle in maintaining the natural diversity and function of habitat important to the fish and wildlife resources of the refuge.

27. At the conclusion of the initial assessment, evaluate the need to continue monitoring stream flow and/or water quality conditions to support research or management objectives.

    Rationale: Sufficient water quality and quantity are critical to support fish, wildlife, and plants on the refuge. Few data are currently available about water resources. Data collected during the initial assessment (see Objective 26) will provide valuable information about the lakes and streams within the refuge. However, stream gauges established for the inventory and assessment are typically operated for 5–6 years and do not provide long-term stream-flow or water quality monitoring information. The refuge staff will work closely with the Service's Water Resources Branch in selecting locations for long-term monitoring.

28. Formulate a strategy to inventory wetland and lake resources within the refuge, including aquatic plants, fish, wetland-dependent wildlife, aquatic invertebrates, and physical and chemical properties of lakes and wetlands.

    Rationale: Data derived from the water resource inventory and assessment (Objective 26) will greatly advance the understanding of the water resources

within the refuge but are not adequate to fully meet the refuge's legal mandate pertaining to water quality and quantity. Additional data are required to describe the lakes and wetlands within refuge boundaries, including the plants and wildlife dependent on them, and to establish a baseline for comparison of future conditions. Changes in water quality and quantity can affect the diversity and abundance of fish, wildlife, and plants within the refuge, but little is known about existing conditions. The refuge staff would work with specialists from other Service branches or outside the Service to design and implement feasible and productive studies.

29. Formulate a strategy to inventory the river and stream resources within the refuge boundaries, including aquatic plants, river-dependent fish and wildlife, aquatic invertebrates, riparian and floodplain habitat, and physical and chemical properties of rivers and streams.

    Rationale: Data derived from the water resource inventory and assessment (Objective 26) will greatly advance the understanding of water resources within the refuge but are not adequate to fully meet the refuge's legal mandate pertaining to water quality and quantity. Additional data are required to describe the water flowing through the refuge, including the natural hydrologic processes that create the dynamic habitats necessary to support the plants, wildlife, and fisheries of the refuge. Changes in rivers and streams can affect the diversity and abundance of fish, wildlife, and plants within the refuge, little is known about existing conditions. The refuge staff would work with specialists from other Service branches or outside the Service to design and implement feasible and productive studies.

30. Assess the feasibility of developing a hydrologic model for the refuge.

    Rationale: As specified in the Refuge's Biological Review (Saperstein 2002b), a hydrologic model would allow the refuge to track and predict changes in water resources and evaluate the effect of these changes on fish, wildlife, plants, and people. For example, climate change could lead to changes in precipitation patterns that could affect flooding regimes and water quantity; melting of permafrost with alteration of drainage patterns and changes in water temperature could affect the survival of fish, aquatic plants, and invertebrates. Model results are highly dependent on the availability and quality of input data, and the refuge does not have the information necessary to develop a successful model. Data collected during projects listed in other objectives (e.g., snow depth monitoring, water resources inventory) will be incorporated into the model and will enable the refuge to assess additional data required to improve the model.

Goal 3:

Provide opportunities for local residents to pursue their subsistence lifestyle.

31. As a continuing commitment, conduct annual informational meetings in each village associated with the refuge and regularly attend other subsistence-related meetings, providing information regarding the status of subsistence resources and their use, and commenting on proposals related to subsistence management within the refuge to maintain a respectful dialogue with refuge resource stakeholders and subsistence users.

    Rationale: Face-to-face meetings in local villages are the most effective forum for reviewing and explaining Federal subsistence harvest regulations promulgated to conserve fish and wildlife populations and for discussing issues of local concern to subsistence users.

32. Continue to work closely with stakeholders to address issues and concerns through the State and Federal regulatory processes as provided in ANILCA to conserve fish and wildlife. Stakeholders include tribal councils, the Koyukuk River State Fish and Game Advisory Committee, the Western Interior Federal Subsistence Regional Advisory Council, other local and regional working groups, Alaska Department of Fish and Game, and the Office of Subsistence Management.

    Rationale: The refuge is mandated by ANILCA to provide the opportunity for continued subsistence uses by local residents when consistent with other refuge purposes. It is essential that affected parties work cooperatively towards achieving common subsistence goals.

33. Develop a partnership with tribal councils, Alaska Department of Fish and Game Subsistence Division, and the Office of Subsistence Management to seek funding to review historical subsistence use data (hunting, trapping, and fishing), identify data gaps, and develop a research protocol that will incorporate western science and traditional ecological knowledge to document changing resource and use patterns.

    Rationale: The majority of information relating to the location and intensity of subsistence activities within the refuge was gathered in the 1980s and may not accurately portray recent patterns in subsistence lifestyles, demographics, bag limits, or hunting seasons; the information is becoming less useful for making management decisions. Updated information will assist with management of natural resources and identify potential areas of user conflict. An effective strategy for providing continued subsistence opportunities and managing for healthy populations of fish, wildlife, and plants should take into account all available historical and current

knowledge of subsistence activities, relying on scientific data and traditional ecological knowledge gained through partnerships with local communities, tribal representatives, and other organizations.

34. Work with stakeholders to develop and implement a subsistence harvest monitoring plan to conserve migratory bird populations for continued subsistence use. Stakeholders include tribal councils, Alaska Department of Fish and Game Subsistence Division, the Office of Subsistence Management, Alaska Migratory Bird Co-management Council, and the Interior Region Management Body (Tanana Chiefs Conference).

    Rationale: ANILCA and a recent amendment to the Migratory Bird Treaty Act direct the conservation of migratory birds for continued subsistence use and documentation of traditional migratory bird harvest levels. The amendment established a spring and summer migratory bird subsistence hunt that has the potential to affect the conservation of many species. A cornerstone of the amendment was that the current level of harvest would remain the same. A migratory bird harvest monitoring plan and implementation protocol based on an accurate estimate of harvest are needed to ensure long-term conservation of Trust species and continued opportunity for subsistence use. Continued communication and collaboration between the refuge and local governments is critical in conducting successful and accurate subsistence harvest monitoring programs.

Goal 4:

Provide opportunities for quality public use and enjoyment of refuge resources in ways that minimize conflicts among user groups through compatible wildlife-dependent recreation activities, including hunting, fishing, wildlife observation and photography.

35. Review methods of monitoring levels and types of public use, and implement new methodology if deemed appropriate.

    Rationale: Accurate public use data is a critical component in evaluating existing levels of service to the public, documenting results of public use programs, determining if the refuge is meeting its resource management goals, and ensuring recreational uses remain compatible with the purposes of the refuge.

36. Continue to provide a range of opportunities for multi-day recreational trips within the refuge that allow the public to experience and explore the dynamic landscape and wildlife of the refuge in solitude, incorporating various methods of access.

    Rationale: Many visitors and local residents who go to the refuge are seeking a remote and wild experience. The mode of access utilized (floatplane, snowmobile, canoe, etc.) will shape the desired experience.

37. Working with community, State and Federal authorities, develop a comprehensive law enforcement program with an emphasis on educating visitors to prevent violations.

    Rationale: To enhance visitor experiences and help protect refuge resources, the refuge needs a good strategy for improving visitor safety and compliance with existing rules and regulations. Violations do occur but are not always intentional—and often are due to misunderstandings, misinformation, or lack of knowledge.

38. Assess and evaluate levels and patterns of snowmobile use on the refuge and off-road vehicle (ORV) use on adjacent and private lands within refuge boundaries.

    Rationale: Snowmobile and ORV use on and near the refuge must be monitored carefully to ensure that activities minimize wildlife disturbance and prevent impacts to habitat.

39. Continue working with Evansville, Incorporated, the National Park Service; Alaska Department of Transportation and Public Facilities; and the City of Bettles to design and build an interpretive nature trail near Bettles on land adjacent to the northern boundary of the refuge.

    Rationale: This interpretive trail would present a unique opportunity for visitors and local residents of Bettles to view wildlife living in and utilizing habitats typical of the refuge. The trail would provide good educational and viewing opportunities for migratory and resident birds, beaver, moose, and other species and their habitats.

Goal 5:

Provide outreach, environmental education, and interpretive programs to develop and/or increase a sense of stewardship for wildlife, cultural resources, and the environment, and to enhance visitor experiences on the refuge.

40. Update the 1992 Environmental Education and Interpretative Plan, reviewing and revising periodically as necessary.

    Rationale: A well planned strategy for conducting environmental education and interpretive programs will help provide for public understanding of refuge resources, issues and public uses, and explain how the National Wildlife Refuge System and the U.S. Fish and Wildlife Service contribute to conserving and providing wildlife, wild lands, and recreational opportunities for future generations.

41. Continue to provide the public timely and accurate information about the refuge through a wide variety of communication tools; re-evaluate the tools used and update and correct information at least twice annually.

Rationale: Currently the refuge uses a variety of communication tools (e.g., a Web site, newsletter, audiovisual programs, brochures, interpretive panels, etc.). These tools and their supporting technologies can provide the public accurate and timely information—but only if periodically evaluated and updated.

42. In partnership with the Bureau of Land Management and the National Park Service, continue providing interpretive and educational experiences to visitors at the Arctic Interagency Visitor Center in Coldfoot by contributing staff and operational support.

    Rationale: In recent years, the Arctic Interagency Visitor Center has hosted more than 8,000 visitors annually. The facility is located in the Dalton Highway Corridor, which passes within eight miles of the eastern border of the refuge and sometimes serves as an access point for refuge visitors. The facility presents an invaluable opportunity to educate and inform the public about recreational opportunities, wildlife and habitat, cultural resources, management activities and good stewardship of the Kanuti Refuge and the nearby Arctic and Yukon Flats refuges.

43. In Fairbanks, Bettles, Evansville, Allakaket, Alatna, and Coldfoot, participate when possible in community events, festivals, and programs that will facilitate education and interpretation of Service and refuge goals.

    Rationale: Participation in community-based events and programs provides opportunities to educate and inform the public, and to build community awareness and support for the National Wildlife Refuge System, the refuge, and resources within its boundaries.

44. Expand opportunities for individuals, organized groups, and families to learn about the refuge through activities such as environmental education programs, nature walks, and interpretive programs.

    Rationale: Opportunities, including interpretive and educational programs, talks, nature hikes, and workshops, provide an important and popular public service. They prepare visitors to have safe and enjoyable experiences on the refuge and educate all audiences about conservation topics or refuge issues.

45. As opportunities arise, provide classroom visits and educational materials as requested by educators in the Yukon-Koyukuk School District.

    Rationale: Increased cooperation between the refuge and the Yukon-Koyukuk School District will improve environmental awareness among youth and the public.

46. Work closely with the National Park Service and U.S. Fish and Wildlife Service staff (including staff in the Divisions of

Engineering and on refuges) to operate and maintain the "shared" office, visitor center, bunkhouse, and other facilities in Bettles.

Rationale: Approximately 400 people visit the shared visitor facility in Bettles annually, with another 3,000 people contacting the station each year seeking information about the park and refuge. This facility is the closest many people will ever come to the refuge. Quality facilities in Bettles will allow the Service to enhance land stewardship and better serve the public by providing a place to learn about resources within and around the refuge.

Goal 6:

Foster an appreciation for the cultural resources of the refuge through conservation and interpretation.

47. Update, compile, and organize the refuge cultural resource atlas and database to include all known historical and archaeological sites, place names, and paleontological locality information. Identify priority areas to inventory for archaeological and other cultural sites and conduct surveys as time and personnel allow. Perform surveys at a level sufficient to evaluate the eligibility of identified sites to the National Register of Historic Places.

    Rationale: Very little is known about the cultural resources of the refuge. Compiling all known information will make it possible to evaluate information needs and set priorities for surveys and research.

48. Seek out and develop partnerships with Native corporations, universities, other government agencies, etc., to cooperatively inventory, manage, and protect cultural and historical resources.

    Rationale: Cooperative projects with museums, universities, Tribal entities, Native corporations, and other institutions allow parties to pool scarce resources and increase the amount of work completed. They allow the Service to receive the advantage of working with recognized experts in the region, which greatly increases the value of completed work.

49. Update the refuge's Cultural Resources Guide by 2011 (15 years after it was first completed).

    Rationale: The refuge's Cultural Resources Guide was completed in 1996. Updating this step-down plan will allow refuge staff to better understand where they should concentrate inventory and survey efforts.

50. In cooperation with the communities of Allakaket, Alatna, Bettles, and Evansville, develop a plan to preserve traditional information, maps, or other products using existing traditional place names information for the refuge.

Rationale: Place names contain an enormous amount of information on traditional uses, culturally significant places, historic camps and settlements, and other culturally important information. Existing information is an untapped archive that could mutually benefit the four communities of Allakaket, Alatna, Bettles, and Evansville, and the refuge, recognizing the significant role of local people in the natural and cultural heritage of the refuge.

2.4.11 Funding and Personnel Requirements

In fiscal year (FY) 2008, the refuge had a staff of five full-time permanent and three part-time and/or seasonal employees assigned solely to Kanuti. Permanent employees included a refuge manager/pilot, a deputy refuge manager, a lead wildlife biologist, and an avian wildlife biologist. Part-time and seasonal employees included a park ranger (stationed at the Arctic Interagency Visitor Center), one biological technician, and one maintenance worker. For efficiency, considerable sharing of staff occurs among the three refuges with offices co-located in Fairbanks (Kanuti, Arctic, and Yukon Flats). One full-time permanent and one part-time administrative staffer were assigned to the Kanuti Refuge but shared among Kanuti, Arctic, and Yukon Flats refuges. In addition, a fire management officer (FMO), assistant fire management officer, and a fire management specialist were assigned to the Kanuti Refuge to serve all three Fairbanks-based refuges. A subsistence coordinator, two law enforcement officers, two information technology specialists, and a maintenance worker/pilot are supervised by Yukon Flats and Arctic Refuges but are shared by the three co-located Fairbanks-based refuges. Additional law enforcement officers at Arctic and Yukon Flats refuges assist Kanuti Refuge when needed. Kanuti Refuge's base budget in FY 2008 was $928,000. This will be reduced by $94,000 in 2009 (and beyond) to reflect administrative restructuring. To maintain the current staffing situation in the short term (less than three years), this present level of funding, adjusted for inflation, would be required. Long-term budget and staffing goals (3–15 years) provide for implementation of projects identified in the Refuge Operational Needs System (RONS) to accomplish refuge objectives and to accommodate anticipated increases in subsistence and recreational demands.

Table 2-3: Budget and staffing needs

Item	Short-Term Implementation (<3 years)	Long-Term Implementation (3–15 years)
Annual Recurring Base Budget + Fire Preparedness Funding[a]	$1,336,606	$2,391,606
Permanent Full-Time (PFT) Employees assigned to Kanuti Refuge	9.6	15.1
Permanent Part-Time (PPT) assigned to Kanuti Refuge	1	2
Permanent Full-Time Kanuti Refuge employees not shared with other Fairbanks-based refuges: Refuge Manager/Pilot Deputy Refuge Manager Lead Wildlife Biologist Wildlife Biologist (Avian) Administrative Support Assistant **Long-term positions to be added (RONS proposals):** Airplane Pilot/Park Ranger or Airplane Pilot/Biologist - PFT- Bettles or Fairbanks Maintenance Worker - PFT - Bettles Interpretive Park Ranger or Outreach Specialist - PFT - Bettles Biologist (aquatics or fisheries) - PFT - Fairbanks Refuge Information Technician - PPT- Allakaket or Alatna[b]	5	9.5
Permanent Kanuti Refuge employees shared with Yukon Flats and Arctic refuges: Administrative Officer Fire Management Officer Assistant Fire Management Officer – PFT – Fairbanks Fire Management Specialist – PFT - Fairbanks Interpretive Park Ranger (Coldfoot - PPT - 24 hr./week) **Long-term positions to be added (RONS proposals):** Office Automation Clerk - PFT – Fairbanks	4.6	5.6
Permanent Yukon Flats Refuge employees shared with Kanuti and Arctic refuges: Subsistence Coordinator Law Enforcement Officer	2	2
Permanent Arctic Refuge employees shared with Kanuti and Yukon Flats refuges: Information Technology Specialists (2) Maintenance Worker/Pilot Law Enforcement Officer	4	4
Seasonal Employees assigned to Kanuti Refuge[c]	2	4
Seasonal Volunteers assigned to Kanuti Refuge[c]	2	4

a Based on FY 2008 base budget minus $94,000 to reflect restructuring of the administrative team plus $216,606 to reflect restructuring of the fire management program

b RIT function may be contracted with a Tribe rather than as a Service employee.

c Numbers of seasonal employees and volunteers would probably increase but would vary from year to year.

Currently identified essential staffing, mission-critical projects, and an increase in recurring base funds to implement projects include the following (values are in 2008 dollars):

an increase of $105,000 in base funds to provide for and support an airplane pilot position within the next three years; this function may be combined with a biologist, manager or maintenance worker; it may be based in Bettles or Fairbanks;

an increase of $74,000 in recurring base funds to provide for and support a maintenance worker in Bettles or Evansville;

an increase of $48,000 to provide for and support an office automation clerk that would be shared among the three Fairbanks-based refuges;

an increase of $59,000 to provide for and support an interpretive park ranger or outreach specialist in Bettles or Fairbanks;

an increase of $72,000 to provide for and support a general biologist for aquatic environments to address important objectives in this plan;

an increase of $27,000 to provide for and support a refuge information technician in Allakaket or Alatna. This position may be contracted for directly with the local tribe.

One-time construction projects include approximately $325,000 for energy efficiency and renewable energy upgrades to three buildings in Bettles. An additional $200,000 will be requested to add a garage and improve energy efficiency at the maintenance shop in Bettles.

Seasonal employees and volunteers play an important role in refuge operations. The number of seasonal employees and volunteers could vary considerably from year to year depending upon projects and budgets. In fiscal year 2008, Kanuti enjoyed the benefits of 26 volunteers who contributed more than 2900 hours of service. The refuge was fortunate in 2008 and it is not likely that this level of volunteer assistance could be sustainable in the long term. It is more likely that some of the duties would eventually have to be performed by paid employees or that projects would be put on hold.

4. Implementation and Monitoring

Implementation of the Kanuti National Wildlife Refuge Comprehensive Conservation Plan (Plan) will be accomplished, in part, through various step-down plans (section 4.1). Each step-down plan has its own program focus, identifying and directing the implementation of strategies designed to achieve programmatic objectives outlined in chapter 2. The implementation process also includes identifying partnership opportunities that assist in implementing strategies while accomplishing refuge objectives, as discussed in section 4.2.

Monitoring the progress of plan implementation is accomplished by a variety of methods (section 4.3). Evaluation of monitoring results may lead to amendment or revision of the Plan (section 4.4).

4.1 Step-Down Plans

Step-down management plans are plans that deal with specific management topics. They describe specific, topic-related management strategies and implementation schedules and provide details necessary to implement management strategies identified in Comprehensive Conservation Plans (USFWS 2000b). Step-down plans for the refuge include the following:

Fisheries Management Plan

Inventory and Monitoring Plan

Cultural Resource Guide

Environmental Education and Interpretative Plan

Fire Management Plan

Land Protection Plan

Station Safety Plan, Fire Emergency Evacuation Plan, and Station Security Plan

Water Resources Inventory and Assessment: Plan of Study

Environmental Management Plan

Oil Spill Contingency Plan

4.1.1 Fisheries Management Plan

The 1993 Kanuti Fisheries Management Plan (FMP) (USFWS 1993) provides a description of habitats and fish species known or expected to occur within the refuge. It identifies the four purposes of the refuge (as defined in the Alaska National Lands Conservation Act) as goals, provides objectives for each goal, and lists tasks designed to meet the objectives. Some of the tasks list Alaska Department of Fish and Game (ADF&G) as the responsible office and may not fall under the jurisdiction of the refuge, although responsibilities may have changed since the FMP was developed.

Many of the 11 objectives listed in the FMP have not been addressed or have been only partially addressed. Some progress has been made toward accomplishing Objective 1.3, section 2.4.10, monitoring escapement of salmon stocks, with the establishment and continued operation of the Henshaw Creek weir. Attempts were made to monitor escapement on the South Fork Koyukuk River, which was specifically mentioned in the FMP, but repeated flooding resulted in the weir being moved to Henshaw Creek. Objective 1.5, determining resident fish abundance and distribution in three major drainages, was partially met. Rather than conducting standard riverine sampling techniques as suggested in the FMP, the U.S. Fish and Wildlife Service (Service) approached this objective by implanting transmitters in broad whitefish, humpback whitefish, and least cisco in two drainages. Data from this ongoing project will provide information on distribution, movements, and seasonal habitat but will not provide information on abundance. Objective 3.1, monitoring and evaluating subsistence harvest of fish species within the refuge as a continuing commitment through 1998, was partially met. Regional information reports by the ADF&G Commercial Fish Division include subsistence harvest of salmon, by village, based on personal interviews and permit returns. Andersen et al. (2004) documented traditional ecological knowledge and contemporary subsistence harvest of non-salmon fish in the Koyukuk River drainage and provided maps of harvest locations that include the refuge.

The FMP is to be updated every five years.

4.1.2 Inventory and Monitoring Plan

Inventory and Monitoring Plans (IMPs) consist of two main components: 1) a discussion of a refuge's biological priorities and objectives and how these were arrived at, and 2) protocols for meeting these priorities and objectives. The refuge does not have an IMP, but it is scheduled to be completed by 2009. Biological priorities were discussed during a 2002 review of the refuge's biological program, and results were summarized in a report (Heglund et al. 2005). This will form the basis for the discussion portion of the IMP. Several IMP protocols for surveys conducted are in draft status (e.g., breeding bird surveys, wolf surveys, post-fire vegetation transects, and post-fire small mammal trapping) but have not been finalized. Other draft sections had been developed, but the projects were subsequently dropped or changed to such a large extent that the drafts became obsolete.

4.1.3 Cultural Resource Guide

The Cultural Resource Guide assists refuge staff in meeting legal requirements to protect and manage the cultural resources of the refuge. It provides a reference to the cultural resource guidance provided by law and regulation, the Service manual, and the Cultural Resource Management Handbook. It outlines roles and responsibilities, summarizes legislation governing management of cultural resources, and contains information of potential use to the refuge manager. It describes the current state of knowledge of the prehistory and history of the region. It includes a list of projects that would fill in gaps in knowledge or complete existing work. This guide was completed in 1996 and is scheduled to be updated in 2012.

4.1.4 Environmental Education and Interpretative Plan

Published in 1992, the refuge's Environmental Education and Interpretative (EE&I) plan gives direction to the educational and outreach programs conducted by refuge staff. In addition to an overview of the refuge and an explanation on the state of the existing EE&I program, the plan presents a section on visitor characteristics and use projections and provides an outlook on the

refuge EE&I program's future with a strong emphasis on the Bettles Contact Station. It does not provide any guidance on the Arctic Interagency Visitor Center (Coldfoot Visitor Center).

The plan describes EE&I efforts within the communities near the refuge, specifically within schools. These programs emphasize national directives of the Service, refuge purposes, and special programs such as International Migratory Bird Day, National Wildlife Refuge Week, and the Junior Duck Stamp Program. All refuge staff are involved with these formal and informal programs. Educational programs are promoted through contacts with school faculty and classroom visits, and by providing or lending environmental education materials.

The last three EE&I goals and associated objectives in the 1992 plan are obsolete, as they concerned the Bettles Contact Station (which burned down in January 2004), and/or the Bettles School (which closed in 2002 due to lack of students). Additionally, the EE&I plan was written before the new Arctic Interagency Visitor Center opened. This plan will be rewritten after the completion of this Comprehensive Conservation Plan.

4.1.5 Fire Management Plan

The Kanuti Fire Management Plan (FMP) described the fire management activities that will occur on Kanuti Refuge. The FMP provides the framework for all refuge fire management decision-making and specifies the uses of fire that are consistent with refuge goals and objectives. Once the FMP is approved, it becomes the basis for the expenditure of fire funds. Service policy (621 FW 1) requires all refuges with vegetation capable of sustaining fire to develop a FMP. The FMP describes the relationship to land management goals and fire policy, wildland fire management strategies, fire staff organization, budget, monitoring, and evaluation. An approved FMP is also a prerequisite to conducting prescribed burning and wildland fire use. The Kanuti FMP was completed in 2007.

4.1.6 Land Protection Plan

The Kanuti Refuge Land Protection Plan, published in 2002, focuses on private lands within the refuge boundaries with the goal of identifying and conserving high-quality habitat on those lands (USFWS 2002b). It guides the refuge's land conservation activities and provides a framework for refuge and private landowner cooperation. Land conservation measures will be pursued only with landowners who are willing to work with the Service and does not obligate the refuge or landowners to undertake any of the measures identified. The refuge must consider management goals, priorities, and availability of funds when approached by private landowners with land conservation proposals.

4.1.7 Station Safety Plan, Fire Emergency Evacuation Plan, and Station Security Plan

These plans focus on providing a safe and healthful environment for employees and visitors. They aim to minimize the potential for injury to employees and the public and to prevent property damage. The safety plan describes programs needed to train personnel in how to deal with the environment, materials, and machines that may pose hazards, and its goal is making safety and environmental health integral parts of every task. All plans are reviewed annually.

4.1.8 Water Resources Inventory and Assessment: Plan of Study

This plan guides a six-year inventory and assessment of the water resources of the refuge. Results of the study will be used to quantify in-stream flow water rights for the maintenance and

protection of fish and wildlife habitat. The plan will be completed in 2009. Implementation will be determined by budget and personnel availability.

4.1.9 Environmental Management Plan

This plan was developed in 2005 and updated in 2008 with the assistance of the Division of Engineering, Environmental, and Facility Compliance Branch. The plan identifies and ranks field station activities, products, and services that affect the environment. It sets goals and measurable targets to improve environmental performance relative to field station operations and impacts. The plan defines key environmental responsibilities, establishes accountability for them, and identifies environmental reporting and training requirements.

4.1.10 Spill Prevention, Control, and Countermeasure Plan

This plan outlines the procedures, methods, and equipment used at the refuge to comply with Environmental Protection Agency oil spill prevention, control, and countermeasure standards and the inspection, reporting, training, and recordkeeping requirements. The plan was implemented in 2000 and is reviewed and evaluated once every three years by the regional spill coordinator.

4.1.11 Visitor Services Plan

Due to low levels of public use, the refuge does not have a separate Visitor Services Plan. Therefore, this Comprehensive Conservation Plan will serve to guide public use management. Public use includes hunting, trapping, fishing, camping, hiking, and wildlife observation and photography. A Visitor Services Plan will be developed if necessitated by increased public use.

4.2 Partnership Opportunities

Partnerships with other organizations are among the ways the Service fulfills its mission: "Working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people."

The refuge exists within a dynamic ecosystem. Many of the resources within the refuge are of regional, State, national, and international importance. The Service recognizes that the public, organizations and other governmental agencies have interests in the refuge. Implementation of many refuge programs requires involvement from these interested parties. The refuge staff looks for opportunities to coordinate activities with the following (among others):

- State of Alaska
- Other Federal agencies
- Western Interior Federal Subsistence Regional Advisory Council
- Migratory Bird Co-management Council
- Alatna, Allakaket, and Evansville village councils
- K'oyitl'ots'ina and Evansville village corporations
- Tanana Chiefs Conference, Inc. (regional Native non-profit organization)
- Doyon, Inc. (regional Native corporation)
- City of Bettles
- City of Allakaket
- Bettles Chamber of Commerce

- Universities and museums
- Greater Fairbanks Chamber of Commerce
- Nongovernmental organizations (including Friends of Alaska National Wildlife Refuges, Alaska Natural History Association, and Ducks Unlimited)

Refuge biologists routinely cooperate with biologists from the Alaska Department of Fish and Game (ADF&G), Bureau of Land Management (BLM), and National Park Service (NPS) to assess status and trends of moose on and near the refuge. They also cooperate on projects involving other species such as wolves and caribou. The refuge has cooperated with the U.S. Geological Survey on regional projects ranging from bird monitoring to heavy metals in snow. A landcover map and report were developed for the refuge and surrounding areas in 2002 in cooperation with BLM and Ducks Unlimited (BLM et al. 2002), and refuge staff assisted these partners with landcover mapping fieldwork elsewhere in interior Alaska. The map will be used as basis for evaluation of wildlife–habitat relationships and long-term, landscape level monitoring of vegetation resources. The refuge is an active participant in Boreal Partners in Flight, an organization comprised of bird biologists from various agencies and organizations in Alaska and Canada. Boreal Partners in Flight provides a venue for biologists to share information on species of concern, discuss inventory and monitoring techniques, and pool resources and data to address questions about bird populations.

Interagency cooperation is crucial when undertaking fire management activities. The BLM Alaska Fire Service (AFS) provides suppression services for Department of Interior agencies and is in charge of detecting, monitoring, and—when appropriate—suppressing fires to protect identified values or meet land and resource management objectives on Federal lands in Alaska. The refuge's fire management officer works closely with AFS when developing fire management plans, attends AFS briefings during the fire season, and coordinates with AFS on activities on the refuge.

The refuge is fortunate to have ready access to expertise at the University of Alaska Fairbanks (UAF). Refuge staff has worked cooperatively with researchers at UAF to develop research proposals. UAF research staff have participated in refuge field projects and provided insight on study design, data analysis, and interpretation of results. The refuge has developed contracts with the UAF Museum bird, mammal, invertebrate, and herbarium departments. Researchers from UAF and other universities have served as advisors for graduate studies conducted on the refuge, and along with other agency biologists and tribal council representatives, have participated in the refuge's biological program reviews.

The BLM, NPS, and the Service are in partnership to manage and maintain the Arctic Interagency Visitor Center in Coldfoot. Since 1989, staffs from the three agencies have provided information to people traveling the Dalton Highway. The Alaska Natural History Association (now Alaska Geographic) financially supports interpretive and volunteer programs at the visitor center.

No permanent refuge staff members are stationed in Bettles year-round, although the need for that capability is documented in this Plan. The refuge shares an office and visitor center with the NPS in Bettles. The refuge cooperates with NPS to operate a small visitor contact station to provide information on both the Gates of the Arctic National Park and Preserve and the refuge. The NPS provides the refuge with exhibit space in their contact station.

The refuge has been awarded Service Challenge Cost-Share Grants focused on activities on and near the refuge and in Fairbanks. Partners for projects that have occurred on and adjacent to the refuge have included the tribal councils of Allakaket, Alatna, and Evansville; the City of Bettles;

Tanana Chiefs Conference, Inc.; Council of Athabascan Tribal Governments; and Ducks Unlimited. Projects have included water quality testing in the Koyukuk River, a pilot project to investigate and monitor reported drying of lakes; purchasing and posting signage notifying visitors that they have entered the Kanuti Controlled Use Area; subsistence coordination; studying prairie bluet damselfly habitat use; conducting a science camp at Henshaw Creek; and development of a self-guided nature trail in Bettles.

Partners for Fairbanks-based Cost-Share projects have involved the Alaska Bird Observatory, Friends of Creamers Field, Arctic Audubon, ADF&G, and the UAF Student Activities Office. These projects have included International Migratory Bird Day events, Dragonfly Day at Creamer's Refuge, and co-hosting the Far North Conservation Film Festival as part of National Wildlife Refuge Week.

The refuge participates in Fairbanks-based activities that promote the role of the Service in conservation efforts and provide environmental education and outreach. These activities and the partners involved have included: Earth Day celebrations with local non-profit organizations, school group presentations during Outdoor Days and the Fifth Grade Bird Watch, and guest lecture presentations for groups such as the local Audubon chapter.

Wildlife research and public use are expected to increase on the refuge in the future. Public and private partners will be routinely sought where mutual interests exist in research and monitoring topics and objectives. Such collaboration would be consistent with the tradition and pattern of cooperative research and monitoring used by the refuge since 1992.

4.3 Monitoring and Evaluation

Monitoring helps refuge staff track the progress of plan implementation. Results of monitoring activities show how objectives are being achieved and measure progress towards accomplishing goals. The refuge is developing inventory and monitoring step-down plans, and many of the refuge's objectives involve collection of baseline data that may lead to additional monitoring efforts (see section 2.4.10). The step-down plans will provide detailed methods and frequencies for inventory and monitoring activities. Table 4-1 displays monitoring indicators, actions to be measured, and possible management actions in response to indicators for fish and wildlife, their habitats, plants, recreational uses, and contaminants. Activities will be refined as step-down plans are prepared or revised.

Table 4-1: Inventory and/or monitoring questions and possible management actions

Inventory and/or Monitoring Question	Measured Characteristics	Goal(s) of Inventory or Monitoring Activity	Possible Management Actions	Sampling Procedure and Frequency
What wildlife and plant species occur on the refuge?	Species, location, and density of breeding birds Species, location, and density of small mammals Species and location of terrestrial insects Species, location, density, and canopy cover of herbaceous and woody plants Habitat information associated with bird, small mammal, and insect data	Collect baseline information Associate different habitats with various species of birds, small mammals, and insects	NA: baseline data. Information will eventually allow the refuge to better predict how habitat disturbances may affect birds, small mammals, and insects.	Birds surveyed using point count method with distance estimation. Small mammals collected using snap and pitfall traps. Insects collected using malaise trap and sweep nets. Habitat data collected according to statewide Alaska Landbird Monitoring Survey and NPS protocols. Data collected annually on fixed plots on the refuge until all plots (60+) are surveyed.
How many moose are on the refuge, and what is their population trend?	Population and herd sex and age composition.	Detect changes in population levels or in sex and age composition that can affect population.	Research potential causes of changes in populations. Modify recreational and subsistence harvest regulations	Aerial surveys to determine population size and age and sex composition at 2–5-year intervals.
How many wolves use the refuge?	Population and distribution	Detect changes in numbers or distribution over time.	Research potential causes of population changes	Aerial surveys in late winter at 2–4 year intervals
How many beaver are on the Refuge?	Number and distribution of fall food caches	Detect changes in number of active caches	Research potential causes of change. Modify trapping regulations if needed.	Aerial surveys at 5-year intervals

Inventory and/or Monitoring Question	Measured Characteristics	Goal(s) of Inventory or Monitoring Activity	Possible Management Actions	Sampling Procedure and Frequency
How does fire affect refuge resources?	Evaluate changes in small mammal species and populations and vegetation species and distribution on permanent plots Tree age Collect fire history data by ageing trees	Document change in small mammal and vegetation communities over time Collect baseline information on refuge fire regime	NA: baseline data Allows better prediction of fire effects based on refuge-specific information	Sampling on permanent plots: small mammal trapping, biennially; vegetation monitoring at 5–10 year intervals Collect tree ring data during other inventory activities (see above)
Are there any invasive plants on the refuge?	Presence of invasive plants	Determine if invasive plants occur on the refuge.	Eradication	No specific survey developed at this time. Invasive species may be detected on other inventory plots or by opportunistic sightings
What are the trends in goose populations on the refuge?	Number and distribution of molting Greater White-fronted and Canada Geese	Collect baseline information. Detect changes in goose numbers and/or distribution. Provide data for regional investigations of Greater White-fronted Geese	Research potential causes of changes in numbers. Modify recreational harvest regulations along flyway and/or subsistence harvest regulations in Alaska	Aerial line transect survey in designated area of refuge. Annually.
How many swans utilize the refuge in late summer?	Number of swans and cygnets on the refuge	Document number and distribution of swans and cygnets on refuge; contribute to statewide swan survey	Research potential causes of population changes	Aerial line transect surveys in mid-August at 5-year intervals
What are the trends in landbird populations?	Species and number of birds	Collect data to contribute to nationwide database Collect data to contribute to statewide effort to monitor bird populations (Alaska Landbird Monitoring Survey)	Research potential causes of populations changes	Breeding Bird Survey along designated Kanuti Canyon route. Annually Point count survey using distance estimation. Biennially

Inventory and/or Monitoring Question	Measured Characteristics	Goal(s) of Inventory or Monitoring Activity	Possible Management Actions	Sampling Procedure and Frequency
How many salmon migrate up the Koyukuk River onto the refuge?	Species and number of salmon passing through a weir	Collect data to contribute to management of Yukon River salmon fishery	ADF&G and the Service consider data in their salmon management actions.	Document species, numbers, sex ratio, and run timing of salmon passing through a resistance board weir. Annually from mid-June through mid-July
What parts of the refuge do whitefish use on a seasonal basis?	Locations of broad and humpback whitefish and least cisco	Track movements of fish to identify migratory patterns, including spawning and wintering areas. Collect morphological and genetic data on whitefish	NA: baseline data. Information will help protect important seasonal habitats; documents movement of fish to off-refuge sites	Conduct short term telemetry projects as needed
What are the current levels of visitor use on refuge lands and what are the trends?	Number of visitors and parties, lengths of stay, sites visited, and activities occurring on the refuge	Collect baseline data	NA: baseline data	Compile information from guide reports, air-taxi operator reports, and staff observations. Annually
What is the relationship between recreational and subsistence use in the refuge?	Number and type of user conflicts observed or reported	Collect baseline data	Increase hunter education; work with guides, transporters, and subsistence users to resolve issues; modify regulations or stipulations on permits	Collect information from refuge users, guides, air-taxi operators, and staff. Annually
Are known historic mining sites along the Koyukuk River leaking containments into the river system?	Water quality downstream of mining sites.	Collect baseline data	To be determined based upon the extent of and hazard posed by contamination.	Measure water quality Biannually

Inventory and/or Monitoring Question	Measured Characteristics	Goal(s) of Inventory or Monitoring Activity	Possible Management Actions	Sampling Procedure and Frequency
How are visitors getting information on the refuge and are they finding the information they are seeking?	Type of information requested, information sources, information lacking	Collect baseline data	Modify methods of information retrieval to increase ease of use, sources, and types of information available	Invite users to complete a comment sheet/survey on the web site. Ask guides and air taxi operators to distribute surveys to their clients. Distribute surveys at, special events, Staff conversations with visitors

4.4 Plan Amendment and Revision

Periodic review and change of this Comprehensive Conservation Plan (Plan) will be necessary. As knowledge of refuge resources, users, and uses improves, changes in management may be identified. Fish and wildlife populations, user groups, adjacent land users, and other management considerations change with time, often in unforeseen ways. Challenges also may be encountered in trying to implement the Plan.

Revisions are a necessary part of the adaptive management approach used by the Service. This means that objectives and strategies to reach goals can be adjusted. Most of the resulting changes will fine-tune the Plan. These changes will not require modification of this document because minor changes will be addressed in the more detailed refuge step-down and annual work plans. Only if a major change is required in management of the refuge will it be necessary to revise this Comprehensive Conservation Plan with a new environmental assessment.

To enable refuge users; adjacent landowners; local, State, and Federal agencies; and other interested parties to express their views on how the refuge is being managed, the refuge will periodically hold meetings or use other techniques such as comment cards and surveys to solicit comments for evaluation purposes. By encouraging continuing public input, the refuge will be better able to serve the public, to determine potential problems before they occur, and to take immediate action to resolve existing problems.

Every three to five years, refuge staff will review public comments, local and State government recommendations, staff recommendations, research studies, and other sources to determine if revisions to the Plan are necessary. If major changes are proposed, public meetings may be held, and a new environmental assessment or an environmental impact statement may be necessary. Full review and updating of the Plan will occur every 15 years.

5. Consultation and Coordination with Others

5.1 Memorandum of Understanding

The Kanuti National Wildlife Refuge (Kanuti Refuge, refuge) has a memorandum of understanding in place with Gates of the Arctic National Park and Preserve to share facilities in the community of Bettles. Shared facilities include an office, a 4,200-square-foot hanger and 1,163-square-foot maintenance shop. The two agencies share maintenance projects, personnel, pilots, and planes when possible to reduce costs.

5.2 Master Memorandum of Understanding

The Alaska Department of Fish and Game (ADF&G) has the primary responsibility for managing fish and resident wildlife populations. On refuge lands, the U.S. Fish and Wildlife Service (Service) and ADF&G share a mutual concern for all fish and wildlife resources and their habitats, and both agencies are engaged in extensive fish and wildlife conservation, management, and protection programs. In 1982, the Service and ADF&G signed a Master Memorandum of Understanding (dated March 13, 1982) that defines the cooperative management roles of each agency (see Appendix B). This memorandum sets the framework for cooperation between the two agencies.

5.3 Interagency agreement 9700-6-8005

A joint facility operation plan was originally signed in 1986 for a Coldfoot Interagency Visitor Center, now called the Arctic Interagency Visitor Center. Center responsibilities were to be shared by the Bureau of Land Management, National Park Service, and the U.S. Fish and Wildlife Service. The new center was opened in 2003. The refuge stations a park ranger, who represents the Service and the three refuges based in Fairbanks, at the center from May through September.

5.4 Section 7 Compliance

There are no known occurrences of (resident) federally threatened or endangered species on the refuge. The planned actions found in the Kanuti National Wildlife Refuge Comprehensive Conservation Plan are unlikely to adversely affect species listed under the Endangered Species Act or designated critical habitat. Therefore, the Service finds the plan to be fully consistent with Section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq: 87 stat 884, as amended).

Appendix A

Legal and Policy Guidance; Coordination with the State of Alaska

1. Legal and Policy Guidance; Coordination with the State of Alaska

Management of the Kanuti National Wildlife Refuge (Kanuti Refuge, refuge) is dictated, in large part, by the legislation that created the unit and the purposes and goals described in chapter 1. However, other laws, regulations and policies; and agreements with the State of Alaska also guide the management of the refuge. This appendix identifies the acts and policy guidance that are integral in the development of this Comprehensive Conservation Plan (Plan) and identifies some of the primary agencies and divisions within the State of Alaska that are important management partners.

1.1 Legal Guidance

Operation and management of the refuge is influenced by Federal laws, treaties, and executive orders. Among the most important are the National Wildlife Refuge System Administration Act, as amended by the National Wildlife Refuge System Improvement Act; the Refuge Recreation Act; and the Endangered Species Act. These acts are described briefly (beginning with section 1.1.2) along with other acts and legal guidance that influence management of the Kanuti Refuge.

1.1.1 International Treaties

Several treaties affect how the Service manages the Kanuti Refuge. 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. These treaties differ in emphasis and species of primary concern but collectively provide clear mandates for identifying and protecting important habitats and ecosystems and for protecting and managing individual species.

1.1.2 National Guidance

Alaska National Interest Lands Conservation Act of 1980, as amended, 16 U.S.C. 140hh-3233, 43 U.S.C. 1602-1784 (ANILCA)

In addition to amending the Alaska Native Claims Settlement Act (ANCSA), the Alaska Statehood Act, and the Wild and Scenic Rivers Act, and modifying portions of the Wilderness Act as it applies to Alaska lands, ANILCA expanded the Federal conservation system throughout the State (including refuges, parks, forests, Wilderness areas, and Wild and Scenic Rivers). ANILCA sets forth the purposes of the refuges, defines provisions for planning and management, and authorizes studies and programs related to wildlife and wildland resources, subsistence opportunities, and recreational and economic uses (such as oil and gas exploration and development, access, and transportation and utility systems).

Title VIII of ANILCA authorizes the State of Alaska to regulate subsistence uses on Federal public lands if several requirements are met. The State of Alaska managed statewide subsistence harvests until late 1989, at which time the Alaska Supreme Court ruled that the rural residency preference required by Federal law violated the Alaska Constitution. Despite repeated efforts, the State has not amended its constitution to bring its regulatory framework back into compliance with ANILCA.

The Federal government began managing subsistence hunting, trapping, and fishing on Alaska's Federal public lands in July of 1990. For the purposes of Federal subsistence management, public

lands are defined to include lands managed by the U.S. Fish and Wildlife Service (Service), National Park Service, Bureau of Land Management, Bureau of Indian Affairs, and the USDA Forest Service; public lands also include non-navigable waters on these lands and some navigable and marine waters. On October 1, 1999, management authority of the Federal Subsistence Board was extended to include navigable water within and adjacent to exterior boundaries of Federal conservation units in which the United States has an interest by virtue of the reserved water rights doctrine.

The Federal Subsistence Board (FSB) establishes regulations for the harvest of fish and wildlife on Federal public lands in Alaska by qualified rural residents for subsistence purposes. The Federal process involves substantial public input. Individuals and organizations submit proposals for regulations to the FSB that are reviewed by the Federal Subsistence Regional Advisory Councils (RACs) (e.g., the Western Interior Federal Subsistence RAC). The RACs, which are composed of local citizens, make recommendations on the proposals to the FSB. The Federal subsistence staff also advises the FSB on regulation proposals, providing data and analysis from local Federal managers as well as from the Alaska Department of Fish and Game (ADF&G).

The State's recreational, commercial, personal use, and subsistence regulations continue to apply on all Federal lands unless superseded by Federal subsistence regulations. However, the FSB may establish Federal regulations to provide for use only by eligible rural residents in order to protect the ANILCA Title VIII preference for local rural users or to protect a wildlife population or fishery.

Alaska Native Claims Settlement Act of 1971 as amended, 43 U.S.C. 1601-1624

The purpose of this act was to provide for ". . . settlement of all claims by Natives and Native groups of Alaska, based on aboriginal land claims." It provided for grants of land, money, and the establishment of Native corporations to maintain the economic affairs of Native organizations. In exchange, all aboriginal titles and claims, including any fishing and hunting rights, were extinguished. Section 12(a) allowed village corporations to select lands, with several stipulations, in national wildlife refuges. Section 22(g), however, stated that these lands were to ". . . remain subject to the laws and regulations governing use and development of such refuge." Other refuge lands were selected under section 14(h)(1), which allowed regional corporations to select cemetery sites and historical places. Section 17(b) provided for public easement across Native lands for access to Federal lands. Section 17(d)(2)(A) provided the basis for the enactment of ANILCA.

National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997, 16 U.S.C. 668dd-668ee (Refuge Administration Act)

This act serves as the "organic act" for the National Wildlife Refuge System (System). Where this act provides direction that conflicts with direction described in ANILCA, the ANILCA direction is followed. The act establishes a unifying mission for the System, direction for determining compatible uses of refuges, and a requirement for preparing comprehensive conservation plans. This act states first and foremost that the mission of the National Wildlife Refuge System be focused singularly on wildlife conservation.

It identifies six priority wildlife-dependent recreation uses and reinforces and expands the "compatibility standard" of the Refuge Recreation Act, which requires that, before they can be allowed, public uses must be determined to be compatible with refuge and agency missions and purposes.

National Historic Preservation Act (NHPA) of 1966 (16 U.S.C. 470)

This act established a program for the preservation of historic properties throughout the United States. It established a Federal policy of cooperation with other nations, tribes, States, and local governments to protect historic sites and values.

Together with its implementing regulations, NHPA authorized the National Register of Historic Places, created the Advisory Council on Historic Preservation, provided further considerations for National Historic Landmarks, and created procedures for approved State and local Government Programs. The National Register of Historic Places criteria for evaluation of properties to be nominated are found at 36 CFR Part 60.4. Consideration is given to "districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association" and that (a) are related to events that have made a significant contribution to the broad patterns of our history; or (b) are associated with the lives of persons significant in our past; or (c) bear a pattern of distinctive characteristics of historic, architectural, archeological, engineering or cultural significance; or (d) have yielded or may in the future yield important information as to our history or prehistory.

Regulatory provisions of NHPA require that State Historic Preservation Officers (SHPOs) prepare and implement State historic preservation plans. Protection of identified historic sites is facilitated through implementation of NHPA section 106 review, a five-step process designed to ensure that historic properties are considered during the planning and execution of Federal projects.

Amendments passed in 1980 provided support for archeological resources protection by codifying portions of Executive order 11593, which requires Federal agencies to develop programs to inventory and evaluate historic resources.

The Refuge Recreation Act of 1962 (16USC460k-460k-4, as amended)

This act requires that any recreational use on areas of the National Wildlife Refuge System be compatible with the primary purpose(s) for which the area was acquired or established. This act also requires that sufficient funding be available for the development, operation, and maintenance of recreational uses that are not directly related to the area's primary purpose(s).

The Endangered Species Act of 1973, as amended

This act did not specifically address the National Wildlife Refuge System, but it does directly affect management activities within the National Wildlife Refuge System. The act directs Federal agencies to take actions that would further the purposes of the act and to ensure that actions they carry out, authorize, or fund do not jeopardize endangered species or their critical habitat. The Endangered Species Act also provides authority for land acquisition. Conservation of threatened and endangered species has become a major objective of land-acquisition and refuge-management programs, especially in refuges outside of Alaska.

The Wilderness Act of 1964 (P.L. 88-577)

This act established the National Wilderness Preservation System and prescribes policy for Wilderness designation and management (U.S. Government 1964). The Wilderness Act and ANILCA provide direction for management of Wilderness areas in Alaska.

The Wild and Scenic Rivers Act (16 USC 1271-1287)—Public Law 90-542, approved October 2, 1968, (82 Stat. 906)

This act establishes a National Wild and Scenic Rivers System and prescribes the methods and standards through which additional rivers may be identified and added to the system. Rivers are added to the National Wild and Scenic Rivers System based on their free-flowing character and their outstanding scenic, recreational, geologic, fish and wildlife, historic, cultural, ecological, or other values. Rivers in the system are managed to maintain and protect these values for present and future generations. For Wild and Scenic Rivers in Alaska, ANILCA also provides direction for management of designated rivers.

The Federal Water Pollution Control Act of 1972, as amended by The Clean Water Act of 1977, (33 USC s/s 1251 et seq.)

This act regulates the discharge of pollutants into waters of the United States. The act protects fish and wildlife, establishes operation permits for all major sources of water pollution, and limits the discharge of pollutants or toxins into water. The act makes it unlawful for any person to discharge any pollutant from a point source into navigable waters unless a permit is obtained under the Clean Water Act.

1.2 Policy Guidance

Programmatic guidance and policy documents provide additional direction for the management of national wildlife refuges throughout the National Wildlife Refuge System (http://www.fws.gov/policy). While 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 throughout this Plan is influenced by guidance from these programmatic and policy documents. Several of these documents guide us to use an ecosystem approach in refuge management. In other words, we must consider the health of the entire ecosystem when managing the refuge. This concept requires close coordination with others. In this section, we provide a brief description of this concept and of several of the national and regional (Alaska) management plans and programs that were considered during the development of this Plan. Other key policies, such as the compatibility policy, are described in chapter 2 because they provide guidance in this Plan.

1.2.1 Ecosystem Approach to Management

The goal of the U.S. Fish and Wildlife Service's ecosystem approach is to constantly strive to contribute to "the effective conservation of natural biological diversity through perpetuation of dynamic, healthy ecosystems" while carrying out the Service's mission and mandates through working closely with others (USFWS 1996). This is an ambitious goal; success lies in the coordinated efforts of many public agencies, private organizations, landowners, and citizens. Many programs and initiatives contribute to the conservation of biological diversity. Most obvious are actions that lead to the protection of habitat and the recovery of fish and wildlife populations in jeopardy. Less obvious, but equally significant, are actions that restore important habitats, reduce environmental degradation and contamination, monitor the integrity of natural systems, regulate the harvest of migratory birds, and provide technical assistance to private landowners.

The Service cannot fulfill this goal alone; only through an ecosystem approach—working with others to conserve the nation's biological heritage—will the goal be realized. An ecosystem

approach to management recognizes that institutions other than refuges have responsibilities and authorities for resources that lie both within and outside refuges.

Fish and wildlife population and habitat goals are based on species biology, population dynamics, and ecological processes that may be international in scope (e.g., migratory waterfowl). Managers must think and function at multiple scales simultaneously. Planning and implementation of management actions within the U.S. Fish and Wildlife Service's ecosystem units must be flexible enough to address site-specific conservation priorities and reflect the broader population and habitat needs of widely ranging species.

1.2.2 National Management Plans

Nature is not constrained by the administrative boundaries that are used to determine ownership or management of specific areas of land. Without physical barriers and with available habitat, wildlife and fish will freely roam through lands and waters regardless of ownership or management. To ensure the conservation of the many species that migrate across State lines, there are several national efforts designed to monitor and protect these species. These plans were reviewed during the revision of the Kanuti Refuge Plan to ensure that the revised management direction is consistent with national conservation plans.

Centennial Legacy Plan

These plans were developed for refuges nationwide to mark the centennial anniversary of the National Wildlife Refuge System (System). They are intended to serve as a vision to provide resources for the System in the next 100 years. These plans prioritize and address only the System's most pressing needs in three main categories: essential staff, mission-critical projects, and major maintenance.

North American Waterfowl Management Plan

This conservation plan seeks to restore, to the levels recorded in the 1970s, waterfowl populations in Canada, the United States, and Mexico. The international partnership has worked to identify priority habitats for waterfowl and has established goals and objectives for the waterfowl populations and habitats (USFWS 1998). The Kanuti Refuge provides breeding and migration habitat for a variety of waterfowl.

Partners in Flight—Bird Conservation Plans

Partners in Flight is a cooperative effort among Federal, State, and local government agencies; philanthropic foundations; professional organizations; conservation groups; industry; universities; and private individuals. Partners in Flight was created in 1990 in response to growing concerns about declines in the populations of many landbird species and to emphasize the conservation of birds not covered by existing conservation initiatives. Bird conservation plans are developed in each region to identify species and habitats most in need of conservation, to establish objectives and strategies to meet those needs, and to implement plans and monitor progress on them.

U.S. Shorebird Conservation Plan

This conservation plan seeks to stabilize populations of all shorebirds that are in decline because of factors affecting habitat in the United States At a regional level, the plan's goal is to ensure that shorebird habitat is available in adequate quantity and quality to support shorebird populations in each region. Ultimately, the goal of the conservation plan is to restore and maintain shorebird

populations throughout the Western Hemisphere through an international partnership (Brown et al. 2000).

North American Waterbird Conservation Plan

Waterbird Conservation for the Americas is a partnership that was created to "support a vision in which the distribution, diversity, and abundance of populations and habitats of breeding, migratory, and non-breeding waterbirds are sustained or restored throughout the lands and waters of North America, Central America, and the Caribbean." Their plan "provides a continental-scale framework for the conservation and management of 210 species of waterbirds…in 29 nations throughout North America…" Over a dozen species of migratory waterbirds, including such diverse groups as loons, grebes, cranes, jaegers, gulls, and terns, occur on Kanuti Refuge, most of them as breeders.

1.2.3 Regional Management Plans

In addition to considering national conservation plans, this plan must consider the management of neighboring lands by reviewing regional conservation plans and other land management goals of the region. Regional plans and goals and objectives from other programs were reviewed to understand how the Kanuti Refuge can contribute to the goals for conservation within the State or local region. This list is not intended to be comprehensive, but it demonstrates some of the major regional plans that were reviewed during the development of this Plan. Where applicable, specific items of information from these plans are identified in the chapters on Management Direction (chapter 2) and Refuge Environment (chapter 3).

Alaska Interagency Fire Management Plan BLM-AFS

Interagency fire management plans (IFMPs) for 13 geographic areas of the State were prepared from 1980–1988 to provide a coordinated and cost effective approach to fire management on all lands in Alaska. In 1998, an amendment was produced called the Alaska Interagency Wildland Fire Management Plan (AIWFMP, 45 BLM 1998). This amendment consolidates the original 13 plans and eliminates the need to refer to multiple documents while providing the land manager, owner(s) and/or fire suppression organizations a single reference for interagency fire management operational information. The amended AIWFMP also incorporates operational changes that occurred since the inception of the statewide fire management planning effort.

Landbird Conservation Plan for Alaska Biogeographic Regions (Boreal Partners in Flight Working Group 1999)

This bird conservation plan was developed through the Partners In Flight national initiative. It provides conservation priorities and objectives for landbirds in each region of Alaska. The Kanuti Refuge contributes to this plan through a variety of inventory and monitoring studies of landbirds within the refuge.

A Conservation Plan for Alaska Shorebirds (Alaska Shorebird Working Group 2000)

This plan identifies shorebird species of concern in Alaska and provides goals and objectives for shorebird conservation throughout the State. Additionally, the "Program for Regional and International Shorebird Monitoring" (PRISM) Boreal Committee is presently investigating techniques for monitoring shorebirds in the boreal forest. The Kanuti Refuge supports several

species that are showing continental declines. The Boreal PRISM program is presently in its development phase and has yet to be implemented in Alaska.

Utility Corridor Resource Management Plan (BLM)

The Utility Corridor Resource Management Plan is a long range comprehensive management plan that directs the Bureau of Land Management (BLM) to manage the approximately 6.1 million acres of BLM lands within the corridor through which the Dalton Highway and Trans-Alaska Pipeline pass. The plan identifies special management areas and development nodes within the utility corridor and explains how the BLM plans to carry out its multiple use mission in this area. This plan is scheduled to be re-written beginning in 2009.

Dalton Highway Recreation Management Plan (BLM)

The Dalton Highway Recreation Area Management Plan divides the area into several different management zones according to the recreation opportunity spectrum (ROS) and establishes recreation management objectives for the zones within the utility corridor.

Alaska's Comprehensive Wildlife Conservation Strategy (Alaska Department of Fish and Game 2006b)

The goal of this plan is to "conserve the diversity of Alaska's wildlife resources, focusing on those species with the greatest conservation need…" and is "intended to be a blueprint for an overall conservation approach." The strategy largely intends to "coordinate and integrate conservation actions and strategies with Alaska's existing wildlife management and research programs…"

Alaska Natural Heritage Program

The mission of the Alaska Natural Heritage Program is "to document the distribution and abundance of ecologically significant plant and animal species, ecological communities, and natural features, and to assist in maintaining an ecologically healthy environment, while promoting the development of a sustainable economy in Alaska."
http://www.uaa.alaska.edu/enri/aknhp_web/about/about.html. The program has developed a biological conservation database that provides information on species distribution, trends, and habitats for species in need for more than 1,300 plant and animal species in Alaska. These data were used to assess the status of species on the refuge.

The Koyukuk River Moose Management Plan

The Koyukuk River Moose Management Plan (KRMMP), finalized in 2001, was developed through cooperative efforts of the Koyukuk River Moose Hunters' Working Group, ADF&G, and other agencies. Kanuti Refuge was an active participant in the planning process, which was carried out by ADF&G. The planning process was initiated in response to concerns about increasing numbers of hunters and harvest levels, and about potential effects on moose populations in State Game Management Unit 24 and a portion of Unit 21D. The KRMMP includes issues of concern, management goals and objectives, and rationales for management actions. The KRMMP was designed to run through 2005, but working group members indicated a desire to keep the planning process active beyond this time (ADF&G Koyukuk River Moose Management Plan 2000–2005).

1.3 State of Alaska Coordination

Consistent with the principles of ecosystem management and the laws and policies described previously, effective management of the refuge must be done in close coordination with the State of Alaska. This section is not intended to be a comprehensive list of State agencies, but rather describes the primary State agencies that share concern and responsibilities for fish, wildlife, and habitat resources.

Alaska Department of Fish and Game

The Alaska Department of Fish and Game (ADF&G) has the primary responsibility for managing fish and resident wildlife populations. On refuge lands, the U.S. Fish and Wildlife Service (Service) and ADF&G share a mutual concern for all fish and wildlife resources and their habitats, and both agencies are engaged in extensive fish and wildlife conservation, management, and protection programs. In 1982, the Service and ADF&G signed a Master Memorandum of Understanding (dated March 13, 1982) that defines the cooperative management roles of each agency (see Appendix B). This memorandum sets the framework for cooperation between the two agencies.

Through the direction of the Board of Fisheries and the Board of Game, the State of Alaska establishes fishing, hunting, and trapping regulations throughout the State. These regulations apply to Federal public lands unless superseded by Federal Subsistence Board regulations.

The State process for developing regulations involves substantial public input to the Alaska Board of Fisheries and the Alaska Board of Game concerning changes in regulations and allocations. Input may be directly to the boards through testimony and proposals or indirectly through participation in local fish and game advisory committees. The area, which includes the refuge, is covered by the Koyukuk River Fish and Game Advisory Committee. The advisory committee assists the boards in assessing local fish and wildlife issues and proposed regulations. ADF&G biology staff members also provide data and analysis of proposals to the boards. Regulations may be changed by the boards at regular meetings, by emergency regulation, or by emergency order.

Although many biologists within ADF&G have law enforcement authority, most enforcement of fishing and hunting regulations is carried out by refuge law enforcement officers and Bureau of Wildlife Protection State Troopers of the Alaska Department of Public Safety.

The ADF&G Division of Wildlife Conservation works to conserve and enhance Alaska's wildlife and to provide for a wide range of uses for the greatest benefit of current and future generations of the people through management of wildlife populations and habitat, research, information transfer, regulatory activities, and public service.

The ADF&G Division of Commercial Fisheries manages, protects, rehabilitates, enhances, and develops fisheries and aquatic plant resources in the interest of the economy and general well-being of the State, consistent with the sustained-yield principle and subject to allocations established through public regulatory processes. It is responsible for management of the State's commercial, subsistence and personal-use fisheries.

The ADF&G Division of Sport Fish is responsible for the State's recreational fishery resource: the conservation of self-perpetuating populations of fish; management of sport fisheries in both salt and fresh water; and hatchery production and release of fish for recreational angling. The goals of the division are to conserve naturally reproducing populations of sport fish species, provide a

diverse mix of sport fishing opportunities, and optimize the social and economic benefits of Alaska's recreational fisheries.

The Division of Subsistence is the research branch of ADF&G responsible for providing comprehensive information on the customary and traditional use of wild resources. Information is provided to meet management goals, aid in regulation development, facilitate collaborative agreements, assess environmental impacts, and describe the unique role of wild resources in Alaska.

Alaska Department of Natural Resources

The Alaska Department of Natural Resources (DNR) and its subdivisions are also key management partners. The DNR manages all State-owned land, water, and surface and subsurface resources except for fish and game. The DNR Division of Mining, Land, and Water manages the State's water and land interests within the refuge. These considerable interests will become increasingly significant in the next 10–15 years, especially with regard to water rights, navigable waters, ownership of submerged lands, and rights-of-way over refuge lands.

Appendix B

Master Memorandum of Understanding between the Alaska Department of Fish and Game and the U.S. Fish and Wildlife Service

and

Recommitment to the MMOU
(November 2006)

Master Memorandum of Understanding Between the Alaska Department of Fish and Game, Juneau, Alaska, and the U.S. Fish and Wildlife Service, Department of the Interior (Anchorage, Alaska)

This Master Memorandum of Understanding between the State of Alaska, Department of Fish and Game, hereinafter referred to as the Department, and the U.S. Fish and Wildlife Service, hereinafter referred to as the Service, reflects the general policy guidelines within which the two agencies agree to operate.

Whereas, the Department, under the Constitution, laws, and regulations of the State of Alaska, is responsible for the management, protection, maintenance, enhancement, rehabilitation, and extension of the fish and wildlife resources of the State on the sustained-yield principle, subject to preferences among beneficial uses; and

Whereas, the Service, by authority of the Constitution, laws of Congress, and regulations of the U.S. Department of Interior, has a mandated management responsibility for certain species or classes of wildlife, and is responsible for the management of Service lands in Alaska, and the conservation of fish and wildlife resources on these lands; and

Whereas, the Department and the Service share a mutual concern for fish and wildlife resources and their habitats and both are engaged in extensive fish and wildlife conservation, management, and protection programs and desire to develop and maintain a cooperative relationship, which will be in the best interests of both parties, the concerned fish and wildlife resources, and their habitats, and produce the greatest public benefit; and

Whereas, it has been recognized in the Alaska National Interest Lands Conservation Act and subsequent implementing Federal regulations that the resources and use of Service lands in Alaska are substantially different than those of other states; and

Whereas, the Department and the Service recognize the increasing need to coordinate resource planning and policy development;

Now, therefore, the parties hereto do hereby agree as follows:

The Department of Fish and Game Agrees

1. To recognize the Service as the agency with the responsibility to manage migratory birds, endangered species, and other species mandated by Federal law, and on Service lands in Alaska to conserve fish and wildlife and their habitats and regulate human use
2. To manage fish and resident wildlife populations in their natural species diversity on Service lands
3. To consult with the Regional Director in a timely manner and comply with applicable Federal laws and regulations before embarking on enhancement or construction activities on Service lands

The Fish and Wildlife Service Agrees:

1. To recognize the Department as the agency with the primary responsibility to manage fish and resident wildlife within the State of Alaska
2. To recognize the right of the Department to enter onto Service lands at any time to conduct routine management activities which do not involve construction, disturbance to the land, or alterations of ecosystems
3. To cooperate with the Department in planning for enhancement or development activities on Service lands which require permits, environmental assessments, compatibility assessments, or similar regulatory documents by responding to the Department in a timely manner with requirements, timetables, and any other necessary input
4. To manage the fish and wildlife habitat on Service lands so as to ensure conservation of fish and wildlife populations and their habitats in their natural diversity
5. To consider carefully the impact of any proposed treaties or international agreements relating to fish and wildlife resources on the State of Alaska which could diminish the jurisdictional authority of' the State and to consult freely with the State when these treaties or agreements have a primary impact on the State
6. To review present U.S. Fish and Wildlife Service policies and any future proposed changes in those policies in consultation with the Department to determine if modified or special policies are needed for Alaska
7. To adopt refuge management plans whose provisions—including provision for animal damage control—are in substantial agreement with the Department's fish and wildlife management plans, unless such plans are determined formally

to be incompatible with the purposes for which the respective refuges were established

8. To utilize the State's regulatory process to maximum extent allowed by Federal law in developing new or modifying existing Federal regulations or proposing changes in existing State regulations governing or affecting the taking of fish and wildlife on Service lands in Alaska

The Department of Fish and Game and the Fish and Wildlife Service Mutually Agree

1. To coordinate planning for management of fish and wildlife resources on Service lands so that conflicts arising from differing legal mandates, objectives, and policies either do not arise or are minimized
2. To consult with each other when developing policy and legislation which affect the attainment of wildlife resource management goals and objectives or management plans
3. To recognize that the taking of fish and wildlife by hunting, trapping, or fishing on Service lands in Alaska is authorized in accordance with applicable State and Federal law unless State regulations are found to be incompatible with documented Refuge goals, objectives, or management plans
4. To develop such supplemental memoranda of understanding between the Commissioner and the Regional Director as may be required to implement the policies contained herein
5. That this Master Memorandum of Understanding shall become effective when signed by the Commissioner of the Alaska Department of Fish and Game and the Alaska Regional Director of the U.S. Fish and Wildlife Service and shall continue in force until terminated by either party by providing notice in writing 120 days in advance of the intended date of termination.
6. That amendments to this Master Memorandum of Understanding may be proposed by either party and shall become effective upon approval by both parties

STATE OF ALASKA

Department of Fish and Game

/Signed/ Ronald 0. Skoog
Commissioner

March 13, 1982
Date

U.S. DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

/Signed/ Keith M. Schreiner
Regional Director, Alaska

March 13, 1982
Date

NOV 14 2006

In Reply Refer To:
FWS/AEA

Memorandum

To: All Employees of Region 7 U.S. Fish and Wildlife Service and
The Alaska Department of Fish and Game

From: Regional Director – Region 7
Commissioner – Alaska Department of Fish and Game

Subject: Recommitment to the Master Memorandum of Understanding

The Master Memorandum of Understanding (MMOU) between the U.S. Fish and Wildlife Service (Service) and the Alaska Department of Fish and Game (Department) has been in place since first signed by Commissioner Skoog for the Department and Regional Director Schreiner for the Service in 1982. The necessity and benefits of working together in recognition of our respective authorities is no less relevant today than it was during the crafting of the original document. In fact, the book commemorating 100 years of the International Association of Fish and Wildlife Agencies illustrates many truly great accomplishments due to cooperation among the Service and various state game and fish agencies.

In that spirit of cooperation and in order to solidify our business and management practice, we are recommitting to the spirit and letter of the MMOU between the Department and the Service. The MMOU was built on solid foundation principles that, when adhered to, will contribute to many more great accomplishments.

In order to achieve this mutually-desired success, we are asking each of you to:

- work together with respect and in the spirit of cooperation
- minimize your disagreements
- go more than half way to reach a compromise
- support and encourage each other's efforts to the highest degree possible, and
- offer each other assistance when the opportunity arises.

We emphasize that positive interagency communications be pursued before airing differences in public forums in order to serve our mutual objectives to the fullest.

Please read and become familiar with the MMOU and practice its cooperative principles to the greatest extent possible.

Thomas O. Melius
Regional Director
Fish and Wildlife Service

McKie Campbell
Commissioner
Alaska Department of Fish and Game

Attachment

Appendix C

JOINT FACILITY OPERATIONS PLAN

Kanuti National Wildlife Refuge

Gates of the Arctic National Park

JOINT FACILITY OPERATIONS PLAN

Kanuti National Wildlife Refuge

Gates of the Arctic National Park

Bettles, Alaska

ARTICLE I. Introduction and Background

The Kanuti National Wildlife Refuge (refuge) and the Gates of the Arctic National Park (park) both operate substations in the town of Bettles, Alaska. Each agency needs various facilities in Bettles to administer and support their operations and seeks the most economical way to meet these needs. Sharing facilities is an important way for each agency to economize their operations.

There is a history of cooperation by Department of Interior agencies working in Bettles. An Interagency Agreement and Subagreement was written in May 1986, between the Bureau of Land Management (BLM) - Alaska Fire Service, the U.S. Fish and Wildlife Service (FWS), and the National Park Service (NPS) to promote the joint use of facilities between the agencies. The subagreement specifically committed the bureau, park and refuge to share roles and responsibilities at Bettles, Alaska. The subagreement was revised and updated to reflect the BLM's withdrawal of facilities and personnel from Bettles; however, the FWS and NPS have continued to periodically update their Joint Facilities Operations Plans stemming from the agreement.

The FWS administers leases from the Alaska Department of Transportation and Public Facilities (DOT), Airport Leasing Section, for the following lands in Bettles:

Block 5, lot 7B - hangar
Block 106, lot 1A - future site new office and visitor contact station
Block 106, lot 14, Block 106 - maintenance shop
Block 110, lots 5,6,12,13,14 - boat yard and possible future bunkhouse
Block 110, lot 19 - FWS residence and temporary bunkhouse/office
Block 1, lot 7 - floatplane shed, tank, and dock

The NPS administers leases from the Alaska Department of Transportation and Public Facilities (DOT), Airport Leasing Section, for the following lands in Bettles:

Block 109, lot 1 - NPS ware-yard
Block 2, lots 3,4,5,6,7 - old FAA site, possible future housing
Block 108/110, lot 1A - backcountry cache, temporary visitor contact station, screen shed
Block 110, lot 15 - metal storage shed
Block 110, lot 20 - housing
Block 111, lots 1,2,3,5,6,7,10A - housing and temporary office
Block 1, lot 8 - floatplane shed, tank, and dock

ARTICLE II. Objectives

This Joint Facility Operations Plan (JFOP) is based upon the Interagency Agreement and Interagency Subagreement. Specifically, Article II.C.5 of the subagreement states that a JFOP will be prepared and signed by the field managers. This document will define and apportion responsibilities for facility operation and maintenance, and identify anticipated work and costs.

ARTICLE III. Statement of Work

The following are the respective roles and responsibilities of the two agencies relating to provision, use, and maintenance of the facilities.

A. The refuge will:

1. Operate the Maintenance Shop Building

- Administer lease on Lot 14, Block 106
- Equally share space and use of most tools in the entire building
- Recognize and provide secure storage for NPS-only specific tools and equipment
- Pay electric utility costs (most recent $5,082/yr); refuge will assume oil heat costs (most recent $3,600/yr) when new office/visitor contact station is completed
- Pay all custodial and maintenance costs

2. Operate the Hangar Building

- Administer lease on Lot 7B, Block 5, for the hangar and ramp facility
- Provide NPS exclusive secure use of approximately 203 square feet of interior storage
- Equally share 4800 square feet in the hangar bay area for aircraft storage
- Equally share space and use of pilot briefing room
- Pay electric (most recent $2038/yr); NPS to continue paying heat (most recent $1001/yr)
- Pay all custodial and maintenance costs

3. Operate the Temporary FWS bunkhouse

- Allow NPS use of bunkhouse facility on a pre-scheduled space-available basis
- Pay all utilities costs (most recent $3,225/ yr electric; $4,255/yr heat)
- Pay all custodial and maintenance costs

4. Operate the Permanent Joint-use bunkhouse

- Obtain funding for, design and construct permanent replacement joint-use bunkhouse
- Consult with NPS on design of new bunkhouse
- Site to be determined (if at present boat yard site, administer leases on block 110, lots 5-6, 12-14)
- Provide NPS 50% of dedicated dorm space; more space possible on a pre-scheduled space-available basis
- Equally share the common areas (dining, bath, laundry, storage)
- Pay all utilities costs
- Pay all custodial and maintenance costs

5. Operate the boat storage yard

- Administer leases on block 110, lots 5-6, 12-14
- Provide NPS occasional boat storage space

6. Operate the heavy duty pickup truck with snow plow and lift gate

- Allow NPS use of truck when lift gate and snow plow are needed
- Pay all maintenance, gasoline, and other operations costs associated with vehicle

B. The park agrees to:

1. Operate the Permanent Joint use office/visitor contact station

- Obtain funding, design, and construct a permanent replacement joint-use office/visitor contact station (probably on lot 1A, Block 106, if on this lot FWS will eventually transfer lease)
- Consult with FWS on design of the office/visitor contact station
- Consult with FWS on design of exhibits in visitor contact station
- Provide FWS one 100 sq. ft private office in main administrative area, and one 80 sq. ft. office in shared temporary employee work area.
- Equally share transient employee work area
- Equally share conference room/theater area on a pre-scheduled basis
- Equally share use of central copier/fax/file/break room area
- Equally share use of visitor contact station, but include some space for Kanuti NWR-specific exhibit and displays
- Pay all utilities and maintenance costs
- Pay all custodial and janitorial costs
- Provide snow removal utilizing FWS truck plow

2. Share the Maintenance Shop Building

- Equally share space and use of most tools in the entire building
- Recognize FWS-only secure tool storage area
- Pay heat (most recent $3,600/yr) until new office/visitor contact station is completed; then FWS will assume the heat bill)
- Provide snow removal utilizing FWS truck plow

3. Share the Hangar Building

- Pay heat (most recent cost $ 1001/yr)
- Provide snow removal with FWS truck plow
- Provide occasional security walk-through inspections when FWS staff not in Bettles

4. Share the Temporary FWS bunkhouse

- Provide occasional security walk-through inspections when FWS staff not in Bettles
- Provide snow removal utilizing FWS truck plow
- Provide periodic refuse disposal and ground maintenance in conjunction with adjacent NPS housing

5. Operate the ware-yard storage area

- Administer lease on block 109, lot 1 (NPS "boneyard")
- Allow FWS use of ground surface storage space on pre-arranged basis

C. The refuge and park jointly agree to:

1. Share equally the jointly used areas, making every effort to accommodate the needs of the other.
2. Unless specified above, for each agency's primary operated buildings, assume all responsibility for routine custodial, operational, repairs, and maintenance costs.
3. If not specified above, share routine custodial, operational, repairs and maintenance costs for jointly used facilities in the approximate proportion as space is shared.
4. Comply with each agency's standards of use, safety, operation, and maintenance for the buildings that each holds primary operations responsibility for, as described above.
5. Unless specified above, equally share labor and material costs for maintenance of grounds (including contracted snow plowing) associated with the jointly used facilities.
6. Share equally in the responsibility to maintain security in the jointly used facilities.
7. Unless specified above, in proportion to space allocated, share all costs not covered by special funding, of damage to the jointly used facilities and shared contents resulting from accidents, vandalism or natural causes. Responsibility for accidents due to employee negligence will rest with the employee's agency.
8. Share minor equipment on a not-to-interfere basis. Responsibility for returning each item loaned and in acceptable condition rests with the borrower.

ARTICLE IV. Term of Plan

This plan shall take affect when signed by the refuge manager and park superintendent. It may be revised at any time that the refuge manager and park superintendent deem necessary in order to adapt to changing circumstances. Otherwise, it shall remain in effect until terminated in accordance with Article VI below.

ARTICLE V. Payments

All reimbursements from one agency to another will be in accordance with the terms of this plan. Cost sharing will be accomplished by dividing, as appropriate, certain costs of these facility operations that mutually benefit the agencies.

ARTICLE VI. Amendment, Modification, and Termination

This plan may be amended, modified or terminated by mutual consent at any time. Each modification shall be included in a new signed document. This plan is to be reviewed and signed on

a periodic basis when deemed necessary by the refuge manager and the park superintendent.

2/22/07

Refuge Manager
Kanuti National Wildlife Refuge

Date

2/22/07

Superintendent
Gates of the Arctic National Park and Preserve

Date

Appendix D

Easements, Withdrawals, and Rights-of-Way

Proposed R.S. 2477 Rights-of-Way

The State of Alaska claims numerous roads, trails, and paths across Federal lands under Revised Statute 2477 (RS 2477), a section in the Mining Act of 1866 that states, "The right-of-way for the construction of highways over public lands, not reserved for public uses, is hereby granted." RS 2477 was repealed by the Federal Land Policy and Management Act of 1976, subject to valid existing claims.

Assertion and identification of potential rights-of-way does not establish the validity of these claims nor the public's right to use them. The validity of all RS 2477 rights-of-way will be determined on a case-by-case basis, either through the courts or by other legally-binding document. The State of Alaska has identified, in Alaska Statute 19.30.400, three routes on the Kanuti National Wildlife Refuge (Kanuti Refuge, refuge) that it claims may be asserted as rights-of-way under RS 2477 (Figure D-1).

Table D-1: Miles of State proposed RS 2477 routes

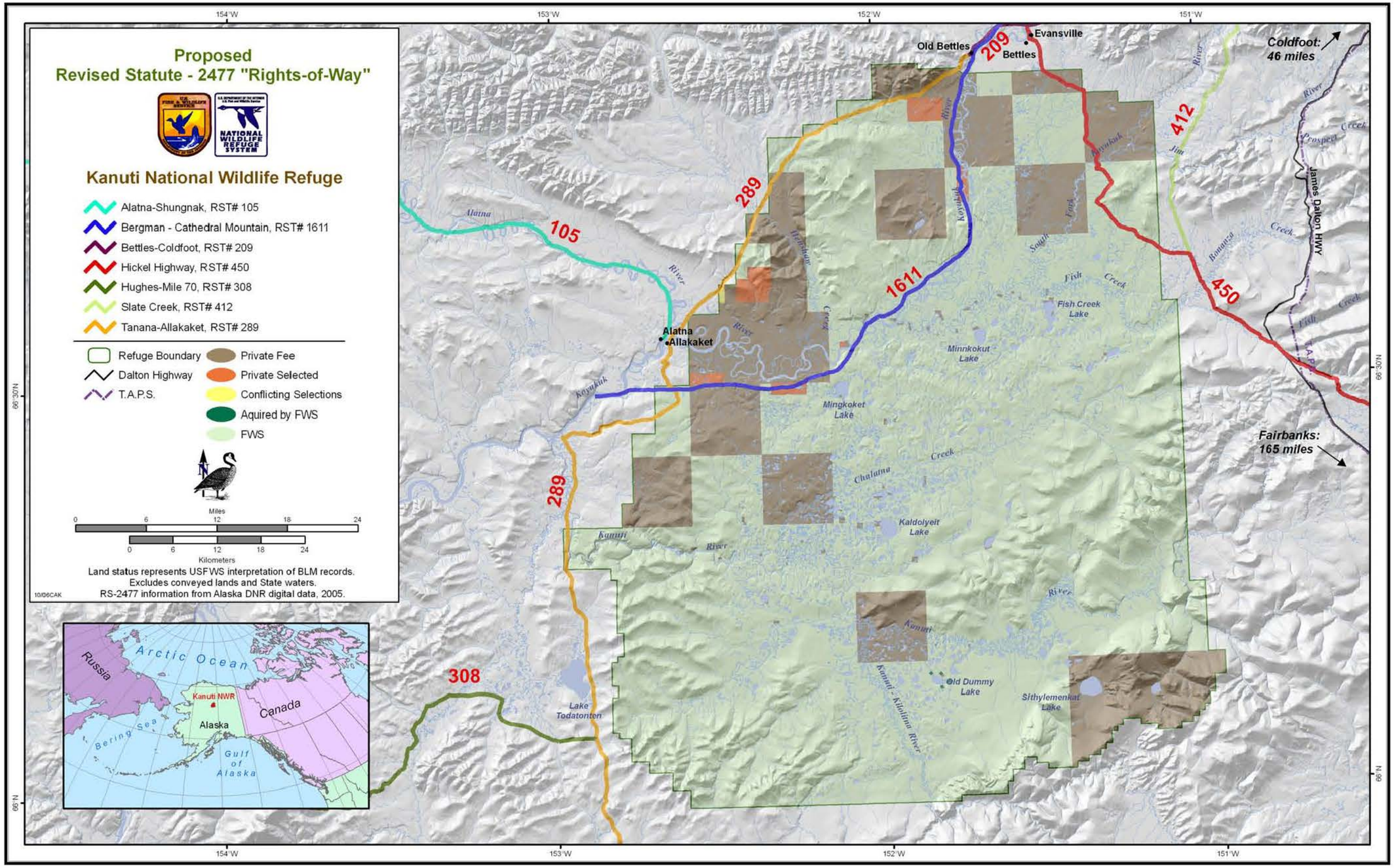
Within the refuge					
No.	**Route Name**	**Native Conveyed**	**Native Selected**	**Refuge Lands**	**Total**
289	Tanana-Allakaket-Bettles Trail	10.09	0.48	21.36	31.93
450	Hickel Highway	10.45	0.00	12.03	22.48
1611	Bergman-Cathedral Mountain Trail				285
	Total Miles	20.54	0.48	33.39	339.41
Adjacent to the refuge*					
No.	**Route Name**				**Total**
105	Alatna-Shungnak Trail				144.07
209	Bettles-Coldfoot Trail				54.04
308	Hughes Trail				46.70
412	Slate Creek Trail				57.84
	Total Miles				302.65
Information from Alaska DNR RS 2477 digital data, 2001. The State of Alaska claims an additional 5,319 miles of section line easements within the Kanuti Refuge.					

*Mileage breakdowns not available.

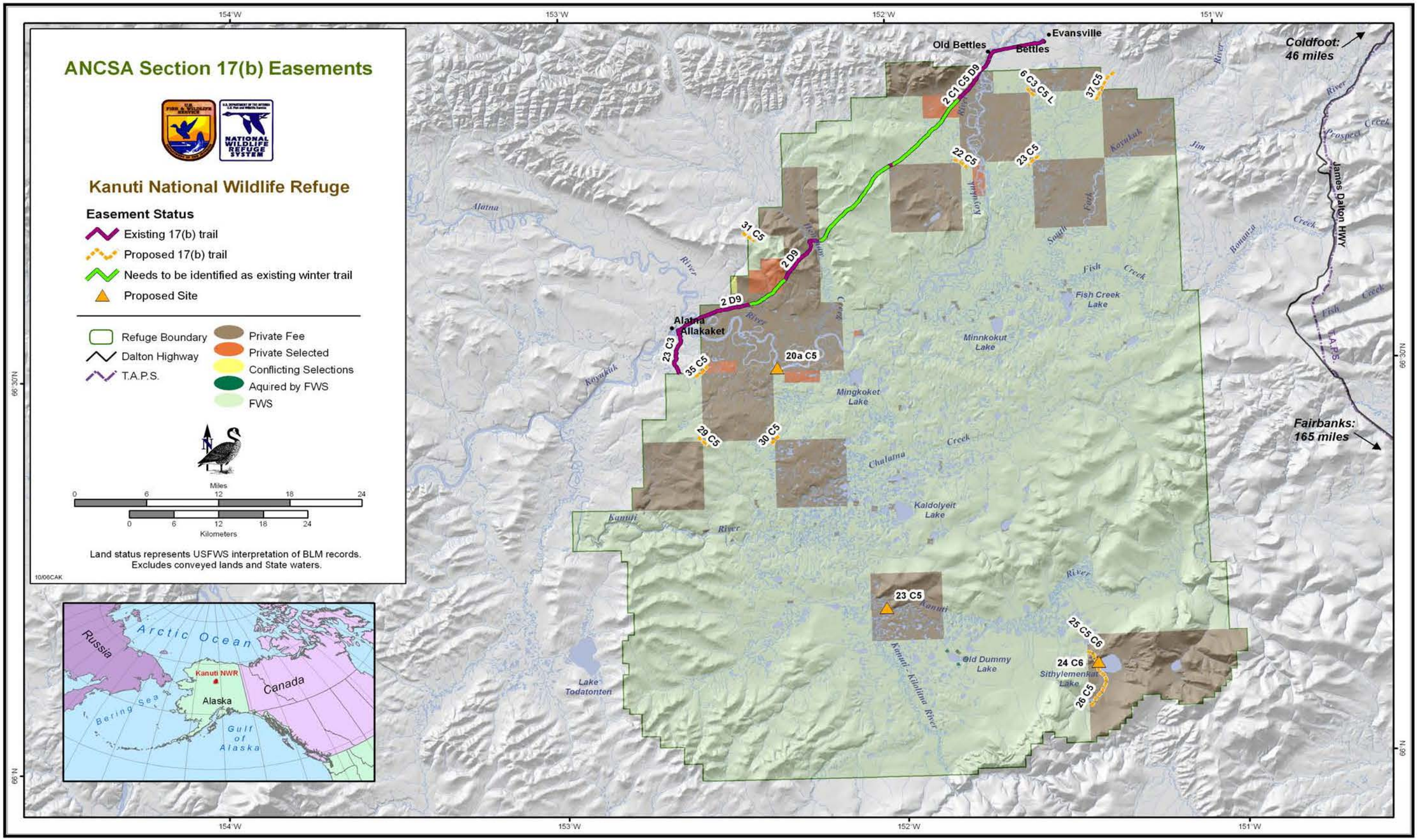
17(b) Easements

Section 17(b) of the Alaska Native Claims Settlement Act (ANCSA) requires the Federal government to reserve easements for public access across Native village and regional corporation lands to publicly owned lands and waters. The Bureau of Land Management (BLM) is responsible for identifying and reserving these easements during the conveyance process. Easements can be linear (i.e., roads or trails) or one-acre sites for use as temporary campsites and/or to change modes of transportation (e.g., switch from an airplane to a boat). A 17(b) easement reserves a right to cross private lands to access public lands for the purpose(s) of recreation, hunting, transportation, utilities, docks, and other public uses. Public activities such as recreation and hunting are not authorized on the easement or the private lands through which the easement reservation was made. The associated conveyance documents describe in detail each 17(b) easement and the specific uses(s) reserved by that easement. Additional information may be found in 43 CFR2650.4-7.

There are sixteen 17(b) easements reserved on or across private lands within the boundary of the Kanuti Refuge (Insert D-1). Thirteen easements were reserved for trails, two of which follow existing trail alignments. The purpose of these trail easements is to provide public access across private property to public lands. Management of these easements lies with the BLM or, under a Memorandum of Understanding, with the U.S. Fish and Wildlife Service (Service). The Service is also responsible for managing one trail easement outside the boundary (EIN 23 C 3) because it provides access to the refuge. There are three one-acre site easements reserved with the refuge boundary: one along the Kanuti River, one along the Koyukuk River, and one on the west side of Sithylemenkat Lake. These easements were reserved in association with trail easements and allow the public to change modes of transportation and access refuge property or camp for a period of up to 24 hours.



Insert D-1: Proposed RS-2477 "Rights of Way"



Insert D-2: ANCSA Section 17(b) Easements

Appendix E

Preparers

Preparers

Name	Expertise/Function	Degree(s)	Experience (YRS)
		REFUGE STAFF	
Robert Schulz	Refuge Manager (retired) 7/04	MS Environmental Field Biology BS Environmental Field Biology	Refuge Management (14) Wetland Management (3) Soil Conservation (5) Wildlife Biology (7)
Mike Spindler	Refuge Manager 3/05– present	MS Wildlife Biology BS Forestry and Wildlife Biology	Refuge Management (15) Wildlife Biology (14)
Merry Maxwell	Deputy Refuge Manager Through 11/05	BS Wildlife Biology/ Biodiversity Option, Minor in Wildlife Mgt.	Refuge Management (4) Wildlife Biology (6)
Joanna Fox	Deputy Refuge Manager 3/06– present	MS Range Science BS Resource Conservation/Forestry	Refuge Management (5) Outreach/Visitor Services (4) Subsistence Management/Biology (2) Fire Management (3)
Lisa Saperstein	Wildlife Biologist	MS Wildlife Biology BS Wildlife Biology BS Forest Biology/ Concentration Botany	Wildlife Biology (15)
Christopher Harwood	Wildlife Biologist	BA Biology Computer Programming and Systems Analysis Certificate	Wildlife Biology (16)
Jody DeMeyere	Park Ranger/Public Use Through 4/06	BS Upland Ecosystem Mgt.	Environmental Education (3) Refuge Management/Biology (2)
Curtis Knight	Biological Technician; GIS Through 11/06	BS Natural Resource Management (in progress)	Resource Management (3)
Wennona Brown	Subsistence Coordinator	BS Biology MS Wildlife Fisheries MA Public Administration	Subsistence Management (5) Environmental Planning (14) Environmental Compliance (5) Environmental Education (2) Public Relations (2) Wildlife Biology (2)
Sam Patten	Fire Management Officer	BA Biology/German MS Wildlife Science/Forestry PhD Public Health	Research Biology Wildlife Management Fire Management

Deborah Webb	Assistant Planner	BS Zoology MS Wildlife Biology	Wildlife Biology (8)
REGION 7 PLANNING STAFF			
Peter E. Wikoff	Planning Team Leader 7/99–present General Coordination	Master of Business Administration BS Forest Mgt	Resource Planning (12) Resource Management (14)
Helen Clough	Consultation and Alternative Development	BA Anthropology	Refuge Planning (14) Public Land Management (19)
Kenneth W. Rice	NEPA, Policy and ANILCA Compliance Through 8/06	MS Wildlife	Resource Management (33)
Brian Glaspell	Social Science 12/02 through 7/07	PhD Recreation/Wilderness Management MS Natural Resource Management BS Geography	Social Aspects of Public Land and Natural Resource Management (12)
STATE OF ALASKA			
Brad Palach	Liaison with State of Alaska; ADF&G	BA Justice	Fish and Wildlife Management (22)
Brandon McCutcheon	Liaison with State of Alaska; DNR through 4/05	BS Natural Resource Management	Resource Management (9)
Bruce Talbot	Liaison with State of Alaska; DNR through 4/08	MS Natural Resource Planning BS Wildlife Management	Planning and Policy (24)
Sara Taylor	Liaison with State of Alaska; DNR 7/05–6/08	BS Environmental Sciences	Wildlife Biology (8) Biometry (2) Resource Management (3)

Appendix F

Finding Of No Significant Impact

U. S. Department of the Interior
Fish and Wildlife Service
Region 7, Alaska

FINDING OF NO SIGNIFICANT IMPACT

Revised Comprehensive Conservation Plan
Kanuti National Wildlife Refuge, Alaska

The U.S. Fish and Wildlife Service (Service) has completed the Revised Comprehensive Conservation Plan (Plan) for the Kanuti National Wildlife Refuge. The draft revised plan and Environmental Assessment (EA) (herein incorporated by reference) describe the three alternatives for managing the Refuge and associated effects on the human environment. In response to public comments the proposed action, Alternative C, was modified slightly and selected for implementation.

Alternatives Considered

The Alaska National Interest Lands Conservation Act requires the Service to designate areas according to their respective resources and values and to specify programs and uses within the areas designated. To meet this requirement, the Alaska Region established management categories for the refuges including Wilderness, Minimal, Moderate, Intensive, and Wild River management. Appropriate activities, public uses, commercial uses, and facilities are identified for each management category. Only Minimal and Moderate management are applied to Kanuti Refuge.

Three alternatives were considered in the environmental assessment. Alternative A, the no-action alternative, would continue current management. Alternative B would convert all refuge lands to Minimal Management and incorporate new regional management policies and guidelines. Alternative C (Draft Plan, proposed action) would convert a portion of the refuge lands in Moderate management to Minimal management and incorporate new regional management policies and guidelines. Under both alternatives B and C, management of the refuge would generally continue to follow the current course of action, but would include the vision statement and goals developed for the refuge. The primary difference among these alternatives is the distribution and amount of land in the Moderate and Minimal management.

Public Review

Public comments on the draft Plan and EA were solicited from May 15, 2007, through September 15, 2007. During the public comment period meetings were held in Alatna, Allakaket, Bettles, Evansville, and Fairbanks. We received a number of comments recommending changes in the management category boundaries proposed in the draft Plan. Generally, local residents and community leaders preferred that refuge lands adjoining private lands near their communities be in Moderate management. Conversely, others preferred to see more of the refuge in Minimal management.

Revisions from Draft Plan

In response to public comments, the Service slightly modified the distribution of Moderate and Minimal management category lands in Alternative C. The table below shows the range of distribution of management categories among the alternatives. The modifications made to Alternative C fall within the range of alternatives considered in the EA. In the revised plan two areas near Bettles are classified Moderate management and an area in the upper Henshaw Creek area is classified Minimal management.

Comparison of Management Category by Alternative

Category/ Alternative	Alternative A		Alternative B		Alternative C Draft Plan		Final Plan	
	Acres	%	Acres	%	Acres	%	Acres	%
Moderate Management	424,454	33	0	0	189,357	15	174,925	14
Minimal Management	865,165	67	1,289,618	100	1,100,261	85	1,114,693	86

The revised plan provides a realistic balance between public desires and the conservation needs of the refuge. There will be additional lands in Minimal management to better maintain the natural environment in one area and two parcels surrounded by private lands will be managed as Moderate management to allow more potential future uses.

Analysis of Impacts

The EA analyzed direct, indirect, and cumulative impacts on refuge resources of fish and wildlife and on subsistence and wildlife dependent recreation, refuge facilities, cultural resources, the refuge environment, and the refuge communities. No significant effects were identified in the analysis.

Conclusions

Based on review and evaluation of the information contained in the EA and revised plan, I have determined that there will be no significant individual or cumulative impacts to the human environment, within the meaning of section 102(2)(c) of the National Environmental Policy Act of 1969, as amended. I have determined that the activities prescribed in this plan are not major Federal actions. Accordingly, the Service is not required to prepare an environmental impact statement.

Gary Edwards
Acting Regional Director

10 July 05
Date

Appendix G

Species Lists

Table G-1: Plant List 1
Table G-2: Mammals 7
Table G-3: Fish 8
Table G-4: Aquatic Invertebrates 8
Table G-5: Terrestrial Insects 11
Table G-6: Birds 14

Table G-1: Plant List

This list is preliminary, based on currently available data, and does not represent a complete listing of refuge flora. Common and scientific names are from the USDA NRCS Plants database.

	SCIENTIFIC NAME	COMMON NAME	SOURCE[1]
Trees	*Betula papyrifera*	Paper birch	1
	Picea glauca	White spruce	1
	Picea mariana	Black spruce	1
	Populus balsamifera	Balsam Poplar/Cottonwood	1
	Populus tremuloides	Quaking aspen	1
Shrubs	*Alnus viridis*	Green alder	1
	Alnus viridis ssp. fruticosa	Siberian alder	2
	Alnus incana	Gray alder	1
	Alnus incana ssp. tenuifolia	Thinleaf	3
	Amelanchier alnifolia	Saskatoon serviceberry	2
	Andromeda polifolia	Bog rosemary	1
	Arctostaphylos alpina	Alpine bearberry	1
	Arctostaphylos rubra	Redfruit bearberry	1
	Arctostaphylos uva-ursi	Kinnikinnick	1
	Artemisia alaskana	Alaska wormwood	2
	Betula glandulosa	Resin birch	1
	Betula nana	Dwarf birch	3
	Chamaedaphne calyculata	Leatherleaf	1
	Dasiphora fruticosa	Shrubby cinquefoil	1
	Diapensia lapponica	Pincushion plant	1
	Dryas octopetala	Eight petal mt.avens	1
	Empetrum nigrum	Black crowberry	1
	Juniperus communis	Common juniper	1
	Ledum palustre ssp. decumbens	Marsh Labrador tea	1
	Ledum groenlandicum	Bog Labrador tea	1
	Linnaea borealis	Twinflower	1
	Loiseleuria procumbens	Alpine azalea	1
	Myrica gale	Sweetgale	1
	Orthilia secunda	Sidebells wintergreen	1
	Pyrola asarifolia	Liverleaf wintergreen	2
	Ribes hudsonianum	Northern black currant	3
	Ribes triste	Red currant	3
	Rosa acicularis	Prickly rose	1
	Salix alaxensis	Feltleaf willow	1
	Salix arbusculoides	Littletree willow	1
	Salix arctica	Arctic willow	2
	Salix athabascensis	Athabasca willow	1
	Salix bebbiana	Bebb willow	1
	Salix fuscescens	Alaska bog willow	1
	Salix glauca	Greyleaf willow	1
	Salix hastata	Halberd willow	1
	Salix phlebophylla	Skeletonleaf willow	1
	Salix pseudomonticola	False mountain willow	1
	Salix pulchra	Tealeaf willow	1
	Salix richardsonii	Richardson's willow	1

[1] *Sources of plant data: 1=Talbot et al. 1985; 2=University of Alaska Fairbamks Herbarium/Alaska Natural Heritage botanists; 3=Refuge Staff; 4=Mendenhall 1902*

	SCIENTIFIC NAME	COMMON NAME	SOURCE[1]
Shrubs, continued	*Salix rotundifolia*	Least willow	2
	Salix scouleriana	Scouler's willow	1
	Shepherdia canadensis	Russet buffaloberry	1
	Spiraea stevenii	Beauverd spiraea	1
	Vaccinium oxycoccus	Small cranberry	1
	Vaccinium uliginosum	Bog blueberry	1
	Vaccinium vitis-idaea	Lingonberry	1
	Viburnum edule	Squashberry (Highbush cranberry)	1
Herbs	*Achillea sibirica*	Siberian yarrow	2
	Aconitum delphiniifolium	Larkspurleaf monkshood	2
	Allium schoenoprasum	Wild chives	2
	Alyssum obovatum	American madwort	4
	Arabis holboelli	Holboell's rockcress	2
	Argentina anserina	Silverweed cinquefoil	2
	Armeria maritima	Thrift seapink	2
	Arnica angustifolia ssp. angustifolia	Narrowleaf arnica	1
	Artemisia borealis	Field sagewort	2
	Artemisia tilesii	Tilesius' wormwood	1
	Boschniakia rossica	Northern groundcone	1
	Bupleurum americanum	American thorow wax	2
	Calla palustris	Water arum	2
	Caltha natans	Floating marsh marigold	2
	Caltha palustris	Yellow marsh marigold	3
	Campanula lasiocarpa	Mountain harebell	2
	Castilleja hyperborean	Northern Indian paintbrush	2
	Castilleja raupii	Raup's Indian paintbrush	2
	Cerastium arvense	Field chickweed	2
	Cerastrium maximum	Great chickweed	2
	Ceratophyllum demersum	Coon's tail	2
	Chamerion angustifolium	Fireweed	1
	Chamerion latifolium	Dwarf fireweed	1
	Cicuta virosa	Mackenzie's water hemlock	3
	Claytonia eschscholtzii	Grassleaf springbeauty	2
	Cnidium cnidiifolium	Jakutsk snowparsley	2
	Comarum palustre	Purple marshlocks	2
	Cornus canadensis	Bunchberry	3
	Crepis elegans	Elegant hawksbeard	2
	Cystopteris fragilis	Fragile fern	2
	Delphinium glaucum	Mountain larkspur	2
	Descurainia sophioides	Northern tansymustard	2
	Dianthus repens	Boreal carnation	2
	Drosera anglica	English sundew	1
	Drosera rotundifolia	Roundleaf sundew	1
	Draba glabella	Smooth draba	2
	Dryopteris fragrans	Fragrant woodfern	2
	Douglasia ochotensis	Alaska dwarf-primrose	2
	Epilobium ciliatum	Fringed willowherb	2
	Epilobium palustre	Marsh willowherb	2
	Equisetum arvense	Field horsetail	1

	SCIENTIFIC NAME	COMMON NAME	SOURCE[1]
Herbs, continued	*Equisetum fluviatile*	Water horsetail	1
	Equisetum pratense	Meadow horsetail	3
	Equisetum scirpoides	Dwarf scouring rush	1
	Equisetum sylvaticum	Woodland horsetail	1
	Erysimum cheiranthoides	Wormseed wallflower	2
	Erysimum inconspicuum	Shy wallflower	2
	Erigeron acris	Bitter fleabane	2
	Erigeron caespitosus	Tufted fleabane	2
	Erigeron hyperboreus	Tundra fleabane	2
	Eritrichium splendens	Showy alpine forget-me-not	2
	Eurybia sibirica	Arctic aster	2
	Galium boreale	Northern bedstraw	2
	Galium trifidum ssp. trifidum	Threepetal bedstraw	2
	Gentiana propinqua ssp. propinqua	Fourpart dwarf gentian	2
	Geocaulon lividum	False toadflax	1
	Hedysarum alpinum	Alpine sweetvetch	1
	Hedysarum boreale ssp. mackenziei	Boreal sweetvetch	2
	Hippuris vulgaris	Common mare's tail	1
	Iris setosa	Beachhead iris	3
	Lupinus arcticus	Arctic lupine	1
	Lycopodium annotinum	Stiff clubmoss	1
	Lycopodium complanatum	Groundcedar	3
	Lysimachia thyrsiflora	Tufted loostrife	2
	Matricaria discoidea	Pineappleweed	2
	Menyanthes trifoliata	Buckbean	1
	Mertensia paniculata	Tall bluebells	1
	Minuartia arctica	Arctic stitchwort	2
	Minuartia elegans	Elegant stitchwort	2
	Minuartia obtusiloba	Twinflower sandwort	2
	Moehringia lateriflora	Bluntleaf sandwort	2
	Myriophyllum sibiricum	Shortspike water-milfoil	2
	Noccaea arctica	Arctic pennycress	2
	Nupha lutear polysepala	Yellow pond lilly	1
	Nymphaea tetragona	Pygmy waterlilly	2
	Packera hyperborealis	Northern groundsel	2
	Papaver nudicaule ssp. americanum	Icelandic poppy	2
	Parnassia palustris	Northern grass-of-Parnassus	3
	Parrya nudicaulis	Nakedstem wallflower	2
	Pedicularis labradorica	Labrador lousewort	1
	Pedicularis kanei	Wooly lousewort	1
	Petasites frigidus	Arctic sweet coltsfoot	1
	Pinguicula villosa	Hairy butterwort	1
	Plantago major	Common plantain	2
	Platanthera obtusata	Bluntleaved orchid	2
	Podistera macounii	Macoun's woodroot	2
	Polemonium pulcherrimum	Jacob's ladder	2
	Polygonum alpinum	Alaska wild rhubarb	3
	Polygonum amphibium	Water knotweed	2
	Polygonum bistorta	Meadow bistort	1

	SCIENTIFIC NAME	COMMON NAME	SOURCE[1]
Herbs, continued	*Polygonum lapathifolium*	Curlytop knotweed	2
	Polygonum vivaparum	Alpine bistort	1
	Potamogeton alpinus	Alpine pondweed	1
	Potamogeton gramineus	Variableleaf pondweed	1
	Potamogeton natans	Floating pondweed	1
	Potamogeton perfoliatus	Claspingleaf pondweed	1
	Potamogeton pusillus ssp. tenuissimus	Small pondweed	1
	Potamogeton richardsonii	Richardson's pondweed	3
	Potamogeton subsibiricus	Yenisi River pondweed	1
	Potamogeton zosteriformis	Flatstem pondweed	1
	Potentilla hookeriana	Hooker's cinquefoil	2
	Potentilla norvegica	Norwegian cinquefoil	2
	Potentilla pensylvanica	Pennsylvania cinquefoil	2
	Pulsatilla patens	American pasqueflower	2
	Orthilia secunda	Sidebell's wintergreen	1
	Ranunculus gmelinii	Gmelin's buttercup	3
	Ranunculus lapponicus	Lapland buttercup	2
	Rorippa barbareifolia	Hoary yellowcress	2
	Rorippa palustris	Bog yellowcress	2
	Rubus arcticus	Arctic blackberry	1
	Rubus chamaemorus	Cloudberry	1
	Rumex acetosa	Garden sorrel	2
	Rumex arcticus.	Arctic dock	2
	Sanguisorba officinalis	Official burnet	2
	Saussurea angustifolia	Narrowleaf saw-wort	3
	Saxifraga reflexa	Reflexed	2
	Saxifraga tricuspidata	Three toothed saxifrage	2
	Scheuchzeria palustris	Rannoch rush	1
	Selaginella sibirica	Siberian spikemoss	2
	Senecio congestus	Marsh fleabane	2
	Silene acaulis	Moss campion	1
	Silene repens	Pink campion	2
	Silene taimyrensis	Taimyr catchfly	2
	Smelowskia porsildii	Porsild's false candytuft	2
	Solidago multiradiata	Mountain goldenrod	2
	Sparganium angustifolium.	Narrowleaf bur reed	2
	Stellaria longipes	Longstalk starwort	2
	Stuckenia filiformis	Fineleaf pondweed	1
	Stuckenia vaginatus	Sheathed pondweed	1
	Symphyotrichum yukonense	Yukon aster	3
	Tanacetum bipinnatum ssp. bipinnatum	Lake Huron tansy	3
	Taraxacum officinale ssp. ceratophorum	Common dandelion	2
	Trientalis europa	Arctic starflower	3
	Utricularia macrorhiza	Common bladderwort	3
	Valeriana capitata	Capitate valerian	3
	Wilhelmsia physodes	Merckia	2
	Woodsia glabella	Smooth woodsia	2
Graminoids	*Arctagrostis latifolia*	Wideleaf polargrass	1

	SCIENTIFIC NAME	COMMON NAME	SOURCE[1]
Graminoids, cont.	*Agrostis scabra*	Rough bentgrass	2
	Alopecurus aequalis	Short foxtail	2
	Arctophila fulva	Pendantgrass	2
	Beckmannia syzigachne	American sloughgrass	2
	Bromus ciliatus	Fringed brome	2
	Calamagrostis canadensis	Bluejoint grass	1
	Calamagrostis lapponica	Lapland reedgrass	2
	Calamagrostis stricta	Northern reedgrass	2
	Calamagrostis purpurascens	Purple reedgrass	2
	Carex aquatilis	Water sedge	1
	Carex bigelowii	Bigelow's sedge	1
	Carex bonanzensis	Yukon sedge	2
	Carex canescens	Silver sedge	2
	Carex chordorrhiza	Creeping sedge	1
	Carex diandra	Lesser panicled sedge	2
	Carex glacialis	Glacial sedge	2
	Carex lapponica	Lapland sedge	2
	Carex lasiocarpa	Woolyfruit sedge	1
	Carex limosa	Mud sedge	1
	Carex lugens	Spruce muskeg sedge	2
	Carex magellanica var. irrigua	Boreal bog sedge	1
	Carex membranacea	Fragile sedge	1
	Carex microchaeta	Smallawned sedge	1
	Carex rostrata	Beaked sedge	1
	Carex rotundata	Round sedge	1
	Carex tenuiflora	Sparseflower sedge	1
	Carex utriculata	Northwest Territory sedge	2
	Carex vaginata	Sheathed sedge	1
	Eleocharis macrostachya	Pale spikerush	2
	Elymus trachycaulus	Slender wheatgrass	2
	Eriphorum angustifolium	Tall cottongrass	1
	Eriophorum brachyantherum	Northland cottonsedge	1
	Eriophorum gracile	Slender cottongrass	1
	Eriophorum russeolum	Red cottongrass	2
	Eriophorum russeolum var. albidum	Red cottongrass	1
	Eriophorum vaginatum	Tussock cottongrass	1
	Festuca lenensis	Tundra fescue	2
	Festuca saximontana	Rocky Mountain fescue	2
	Glyceria grandis	American mannagrass	1
	Glyceria striata ssp. stricta	Fowl mannagrass	2
	Hierochloe alpina	Alpine sweetgrass	1
	Hordeum jubatum	Foxtail barley	3
	Juncus arcticus	Arctic rush	2
	Koeleria asiatica	Eurasian junegrass	2
	Luzula rufescens	Rufus woodrush	2
	Poa glauca	Glaucus bluegrass	2
	Trichophorum caespitosum	Tufted bulrush	1
Lichens	*Alectoria ochroleuca*	Witch's hair lichen	1
	Cetraria islandica	Island cetraria lichen	1
	Cladina mitis	Reindeer lichen	1

	SCIENTIFIC NAME	COMMON NAME	SOURCE[1]
Lichens, cont.	*Cladina rangiferina*	Graygreen reindeer lichen	1
	Cladina stellaris	Star reindeer lichen	1
	Cladina arbuscula	Reindeer lichen	1
	Cladonia amaurocraea	Cup lichen	3
	Cladonia borealis	Boreal cup lichen	3
	Cladonia botrytes	Cup lichen	3
	Cladonia fimbriata	Cup lichen	3
	Cladonia gracilis	Cup lichen	3
	Cladonia sulpherina	Sulpher cup lichen	3
	Dactylina arctica	Arctic dactylina lichen	1
	Flavocetraria cucullata		1
	Flavoetraria nivalis		1
	Icmadophila ericetorum	Peppermint drop lichen	1
	Masonhalea richardsonii	Richardson's masonhalea lichen	1
	Nephroma arcticum	Arctic kidney lichen	1
	Peltigera aphthosa	Felt lichen	1
	Peltigera neopolydactyla	Felt lichen	3
	Stereocaulon spp.	Snow lichen	1
	Thamnolia subuliformis	Whiteworm lichen	1
	Vulpicida tilesii		3
Bryophytes	*Aulacomnium turgidum*	Turgid aulacomnium moss	1
	Aulacomnium palustre	Aulacomnium moss	1
	Brachythecium salebrosum	Brachythecium moss	1
	Brachythecium cf. turgidum	Turgid brachythecium moss	1
	Calliergon richardsonii	Richardson's calliergon moss	1
	Campylium stellatum	Star campylium moss	1
	Ceratodon purpureus	Ceratodon moss	1
	Climacium dendroides	Tree climacium moss	3
	Dicranum elongatum	Elongate dicranum moss	1
	Dicranum fuscescens		1
	Dicranum groenlandicum	Greenland dicranum moss	1
	Dicranum scoparium		1
	Dicranum undulatum	Undulate dicranum moss	1
	Drepanocladus cf. aduncus		1
	Hylocomium splendens	Splendid feather moss	1
	Hypnum callichroum		1
	Hypnum imponens		3
	Marchantia polymorpha		1
	Mylia anomala		1
	Pleurozium schreberi	Schreber's big red stem moss	1
	Pohlia cruda		3
	Polytrichum commune		1
	Polytrichum juniperinum	Juniper polytrichum moss	1
	Polytrichum strictum		1
	Pseudobryum cinclidioides		1
	Ptilium crista-castrensis	Knight's plume moss	1
	Ptilidium ciliare		1
	Racomitrium lanuginosum		1
	Rhytidium rugosum		1
	Rhytidiadelphus triquetrus	Rough goose neck moss	1

	SCIENTIFIC NAME	COMMON NAME	SOURCE[1]
Bryophytes, cont.	*Scapania paludicola*		1
	Scorpidium scorpioides		1
	Sphagnum angustifolium		1
	Sphagnum balticum	Baltic sphagnum	1
	Sphagnum capillifolium		1
	Sphagnum compactum	Low sphagnum	1
	Sphagnum fimbiratum		1
	Sphagnum fuscum		1
	Sphagnum girgensohnii	Girgensohn's sphagnum	1
	Sphagnum jensenii	Jensen's sphagnum	1
	Sphagnum lenense		1
	Sphagnum lindbergii	Lindberg's sphabnum	1
	Sphagnum magellanicum	Magellan's sphagnum	1
	Sphagnum nitidum		1
	Sphagnum obtusum		1
	Sphagnum orientale	Oriental sphagnum	1
	Sphagnum platyphyllum		1
	Sphagnum riparium	Streamside sphagnum	1
	Sphagnum rubellum		1
	Sphagnum russowii	Russow's sphagnum	1
	Sphagnum squarrosum		1
	Sphagnum warnstorfii	Warnstorf's sphagnum	1
	Splachnum luteum	Yellow moose dung moss	3
	Splachnum rubrum	Brilliant red dung moose	3
	Tomenthynum nitens		1
	Warnstorfia exannulatus		1
	Warnstorfia fluitans		1

Table G-2: Mammals

Known to occur on the Refuge

Common Name	Scientific Name
Masked shrew	*Sorex cinereus*
Dusky shrew	*Sorex monticolus*
Pygmy shrew	*Sorex hoyi*
Arctic shrew	*Sorex arcticus*
Little brown bat	*Myotis lucifugus*
Collared pika	*Ochotona collaris*
Snowshoe hare	*Lepus americanus*
Hoary marmot	*Marmota caligata*
Arctic ground squirrel	*Spermophilus parryii*
Red squirrel	*Tamiasciurus hudsonicus*
Northern flying squirrel	*Glaucomys sabrinus*
Beaver	*Castor canadensis*
Northern red-backed vole	*Clethrionomys rutilus*
Meadow vole	*Microtus pennsylvanicus*
Tundra vole	*Microtus oeconomus*
Yellow-cheeked vole	*Microtus xanthognathus*
Singing vole	*Microtus miurus*
Muskrat	*Ondatra zibethicus*
Brown lemming	*Lemmus sibiricus*
Northern bog lemming	*Synaptomys borealis*

Common Name	Scientific Name
Collared lemming	*Dicrostonyx groenlandicus*
Porcupine	*Erethizon dorsatum*
Coyote	*Canis latrans*
Gray wolf	*Canis lupus*
Red fox	*Vulpes vulpes*
Black bear	*Ursus americanus*
Grizzly bear	*Ursus arctos*
Marten	*Martes americana*
Ermine	*Mustela erminea*
Least weasel	*Mustela nivalis*
Mink	*Mustela vison*
Wolverine	*Gulo gulo*
River otter	*Lutra canadensis*
Lynx	*Lynx canadensis*
Moose	*Alces alces*
Caribou	*Rangifer tarandus*
Muskox	*Ovibos moschatus*

Table G-3: Fish

Found on the Refuge (USFWS 1993)

Common Name	Scientific Name
Chinook (king) salmon	*Oncorhynchus tshawytscha*
Chum (dog) salmon	*Oncorhynchus keta*
Coho (silver) salmon	*Oncorhynchus kisutch*
Dolly Varden	*Salvelinus malma*
Northern pike	*Esox lucius*
Sheefish (inconnu)	*Stenodus leucichthys*
Arctic grayling	*Thymallus arcticus*
Burbot (lush)	*Lota lota*
Round whitefish	*Prosopium cylindraceum*
Broad whitefish	*Coregonus nasus*
Humpback whitefish	*Coregonus pidschian*
Least cisco	*Coregonus sardinella*
Alaska blackfish	*Dallia pectoralis*
Longnose sucker	*Catostomus catostomus*
Slimy sculpin	*Cottus cognatus*
Lake chub	*Couesius plumbeus*
Arctic lamprey	*Lampetra japonica*

Table G-4 (a): Aquatic Invertebrates

Collected in lakes on the Refuge in August and June, 1999-2001. Invertebrates are identified to the lowest level possible.

Phylum	Class	Order	Lowest taxonomic unit identified
Annelida	*Hirudinea*		*Hirudinea*
	Oligochaeta		*Oligochaeta*
Arthropoda	*Arachnoidea*		*Acari*
		Acariformes	*"Hydracarina"*
Arthropoda	*Crustacea*	*Amphipoda*	*Amphipoda*
		Amphipoda	*Hyalella azteca*

Phylum	Class	Order	Lowest taxonomic unit identified
		Cladocera	*Cladocera*
		Conchostraca	*Conchostraca*
		Copepoda	*Copepoda*
		Ostracoda	*Ostracoda*
Arthropoda	*Insecta*	*Coleoptera*	*Carabidae*
		Coleoptera	*Chrysomelidae*
		Coleoptera	*Dytiscidae*
		Coleoptera	*Gyrinus*
		Coleoptera	*Haliplus*
		Coleoptera	*Helodidae*
		Coleoptera	*Hydrobius*
		Coleoptera	*Hydrophilidae*
		Coleoptera	*Staphylinidae*
Arthropoda	*Insecta*	*Diptera*	*Atrichopogon*
		Diptera	*Brachycera*
		Diptera	*Ceratopogonidae*
		Diptera	*Chironomidae*
		Diptera	*Culicidae*
		Diptera	*Dasyhelea*
		Diptera	*Dixella*
		Diptera	*Dixidae*
		Diptera	*Limonia*
		Diptera	*Muscidae*
		Diptera	*Palpomyia*
		Diptera	*Pericoma*
		Diptera	*Phalacrocera*
		Diptera	*Phoridae*
		Diptera	*Psychoda*
		Diptera	*Sciomyzidae*
		Diptera	*Stratiomyidae*
		Diptera	*Tabanidae*
Arthropoda	*Insecta*	*Diptera*	*Tipula*
		Diptera	*Tipulidae*
		Diptera	*Ulomorpha*
		Diptera	Unknown *Brachycera*
		Diptera	Unknown *Diptera*
Arthropoda	*Insecta*	*Ephemeroptera*	*Acerpenna*
		Ephemeroptera	*Caenidae*
		Ephemeroptera	*Caenis*
		Ephemeroptera	*Callibaetis*
		Ephemeroptera	*Centroptilum*
Arthropoda	*Insecta*	*Gastropoda*	*Planorbidae*
Arthropoda	*Insecta*	*Hemiptera*	*Corixidae*
		Hemiptera	*Gerridae*
		Hemiptera	*Mesovelia*
		Hemiptera	*Microvelia*
		Hemiptera	*Saldidae*
		Hemiptera	*Veliidae*

Phylum	Class	Order	Lowest taxonomic unit identified
Arthropoda	*Insecta*	*Neuroptera*	*Climacia*
Arthropoda	*Insecta*	*Odonata*	*Aeshna*
		Odonata	*Aeshnidae*
		Odanata	*Coenagrionidae*
		Odonata	*Coenagrion/Enallagma*
		Odonata	*Leucorrhinia*
		Odonata	Early instar *Libellulidae*
		Odonata	*Somatochlora*
Arthropoda	*Insecta*	*Pelecypoda*	*Sphaeriidae*
Arthropoda	*Insecta*	*Tichoptera*	*Limnephilus*
		Tichoptera	*Oecetis*
		Trichoptera	*Ceraclea*
Arthropoda	*Insecta*	*Trichoptera*	*Grammotaulius*
		Trichoptera	*Hydroptila*
		Trichoptera	Early instar *Limnephilidae*
		Trichoptera	*Mystacides*
		Trichoptera	*Nemotaulius hostilis*
		Trichoptera	*Oligotricha lapponica*
		Trichoptera	*Oxyethira*
		Trichoptera	*Phryganeidae*
		Trichoptera	*Polycentropus*
		Trichoptera	*Triaenodes*
Mollusca		*Bivalvia*	*Bivalvia*
		Gastropoda	*Gastropoda*
		Pelecypoda	*Physidae*
Coelenterata	*Hydrazoa*	*Hydroida*	*Hydra*
Nematoda			*Nematoda*
Nematomorpha			*Nematomorpha*
Platyhelminthes	*Turbellaria*		*Turbellaria*

Table G-4 (b): Aquatic Invertebrates

Collected from riffles in the Kanuti River, Kanuti NWR, June 1999. Invertebrates are identified to the lowest level possible.

Phylum:	Class:	Order:	Lowest taxonomic unit identified
Annelida	*Oligochaeta*		*Oligochaeta*
Arthropoda	*Arachnoidea*	*Acariformes*	"*Hydracarina*"
Arthropoda	*Insecta*	*Coleoptera*	*Dytiscidae*
		Diptera	*Ceratopogonidae*
		Diptera	*Chironomidae*
		Diptera	*Empididae*
		Diptera	*Simuliidae*
		Diptera	*Tiplulidae*
		Ephemeroptera	*Amelitidae*
		Ephemeroptera	*Baetidae*

		Ephemeroptera	*Ephemerellidae*
		Ephemeroptera	*Heptageniidae*
		Ephemeroptera	*(early instar)*
		Plecoptera	*Chloroperlidae*
		Plecoptera	*Perlodidae*
		Plecoptera	*(early instar)*
		Trichoptera	*Brachycentridae*
		Trichoptera	*Glossossomatidae*
		Trichoptera	*Limnephilidae*
		Trichoptera	*Phryganeidae*
		Trichoptera	*(early instar)*
Mollusca	*Gastropoda*		*Gastropoda*
Nematoda			*Nematoda*

Table G-5: Terrestrial Insects

Preliminary list of terrestrial insects (Collected on Kanuti Refuge and in Bettles, Alaska, 2001–2003. Insects identified to the lowest possible taxon.)

Order	Family	Subfamily	Tribe	Genus	Species
Aranae					
Coleoptera	*Carabidae*			*Carabus*	*vietinghoffi*
Coleoptera	*Carabidae*			*Pterostichus*	*adstrictus*
Coleoptera	*Cerambicidae*			*Monochamus*	*scutellatum*
Coleoptera	*Cerambicidae*			*Pachys*	*lamed*
Coleoptera	*Cerambicidae*			*Xylotrechus*	*undulatus*
Coleoptera	*Chrysomelidae*			*Crepidodera*	*digna*
Coleoptera	*Chrysomelidae*			*Entomoscelis*	
Coleoptera	*Chrysomelidae*			*Hippuriphila*	
Coleoptera	*Chrysomelidae*			*Phratora*	*kenaiensis*
Coleoptera	*Chrysomelidae*			*Plateumaris*	
Coleoptera	*Chrysomelidae*				
Coleoptera	*Cicindelidae*			*Cicindela*	*oregona*
Coleoptera	*Dytiscidae*			*Graphoderus*	*perplexus*
Coleoptera	*Silphidae*			*Silpha*	*lapponica*
Coleoptera	*Staphylinidae*			*Creophilus*	*maxillosus*
Diptera	*Bibionidae*			*Bibio*	
Diptera	*Canacidae*				
Diptera	*Cecidomyiidae*				
Diptera	*Ceratopogonidae*				
Diptera	*Chloropidae*				
Diptera	*Culicidae*				
Diptera	*Dolichopodidae*				
Diptera	*Empididae*				
Diptera	*Micropezidae*			*Compsobata*	
Diptera	*Mycetophylidae*				
Diptera	*Odiniidae*			*Odinia*	
Diptera	*Phoridae*				
Diptera	*Pieridae*			*Colias*	*palaeno*
Diptera	*Pieridae*			*Colias*	
Diptera	*Pieridae*			*Colias*	*philodice*
Diptera	*Pieridae*			*Erebia*	

Order	Family	Subfamily	Tribe	Genus	Species
Diptera	*Pieridae*			*Pontia*	*occidentalis*
Diptera	*Pipinculidae*				
Diptera	*Pipunculidae*			*Dorylomorpha*	
Diptera	*Rhagionidae*			*Ptiolina*	
Diptera	*Sciaridae*				
Diptera	*Simuliidae*				
Diptera	*Syrphidae*			*Arctosyrphus*	*willingii (Smith)*
Diptera	*Syrphidae*			*Eristalis*	
Diptera	*Syriphidae*			*Syrphus*	
Diptera	*Tabanidae*			*Chrysops*	
Diptera	*Tabanidae*			*Hybomitra*	
Diptera	*Tabanidae*			*Tabanus*	
Diptera	*Tachinidae*				
Diptera	*Tephritidae*				
Diptera	*Tipulidae*			*Tipula*	
Diptera	*Tipulidae*				
Hemiptera	*Anthocoridae*				
Hemiptera	*Coreidae*				
Hemiptera	*Miridae*				
Heteroptera	*Scutelleridae*				
Homoptera	*Cercopidae*				
Homoptera	*Cicadellidae*				
Homoptera	*Cicindelidae*			*Cicindella*	
Homoptera	*Psyllidae*				
Hymenoptera	*Andrenidae*			*Andrena*	
Hymenoptera	*Aphidae*				
Hymenoptera	*Apidae*			*Bombus*	*flavifrons*
Hymenoptera	*Apidae*			*Bombus*	*frigidus*
Hymenoptera	*Apidae*			*Bombus*	*melanopygus*
Hymenoptera	*Apidae*			*Bombus*	
Hymenoptera	*Apidae*			*Nomada*	
Hymenoptera	*Apidae*				
Hymenoptera	*Chrysidae*				
Hymenoptera	*Colletidae*			*Caupolicana*	
Hymenoptera	*Diapriidae*	*Betylinae*			
Hymenoptera	*Eurytomidae*			*Eurytoma*	
Hymenoptera	*Figitidae*	*Figitinae*			
Hymenoptera	*Formicidae*			*Camponotus*	*herculeanus*
Hymenoptera	*Formicidae*				
Hymenoptera	*Halictidae*			*Halictus*	*rubicundus*
Hymenoptera	*Halictidae*				
Hymenoptera	*Ichneumonidae*	*Triphoninae*			
Hymenoptera	*Megachilidae*				
Hymenoptera	*Megaspilidae*			*Conostigmus*	
Hymenoptera	*Mymmaridae*				
Hymenoptera	*Pompilidae*				
Hymenoptera	*Proctotrupidae*				

Order	Family	Subfamily	Tribe	Genus	Species
Hymenoptera	*Pteromalidae*			*Mesopolobus*	
Hymenoptera	*Pteromalidae*				
Hymenoptera	*Siricidae*			*Uroceros*	*gigas*
Hymenoptera	*Sphecidae*	*Pemphedoninae*	*Pemphedonini*		
Hymenoptera	*Sphecidae*	*Craboninae*			
Hymenoptera	*Sphecidae*	*Pemphedoninae*	*Pemphedonini*		
Hymenoptera	*Sphecidae*		*Psenini*		
Hymenoptera	*Sphecidae*	*Pemphedoninae*	*Pemphedonini*		
Hymenoptera	*Sphecidae*	*Craboninae*			
Hymenoptera	*Tenthredinidae*				
Hymenoptera	*Torymidae*			*Megastigmus*	
Hymenoptera	*Torymidae*			*Torymus*	*cecidomyiae*
Hymenoptera	*Vespidae*			*Dolichovespula*	*norvegicoides*
Hymenoptera	*Vespidae*			*Dolichovespula*	*arctica*
Hymenoptera	*Vespidae*			*Dolichovespula*	*arenaria*
Hymenoptera	*Vespidae*			*Dolichovespula*	*norvegicoides*
Hymenoptera	*Vespidae*			*Vespula*	*consobrina*
Hymenoptera					
Lepidoptera	*Arctiidae*			*Platarctia*	*parthenos*
Lepidoptera	*Geometridae*			*Carpaea*	*perlata*
Lepidoptera	*Geometridae*			*Rheumaptera*	
Lepidoptera	*Hesperiidae*				
Lepidoptera	*Lycaenidae*				
Lepidoptera	*Lymantriidae*			*Orgya*	*antiqua*
Lepidoptera	*Nymphalidae*			*Basilarchia*	*arthemis*
Lepidoptera	*Nymphalidae*			*Erebia*	*discoidalis*
Lepidoptera	*Nymphalidae*			*Nymphalis*	*antiopa*
Lepidoptera	*Nymphalidae*			*Phyciodes*	*pulchella*
Lepidoptera	*Nymphalidae*				
Lepidoptera	*Papilionidae*			*Papilio*	*machaon*
Lepidoptera	*Papilionidae*			*Papilio*	*canadensis*
Lepidoptera	*Pieridae*			*Colias*	*palaeno*
Lepidoptera	*Pieridae*			*Pieris*	*angelika*
Lepidoptera					
Neuroptera	*Hemerobiidae*				
Neuroptera					
Plecoptera	*Perlidae*				
Plecoptera					
Psocoptera					
Thysanoptera					

Table G-6: Birds

Bird Checklist for the Kanuti National Wildlife Refuge (Observers have confirmed the following species for the Refuge; updated as of August 31, 2008; follows The A.O.U. Checklist of North American Birds (7th ed., 1998) and supplements.)

Common Name	Scientific Name
Greater White-fronted Goose	*Anser albifrons*
Snow Goose	*Chen caerulescens*
Brant	*Branta bernicla*
Canada Goose	*Branta canadensis*
Trumpeter Swan	*Cygnus buccinator*
Tundra Swan	*Cygnus columbianus*
Gadwall	*Anas strepera*
American Wigeon	*Anas americana*
Mallard	*Anas platyrhynchos*
Blue-winged Teal	*Anas discors*
Northern Shoveler	*Anas clypeata*
Northern Pintail	*Anas acuta*
Green-winged Teal	*Anas crecca*
Canvasback	*Aythya valisineria*
Redhead	*Aythya americana*
Ring-necked Duck	*Aythya collaris*
Greater Scaup	*Aythya marila*
Lesser Scaup	*Aythya affinis*
Common Eider	*Somateria mollissima*
Harlequin Duck	*Histrionicus histrionicus*
Surf Scoter	*Melanitta perspicillata*
White-winged Scoter	*Melanitta fusca*
Black Scoter	*Melanitta nigra*
Long-tailed Duck	*Clangula hyemalis*
Bufflehead	*Bucephala albeola*
Common Goldeneye	*Bucephala clangula*
Common Merganser	*Mergus merganser*
Red-breasted Merganser	*Mergus serrator*
Ruffed Grouse	*Bonasa umbellus*
Spruce Grouse	*Falcipennis canadensis*
Willow Ptarmigan	*Lagopus lagopus*
Sharp-tailed Grouse	*Tympanuchus phasianellus*
Red-throated Loon	*Gavia stellata*
Pacific Loon	*Gavia pacifica*
Common Loon	*Gavia immer*
Horned Grebe	*Podiceps auritus*
Red-necked Grebe	*Podiceps grisegena*
Osprey	*Pandion haliaetus*
Bald Eagle	*Haliaeetus leucocephalus*
Northern Harrier	*Circus cyaneus*
Sharp-shinned Hawk	*Accipiter striatus*
Northern Goshawk	*Accipiter gentilis*
Red-tailed Hawk	*Buteo jamaicensis*
Rough-legged Hawk	*Buteo lagopus*
Golden Eagle	*Aquila chrysaetos*
American Kestrel	*Falco sparverius*
Merlin	*Falco columbarius*
Gyrfalcon	*Falco rusticolus*
Peregrine Falcon	*Falco peregrinus*

Common Name	Scientific Name
Sandhill Crane	*Grus canadensis*
American Golden-Plover	*Pluvialis dominica*
Semipalmated Plover	*Charadrius semipalmatus*
Spotted Sandpiper	*Actitis macularius*
Solitary Sandpiper	*Tringa solitaria*
Wandering Tattler	*Tringa incana*
Lesser Yellowlegs	*Tringa flavipes*
Upland Sandpiper	*Bartramia longicauda*
Whimbrel	*Numenius phaeopus*
Hudsonian Godwit	*Limosa haemastica*
Semipalmated Sandpiper	*Calidris pusilla*
Least Sandpiper	*Calidris minutilla*
Baird's Sandpiper	*Calidris bairdii*
Pectoral Sandpiper	*Calidris melanotos*
Long-billed Dowitcher	*Limnodromus scolopaceus*
Wilson's Snipe	*Gallinago delicata*
Red-necked Phalarope	*Phalaropus lobatus*
Long-tailed Jaeger	*Stercorarius longicaudus*
Bonaparte's Gull	*Larus philadelphia*
Mew Gull	*Larus canus*
Herring Gull	*Larus argentatus*
Glaucous-winged Gull	*Larus glaucescens*
Glaucous Gull	*Larus hyperboreus*
Arctic Tern	*Sterna paradisaea*
Great Horned Owl	*Bubo virginianus*
Snowy Owl	*Bubo scandiacus*
Northern Hawk Owl	*Surnia ulula*
Great Gray Owl	*Strix nebulosa*
Short-eared Owl	*Asio flammeus*
Boreal Owl	*Aegolius funereus*
Belted Kingfisher	*Megaceryle alcyon*
Downy Woodpecker	*Picoides pubescens*
American Three-toed Woodpecker	*Picoides dorsalis*
Black-backed Woodpecker	*Picoides arcticus*
Northern Flicker	*Colaptes auratus*
Olive-sided Flycatcher	*Contopus cooperi*
Western Wood-Pewee	*Contopus sordidulus*
Yellow-bellied Flycatcher	*Empidonax flaviventris*
Alder Flycatcher	*Empidonax alnorum*
Hammond's Flycatcher	*Empidonax hammondii*
Say's Phoebe	*Sayornis phoebe*
Northern Shrike	*Lanius excubitor*
Gray Jay	*Perisoreus canadensis*
Common Raven	*Corvus corax*
Horned Lark	*Eremophila alpestris*
Tree Swallow	*Tachycineta bicolor*
Violet-green Swallow	*Tachycineta thalassina*
Bank Swallow	*Riparia riparia*
Cliff Swallow	*Hirundo pyrrhonota*
Black-capped Chickadee	*Poecile atricapillus*
Boreal Chickadee	*Poecile hudsonica*

Common Name	Scientific Name
Ruby-crowned Kinglet	*Regulus calendula*
Arctic Warbler	*Phylloscopus borealis*
Townsend's Solitaire	*Myadestes townsendi*
Gray-cheeked Thrush	*Catharus minimus*
Swainson's Thrush	*Catharus ustulatus*
Hermit Thrush	*Catharus guttatus*
American Robin	*Turdus migratorius*
Varied Thrush	*Ixoreus naevius*
American Pipit	*Anthus rubescens*
Bohemian Waxwing	*Bombycilla garrulous*
Orange-crowned Warbler	*Vermivora celata*
Yellow Warbler	*Dendroica petechia*
Yellow-rumped Warbler	*Dendroica coronata*
Palm Warbler	*Dendroica palmarum*
Blackpoll Warbler	*Dendroica striata*
Northern Waterthrush	*Seiurus noveboracensis*
Wilson's Warbler	*Wilsonia pusilla*
American Tree Sparrow	*Spizella arborea*
Savannah Sparrow	*Passerculus sandwichensis*
Fox Sparrow	*Passerella iliaca*
Lincoln's Sparrow	*Melospiza lincolnii*
White-crowned Sparrow	*Zonotrichia leucophrys*
Golden-crowned Sparrow	*Zonotrichia atricapilla*
Dark-eyed Junco	*Junco hyemalis*
Lapland Longspur	*Calcarius lapponicus*
Snow Bunting	*Plectrophenax nivalis*
Red-winged Blackbird	*Agelaius phoeniceus*
Rusty Blackbird	*Euphagus carolinus*
Pine Grosbeak	*Pinicola enucleator*
White-winged Crossbill	*Loxia leucoptera*
Common Redpoll	*Carduelis flammea*
Hoary Redpoll	*Carduelis hornemanni*
Pine Siskin	*Carduelis pinus*

Appendix H

Compatibility Determinations

Subsistence Activities
Wildlife Observation, Wildlife Photography, Environmental Education and Interpretation
Recreational Hunting
Recreational Fishing
Non-Wildlife Dependent Recreational Activities
Trapping
Snowmobiling
Trapping Cabin and Temporary Camps
Subsistence Harvest of House Logs
Scientific Research
Helicopter Landings
Commercial Transporter Services
Commercial Big-Game Hunting Guide Services
Commercial Recreational Fishing Guide Services
Commercial Recreational Guide Services
State of Alaska Management Activities
Reburial of Archaeological Human Remains per State and Federal Guidelines

Compatibility determinations are available for viewing at the Kanuti Refuge office and at http://alaska.fws.gov/nwr/planning/completed.htm.

Appendix I

Glossary

Adequate snow cover — Snow cover of a sufficient depth to protect underlying vegetation and soil (50 CFR 36.2); generally about six inches within the Kanuti Refuge.

air taxi operator/transporter — A person who transports people, equipment, supplies, harvested fish and wildlife products, or other personal property by means of aircraft for compensation or with the intent or agreement to receive compensation; a transporter who provides commercial transportation services by means of aircraft. Must have a special use permit to operate on a national wildlife refuge.

allowed — Activity, use, or facility is allowed under existing National Environmental Policy Act (NEPA) analysis, a specific compatibility determination, and compliance with all applicable laws and regulations of the U.S. Fish and Wildlife Service, other Federal agencies and the State of Alaska.

not allowed — Activity, use or facility is not allowed.

alternatives — Different ways to resolve issues, achieve refuge purposes, meet refuge goals, and contribute to the National Wildlife Refuge System (System) mission. Alternatives provide different options to respond to major issues identified during the planning process.

No-Action Alternative — In the context of a comprehensive conservation plan, the current management direction. With this alternative, no change from the current Comprehensive Conservation Plan would be implemented.

Preferred Alternative — A proposed action in the NEPA document for the Comprehensive Conservation Plan identifying the alternative that the Service believes best achieves planning unit purposes, vision, and goals; helps fulfill the System mission; maintains and, where appropriate, restores the ecological integrity of each refuge and the System; addresses the significant issues and mandates; and is consistent with principles of sound fish and wildlife management.

archaeological resource — Any material remains of past human life or activities that are of interest to the scientific study of historic or prehistoric peoples and their cultures. Materials that are capable of providing an understanding of past human behavior, cultural adaptation, and related topics through the application of scholarly or scientific techniques.

authorized	Activity, use, or facility allowed upon issuance of a special use permit or other authorization.
base camp	Serves as a center of operations and overnight accommodations for people working in a remote part of the refuge (e.g., refuge staff, guides, and clients). A temporary base camp usually remains in place for the full season of use but may be removed within 48 hours. It generally consists of larger tents than do primitive camps and often has tent platforms or other rigid floors. The primary distinction between temporary base camps and primitive camps is the period of occupancy. The specific details of a temporary base camp located on refuge lands would be spelled out in the refuge special use permit.
big-game guide	A person who is licensed by the State of Alaska to provide services, equipment, or facilities to a big-game hunter in the field. A big-game guide accompanies or is present with, personally or through an assistant, the hunter in the field. Must have a special use permit to operate on a national wildlife refuge.
big-game outfitter	A person who provides for compensation or with the intent to receive compensation, services, supplies, or facilities to a big-game hunter in the field. The outfitter does not accompany nor provide an assistant to the hunter in the field. Must have a special use permit to operate on a national wildlife refuge.
biological diversity	The variety of life, including the variety of living organisms, the genetic differences among them, and the communities in which they occur (USFWS Service Manual, 602 FW 1.6).
biological integrity	Biotic composition, structure, and functioning at the genetic, organism, and community levels consistent with natural conditions, including the natural biological processes that shape genomes, organisms, and communities (USFWS Service Manual, 602 FW 1.6).
campsite hardening	Actions undertaken to increase the durability of a campsite through manipulation, such as placing gravel on a place to pitch a tent, or trails within the campsite. Does not include facilities normally associated with campgrounds, including outhouses, picnic tables, etc.
categorical exclusion	A category of actions that do not individually or cumulatively have a significant effect on the human environment and have been found to have no such effect in

	procedures adopted by a Federal agency pursuant to the National Environmental Policy Act (40 CFR 1508.4).
commercial recreational uses	Recreational uses of lands, waters, and resources for business or financial gain; includes guided recreational fishing, guided recreational hunting, other guided recreation, and air-taxi services.
commercial visitor service	Any service or activity made available for a fee, commission, brokerage, or other compensation to persons who visit a refuge, including such services as providing food, accommodations, transportation, tours, and guides.
compatible use	A proposed or existing wildlife-dependent recreational use or any other use of a refuge that, based on sound professional judgment, will not materially interfere with or detract from the fulfillment of the mission of the System or the purposes of the refuge (USFWS Service Manual, 603 FW 2 2.6).
compatibility determination	A written determination, signed and dated by the refuge manager and the Service regional chief, signifying that a proposed or existing use of a national wildlife refuge is a compatible use or is not a compatible use. The director of the Service makes this delegation through the regional director (USFWS Service Manual, 603 FW 2 2.6).
consumptive use	Use of a refuge resource that removes the resource from the refuge (e.g., killing an animal to eat, catching and keeping fish, harvesting berries or plants, or removal of mineral or other specimens).
cultural resources	Fragile nonrenewable properties, including any district, site, building, structure, or object that is significant in American history, architecture, archaeology, engineering, or culture. These resources are significant for information they contain or the associations they have with past people, events, or life ways (USFWS 1992b).
ecological integrity	The integration of biological integrity, natural biological diversity, and environmental health; the replication of natural conditions (USFWS Service Manual, 602 FW 1.6).
ecoregion	Delimits large areas within which local ecosystems reoccur more or less throughout the region in a predictable pattern.
ecosystem	A biological community functioning together with its environment as a unit.

effects (wildlife and habitat)

long-term effects	Effects occurring after or lasting longer than five years after implementation of the action.
major effects	Affecting a regional or local population of a species, or its habitat, sufficiently to cause a change in abundance or a change in distribution beyond which natural recruitment is not likely to return the population to its former abundance within several generations.
minor effects	Affecting the survival, reproduction, distribution, or behavior of a specific group of individuals of a population in a localized area for one generation or less without affecting the regional population. Habitat composition and structure remain unchanged; habitat quality, however, may be affected by indirect actions (e.g., disturbance or displacement affecting a specific group of individuals that may result in altered use of an area).
moderate effects	Affecting a local population or habitat quality and composition in a localized area sufficiently to cause a change in abundance or distribution for more than one generation, but unlikely to affect the integrity of the regional population over the long term.
negligible effects	Temporary effects that do not result in a change in the survival, reproduction, distribution, or behavior of individuals. The ability of the habitat to support populations would remain unchanged (e.g., temporary disturbance of a specific group of individuals that does not result in a change in use of an area).
short-term effects	Effects are anticipated to occur and end within five years from implementation of the action.
cumulative effects	Combined effects of past actions, present actions, proposed action (plan), and reasonably foreseeable future actions (regardless of source).

environmental assessment — A concise public document that provides a sufficient analysis for determining whether to prepare an environmental impact statement (EIS) or a finding of no significant impact. It also aids an agency's compliance with NEPA when no EIS is necessary (40 CFR 1508.9).

environmental health — Abiotic (the nonliving factors of the environment, including light, temperature, and atmosphere) composition, structure, and functioning of the environment consistent with natural

	conditions, including the natural abiotic processes that shape the environment (USFWS Service Manual, 602 FW 1.6).
environmental impact statement	A detailed written statement required by section 102(2)(C) of the National Environmental Policy Act (NEPA) that analyzes the environmental impacts of a proposed action; adverse effects of the project that cannot be avoided; alternative courses of action; short-term uses of the environment versus the maintenance and enhancement of long-term productivity; and any irreversible and irretrievable commitment of resources (40 CFR 1508.11).
goal	A descriptive, open-ended, and often broad statement of desired future conditions that conveys purposes but does not define measurable units (USFWS Service Manual, 620 FW 1.6).
guide	Any person who has a special use permit to provide a commercial visitor service for hire on a refuge. This term does not generally apply to air-taxi operators, who only provide transportation services.
habitat	The physical and biological resources required by an organism for its survival and reproduction; these requirements are species-specific. Food and cover are major components of habitat and must extend beyond the requirements of the individual to include a sufficient area capable of supporting a viable population.
helicopter use for recreation access	Use of helicopters for other than official government management activities, search and rescue, or other authorized activities.
incidental uses	Recreational or public uses of refuge lands, waters and/or resources that are secondary to, or of less importance than, the primary recreational use a visitor is participating in. An incidental use may or may not support a primary use.
issue	Any unsettled matter that requires a management decision (e.g., a Service initiative, opportunity, resource management problem, threat to the resources of the unit, conflict in uses, public concern, or the presence of an undesirable resource condition) (USFWS Service Manual, 602 FW 1.6).
"leave no trace" principles	Principles of outdoor recreation designed to minimize effects on the natural environment and other visitors. These principles are: (1) plan ahead and prepare, (2) travel and camp on durable surfaces, (3) dispose of waste properly, (4)

	leave what you find, (5) minimize campfire impacts, (6) respect wildlife, and (7) be considerate of other visitors (Leave No Trace Center for Outdoor Ethics, http://www.lnt.org, accessed May 11, 2004).
likelihood	
low	Effects are typically not expected but could occur under unusual conditions.
medium	Effects are not expected to occur in the majority of instances.
high	Effects are anticipated to occur as a result of implementing the action.
muskeg	A bog in northern North America characterized by an abundance of Sphagnum (peat moss) and a sparse cover of shrubs and small trees such as black spruce.
national wildlife refuge	A designated area of land, water, or an interest in land or water within the National Wildlife Refuge System (System); does not include coordination areas. Find a complete listing of all units of the System in the current Annual Report of Lands Under Control of the U.S. Fish and Wildlife Service (USFWS 2004).
native species	A species, subspecies, or distinct population that occurs within its natural range or natural zone of potential dispersal (i.e., the geographic area the species occupies naturally or would occupy in the absence of direct or indirect human activity or an environmental catastrophe). This definition recognizes that ecosystems and natural ranges are not static; they can and do evolve over time. Thus a species may naturally extend its range onto (or within) a refuge and still be considered native.
navigable waters	Under Federal law, for the purpose of determining ownership of submerged lands beneath inland water bodies not reserved at the date of statehood, navigable waters are waters used or susceptible to being used in their ordinary condition as highways of commerce over which trade and travel are or may be conducted in the customary modes of trade and travel on water. In situations where navigability and the ownership of submerged lands are disputed, the final authority for determining navigability rests with the Federal courts.

National Environmental Policy Act — This act, promulgated in 1969, requires all Federal agencies to disclose the environmental effects of their actions, incorporate environmental information, and use public participation in the planning and implementation of all actions. Federal agencies must integrate the National Environmental Policy Act (NEPA) with other planning requirements and must prepare appropriate NEPA documents to facilitate better environmental decision-making (from 40 CFR 1500). The law also established the Council on Environmental Quality to implement the law and to monitor compliance with the law.

non-consumptive uses — Recreational activities (e.g., hiking, photography, and wildlife observation) that do not involve the taking or catching of fish, wildlife, or other natural resources.

noncommercial recreational uses — Recreational uses of lands, waters, and resources not for business or financial gain, including recreational fishing and hunting, boating and floating, camping, hiking, photography, and sightseeing.

nonnative species — A species, subspecies, or distinct population that has been introduced by humans (intentionally or unintentionally) outside its natural range or natural zone of potential dispersal.

objective — A concise statement of what we want to achieve, how much we want to achieve it, when and where we want to achieve it, and who is responsible for the work. Objectives derive from goals and provide the basis for determining strategies, monitoring refuge accomplishments, and evaluating the success of strategies. (USFWS Service Manual, 602 FW 1.6).

ordinary high-water mark — The line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding area (33 CFR 328.3[e]).

primitive tent camps — Portable camps, normally consisting of small tents, used by people remaining overnight in remote parts of the refuge (e.g., refuge staff, nonguided and guided visitors). Such camps usually remain in place when in use and then are disassembled and removed.

proposed action

The alternative that best achieves refuge purposes, vision and goals; helps fulfill the mission of the National Wildlife Refuge System (System); maintains, and where appropriate, restores the ecological integrity of the refuge and the System; addresses the significant issues and mandates, and is consistent with principles of sound fish and wildlife management. The proposed action is, for all practical purposes, the draft comprehensive conservation plan for the refuge (USFWS Service Manual, S 602 FW 3.4C). See also "preferred alternative" in section 2.8.

prospectus

The document that the Service uses in soliciting competition to award permits for commercial visitor services on a refuge.

public

Individuals, organizations, and groups; officials of Federal, State, and local government agencies; Indian tribes; Native organizations; and foreign nations. Public may include anyone outside the core planning team. It includes those who may or may not have indicated an interest in Service issues and those who do or do not realize that Service decisions may affect them.

public involvement

A process that offers affected and interested individuals and organizations opportunities to become informed about, and to express their opinions on, Service actions and policies. In the process, these public views are studied thoroughly and are thoughtfully considered in shaping decisions for refuge management.

purposes of the refuge

The purposes specified in or derived from the law, proclamation, executive order, agreement, public land order, donation document, or administrative memorandum establishing, authorizing, or expanding a refuge, refuge unit, or refuge subunit (USFWS Service Manual, 602 FW 1.6).

quality recreation program

A refuge quality recreation program promotes safety of participants, other visitors, and facilities; reliable and reasonable opportunities for the public to experience wildlife; refuge goals and objectives; resource stewardship and conservation; public understanding and increased public appreciation of America's natural resources and the Service's role in managing and protecting these resources; compliance with applicable laws and regulations and responsible behavior; accessibility and availability to a broad spectrum of the American people; facilities that blend into the natural setting; and the use of feedback from visitors to

	help define and evaluate programs (USFWS Service Manual, 605 FW 1.6).
record of decision (ROD)	A concise public record of a decision prepared by the Federal agency, pursuant to NEPA, that contains a statement of the decision, identification of all alternatives considered, identification of the environmentally preferable alternative, a statement whether all practical means to avoid or minimize environmental harm from the alternative selected have been adopted (and if not, why they were not), and a summary of monitoring and enforcement where applicable for any mitigation (40 CFR 1505.2).
recreation guide	A commercial operator who accompanies clients on the refuge for photography, sightseeing, or other activities not related to hunting or fishing, for day or overnight trips. A recreation guide must have a special use permit to operate on the refuge.
recreational fishing	Taking or attempting to take for personal use (not for sale or barter) any fish by hook and line held in the hand or attached to a pole or rod that is held in the hand or is closely attended.
recreational hunting	Taking or attempting to take for personal use (not for sale or barter) a game animal (as defined by the regulatory agency) by any means allowed by the regulatory agency.
recreational fishing or hunting guide	A commercial operator who accompanies recreational fishing or hunting clients on the refuge for day or overnight trips. Must have a special use permit to operate on the refuge.
scoping	An early and open process with the public for determining the range of issues and the significant issues related to a proposed action (40 CFR 1501.7).
special use permit	A U.S. Fish and Wildlife Service authorization required for all commercial uses of refuge lands and waters.
spike camp	A temporary camp of a primitive nature set up by a guide or outfitter to provide overnight accommodations away from base camp.
step-down management plan	A plan that provides specific guidance on management subjects (e.g., habitat, public use, fire, safety) or groups of related subjects. It describes strategies and implementation

	schedules for meeting comprehensive conservation plan goals and objectives.
subsistence uses	The customary and traditional uses by rural Alaska residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of inedible byproducts of fish and wildlife resources taken for personal or family consumption; for barter or sharing for personal or family consumption; and for customary trade (from section 803 of the Alaska National Interest Lands Conservation Act).
Taiga	(1) A Russian term meaning "land of little sticks" and originally applied to the open conifer lichen woodland, which is the transition between the boreal forest and the tundra. (2) Ecosystems adjacent to arctic tundra in which *Abies*, *Picea*, *Larix*, or paper-barked *Betula* are characteristic tree genera; and muskeg, fen, and bog are prominent features of the landscape. Sometimes narrowly applied to just the arctic timberline transition zone; sometimes extended to all subarctic and even subalpine forests of the north temperate zone. (3) The wooded vegetation of boreal-subarctic latitudes that occupies the subarctic climatic zone adjacent to the treeless tundra.
unguided visitor	A visitor who arranges, organizes, and conducts his or her own trip without the assistance of a guide.
use day	A period of one calendar day (24 hours), or portion thereof, for each entity using a resource. When employed as a measure of human use, it is called a visitor, visitor use day, or client use day.
visitor contact station	A staffed or unstaffed facility where the public can learn about the refuge and its resources.
vision statement	A concise statement of the desired future condition of the planning unit, based primarily on the System mission, specific refuge purposes, and other relevant mandates (USFWS Service Manual, 602 FW 1.6).
wilderness	An area essentially undisturbed by human activity, together with its natural ecosystem.
wildlife-dependent recreation	A use of a refuge involving hunting, fishing, wildlife observation and photography, or environmental education and interpretation. These are the six priority public uses of

the Refuge System, as established in the National Wildlife Refuge System Administration Act, as amended. Wildlife-dependent recreational uses, other than the six priority public uses, are those that depend on the presence of wildlife.

Appendix J

Management Policies and Guidelines

for

National Wildlife Refuges in Alaska

Note:

These guidelines include all management categories used on refuges in Alaska. Only the Minimal and Moderate Management categories are currently used on the Kanuti Refuge.

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These guidelines include all management categories used on refuges in Alaska. Only the Minimal and Moderate Management categories are currently used on the Kanuti Refuge. 1
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Introduction

This document presents an overview of the management direction for national wildlife refuges in Alaska. The primary sources of this management direction are the laws governing the National Wildlife Refuge System (Refuge System) and the regulations, policies, and other guidance, both national and regional, developed to implement these laws. Although each refuge is unique, it is only one piece of this system. The management direction presented here represents the common base for management of the Alaska refuges and identifies appropriate sideboards for management of individual refuges.

Some deviations from these region-wide management policies and guidelines are likely to appear in each comprehensive conservation plan given differing establishing orders or refuge purposes. Any refuge-specific departures will be clearly described, along with supporting rationale, in each revised comprehensive conservation plan.

This document contains the following:

- Descriptions of the management categories and their associated general management intent.
- Policies and guidelines specific to each category.
- A table that displays activities, public uses, commercial uses, and facilities by management category.

The management category descriptions are not the same as those from the previous (1980s) round of comprehensive conservation plans which evolved over the course of the planning process. These management category descriptions will remain constant for all the plans unless a well-justified exception is warranted as described above.

Until a final revised comprehensive conservation plan is adopted for a refuge, if there is any conflict between the existing refuge plan and these management guidelines, the direction in the existing plan will take precedence over that contained in these guidelines, unless the conflict is the result of changes in law, judicial rulings, or other non-discretionary guidance.

1. Management Categories

Five management categories, ranging from Intensive management to designated Wilderness, are used to describe management levels throughout the refuges in Alaska. A management category is used to define the level of human activity appropriate to a specific area of the refuge. It is a set of refuge management directions applied to an area, in light of its resources and existing and potential uses, to facilitate management and the accomplishment of refuge purposes and goals. The Management Activities Table (Table 1) shows those management activities, public uses, commercial uses, and facilities that may be allowed in each management category and under what conditions. Only two of these management categories (Moderate and Minimal) apply to the Kanuti Refuge.

1.1 Intensive Management

This category is designed to allow compatible management actions, public facilities, and economic activities that may result in alterations to the natural environment. In Intensive management areas, the presence of human intervention may be very apparent. Roads, buildings, and other structures are likely to be seen. Intensive management is applied to the smallest area reasonable

to accommodate the intended uses. When Intensive management is proposed for an area, the specific purposes for its establishment will be described.

Natural processes or habitats may be modified through human intervention. Habitats may be highly modified to enhance conditions for one or more animal species. For example, water regimes may be artificially controlled to improve habitat for waterfowl.

High levels of public use may be accommodated and encouraged through modifications to the natural environment such as paving, buildings, developed campgrounds, and other facilities that could alter the natural environment in specific areas. Public facilities are designed to provide a safe and enjoyable experience of the natural environment and an increased understanding of refuge resources for a wide range of visitors. Facilities may accommodate a large number of visitors while protecting refuge resources from damage through overuse.

Compatible economic uses of refuge resources that result in alterations to the natural environment may be authorized in Intensive management areas. All economic uses are subject to the compatibility standard, must contribute to the purposes of the refuge, and require official authorizations such as special use permits.

1.2 Moderate Management

Moderate management is meant to allow compatible management actions, public uses, commercial uses, and facilities that may result in changes to the natural environment that are temporary, or permanent, but small in scale and that do not disrupt natural processes. The natural landscape is the dominant feature of Moderate management areas although signs of human actions may be visible.

Management actions in the category of Moderate management will focus on maintaining, restoring, or enhancing habitats to maintain healthy populations of plants and animals where natural processes predominate. For example, logging and prescribed burning may be used to convert mature forests to earlier native seral stages to enhance browse for moose. In general, management facilities, both temporary and permanent, will be allowed for the purposes of gathering data needed to understand and manage resources and natural systems of the refuge. Structures will be designed to minimize overall visual impact.

Public facilities provided in Moderate management will, while protecting habitats and resources, allow the public to enjoy and use refuge resources in low numbers over a large area or they will encourage the short-term enjoyment of the refuge in focused areas. The emphasis is on small facilities that encourage outdoor experiences. Facilities such as public use cabins, rustic campgrounds, kiosks, viewing platforms, trails, and toilets may be provided. Facilities will be designed to blend with the surrounding environment.

Compatible economic activities may be allowed where impacts to natural processes and habitats are temporary (e.g., small-scale logging where an earlier seral stage meets management goals; facilities in support of guiding and outfitting services such as tent platforms or cabins that encourage enhanced public use). All economic activities and facilities require authorizations such as special use permits.

1.3 Minimal Management

Minimal management is designed to maintain the natural environment with very little evidence of human-caused change. Habitats should be allowed to change and function through natural

processes. Administration will ensure that the resource values and environmental characteristics identified in the comprehensive conservation plan are conserved. Public uses, economic activities, and facilities should minimize disturbance to habitats and resources. Ground-disturbing activities are to be avoided whenever possible.

Management actions in this category focus on understanding natural systems and monitoring the health of refuge resources. Generally, no roads or permanent structures are allowed (except cabins). Temporary structures may be allowed in situations in which removal is planned after the period of authorized use and the site can be rehabilitated using plants native to the immediate area. Existing cabins may be allowed for administrative, public use, subsistence, or commercial or economic (e.g., guiding) purposes. New subsistence or commercial cabins may be authorized if no reasonable alternatives exist. Public use or administrative cabins may be constructed if necessary for health and safety.

Public use of the refuge for wildlife-dependent recreation and subsistence activities is encouraged. Public use facilities are not generally provided. Mechanized and motorized equipment may be allowed when the overall impacts are temporary or where its use furthers management goals.

If a transportation or utility system, as defined in Section 1102 of the Alaska National Interest Lands Conservation Act (ANILCA), is proposed to cross an area in Minimal management, the authorization process would incorporate a corresponding comprehensive conservation plan amendment to change the management category in the affected area from Minimal management to Moderate or Intensive management, as appropriate.

Compatible economic activities may be allowed where the evidence of those activities does not last past the season of use, except as noted in the preceding discussion of cabins. The primary economic activities are likely to be guiding and outfitting of recreation activities such as hunting, fishing, hiking, river floating, and sightseeing. All economic activities and facilities require authorizations such as special use permits.

1.4 Wild and Scenic Rivers

The Wild and Scenic Rivers category applies to those rivers and corridors of the adjacent lands that have been designated by Congress as part of the Wild and Scenic Rivers System. This is a national system of designated rivers that possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values. All designated rivers on refuges in Alaska are classified as Wild Rivers. Wild Rivers are those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and waters unpolluted.

Within this management category, water bodies are maintained in natural, free-flowing, and undisturbed conditions. Emphasis is placed on maintaining the natural function of the river system, and the appearance and sense of wildness are preserved. Evidence of human activities is minimal. Each river within the Wild and Scenic Rivers System has particular values for which it was designated; the management of a Wild River must protect those specific values. Management actions focus on understanding, monitoring, and maintaining the resources, natural ecosystem function, and aesthetics of the river corridor.

Permanent structures generally are not allowed, with the exception of historic and cultural resources and, in certain limited circumstances, subsistence or administrative cabins and associated structures. Cabins, temporary structures, and hardened sites will be visually shielded from the river wherever possible. Where shielding is not practical, facilities and structures are as

rustic or unobtrusive in appearance as possible. Public use facilities would provide opportunities for primitive recreation experiences.

Compatible uses of a Wild River corridor will be allowed where those activities do not detract from the values for which the corridor was designated. Primary commercial uses are likely to be recreation services such as guided float, sightseeing, fishing, and hunting trips. A variety of management actions may be taken to maintain the values and classification of the corridor. All commercial activities and facilities require authorizations such as special use permits.

1.5 Wilderness

This category applies only to areas designated by Congress as units of the National Wilderness Preservation System; areas proposed for Wilderness designation will be managed under Minimal management, consistent with Section 1317(c) of ANILCA and U.S Fish and Wildlife Service (Service) policy. Designated Wilderness will be managed under the Wilderness Act of 1964 and the exceptions provided by ANILCA. Because Wilderness units are part of a nationwide, multi-agency system, the Service recognizes that responsibilities for managing refuge Wilderness go beyond the mission of the Service and that the purposes of the Wilderness Act are within and supplemental to the other purposes for which individual refuges were established. (Also, see section 2.18)

The history and intent behind the Wilderness Act make Wilderness more than just another category of land management. Wilderness encourages having a broadened perspective of the refuge landscape, one that extends beyond managing it solely as wildlife habitat. Wilderness is managed as an area "retaining its primeval character and influence." In addition, Wilderness provides human visitors with opportunities for solitude or a primitive and unconfined type of recreation, which may be characterized in terms of experiential dimensions such as discovery, self-reliance, and challenge.

Wilderness Areas are managed to preserve their experiential values as well as aesthetic, scientific, and other related values. Research has shown that some values of Wilderness extend beyond their boundaries to people who may never visit but who benefit from the protection of natural ecological processes – benefits such as clean air and water and the simple knowledge that such places exist. In managing Wilderness, managers are encouraged to consider in decision-making these off-site and symbolic values as well as tangible resource values.

Permanent structures are generally prohibited; examples of exceptions are historic and cultural resources and, in certain circumstances, administrative structures or cabins that predate ANILCA, cabins that are necessary for trapping and public use cabins necessary for the protection of human health and safety. Facilities and structures are rustic and unobtrusive in appearance.

Compatible commercial uses of Wilderness Areas are generally limited to those activities that facilitate wilderness recreation (e.g., guided fishing, hunting, and wilderness trips). All commercial activities and facilities require authorizations, such as special use permits.

Actions such as prescribed fires or invasive species control may be conducted when it is necessary to protect life or property or when it is necessary to restore, maintain, or protect wilderness values. Management activities in Wilderness must be found to be the minimum requirements for the administration of the area as Wilderness.

1.6 Special Management

Special management lands are managed within one of the categories described previously but have additional requirements because of their status.

1.6.1 Management of Selected Lands

The Service retains management responsibility for lands selected but not yet conveyed to Native village and regional corporations or to the State of Alaska. The appropriate Native corporation or agency of the State of Alaska will be contacted and its views considered prior to issuing a permit involving these lands. Fees collected for special use or right-of-way permits will be held in escrow until the selected lands are conveyed or relinquished. Management of these lands will be the same as for adjacent refuge lands.

1.6.2 Alaska Native Claims Settlement Act Section 22(g)

Section 22(g) of the Alaska Native Claims Settlement Act (ANCSA) provides that those refuge lands established prior to December 18, 1971, that are conveyed under that act remain subject to the laws and regulations governing the use and development of the refuge. The compatibility standard, as it applies to activities occurring on these lands, is described in 50 CFR 25.21(b)(1). In addition, the Service retains the right of first refusal on village corporation lands if these lands are ever offered for sale.

The refuge will work with landowners to balance the commercial development and use of 22(g) lands with the protection of resources important to refuge purposes.

2. Management Policies and Guidelines

Refuge management is governed by Federal laws such as the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd), as amended, (Refuge Administration Act); the National Wildlife Refuge System Improvement Act of 1997, an amendment to the Refuge Administration Act (P.L. 105-57) (Refuge Improvement Act); and ANILCA; by regulations implementing these laws; by treaties; by Service policy; and by principles of sound resource management—which establish standards for resource management or limit the range of potential activities that may be allowed on the refuge.

The ANILCA authorizes traditional activities such as subsistence, the exercise of valid commercial fishing rights, hunting, fishing, and trapping in accordance with State and Federal laws. Under Service regulations implementing this direction, "[p]ublic recreation activities within the Alaska National Wildlife Refuges are authorized as long as such activities are conducted in a manner compatible with the purposes for which the areas were established" (50 CFR 36.31(a)). Such recreation activities include but are not limited to, sightseeing, nature observations and photography, hunting, fishing, boating, camping, hiking, picnicking, and other related activities. The Refuge Administration Act, as amended by the Refuge Improvement Act, defines "wildlife-dependent recreation" and "wildlife-dependent recreational use" as "hunting, fishing, wildlife observation and photography, or environmental education and interpretation" (16 U.S.C. § 668ee). These uses are encouraged and will receive emphasis in management of public use on refuges.

2.1 Management Emergencies

It may be necessary, when emergencies occur on the refuge, to deviate from policies and guidelines discussed in the comprehensive conservation plan. Activities not allowed on the refuge or under a specific management category, as shown in Table 1, may occur during or as a result of emergencies. For example, if naturally occurring or human-caused actions (e.g., landslides, floods, fires, droughts) adversely affect refuge resources, it may be necessary to undertake rehabilitation, restoration, habitat improvement, water management, fisheries enhancement, or other actions that would not otherwise be allowed to the same extent on the refuge. Threats to human health and safety may also result during emergencies. In emergencies, the refuge manager is authorized to take prudent and reasonable actions to protect human life and to address immediate health, safety, or critical resource-protection needs.

2.2 Land Exchanges and Acquisitions

Under Section 1302 of ANILCA, and subject to certain restrictions, the Service may acquire by purchase, donation, or exchange any lands within the boundaries of Alaska refuges. Proposed land exchanges or acquisitions must benefit fish and wildlife resources, satisfy other purposes for which the refuge was established, or be necessary to satisfy other national interests. The Service can also purchase conservation easements or enter into cooperative management agreements to meet these objectives.

2.3 Land Protection Plans

Department of Interior and Service policies require development of a step-down plan, called a land protection plan, addressing priorities for habitat conservation within refuge boundaries. Land protection plans inform private landowners what land within refuge boundaries the Service would like to see conserved for fish and wildlife habitat. The plans do the following:

- Identify the private lands within the refuge boundary that the Service believes should be conserved.
- Display the relative protection priority for each parcel.
- Discuss alternative means of land and resource conservation.
- Analyze the impacts on local residents of acquisition.

The Service only acquires land from willing landowners. It is Service policy to acquire land only when other methods of achieving goals are not appropriate, available, or effective. Sometimes resource conservation goals can be met through cooperative management agreements with landowners or by similar means. The refuge will work with all landowners to ensure that overall fish and wildlife and habitat values within the refuge are conserved.

A land protection plan for the refuge was completed in December 2002.

A pre-acquisition environmental site assessment is required for all real property proposed for acquisition by the Service or for public domain lands returning to Service jurisdiction (Service Manual 341 FW 3).

2.4 Appropriate Refuge Uses and Compatibility

Comprehensive conservation plans include a review of the appropriateness and compatibility of existing refuge uses and of any planned future public uses.

2.4.1 Appropriate Refuge Uses

All uses of a national wildlife refuge over which the Service has jurisdiction must be determined to be appropriate uses under the Appropriate Refuge Uses Policy (Service Manual 630 FW 1). An appropriate use of a national wildlife refuge is a proposed or existing use on a refuge that meets at least one of the following four conditions.

(1) The use is a wildlife-dependent recreational use as identified in the Refuge Improvement Act (hunting, fishing, wildlife observation and photography and environmental education and interpretation).

(2) The use contributes to fulfilling the refuge purpose(s), the Refuge System mission, or goals or objectives described in a refuge management plan approved after October 9, 1997, the date the Refuge Improvement Act was signed into law.

(3) The use involves the take of fish and wildlife under State regulations.

(4) The refuge manager has evaluated the use following guidelines in the Service Manual 603 FW 1.11 (listed below) and found it appropriate.

(a) Do we have jurisdiction over the use?

(b) Does the use comply with applicable laws and regulations (Federal, State, tribal, and local)?

(c) Is the use consistent with applicable Executive orders, Department and Service policies?

(d) Is the use consistent with public safety?

(e) Is the use consistent with goals and objectives in an approved management plan or other document?

(f) Has an earlier documented analysis not denied the use or is this the first time the use has been proposed?

(g) Is the use manageable within available budget and staff?

(h) Will this be manageable in the future within existing resources?

(i) Does the use contribute to the public's understanding and appreciation of the refuge's natural or cultural resources, or is the use beneficial to the refuge's natural or cultural resources?

(j) Can the use be accommodated without impairing existing wildlife-dependent recreational uses or reducing the potential to provide quality, compatible, wildlife-dependent recreation into the future?

This plan identifies those existing and proposed uses that are found appropriate and compatible. The following uses have been found appropriate following the guidelines in Service Manual 603 FW 1.11: commercial big game hunting guide services, commercial recreational fishing guide services, commercial recreational guide services, commercial transporter services, helicopter landings for authorized activities, non-wildlife dependent recreational uses, reburial of archaeological human remains per state and federal guidelines, scientific research, snowmobiling, State of Alaska management activities, subsistence activities, subsistence and trapping cabins, and

subsistence harvest of house logs. Appropriate use documentation is on file with the refuge headquarters and the Alaska Regional Office. If additional uses not addressed in this plan are proposed for the refuge, the refuge manager will determine if they are appropriate uses following guidance in the Service Manual (603 FW 1).

2.4.2 Compatibility Determinations

The Refuge Administration Act states that "the Secretary [of the Interior] is authorized, under such regulations as he [or she] may prescribe, to… permit the use of any area within the [Refuge] System for any purpose, including but not limited to hunting, fishing, public recreation and accommodations, and access whenever he [or she] determines that such uses are compatible . . . ."

A compatible use is a proposed or existing wildlife-dependent recreation use or any other use of a national wildlife refuge that, based on sound professional judgment, will not materially interfere with nor detract from the fulfillment of the Refuge System mission or the purposes for which the national wildlife refuge was established. Economic uses must contribute to achieving refuge purposes and the Refuge System mission.

Compatibility determinations are not required for refuge management activities, except economic activities. They are also not required where statute directs mandatory approval of the activity, as in the case of facilities for national defense.

If a use is found to be incompatible, the refuge would follow normal administrative procedures for stopping the action. If the use was a new use requiring a special use permit, the refuge manager would not issue a permit. If the use was an existing use already under permit, the refuge manager would work with the permittee to modify the use to make it compatible or would terminate the permit.

Ending incompatible uses that do not require a special use permit or other formal authorization, or that cannot be addressed by other Federal or State agencies, would require the refuge to go through the normal rule-making process. This would include publishing the proposed regulations in the *Federal Register* and providing opportunity for public comment.

A list of final compatibility determinations for refuge uses are included in this comprehensive conservation plan as Appendix H. Final compatibility determinations are on file at the refuge headquarters and the regional office and can be found on the internet at http://alaska.fws.gov/nwr/planning/completed.htm. Public comments on the draft determinations are addressed in the final compatibility determinations and in Appendix P.

Compatibility determinations for existing hunting, fishing, wildlife observation and photography, and environmental education and interpretation must be re-evaluated with the preparation or revision of a comprehensive conservation plan or at least every 15 years, whichever is earlier. Refuge compatibility determinations for all other uses must be re-evaluated every 10 years or earlier if conditions change or significant new information relative to the use and its effects becomes available.

To review completed compatibility determinations for all refuges in Alaska, go to http://alaska.fws.gov/nwr/planning/completed.htm

Additional details on applying compatibility standards and completing refuge compatibility determinations are found in the compatibility regulations at 50 CFR (Parts 25, 26, and 29) and in the Service Manual (603 FW 2).

2.5 Mitigation

In the interest of serving the public, it is the policy of the Service, throughout the nation, to seek to prevent, reduce, or compensate for losses of fish, wildlife, and their habitats, and uses thereof, from land and water development. To that end, the Service developed a Mitigation Policy in 1981 that includes measures ranging from avoiding an activity that results in loss of such resources to seeking compensation by replacement of or substitution for resource loss.

The Service will promulgate regulations, develop stipulations, and issue permits to reduce or eliminate potential adverse impacts resulting from compatible activities that may be authorized under this plan. These regulations, stipulations, and permits would mitigate impacts in a variety of means, as stipulated in the Mitigation Policy guidelines (Service Manual 501 FW 2.1). The means, in order of application, are as follows:

- Avoiding the impact altogether by not taking a certain action or parts of an action.
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- Compensating for the impact by replacing or providing substitute resources or environments.

When determining activities or uses are compatible, projects should be designed first to avoid adverse impacts. The Service generally does not allow compensatory mitigation on Refuge System lands. Only in limited and exceptional circumstances related to existing rights-of-way could compensatory mitigation be used to find a use compatible. The Service Manual (501 FW 2 and 603 FW 2) provides more information.

Mitigation may consist of standard stipulations such as those attached to right-of-way permits; special stipulations that may be attached to leases or permits on a site-specific basis; and site-specific, project-specific mitigation identified through detailed step-down management plans or the environmental assessment process. In all instances, mitigation must support the mission of the Refuge System and must be compatible with the purposes of the refuge. The degree, type, and extent of mitigation undertaken would depend on the site-specific conditions present and the management goals and objectives of the action being implemented.

2.6 Coastal Zone Consistency

Although Federal lands, including lands in the Refuge System, are excluded from the coastal zone (16 U.S.C., Section 1453(1)), the Coastal Zone Management Act of 1972, as amended, directs Federal agencies conducting activities within the coastal zone or that may affect any land or water use or natural resources of the coastal zone to conduct these activities in a manner that is consistent "to the maximum extent practicable"[1] with approved State management programs (16 U.S.C. 1456).

[1] "To the maximum extent practicable" means "to the fullest degree permitted by existing law (15 CFR 930.32)."

The Alaska Coastal Zone Management Act of 1977, as amended, and the subsequent Alaska Coastal Management Program, as amended, and Final Environmental Impact Statement (1979) establish policy guidance and standards for the review of projects within or potentially affecting Alaska's coastal zone. In addition, specific policies have been developed for activities and uses of coastal lands and water resources within regional coastal resource districts. Most incorporated cities, municipalities, and boroughs as well as unincorporated areas (coastal resource service areas) within the coastal zone now have State-approved coastal management programs.

Although State and coastal district program policies are to guide consistency determinations, more restrictive Federal agency standards may be applied. Federal regulations state that "(w)hen Federal agency standards are more restrictive than standards or requirements contained in the State's management program, the Federal agency may continue to apply its stricter standards . . ." (15 CFR 930.39[d]).

Certain Federal actions may require a Federal Coastal Consistency Determination. The refuge will contact the Department of Natural Resources' Alaska Coastal Management Program for program applicability before beginning a project that may affect the coastal zone.

The Kanuti National Wildlife Refuge is outside of the Coastal Zone Management Area. Therefore, a determination of consistency with the Alaska Coastal Zone Management Act of 1977 is not required.

2.7 Cooperation and Coordination with Others

2.7.1 Federal, State and Local Governments

The refuge will continue to work closely with those Federal, State, and local governments and agencies whose programs affect, or are affected by, the refuge. State and local government input will be sought during the development of regulatory policies addressing management of the Refuge System (Executive Order 13083, "Federalism"). When possible, the Service will participate in interagency activities (such as joint fish and wildlife surveys and co-funded research), cooperative agreements, sharing data, and sharing equipment and/or aircraft costs to meet mutual management goals and objectives.

The refuge and the State of Alaska will cooperatively manage fish and wildlife resources within the refuge. The Master Memorandum of Understanding between the Service and the Alaska Department of Fish & Game, dated March 13, 1982, defines the cooperative management roles of each agency (see Appendix B). In this agreement, the Alaska Department of Fish & Game agreed to "recognize the Service as the agency with the responsibility to manage migratory birds, endangered species, and other species mandated by Federal law, and on Service lands in Alaska to conserve fish and wildlife and their habitats and regulate human use." Correspondingly, the Service agreed to "recognize the right of the Alaska Department of Fish & Game as the agency with the primary responsibility to manage fish and resident wildlife within the State of Alaska." Further discussion of intergovernmental cooperation regarding the preservation, use, and management of fish and wildlife resources is found in 43 CFR 24, "Department of the Interior Fish & Wildlife Policy: State and Federal Relationships."

The Service does not require refuge compatibility determinations for State wildlife management activities on a national wildlife refuge pursuant to a cooperative agreement between the State and the Service where the refuge manager has made a written determination that such activities support fulfilling the refuge purposes or the Refuge System mission. When the activity proposed by the State is not part of a cooperative agreement or the State is not acting as the Service's

agent, a special use permit may be required, and a refuge compatibility determination will need to be completed before the activity may be allowed. 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 individual rogue animals), reintroduction of species, nonnative species management, pest management, disease prevention and control, fishery restoration, fishery enhancement, native fish introductions, nonnative species introductions, construction of facilities, helicopter and off-road vehicle access, or any other un-permitted activity that could alter ecosystems on the refuge.

The Service will cooperate with other State agencies such as the Department of Natural Resources and Department of Transportation and Public Facilities on matters of mutual interest and may enter into informal and formal management agreements.

2.7.2 Tribes and Native American Organizations

The Service's Native American Policy (USFWS 1994) identifies general principles that guide the Service's government-to-government relationships with tribal governments in the conservation of fish and wildlife resources. Additional guidance has been provided by Executive Order 13084, "Consultation and Coordination with Indian Tribal Governments," issued May 14, 1998, and the Department of the Interior–Alaska Policy on Government-to-Government Relations with Alaska Native Tribes, issued January 18, 2001 (USDI 2001). The refuge will maintain government-to-government relationships with tribal governments. The refuge will also work directly with regional and village corporations and respect Native American cultural values when planning and implementing refuge programs.

2.7.3 Owners of Refuge Inholdings and Adjacent Lands

The refuge will work cooperatively with inholders and adjacent landowners, providing information on refuge management activities and policies. The refuge will consult periodically with them regarding topics of mutual interest; will respond promptly to concerns over refuge programs; and will participate in cooperative projects (e.g., water quality monitoring and fish and wildlife management).

2.7.4 Fish and Wildlife Service Jurisdiction over Waters within the Kanuti National Wildlife Refuge

Where the United States holds title to submerged lands beneath waters within the refuge, the Service has jurisdiction over certain activities on the water. In 1980, under ANILCA, the United States Congress established or expanded 16 national wildlife refuges. These areas of land and water may contain both navigable and non-navigable waters. Where waterbodies are non-navigable within the refuge, the Service has management authority over most activities on water where adjacent uplands are Federally-owned. Where State of Alaska lands exist beneath navigable waterbodies or where the State, a Native corporation, or a Native allotee owns the adjacent uplands within areas of the refuge where the withdrawal process started after Statehood, the Service's management authority is more limited.

The Service's statutory authority to manage these lands and waters comes from ANILCA; the Service manages these lands pursuant to the Refuge Administration Act. Under provisions of ANILCA, the Service manages the Federal subsistence program on all inland waters within and adjacent to the external boundaries of the refuge (50 CFR 100.3(b)).

2.7.5 Other Constituencies

The refuge will inform local communities, special interest groups, and others who have expressed an interest in or are affected by refuge programs about refuge management policies and activities. The refuge will seek input from these constituents when issues arise that may affect how the refuge is managed. When appropriate, local residents and other stakeholders will be asked to participate in refuge activities so their expertise and local knowledge can be incorporated into refuge management.

2.8 Ecosystem and Landscape Management

Species do not function alone; they function together in the environment as part of an ecosystem. Refuge resources will be managed by employing ecosystem-management concepts. Individual species are viewed as integral to the diversity of those ecosystems and as such are indicators of the healthy functioning of the entire ecosystem. When the Service identifies species to use as indicators of the health of an ecosystem, it will do so through a rigorous peer-reviewed scientific process involving experts from other Federal agencies and the Alaska Department of Fish & Game.

Inventorying, monitoring, and maintaining a comprehensive database of selected ecosystem components, are critical for making refuge management decisions and for ensuring proper long-term ecosystem stewardship. This includes regular and recurring monitoring of status and trends of ecosystem components such as fish, wildlife, plants, climatic conditions, soils, and waterbodies. All monitoring will employ appropriate disciplines, new technologies, and scientific capabilities whenever practical.

2.8.1 Air Quality

The Service's authorities for air quality management are included in several laws. The most direct mandates to manage air resources are found in the Wilderness Act and the Clean Air Act.

The Service is required by the Clean Air Act to preserve, protect, and enhance air quality and air quality-related values on Service lands. Air quality-related values include visibility, plants, animals, soil, water quality, cultural and historical resources, and virtually all resources that are dependent upon and affected by air quality. In addition, the Wilderness Act requires the Service to protect and preserve the wilderness character, including the pristine air quality, of designated areas.

Class I air quality sites receive the highest level of protection. Very little deterioration is allowed in these areas, and the Federal land manager has an "affirmative responsibility" to protect air quality-related values on those lands. With the exception of three Class I air quality sites in designated Wilderness on the Alaska Maritime National Wildlife Refuge, all other lands managed by the Service in Alaska are classified as Class II and receive protection through the Clean Air Act. Moderate deterioration, associated with well-managed growth, is allowed in Class II areas.

If air quality or related resources are at risk, the refuge manager will work with the Service's Air Quality Branch; the regional air quality coordinator; the Alaska Department of Environmental Conservation and other State, local, and Federal agencies; and the public, as appropriate, in developing an air quality management plan as outlined in the Service Manual (563 FW 2.8).

2.8.2 Water Resources (Hydrology) Management

Every national wildlife refuge in Alaska shares the common purpose of ensuring that water resources are maintained and protected. The ANILCA mandates that the Service safeguard

water quality and necessary water quantity within refuges and to conserve fish and wildlife populations and habitats in their natural diversity.

Although the Service has reserved water rights sufficient to accomplish the purposes of the refuges, the Refuge Administration Act and the Service Manual (403 FW 1 through 3) direct the Service to obtain, to the extent practicable, water supplies of adequate quantity and quality for Service facilities, for refuge purposes and as trust resources, and to obtain the legal right to use that water through State laws, regulations, and procedures.

The Alaska Region of the Service conducted a water resources threats analysis (Harle 1994) for the purpose of guiding water resource investigations and protecting water resources by acquiring instream water rights. Based on the results of the threats analysis, the Service's regional office developed a strategic plan for systematically quantifying the surface water on refuges within Alaska (Bayha et al. 1997).

Using existing data, or through the collection of hydrologic and biologic data, the Service applies to the State of Alaska for appropriative water rights, for instream water reservations and for water withdrawals to meet the Service's needs. Establishing State water rights is only a part of a management strategy to protect refuge resources and to understand ecosystem processes. Collection of hydrologic data allows the Service to accomplish the following:

- Plan flood-plain and riparian zone management.
- Estimate flow for unguaged streams within the refuge.
- Supplement historical or current fisheries and wildlife studies.
- Detect and evaluate future natural or human-induced changes in the hydrologic system.
- Provide stream profile and velocity data for the design of fish weirs or other structures.
- Estimate the potential for future flooding and erosion.
- Analyze the impacts of proposed projects on stream flow and water supply.
- Provide a basis for decision-making about commercial operations on some important streams.
- Provide baseline water quality information.

All facilities and activities on refuges must comply with pollution-control standards set by Federal laws (e.g., the Clean Water Act 33 U.S.C. 1251 and the Safe Drinking Water Act 42 U.S.C. 300f); State laws where Federal law so provides; and the regulations, policies, and standards implementing these laws.

2.8.3 Visual Resource Management

Visual resource management has two primary purposes: (1) to manage the quality of the visual environment and (2) to reduce the visual impact of development activities. To accomplish these purposes, the refuge will identify and maintain scenic values and will, within the constraints imposed by the comprehensive conservation plan, minimize the visual impacts of refuge development and uses. All activities and facilities on the refuge will be designed to blend into the landscape to the extent practical. The Service will cooperate with other Federal, State, local, tribal, and private agencies and organizations to prevent significant deterioration of visual resources.

2.8.4 Cultural, Historical, and Paleontological Resources

The Service has long-term responsibilities for cultural resources on refuge lands. Cultural resources on refuge lands are managed under a number of laws, Executive Orders, and regulations, including the Antiquities Act; the National Historic Preservation Act, as amended; the Archaeological Resources Protection Act; the American Indian Religious Freedom Act; the Native American Graves Protection and Repatriation Act; Executive Order 11593, "Protection and Enhancement of the Cultural Environment"; Executive Order 13007, "Indian Sacred Sites"; and 36 CFR 800.

The 1980 amendments to the National Historic Preservation Act direct the Service to inventory and evaluate cultural resources for their eligibility for inclusion on the National Register of Historic Places. Pending a complete evaluation, all cultural resources will be considered potentially eligible for the National Register of Historic Places. All significant historic, archaeological, cultural, and paleontological resources on the refuge will be protected and managed in accordance with Federal and State law.

A cultural resource plan for the refuge will be completed by (was completed on). This plan provides guidance for cultural resource management on the refuge. It outlines legal mandates and considerations, reviews current information about resources and establishes goals and objectives for the program. The cultural resource plan should be updated every five years.

It is illegal to collect archaeological materials and/or paleontological remains on the refuge without a permit. Historic aircraft and other World War II material will be managed in accordance with the policy published December 20, 1985, in the *Federal Register* (FR 50:51952-51953). These materials may be collected on refuge lands only as authorized by a permit issued to a qualified organization or individual. Cultural resource research permits will only be issued to qualified individuals operating under appropriate research designs. The refuge will encourage archaeologists, historians, ethnologists, and paleontologists from educational institutions and other government agencies to pursue their research interests on refuge lands as long as these research interests are compatible with refuge purposes. Research that collects data from threatened sites and minimizes disturbance to intact sites will be encouraged.

When any Federal undertaking—including any action funded or authorized by the Federal government and having the potential to directly or indirectly affect any archaeological or historic site—is planned, a consultation must be initiated with the State Historic Preservation Officer, under Section 106 of the National Historic Preservation Act. If sites that may be affected are found in the project area, their significance will be evaluated to determine their eligibility for inclusion in the National Register of Historic Places. For eligible sites, consultation will result in a course of action causing the least possible impact. Impacts may be minimized in a variety of ways, including relocation or redesign of a project, site hardening, mitigation through information collection, or cancellation of the project if no alternatives are feasible. To protect archaeological and historic sites, other uses may be precluded. Private interests proposing to conduct commercial uses on the refuge will normally be required to fund studies necessary for consultation and for mitigation of impacts.

The refuge will implement Executive Order 13007, "Indian Sacred Sites", allowing access to identified sacred sites and avoiding adversely affecting the physical integrity of these sites. Where appropriate, the Service will maintain the confidentiality of sacred sites.

Further information on cultural resources management can be found in the Service Manual (614 FW 1 through 5) and the Cultural Resources Management Handbook (USFWS 1992).

2.9 Fish and Wildlife Habitat Management

2.9.1 Habitat Management

Habitats are managed in keeping with the purposes, goals, and objectives of a refuge. In Alaska, this means habitats are largely managed to maintain natural diversity and natural processes. However, in some cases, habitats are manipulated to maintain or improve conditions for selected fish and wildlife populations, to control invasive plant species, or to manage fire fuels on refuge lands. These habitat management and manipulation activities will be carried out in support of the purposes, goals, and objectives of the refuge. Generally, refuges use the least intrusive management measures needed. Where practical and economically feasible, habitat management practices should maintain a natural appearance on the landscape. Habitat management practices, even those carried out for the benefit of a single species or small group of species, will, to the extent possible, maintain the natural diversity of native (indigenous) wildlife species and habitat types.

Habitat management and manipulation may be achieved by mechanical, chemical, and manual methods, including the use of fire, or by a combination of methods. Mechanical treatment could include mechanical removal, crushing, cutting, or mowing. When applicable, State and Federal guidelines for timber management will be followed. Mechanical treatment could also include the construction of fish passages, fish ladders, fish barriers, water impoundments and structures such as fences or artificial nests, and raising or lowering of water levels to manage wildlife or waterfowl habitat. Riparian or aquatic habitat management and manipulation may be achieved by acquiring instream flow reservations or making beneficial water diversions.

Chemical treatment involves the use of chemicals to restore nutrient levels in a lake system (fertilization) for fisheries restoration, to reduce hazardous fuels, or to eliminate invasive plant and animal species, normally by killing them or destroying their ability to spread or prosper. Before chemical treatment is approved for use, the refuge will analyze the need for action, the options for treatment, and the potential impacts of those options through the National Environmental Policy Act (NEPA) process. Pest control, including integrated pest management, is discussed in section 2.10.8.

Manual treatment could include the use of hand tools to remove, reduce, or modify plants or to modify habitats (e.g., removal of beaver dams).

Aquatic habitat modification may include activities and structures such as streambank restoration, passage structures, and fish barriers or obstacle removal that results in physical modification of aquatic or riparian habitats to benefit fish species. These activities would be undertaken to maintain or restore native fish populations and may require appropriate NEPA compliance and refuge compatibility determinations.

2.9.2 Fire Management

Fire management is the full range of activities necessary to conserve, protect, and enhance habitat and to maintain desired ecological conditions for the benefit of fish and wildlife. Fire management activities include preparedness, emergency suppression operations, wildland fire use, fire prevention, education, monitoring, research, prescribed fire, hazardous fuel reduction, and mechanical treatments. All activities will be conducted in accordance with refuge, Service, and Department of Interior policies and approved interagency and refuge-specific fire management plans. Additional guidance on fire management can be found in the Service Manual (621 FW 1 through 3).

Fire management plans provide the basis for integrating fire as a critical natural process into other refuge plans and activities at a landscape scale. The refuge fire management plan provides specific information on the application and management of fire on the refuge. The Alaska Interagency Wildland Fire Management Plan provides a cooperative framework and operational guidelines for the suppression of wildland fires. The suppression of human-caused and unwanted wildland fires and the use of nature-caused wildland fires and prescribed fires as management tools are important management prerogatives.

2.9.2.1 Wildland Fire Suppression

Fire suppression activity is the work of confining, constraining, controlling, or monitoring a fire or portion of a fire to protect, prevent, or reduce the loss of identified values. Suppression takes place, with the highest priority being the safety of firefighters and the public, using the appropriate management response based on values to be protected. The Alaska Interagency Wildland Fire Management Plan, amended in October 1998, is the guiding document for suppression actions. The plan establishes four management options—critical, full, modified, and limited—that direct a range of wildlife fire management responses. Refuge lands have been classified by using these fire management options with all facilities mapped.

The Bureau of Land Management Alaska Fire Service (BLM/AFS) provides emergency suppression services on refuge lands in Alaska (Department Manual 620 DM 2), as directed by the refuge manager. Through a cooperative agreement with BLM/AFS, the State of Alaska Division of Forestry provides emergency suppression services on refuge lands in State protection zones, as directed by the refuge manager.

2.9.2.2 Wildland Fire Use

Wildland fire use is the application of the appropriate management response to naturally ignited wildland fires to accomplish resource management objectives outlined in fire management plans. Wildland fires may be used to protect, maintain, and enhance natural and cultural resources and, as nearly as possible, wildland fires will be allowed to function in their natural ecological role. Optional management is described in each refuge fire management plan.

2.9.2.3 Prescribed Fire

Prescribed fires are ignited by management action to meet specific wildland fuel, vegetation, and habitat management objectives. Prior to each ignition, a written, approved plan outlining prescription conditions is required. Use of prescribed fires must also comply with the Alaska Enhanced Smoke Management Plan for Prescribed Fire. The plan provides guidance and direction concerning smoke issues related to prescribed fire.

2.10 Fish and Wildlife Population Management

Conservation of habitat is a key element in maintaining the natural diversity of populations on the refuge, and management of native fish and wildlife populations is an important component of maintaining healthy ecosystems. The refuge will be managed in accordance with the purposes of the refuge and consistent with the Policy on Maintaining Biological Integrity, Diversity, and Environmental Health of the National Wildlife Refuge System (Service Manual 601 FW 3) to ensure native species are managed in their natural diversity and abundance.

The refuge will work with the State of Alaska to conserve fish and wildlife populations, recognizing that populations may experience fluctuations in abundance because of environmental

factors and may require management actions for conservation purposes. The refuge will be managed to maintain the genetic variability of wild, native fish stocks.

2.10.1 Wildlife Inventory and Monitoring Plan

To assess presence, relative abundance, distribution, and trends in populations of fish, wildlife, and plants, the refuge will draft a Wildlife Inventory and Monitoring Plan (I & M Plan). The I & M Plan describes objectives, justification, methods, management implications, geographic scale, report schedules, and database management for studies on species targeted for inventory and monitoring. The I & M Plan will include studies that address environmental parameters (e.g., weather) and hydrology, soils, and fire history to explain potential changes in the distribution, relative abundance, and populations of fish, wildlife and plants. The refuge will update its I & M Plan every two years. Every five to eight years, the I & M Plan will be reviewed by the regional refuge biologist and other professional staff prior to final approval by the regional refuge chief.

2.10.2 Scientific Peer Review

Biologists, ecologists, botanists, and other refuge personnel conducting scientific investigations will adhere to refuge, regional, Service, and Department of Interior policies on scientific conduct, including the Management of Fish and Wildlife Service Scientific Publications Recommended Outlets, Procedures and Policies. The overall goal of scientific peer review is to ensure that information collected, analyzed, interpreted, and reported to the public and upon which policy and management decisions are based, meets established standards of the scientific community. To achieve this goal, study plans and reports to be disseminated outside the originating office must be peer-reviewed. The region's peer review procedure is available upon request. The type and level of review shall be commensurate with the potential significance of the scientific information and its likely influence on policy and management actions.

2.10.3 Compliance with the Animal Welfare Act

The Animal Welfare Act of 1996, as amended, established legal standards for animal care and use. To prescribe methods and set standards for the design, performance, and conduct of animal care and use, research facilities and Federal agencies must establish an Institutional Animal Care and Use Committee (IACUC). Field studies conducted or authorized by refuge employees within the purview of the Animal Welfare Act will require review and approval of an IACUC. Any refuge study that involves an invasive procedure or that harms or materially alters the behavior of an animal under study should be reviewed and approved by an IACUC prior to implementing field work. Note that a scientific collection permit is also required from the Alaska Department of Fish and Game under 5 Alaska Administrative Code 92.033.

2.10.4 Marking and Banding

These activities include fish and wildlife capture, marking, banding, radio-collaring, release, tracking, and other information-gathering techniques. Cooperation with appropriate partners, including the Alaska Department of Fish & Game, will be stressed, and specific protocols will be followed, taking advantage of all appropriate disciplines and new technologies wherever possible.

2.10.5 Threatened or Endangered Species

The refuge will consult with the U.S. Fish & Wildlife Service Ecological Services field office on actions that may affect listed, proposed, or candidate species or designated or proposed critical

habitat. These actions include refuge operations, public use programs, private lands and Federal Assistance activities, promulgating regulations, and issuing permits (USFWS 1973, Section 7 Consultation Handbook 1998).

2.10.6 Reintroductions

A species may be introduced on a refuge only if that species is native to the refuge (i.e., a reintroduction). Nonnative species may not be introduced. Definitions of native and nonnative species are found in the glossary (Appendix I).

Reintroductions can be useful tools for restoring species to natural ranges and reestablishing a refuge's natural fish, wildlife, and habitat diversity. Reintroductions would require appropriate NEPA compliance, a review to ensure consistency with the Policy on Maintaining Biological Integrity, Diversity, and Environmental Health of the National Wildlife Refuge System, an ANILCA Section 810 determination, and a refuge compatibility determination. Reintroductions also require extensive coordination with adjacent landowners and with the State of Alaska. In evaluating the project, the cause(s) of the extirpation should be evaluated and management actions taken to alleviate the cause(s) prior to reintroduction.

The environmental requirements of the species and the ecological dynamics of the area proposed for the reintroduction need to be thoroughly reviewed prior to a reintroduction. Some factors to consider include behavior, diseases, general ecology of the species, habitat requirements, inter- and intra-species competition, life history, genetics, management practices, population dynamics, and predators. Consideration should be given to whether there have been significant habitat changes since the species' extirpation (e.g., is the area still within the species' natural range?).

2.10.7 Fish and Wildlife Control

These activities involve the control, relocation, and/or removal of native species, including predators, to maintain natural diversity of fish, wildlife, and habitats. These management actions may be employed with species of fish and wildlife within their original range to restore other depleted native populations. These activities are subject to appropriate NEPA compliance, an ANILCA Section 810 determination, and a refuge compatibility determination.

Predator management includes the relocation, removal, sterilization, and other management of native predators to accomplish management objectives. The Service considers predator management to be a legitimate conservation tool when applied in a prudent and ecologically sound manner and when other alternatives are not practical. The key requirements are that a predator-management program be ecologically sound and biologically justified. In keeping with the Service's mandate to first and foremost maintain the biological integrity, diversity, and environmental health of fish and wildlife populations at the refuge scale, a predator population will not intentionally be reduced below a level consistent with the low-end of natural population cycles (see Service Manual 601 FW 3).

A predator-management program requires appropriate NEPA compliance, an ANILCA Section 810 determination, and, if conducted by other than the Service or an agent of the Service, a refuge compatibility determination. Alternative management actions must be evaluated prior to pursuing direct predator-control activities. Any proposal to allow or implement a predator-management program on national wildlife refuges in Alaska will be subjected to public review and closely coordinated with the Alaska Department of Fish & Game, local communities, tribal governments, and adjacent landowners and/or managers. Predator-management activities must be monitored and evaluated for effectiveness and resource impacts.

Normal environmental education and population-management activities—such as trapper education programs and regulation changes that allow for increased harvests of predatory animals by licensed trappers and hunters—are not considered to be "predator management." The control or extirpation of nonnative predators is not considered to be "predator management" (see section 2.10.8).

2.10.8 Management of Nonnative, Invasive and Pest Species

In general, nonnative species (including feral domestic animals) are not compatible with refuge purposes or with Refuge System policies. When a nonnative species (fish, wildlife, or plants) occurs on a refuge, the Service may control or eliminate that species. Where a population of a nonnative species has already been established on a refuge and this population does not materially interfere with or detract from the fulfillment of the mission of the Refuge System or the purposes of the refuge, the species may be managed as part of the refuge's diverse ecosystems.

Pests are defined as those organisms (vertebrates, invertebrates, plants, and microorganisms and their vectors), which are detrimental to fish, wildlife, human health, fish and wildlife habitat, or to established management goals. Pests also include noxious weeds and other organisms, which are classified as pests by law (Administrative Manual 30 AM 12).

Invasive species are nonnative species whose introduction causes or is likely to cause economic or environmental harm, or harm to human health. The Federal government is prohibited by Executive Order, law, and policy from authorizing, funding, or carrying out actions that are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere (Service Manual 620 FW 1). Refuge managers conduct habitat management activities to prevent, control, or eradicate invasive species using techniques described through an integrated pest management plan, or other similar management plan. Refuge integrated pest management planning will address the advantages and limitations of potential techniques including chemical, biological, mechanical, and cultural techniques. Management of invasive species on refuges is guided by the National Strategy for Invasive Species Management and conducted within the context of applicable policy (Service Manual 620 FW 1).

By definition, invasive species cause significant impacts to the land and water resources or to the species of plants and animals that use these habitats. To manage invasive plants, the refuge will include weed inventories as part of all habitat inventories. The refuge will review the proposed action's potential to introduce or spread invasive plants and will take measures to reduce the hazards (e.g., require weed-free feed for pack animals).

Introduced vertebrates (e.g., fox and rats) may also adversely affect wildlife populations, particularly in island ecosystems where species historically occurred without vertebrate predators. Presence of these invasive species may interfere with attainment of refuge purposes and management goals.

Pests on refuges may also be controlled to prevent damage to private property, and routine protection of refuge buildings, structures and facilities is addressed in refuge policy (Refuge Manual 7 RM 14).

The refuge will coordinate with other landowners and agencies and use integrated pest management practices to enhance the detection, prevention, and management of invasive species and other pests. Use of chemical control measures on refuge lands requires regional office review and approval of a pesticide-use proposal (Administrative Manual 30 AM 12 and Refuge Manual 7 RM 14).

2.10.9 Disease Prevention and Control

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. These threats may be managed or eliminated after consideration of all reasonable options and consultation with the State of Alaska and other concerned parties. This will normally only occur when severe resource damage is likely or when public health or safety is jeopardized. Wherever possible, an integrated approach to pest management will be used in accordance with the Service's Administrative Manual (30 AM 12) and Refuge Manual (7 RM 14). If chemical controls are used, a pesticide-use proposal must be approved.

2.10.10 Fishery Restoration

Fishery restoration is any management action that increases fishery resources to allow full use of available habitat or to reach a population level based on historical biologic data. Although the goal of restoration is self-sustaining populations, situations may exist in which some form of fishery management or facilities could continue indefinitely.

Where fishery resources have been severely adversely affected, the refuge will work with the State of Alaska, local tribes, and other partners to restore habitats and populations to appropriate, sustainable conditions. Restoration emphasis will focus on strategies that are the least intrusive to ecosystems and do not compromise the viability or genetic characteristics of the depleted population. This may include regulatory adjustments and/or evaluations of escapement goals. If the stocks have been reduced or are threatened, temporary restoration facilities may be allowed in designated Wilderness or Wild River Areas, as long as the facilities will not significantly detract from the values for which those areas were established.

2.10.11 Fishery Enhancement

Fishery enhancement is any management action or set of actions that is applied to a fishery stock to supplement numbers of harvestable fish to a level beyond that which could be naturally produced based on a determination or reasonable estimate of historic levels. This could be accomplished by stocking barren lakes, providing access to barren spawning areas (fish passages), constructing hatcheries, outstocking in productive systems, or fertilizing rearing habitat.

Refuge management priorities will focus on conserving naturally diverse ecosystems. Fishery enhancement facilities for the purpose of artificially increasing fish populations normally will not occur within any management category.

Proposals for fishery-enhancement projects will be subject to the provisions of NEPA regulations, an ANILCA Section 810 determination, and a refuge compatibility determination. Only temporary fishery enhancement facilities may be authorized in Minimal, Wild River, and Wilderness management areas. Proposals for facilities within designated Wilderness require a minimum-requirements analysis to determine if the facilities are necessary within the Wilderness Area and would not significantly detract from the values for which those areas were established.

2.11 Subsistence Use Management

Providing the opportunity for continued subsistence use by local residents is one of the purposes of the refuge, as stated in Title III of ANILCA. Title VIII of ANILCA further provides that rural Alaska residents engaged in a subsistence way of life be allowed to continue using resources within refuges for traditional purposes. These resources include fish and wildlife, house logs and

firewood, and other plant materials (berries, bark, etc.). Many aspects of subsistence management are addressed outside of refuge comprehensive conservation plans. The Federal Subsistence Board, through its rule-making process, addresses seasons, harvest limits, and customary and traditional use determinations. The Federal board has established Regional Subsistence Advisory Councils to provide for meaningful public input to the rule-making process.

The refuge will work with others to monitor subsistence harvest. The refuge will supplement the State's ongoing harvest and resource monitoring programs to provide additional information on the status of fish and wildlife populations harvested for subsistence uses. This monitoring is intended to identify potential problems before populations of fish and wildlife become depleted and to ensure preference is given to subsistence users as required by law. All information the refuge gathers through subsistence monitoring will be shared with local State fish and game advisory committees, tribes, and other entities. Refuge staff attend various subsistence-related meetings, including those of local fish and game advisory committees and Regional Subsistence Advisory Councils, and provide information on the status of subsistence resources and management.

The noncommercial gathering by local rural residents of fruits, berries, mushrooms, and other plant materials for subsistence uses and of dead standing or down timber for firewood is allowed without a special use permit. Harvest of live standing timber for house logs, firewood, or other uses is allowed, although specific requirements vary by size and location. See 50 CFR 36.15 for specific details. Timber stocks subject to subsistence use will also be monitored to ensure they remain available over the long term.

Under Section 816 of ANILCA, refuge lands may be closed to the taking of fish and wildlife if closure is deemed necessary for reasons of public safety, administration, or to ensure the continued viability of particular populations of fish or wildlife. Emergency closure to subsistence taking generally would occur only after other consumptive uses competing for the resources were restricted or eliminated.

2.11.1 Access for Subsistence Purposes

Access to refuge lands by traditional means will be allowed for subsistence purposes in accordance with Section 811 of ANILCA, subject to reasonable regulation (50 CFR 36.12). Traditional means include snowmachines, motorboats, dog teams, and other means of surface transportation traditionally used by local rural residents engaged in subsistence activities. Use of these traditional means of travel will be in compliance with State and Federal law in such a manner to prevent waste of harvested resources or damage to the refuge and to prevent herding, harassment, hazing, or driving of wildlife.

2.11.2 Section 810 Evaluations

The refuge will evaluate the effects of proposed activities on subsistence use to ensure compliance with Section 810 of ANILCA. The refuge will work with the Federal Subsistence Board, Regional Subsistence Advisory Councils, local fish and game advisory committees, tribes, Native corporations, the Alaska Department of Fish & Game, and other appropriate local sources to determine whether a proposed activity would "significantly restrict" subsistence uses. If the refuge determines that a proposal would probably result in adverse effects to subsistence use, the refuge would follow the requirements identified in Section 810 before making a final decision on the proposal.

2.12 Public Access and Transportation Management

2.12.1 Snowmachines, Motorboats, Airplanes, and Nonmotorized Surface Transportation

Section 1110(a) of ANILCA allows the use of snowmachines (during periods of adequate snow cover and frozen river conditions), motorboats, airplanes, and nonmotorized surface transportation methods for traditional activities and for travel to and from villages and homesites. Such access shall be subject to reasonable regulations to protect the natural and other values of the refuge (43 CFR 36.11). Specific areas may be closed, in accordance with these regulations, to such uses. The refuge manager is responsible for determining when snow cover is adequate to protect the underlying vegetation and soil from damage by snowmachine use.

2.12.2 Off-Road Vehicles

The regulations at 43 CFR 36.11(g) restrict the use of off-road vehicles within refuges. The definition of off-road vehicles in 50 CFR 36.2 excludes snowmachines but includes air boats and air-cushion vehicles along with motorized wheeled vehicles. Off-road vehicles may be allowed only on designated routes or areas within Intensive and Moderate management areas or by special use permit.

2.12.3 Helicopters

The use of a helicopter in any area other than at designated landing areas pursuant to the terms and conditions of a permit issued by the Service, or pursuant to a memorandum of understanding between the Service and another party, or involved in emergency or search and rescue operations is prohibited (43 CFR 36.11(f)(4)).

Helicopter landings for volcano monitoring, geologic hazards evaluations, and fisheries and wildlife management activities may be authorized under special use permit or other authorization, subject to site-specific stipulations. Helicopter landings for initial-attack fire suppression must comply with operational guidance in the Alaska Interagency Wildland Fire Management Plan. Helicopter landings by commercial operators and for general public access are generally not allowed in designated Wilderness. Where such use was established prior to Wilderness designation, it may be allowed to continue.

2.12.4 Access to Inholdings

Section 1110(b) of ANILCA ensures adequate and feasible access, for economic or other purposes, across a refuge for any person or entity that has a valid inholding. An inholding is defined as State-owned or privately-owned land, including subsurface rights underlying public lands, valid mining claims, or other valid occupancy that is within or effectively surrounded by one or more conservation system units. When a right-of-way permit is necessary under this provision (e.g., construction of permanent or long-term facilities), the Service will review and process the application in accordance with regulations at 43 CFR 36 and 50 CFR 29. Such permits are subject to terms and conditions as specified in the regulations.

2.12.5 Temporary Access

43 CFR 36.12(a)(2) defines temporary access as "limited, short-term (i.e., up to one year from issuance of the permit) access which does not require permanent facilities for access to State or private lands." Temporary access is limited to survey, geophysical, exploratory, or other

temporary uses of nonfederal lands and where access is not otherwise provided for in 43 CFR 36.10 or 43 CFR 36.11.

The refuge will evaluate applications for temporary access across the refuge and shall issue a permit with the necessary stipulations and conditions to ensure that the access granted is compatible with the purposes for which the refuge was established, that it complies with the provisions of Section 810 of ANILCA, and that it ensures that no permanent harm will result to refuge resources.

2.12.6 Subsistence Access

See Access for Subsistence Purposes under Subsistence Use Management (section 2.11.1).

2.12.7 Transportation and Utility Systems

Transportation and utility systems include roads, highways, railroads, airports, pipelines, electrical transmission lines, communication systems, and related structures and facilities reasonably and minimally necessary for the construction, operation, and maintenance of such systems (Section 1102 of ANILCA). Anyone seeking to acquire a right-of-way across refuge lands for a transportation or utility system must, consistent with 43 CFR 36, file an application with the regional office. Regulations at 43 CFR 36 and 50 CFR 29 establish specific procedures and time constraints for application review, compliance with NEPA, decision-making, and appeals.

The Service will decide whether to approve or disapprove that portion of a transportation or utility system that would cross refuge lands, except for those on designated Wilderness. When the proposed transportation or utility system would cross a designated Wilderness Area, the Service tentatively approves or disapproves the application subject to the President's subsequent decision. If the President approves, a recommendation is submitted to Congress for final approval.

A right-of-way for a transportation or utility system across refuge lands can be granted only if the system meets the compatibility standard, the criteria outlined in Section 1104(g)(2) of ANILCA, and the regulations at 43 CFR 36.7(a)(2) and if there is no economically feasible and prudent alternative route for the system. If approved, permits issued for a transportation or utility system will contain terms and conditions as required under regulations at 43 CFR 36.9(b) and 50 CFR 29.21 through 29.24. Rights-of-way that cross any area within the boundaries of a Wild and Scenic River unit will assure that the stream flow of, and transportation on, such river are not interfered with or impeded and that the facility is located and constructed in an environmentally sound manner (Section 1107(b) of ANILCA and the regulations at 43 CFR 36.9(c) and (d)). Additional special requirements apply to rights-of-way for pipelines issued under the Mineral Leasing Act of 1920 (30 U.S.C. 185), Section 1107(c) of ANILCA, and regulations at 43 CFR 36.9(d).

When considering an application for a transportation or utility system, the authorization process would incorporate a corresponding comprehensive conservation plan amendment to update the desired management category(s) of the affected area if the system were to be approved.

2.12.8 State Transportation Planning

Federal transportation planning regulations require each state to develop a long-range Statewide transportation plan in consultation and coordination with other government agencies and the public. In Alaska, transportation projects nominated for funding are evaluated and ranked by the Alaska Department of Transportation and Public Facilities. When appropriate, the refuge will

participate in the State transportation-planning process and provide input regarding environmental considerations of proposed projects affecting refuge lands and resources.

2.12.9 RS 2477 Rights-of-Way

The State of Alaska identifies numerous claims to roads, trails, and paths across Federal lands under Revised Statute 2477 (RS 2477), a section in the Mining Act of 1866 that states, "The right-of-way for the construction of highways over public lands, not reserved for public uses, is hereby granted." RS 2477 was repealed by the Federal Land Policy and Management Act of 1976, subject to valid existing claims.

Assertion and identification of potential rights-of-way does not establish the validity of these claims nor the public's right to use them. The validity of all RS 2477 rights-of-way will be determined on a case-by-case basis, either through the courts or by other legally-binding document. The State of Alaska has identified in Alaska Statute 19.30.400 three routes on the refuge it claims may be asserted as rights-of-way under RS 2477 (see Figure D-1 in Appendix D).

2.12.10 17(b) Easements

Section 17(b) of the Alaska Native Claims Settlement Act of December 18, 1971, authorizes the Secretary of the Interior to reserve easements on lands conveyed to Native corporations to guarantee access to public lands and waters. Easements across Native lands include linear easements (e.g., roads and trails) and site easements. Site easements are reserved for use as temporary campsites and to change modes of transportation.

The Service is responsible for administering those public easements inside and outside refuge boundaries that provide access to refuge lands. Service authority for administering 17(b) easements is restricted to the lands within the easement. The size, route, and general location of 17(b) easements are identified on maps filed with conveyance documents. Conveyance documents also specify the terms and conditions of use, including the acceptable periods and methods of public access.

2.12.11 Navigation Aids and other Facilities

Section 1310 of ANILCA authorizes reasonable access to and operation and maintenance of existing air and water navigation aids, communications sites, and related facilities. It authorizes existing facilities for weather, climate, and fisheries research and monitoring subject to applicable laws and regulations. Reasonable access to and operation and maintenance of facilities for national defense and related air and water navigation are also provided for, including within designated Wilderness Areas.

New facilities shall be authorized only after consultation with the head of the Federal department or agency undertaking the establishment, operation, or maintenance and in accordance with mutually agreed to terms and conditions.

2.13 Recreation and Other Public Use

Public recreation activities compatible with refuge purposes are authorized unless specifically prohibited (50 CFR 36.31). Compatible recreation uses of the refuge will continue. The Refuge Administration Act identifies compatible hunting, fishing, wildlife observation and photography, and environmental education and interpretation as priority public uses. These uses are encouraged and will receive emphasis in public use management.

Both consumptive (e.g., hunting, fishing, and trapping) and nonconsumptive (e.g., wildlife observation and photography) recreation uses are appropriate. Some recreational uses are incidental to others. For example, camping and hiking may be related to hunting, fishing, wildlife photography, or other recreational uses.

There is often a fine line between subsistence and recreation use (e.g., berry picking). Subsistence uses are addressed under Subsistence Use Management (section 2.11). When it is necessary to restrict the taking of fish and wildlife on a refuge to protect the continued viability of such populations, the taking of fish and wildlife for nonwasteful subsistence uses on refuges shall be accorded priority over the taking of fish and wildlife for other purposes, in accordance with Title VIII of ANILCA.

The refuge will be managed to provide recreation experiences in generally natural wildland settings. Recreation use would be managed consistent with the designated management area category. Intensive and Moderate management areas will be managed for greater concentrations of visitors than will be Minimal management and Wilderness Areas. The refuge will manage all recreation use to avoid crowded conditions and to minimize adverse effects to cultural resources, fish and wildlife, wilderness, and other special values of the refuge. "Leave No Trace" will be the standard.

The least intrusive means of managing use will be employed. Education will be the primary management tool for recreation management, using brochures, maps, signs, and personal contacts. However, if voluntary methods fail, other actions may be taken. Actions that may be taken to manage recreation include limiting commercial guiding and outfitting; regulating use and access subject to the provisions of Section 1110(a) of ANILCA; and recommending changes in State and/or Federal fishing, hunting, and/or trapping regulations. When necessary, recreation opportunities may be seasonally or otherwise restricted to minimize user conflicts and to protect the natural or other values of a refuge.

Any restrictions on public use will follow the public participation and closure procedures at 50 CFR 36, 43 CFR 36, or other applicable regulations. State management actions available through the Master Memorandum of Understanding (see Appendix B)-and other State management tools will also be used where mutually desirable.

A Visitor Services Plan may be prepared for the entire refuge, or more specific management plans may be prepared for areas of relatively concentrated use.

2.14 Public Use Facilities

Facilities may be provided to support certain recreation and other public uses. Recreation facilities may be located on refuge lands and at administrative sites. Visitor centers and highly developed environmental education and interpretive sites may be located off refuge lands at administrative sites or other appropriate locations. Public use facilities may include roads, trails, boat-launch sites, airstrips, campgrounds, interpretive sites, environmental education sites, visitor centers, public use cabins, visitor-contact facilities, and signs.

All new buildings (e.g., visitor centers, restrooms, public use cabins, and visitor-contact buildings), some recreation facilities (e.g., fishing platforms) and additions and alterations to existing buildings will comply with current accessibility standards. Other non-building recreation facilities (e.g., campgrounds, trails) are not currently covered under these standards, although access for the disabled will be considered in the design of new or upgraded facilities. As funds are available, existing buildings will be updated to meet these standards.

The level of development and appearance of facilities will be appropriate for the management category of the area in which they are located. More intensive and sophisticated facilities will be constructed in the Intensive management category; more rustic and rudimentary facilities will occur in the other management categories.

2.14.1 Cabins

Special use permits are required for subsistence and commercial cabins. Management of existing cabins and review of proposals for construction of new cabins for traditional uses will be in accordance with the Service's cabin regulations (50 CFR 36.33) and regional cabin policy. Private recreation-use cabins will not be authorized.

Public use cabins are intended to provide the public with unique opportunities to enjoy and use the refuge. They also help ensure public health and safety in bad weather and emergencies.

2.14.2 Temporary Facilities for the Taking of Fish and Wildlife

Per Section 1316 of ANILCA, the refuge will allow the use of temporary campsites, tent platforms, shelters, and other temporary facilities and equipment directly and necessarily related to the taking of fish and wildlife, provided these facilities are not detrimental to refuge purposes. Special use permits may be issued for tent frames, caches, smokehouses, and other facilities. Appropriate stipulations will be included in the special use permits to ensure protection of refuge resources.

The following criteria will be considered in evaluating applications for temporary facilities:

- Where feasible, they will be located in a manner to not displace or compete with existing public uses.
- They will be located away from the vicinity of existing cabins.
- They will be located on sites that are not currently popular campsites.
- They will be located to minimize displacement of wildlife.

The following conditions may be imposed on temporary facility special use permits:

- The time of occupancy will coincide with the State and/or Federal hunting, fishing, and/or trapping season for the species for which the temporary facility is being used.
- At the end of the specified occupancy, tents and other readily portable materials will be removed.
- To the extent feasible, temporary structures will be built with materials that blend into and are compatible with the surrounding landscape.
- To the extent feasible, temporary facilities will be screened from water and located so that they are as unobtrusive as possible when viewed from trails and areas of significant public use.

2.15 Outreach

Outreach is two-way communication between the refuge and the public to establish mutual understanding, promote public involvement, and influence public attitudes and actions. The refuge will continue to take advantage of partnership opportunities in providing these services, including working with Alaska Geographic; Alaska Public Lands Information Centers; Friends of Alaska

National Wildlife Refuges, local, State, and other Federal agencies; local schools; tribal governments; Alaska Native organizations; and others.

Use of outreach as a management tool is key to the success of many of the management activities outlined in this plan. Two outreach activities—environmental education and interpretation—are included in the six priority public uses identified in the Refuge Improvement Act. Many other activities are also available for use by the refuge staff in its outreach program, which may be developed in more detail as a step-down management plan. All outreach activities must be continually evaluated to determine whether they fulfill refuge management goals and objectives. The refuge will ensure that these services are available to all segments of the public, including those with disabilities and those who speak languages other than English.

Refuge staff will work with the news media, attend public meetings and workshops, develop Internet home pages, invite the public to the refuge (open houses), and foster one-on-one communication.

2.16 Commercial-Use Management

Commercial uses are activities involving use of a refuge or its resources for a profit. Subsistence uses are not included in commercial uses. Refer to section 2.11 for policies related to subsistence.

Except for mining on valid claims under the 1872 Mining Law, other activities where specific property rights are held by entities other than the Federal government, or where specifically exempted by law, all commercial uses must comply with both NEPA and the compatibility requirements of the refuge Administration Act. A written authorization (such as a special use permit) is required to conduct commercial activities on any refuge. Compliance with NEPA and a refuge compatibility determination will be required prior to deciding whether to authorize a commercial use. Prior to authorizing any economic use of a natural resource, the refuge manager must determine that each use, except for proposed activities authorized by ANILCA, contributes to the achievement of refuge purposes or the Refuge System mission (50 CFR 29.1). Except for commercial services described previously, commercial enterprises are prohibited in designated Wilderness.

2.16.1 Commercial Recreation Services

Air-taxi and water-taxi operators, wildlife-viewing guides, tour operators, wilderness guides, recreational fishing guides, big-game hunting guides, and others providing recreation services are required, under 50 CFR 27.97, to obtain special use permits to operate on refuge lands. Where the number of special use permits is limited, refuge managers will award permits competitively (50 CFR 36.41). Special use permits require compliance with all applicable laws and regulations (e.g., United States Coast Guard licensing regulations). Permit stipulations ensure that camps; travel methods; storage of food, fish, and game meat; and activities are compatible with refuge purposes and reduce the potential for impacts to resources and to other refuge users. If problems arise relating to commercial recreation activities—such as disturbance of active nests, conflicts with subsistence use, chronic incidence of bears getting into food, or violations of State or Federal regulations—the refuge may modify or terminate use under the special use permit stipulations. The refuge will monitor the number and type of guides and outfitters operating in the refuge and the number of clients and will, if necessary, further regulate use.

Under Section 1307 of ANILCA, local preference is provided for all new commercial visitor services except guiding for recreational hunting and fishing. Regulations defining local preference are at 50 CFR 36.37.

2.16.2 Mineral Exploration and Development

2.16.2.1 Oil and Gas Assessment

Geological and geophysical studies, including subsurface core sampling and seismic activities, require special use permits with site-specific stipulations that ensure compatibility with refuge purposes and consistency with the management objectives of this plan. Decisions to allow exploration will be made on a case-by-case basis. These activities will not be allowed in designated Wilderness.

2.16.2.2 Oil and Gas Leasing

Oil and gas leasing may be allowed only in Intensive management areas. Oil and gas leasing will not be authorized until completion of the following:

- An assessment of potential
- A national interest determination
- A refuge compatibility determination, where applicable
- A comprehensive conservation plan amendment

During this process, the Service will seek the views of State and local governments and other interested parties, in accordance with Section 1008(b)(2) of ANILCA.

If leasing is authorized, lease holders will be subject to Federal leasing regulations (43 CFR 3100) and appropriate State regulations. Leases will be subject to stipulations on access, seasonal use, and site restoration; operators would be required to use technology that minimizes impacts on fish, wildlife, and habitat. The refuge will work closely with leaseholders to minimize adverse effects of mineral exploration and extraction on refuge resources and recreation opportunities.

2.16.2.3 Sand, Gravel, and Other Common Variety (Saleable) Minerals

Common variety minerals—such as sand, gravel, stone, limestone, pumice, pumicite, cinders, and clay—may be sold pursuant to the Materials Act of July 31, 1947 (30 U.S.C. 601 and 602), as amended. Regulations are found at 43 CFR 3600. Disposal is also authorized under the Refuge Revenue Sharing Act (16 U.S.C. 715s). Also see 612 FW 1 of the Service Manual. Extraction may be authorized, where compatible, in Intensive and Moderate management areas to support construction and maintenance projects on or near refuge lands if no reasonable material sites exist off refuge lands.

2.16.2.4 Other Mineral Leasing

In general, mineral leasing is not allowed on refuge land. Geothermal leasing is not allowed on refuges under Section 1014(c) of the Geothermal Steam Act (30 U.S.C. 1014). Coal mining is also prohibited, subject to valid existing rights, under Section 16 of the Federal Coal Leasing Amendment Act of 1975 (30 U.S.C. 201 Notes) and the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1272; 43 CFR 3400.2). In specific cases of national need, however, mineral exploration, development, or extraction may be permitted under Section 1502 of ANILCA. The President must determine that the national need for the mineral activity outweighs the other public values of the land. Any recommendation by the President would take effect only after enactment of a joint resolution by Congress.

2.16.3 Commercial Fishing and Related Facilities

Under Section 304(d) of ANILCA, the Service will continue to allow individuals with valid commercial fishing rights or privileges to operate on the refuge. The use of campsites, cabins, motor vehicles, and aircraft on the refuge in support of commercial fishing is subject to reasonable regulation. Section 304(d) provides for restricting commercial fishing rights if the use is determined to be inconsistent with refuge purposes *and* to be a "significant expansion of commercial fishing activities . . . beyond the level of such activities during 1979." The Service recognizes that fishery levels are cyclic and will take that into consideration when applying the 1979-level criteria. Any new fishery and related facilities and equipment will have to meet the compatibility standard.

Aquaculture and mariculture support facilities may be allowed in Intensive management, subject to provisions of State and Federal laws. Seafood processing plants will not be allowed.

2.16.4 Commercial Harvest of Timber and Firewood

Commercial harvest of timber and firewood will only be authorized under a special use permit and when necessary to fulfill overall refuge management objectives. Within Moderate, Minimal and Wild River management categories, commercial harvest of timber and firewood to accomplish management objectives will only occur when an approved refuge fire management plan identifies the need to reduce fuel loads in an area. Applicable Federal and State of Alaska guidelines for timber management will be followed. Commercial harvest of timber and firewood is not allowed in designated Wilderness.

2.16.5 Commercial Gathering of Other Resources

Commercial gathering of other resources (e.g., antlers or mushrooms) requires a special use permit under 50 CFR 27.51 and may be authorized in Intensive and Moderate management.

2.16.6 Commercial Filming and Recording Activities

It is Service policy to provide refuge access and/or assistance to firms and individuals in the pursuit of commercial visual and audio recordings when they are compatible with refuge purposes or the mission of the Refuge System. Commercial films, television production, or sound tracks made within refuges for other than news purposes require a special use permit or authorization (43 CFR 5.1).

Commercial filming or recording activities such as videotaping, audio taping, and photography for the purpose of advertising products and services are subject to an A/V Production Permit (Refuge Manual 8 RM 16).

Permits are not required for still photography on refuge lands open to the general public, including commercial still photography so long as no models or props which are not a part of the site's natural or cultural resources or administrative facilities are used (16 U.S.C. 460l-6d[c]).

2.16.7 Other Commercial Uses

Generally, other commercial uses such as grazing, agriculture, and hydroelectric power development will not be allowed. An exception may be made for low-head or small run-of-the-river hydropower facilities. These may be authorized in Intensive and Moderate management areas on a case-by-case basis. See section 2.12.7 for transmission lines, pipelines, and other rights-of-way mentioned in Title XI of ANILCA.

2.17 Environmental Contaminants Identification and Cleanup

One goal of the Refuge Administration Act is to maintain the biological integrity, diversity, and environmental health of the Refuge System. In support of this goal, the Service studies environmental contaminants that may threaten trust species (i.e., those species for which the Service has primary jurisdiction) and other resources of the refuge. This work will continue as new concerns are identified and as funding allows.

An assessment of known or suspected contaminants threats is normally completed for each refuge as part of the national Contaminants Assessment Process. During comprehensive conservation plan revisions, existing information will be reviewed, and an assessment of potential contaminants threats will be entered into an electronic database. A contaminant assessment report will also be prepared.

When contaminants are identified on refuge lands, the Service will initiate discussions with the responsible party or parties to remedy the situation. If the Service caused the contamination, funds will be sought to define the extent and type of the contamination and to remedy it. Appropriate environmental regulations—including the Resource Conservation Recovery Act, Comprehensive Environmental Response and Compensation Liability Act, Oil Pollution Act of 1990, and State of Alaska regulations (e.g., 18 AAC 75)—would be followed during remediation work.

All spills of petroleum products and hazardous materials must be reported to the Alaska Department of Environmental Conservation and to the National Response Center. Incidents also need to be reported to the U.S. Fish & Wildlife Service Regional Spill Response Coordinator. The refuge will refer to the U.S. Fish & Wildlife Service Region 7 Spill Response Contingency Plan and other relevant plans when responding to spills.

2.18 Management of Designated Wilderness

Designated Wilderness will be managed in accordance with the Wilderness Act of 1964, as modified by provisions of ANILCA; Service guidelines as found in the Refuge Manual (6 RM 8) and Part 610 of the Service Manual, when approved; and regional policy. Preserving the wilderness character of the area is the management focus for designated Wilderness. A minimum requirements analysis will be conducted for administrative activities proposed in Wilderness Areas. This two-step decision process involves determining if an activity should be conducted in the Wilderness Area and, if so, determining the minimum tool, which is the least intrusive tool, equipment, device, force, regulation, or practice determined to be necessary to achieve a management objective in Wilderness.

Certain activities are legislatively prohibited in designated Wilderness, including oil, gas, and other mineral leasing and most surface-disturbing activities. Section 4(c) of the Wilderness Act generally prohibits roads, commercial enterprises, motor vehicles, motorboats, other forms of mechanical transport, motorized equipment, the landing of aircraft, and structures and installations in Wilderness Areas. Provisions of ANILCA, however, provide exceptions to some of these prohibitions for specific purposes, such as allowing motorized public access for traditional activities, and for the continuation of pre-existing commercial and private use cabins. Following are some of the ANILCA provisions and their applicable sections affecting public use of Wilderness Areas:

- Access for subsistence purposes (Section 811).
- Access for traditional activities and to and from villages and homesites (Section 1110(a)).

- Access to State- or privately-owned lands (including subsurface rights), valid mining claims, or other valid occupancy (Section 1110 (b)).
- Construction and use of cabins for traditional and customary uses (Section 1303)
- Use of facilities associated with the exercise of valid commercial fishing rights (Section 304(d))

Other provisions of ANILCA affect the administrative uses of Wilderness Areas, including the following:

- Access for mineral assessment purposes, as part of the Alaska Mineral Resources Assessment Program (Section 1010)
- Construction and maintenance of navigation aids and other facilities (Section 1310)
- Continuation of existing, and construction of new, public use cabins (Sections 1315[c] and [d])

Under 50 CFR 35.5(b), regional policy (RW-16) allows local residents engaged in subsistence activities to use chainsaws. Other motorized equipment not related to transportation (such as generators and water pumps) are not allowed.

Granting rights-of-way for transportation or utility systems through designated Wilderness requires Presidential and Congressional approval (Section 1106[b] of ANILCA; see also section 2.12.7).

A step-down Wilderness stewardship plan may be prepared for specific designated Wilderness Areas to address in greater detail their resources, uses, and management. Specific details would be included on how the broad management direction provided in the comprehensive conservation plan would be applied in a given designated Wilderness Area to preserve the wilderness character. The step-down plan would be prepared in cooperation with and would include appropriate public involvement.

2.19 Administration of the Kanuti National Wildlife Refuge

2.19.1 Administrative Sites and Visitor Facilities

Administrative sites include temporary and permanent field camps, residences, offices, and associated storage, communication, and transportation facilities. The type of administrative site and level of development will be consistent with the management intent of the management category in which they are constructed. Administrative field camps or other administrative facilities within Minimal, Wild River and Wilderness management categories will only be allowed when required to meet management objectives, when no reasonable alternative sites exist, and when the facilities are essential to protect the health and safety of employees. New facilities would only be the minimum required to meet long-term needs.

Fuel storage or other hazardous-material storage in conjunction with administrative sites will meet all Federal and State requirements for spill containment and storage. Hazardous materials stored within the Wild River and Wilderness management categories will be in small (55-gallon or less) containers.

Under Section 1306 of ANILCA, the Secretary of the Interior may establish administrative sites and visitor facilities, either within or outside the boundaries of a conservation system unit, in accordance with the unit's management plan and for the purposes of ensuring the preservation,

protection, and proper management of the unit. Section 1306 further states that to the "extent practicable and desirable, the Secretary shall attempt to locate such sites and facilities on Native lands in the vicinity of the unit."

Department of Interior guidelines, developed in 1995, implementing Section 1306 require that prior to initiating a search for an administrative site or visitor facility, site-selection criteria be developed, with public input, and all proposals be evaluated according to the site-selection criteria. If it is determined that Native lands satisfy the site-selection criteria and are desirable and practicable for the intended use, the highest-ranked Native lands shall be selected as the preferred site, subject to a specific site evaluation. If no Native lands satisfy the site-selection criteria, the highest-ranked parcel will become the preferred site. Public comments will be considered prior to making a final decision.

2.19.1.1 Applicability of Refuge Regulations to Off-Refuge Administrative and Visitor Facility Sites

Under 50 CFR 36.1(c) the Service is authorized to enforce regulations concerning public safety and protection of government property, and State of Alaska fish and wildlife regulations, on administrative and visitor facility sites that may be held in fee or less-than-fee title and are either inside or outside the approved boundaries of any Alaska national wildlife refuge.

2.19.2 Refuge Management Plans

Some management programs are addressed in sufficient detail in the comprehensive conservation plan to be integrated directly into the budgetary process. For other programs, it may be necessary to prepare step-down management plans to implement general strategies identified in this plan. Additional information on the step-down planning process can be found in 602 FW 3 of the Service Manual.

The step down management plans necessary for management of the Kanuti Refuge are described in detail in Chapter 6, Section 6.1. They are:

Fisheries Management Plan

Inventory and Monitoring Plan

Cultural Resource Guide

Environmental Education and Interpretative Plan

Fire Management Plan

Land Protection Plan

Station Safety Plan, Fire Emergency Evacuation Plan, and Station Security Plan

Water Resources Inventory and Assessment: Plan of Study

Environmental Management Plan

Oil Spill Contingency Plan

2.20 Alaska Mineral Resource Assessment Program

Section 1010 of ANILCA requires that all Federal lands be assessed for their oil, gas, and other mineral potential, although Section 304(c) prohibits new hardrock mining on refuges. Mineral assessment techniques that do not have lasting impacts—such as side-scanning radar, trenching, and core drilling—may be allowed throughout the refuge. Special use permits issued to other government agencies or their contractors for assessment work would include stipulations to ensure that the assessment program is compatible with refuge purposes. For example, stipulations may limit access during nesting, calving, spawning, or other times when fish and wildlife may be especially vulnerable to disturbance.

3. Management Categories Table

3.1.1 Introduction

This table lists activities, public uses, commercial uses, and facilities by management category. In some cases it provides very specific guidance (such as for highway vehicles). In other cases (such as for research and management facilities), the direction is general. While facilities may be allowed in all management categories, the types of facilities and how they would be constructed and operated vary widely by management category. The descriptions of the management categories reflect a clear distinction in the level of action, type of action, and constraints that may be placed on activities or development within the management categories. They should be used to reflect the desired future condition of the area when site-specific proposals are being evaluated. Activities allowed or authorized within the different categories will be managed differently depending on the management category in which they occur.

3.1.2 Definitions for Management Categories Table

The following are definitions for terms used in the table.

Allowed—Activity, use or facility is allowed under existing NEPA analysis, appropriate use findings, refuge compatibility determinations, and applicable laws and regulations of the Service, other Federal agencies and the State of Alaska.

May be allowed—Activity, use or facility may be allowed subject to site-specific NEPA analysis, an appropriate use finding (when required), a specific refuge compatibility determination (when required), and compliance with all applicable laws and regulations of the Service, other Federal agencies and the State of Alaska.

May be authorized—Activity, use or facility may be allowed; a special use permit or other authorization is required.

Not allowed—Activity, use or facility is not allowed.

The following terms are used:

NEPA analysis—All activities, uses and facilities proposed for a refuge that have the potential to result in significant effects on the environment require an analysis of potential environmental impacts under the National Environmental Policy Act. This analysis may be documented as a categorical exclusion (CE), an environmental assessment (EA), or an environmental impact statement (EIS), depending on the nature of the proposed project.

Appropriate Use—All uses over which the Service has jurisdiction must be determined to be appropriate following direction in Service Manual 630 FW 1. Hunting, fishing, wildlife observation and photography and environmental education and interpretation are considered appropriate by national policy with no further analysis required. See section 2.4.1 for a description of the criteria used to determine if other uses are appropriate.

Compatibility—All activities, uses and facilities allowed on the refuge, except management actions undertaken by or for the Service, must be compatible with the purposes of the refuge and the mission of the Refuge System. The analysis that occurs results in a refuge compatibility determination. Management activities undertaken by the Service or by volunteers, cooperators, or contractors working for the Service, with limited exception, are exempt from compatibility review (Part 603 of the Service Manual).

Regulations—All activities, uses and facilities allowed on a refuge must comply with any applicable regulations, as published in the Code of Federal Regulations. Regulations are developed by the Service through a public process to implement the legal authorities under which the Service manages the Refuge System. For more information on these regulations, see the appropriate topic in the Management Directions and Guidelines section of this chapter. For some activities, other Federal agency and/or state regulations may also apply.

Temporary—A continuous period of time not to exceed 12 months, except as specifically provided otherwise. Special use permits or other authorizations may prescribe a longer period of time, but the structures or other human-made improvements need to be readily and completely dismantled and removed from the site when the period of authorized use terminates.

The following guidelines apply to all activities, uses, and facilities allowed on a refuge.

Area or time restrictions—All activities and uses allowed on a refuge may be restricted in certain areas or at certain times, at the discretion of the refuge manager and with the appropriate level of public involvement, by emergency (short-term) or permanent regulation, if necessary to protect refuge resources or human health and safety.

Management emergencies—Activities, uses and facilities not allowed on a refuge or in specific management categories may be allowed if naturally-occurring or human-caused actions adversely affect refuge resources or threaten human health and safety.

Table J-1: Activities, public uses, commercial uses, and facilities by management category

ACTIVITY	MINIMAL MANAGEMENT	MODERATE MANAGEMENT	INTENSIVE MANAGEMENT	MANAGEMENT of WILDERNESS	MANAGEMENT of WILD RIVERS
ECOSYSTEM, HABITAT, AND FISH AND WILDLIFE MANAGEMENT					
Ecosystem and Landscape Management					
Collecting Information on and Monitoring Ecosystem Components Data gathering, monitoring and maintaining a comprehensive data base of selected ecosystem components (plants, animals, fish, water, air). (See sections 2.10.1 and 2.10.2)	Allowed	Allowed	Allowed	Allowed; see section 2.18*	Allowed
Research and Management Access and collection of data necessary for management decisions or to further science by the Service. (See section 2.10)	Allowed	Allowed	Allowed	Allowed; see section 2.18*	Allowed
Access and collection of data necessary for management decisions or to further science by ADF&G.	Allowed	Allowed	Allowed	Allowed; see section 2.18*	Allowed
Access and collection of data necessary for management decisions or to further science by other researchers.	May be authorized	May be authorized	May be authorized	May be authorized; see section 2.18*	May be authorized

**All activities in Designated Wilderness will be subject to a minimum requirements analysis.*

ACTIVITY	MINIMAL MANAGEMENT	MODERATE MANAGEMENT	INTENSIVE MANAGEMENT	MANAGEMENT of WILDERNESS	MANAGEMENT of WILD RIVERS
Research and Management Facilities May be permanent or temporary structures or camps including weirs, counting towers and sonar counters. (See section 2.19.1)	May be allowed	May be allowed	May be allowed	May be allowed; consistent with section 1.5*	May be allowed
Fish and Wildlife Habitat Management					
Describing, Locating, and Mapping Habitats Development of quantitative, written, and graphic descriptions of fish and wildlife habitat including water, food, and shelter components. (See section 2.10.1)	Allowed	Allowed	Allowed	Allowed; see section 2.18*	Allowed
Habitat Management (See section 2.9.1)					
Mechanical Treatment Activities such as cutting, crushing or mowing of vegetation; water control structures; fencing; artificial nest structures.	Not allowed; with exceptions consistent with section 1.3	May be allowed	May be allowed	Not allowed; with exceptions consistent with section 1.5. See also section 2.18*	Not allowed; with exceptions consistent with section 1.4
Chemical Treatment Use of chemicals to remove or control nonnative species. (See section 2.10.8)	May be allowed	May be allowed	May be allowed	May be allowed; see section 2.18*	May be allowed
Manual Treatment Use of hand tools to remove, reduce, or modify hazardous plant fuels, exotic plant species, or to modify habitats (e.g. remove beaver dams).	May be allowed	May be allowed	May be allowed	May be allowed; see section 2.18*	May be allowed

**All activities in Designated Wilderness will be subject to a minimum requirements analysis.*

ACTIVITY	MINIMAL MANAGEMENT	MODERATE MANAGEMENT	INTENSIVE MANAGEMENT	MANAGEMENT of WILDERNESS	MANAGEMENT of WILD RIVERS
Aquatic Habitat Modifications Activities such as stream bank restoration, passage structures, fish barriers, or removal of obstacles which result in physical modification of aquatic habitats to maintain or restore native fish species. (See section 2.9.1)	May be allowed	May be allowed	May be allowed	May be allowed; consistent with section 1.5. See also section 2.18*	May be allowed; consistent with section 1.4
Fire Management—Prescribed Fires Fire ignited by management actions to meet specific management objectives. (See section 2.9.2)	May be allowed	May be allowed	May be allowed	May be allowed; see section 1.5*	May be allowed
Fire Management—Wildland Fire Use The planned use of naturally occurring fires to meet management objectives. (See section 2.9.2)	May be allowed	May be allowed	May be allowed	May be allowed*	May be allowed
Fire Management—Fire Suppression Management actions intended to protect identified resources from a fire, extinguish a fire, or alter a fire's direction of spread. (See section 2.9.2)	Allowed	Allowed	Allowed	Allowed	Allowed
Nonnative and Pest Plant Control Monitoring, extirpation, control, removal and/or relocation and other management practices for pest and nonnative plant species. (See section 2.10.8)	May be allowed	May be allowed	May be allowed	May be allowed; see section 2.18*	May be allowed
Water Quality and Quantity Management Monitoring of water quality and quantity to identify baseline data and for management purposes; includes installation of gauging stations. (See section 2.8.2)	Allowed	Allowed	Allowed	Allowed; see section 2.18*	Allowed
Fish and Wildlife Population Management					
Reintroduction of Species The reintroduction of native species to restore natural diversity of fish, wildlife and habitats. (See section 2.10.6)	May be allowed	May be allowed	May be allowed	May be allowed; see section 2.18*	May be allowed

**All activities in Designated Wilderness will be subject to a minimum requirements analysis.*

ACTIVITY	MINIMAL MANAGEMENT	MODERATE MANAGEMENT	INTENSIVE MANAGEMENT	MANAGEMENT of WILDERNESS	MANAGEMENT of WILD RIVERS
Fish and Wildlife Control The control, relocation, sterilization, removal or other management of native species including predators to maintain natural diversity of fish, wildlife and habitats; favor other fish or wildlife populations; protect reintroduced, threatened, or endangered species or to restore depleted native populations. (See section 2.10.7)	May be allowed	May be allowed	May be allowed	May be allowed; see section 2.18*	May be allowed
Nonnative Species Management The removal or control of nonnative species (including predators). (See section 2.10.8)	May be allowed	May be allowed	May be allowed	May be allowed; see section 2.18*	May be allowed
Pest Management and Disease Prevention and Control Relocation or removal of organisms that threaten human health or survival of native fish, wildlife or plant species. Management practices directed at controlling pathogens that threaten fish, wildlife and people, such as rabies and parasite control. (See section 2.10.9)	May be allowed	May be allowed	May be allowed	May be allowed; see section 2.18*	May be allowed
Fishery Restoration Actions taken to restore fish access to spawning and rearing habitat, or actions taken to restore populations to historic levels. Includes harvest management, escapement goals, habitat restoration, stocking, egg incubation boxes, and lake fertilization. (See section 2.10.10)	May be allowed	May be allowed	May be allowed	May be allowed*	May be allowed
Fishery Restoration Facilities Fisheries facilities may be permanent or temporary and may include hatcheries, fish ladders, fish passages, fish barriers and associated structures. (See sections 2.10.10 and 2.19.1)	May be authorized	May be authorized	May be authorized	May be authorized*	May be authorized

**All activities in Designated Wilderness will be subject to a minimum requirements analysis.*

ACTIVITY	MINIMAL MANAGEMENT	MODERATE MANAGEMENT	INTENSIVE MANAGEMENT	MANAGEMENT of WILDERNESS	MANAGEMENT of WILD RIVERS
Fishery Enhancement Activities applied to a fish stock to supplement numbers of harvestable fish to a level beyond what could be naturally produced based upon a determination or reasonable estimate of historic levels. (See section 2.10.11)	May be allowed	May be allowed	May be allowed	May be allowed; consistent with section 2.18*	May be allowed
Fishery Enhancement Facilities May be permanent or temporary and may include hatcheries, egg incubation boxes, fish ladders, fish passages, fish barriers and associated structures. (See sections 2.10.11 and 2.19.1)	May be authorized	May be authorized	May be authorized	May be authorized*	May be authorized
Native Fish Introductions Movement of native fish species within a drainage on the refuge to areas where they have not historically existed. (See section 2.10.6)	May be allowed	May be allowed	May be allowed	May be allowed*	May be allowed
Nonnative Species Introductions Introduction of species not naturally occurring within the refuge. (See section 2.10.6)	Not allowed	Not allowed	Not allowed	Not allowed	Not allowed
SUBSISTENCE (See section 2.11)					
Subsistence Activities					
Fishing, Hunting, Trapping, and Berry Picking The taking of fish and wildlife and other natural resources for personal consumption, as provided by law.	Allowed	Allowed	Allowed	Allowed	Allowed
Collection of House Logs and Firewood Harvesting live standing timber greater than 6 inches diameter at breast height for personal or extended family use.	May be authorized	May be authorized	May be authorized	May be authorized	May be authorized
Collection of House Logs and Firewood Live trees between 3 and 6 inches diameter at breast height for personal or extended family use.	20 trees or less per year allowed; more than 20 trees per year may be authorized	20 trees or less per year allowed; more than 20 trees per year may be authorized	20 trees or less per year allowed; more than 20 trees per year may be authorized	20 trees or less per year allowed; more than 20 trees per year may be authorized	20 trees or less per year allowed; more than 20 trees per year may be authorized

**All activities in Designated Wilderness will be subject to a minimum requirements analysis.*

ACTIVITY	MINIMAL MANAGEMENT	MODERATE MANAGEMENT	INTENSIVE MANAGEMENT	MANAGEMENT of WILDERNESS	MANAGEMENT of WILD RIVERS
Collection of Plant Materials Harvesting trees less than 3 inches diameter at breast height, dead standing or downed timber, grass, bark, and other plant materials used for subsistence purposes.	Allowed	Allowed	Allowed	Allowed	Allowed
Temporary Facilities Establishment and use of tent platforms, shelters, and other temporary facilities and equipment directly related to the taking of fish and wildlife. (See section 2.14.2)	Allowed	Allowed	Allowed	Allowed	Allowed
Subsistence Cabins – See Cabins (See also section 2.14.1)					
Subsistence Access – subject to reasonable regulations under provisions of Section 810 of ANILCA (See section 2.11.1)					
Use of snowmobiles, motorboats, and other means of surface transportation traditionally employed for subsistence purposes.	Allowed	Allowed	Allowed	Allowed	Allowed
ACCESS (See sections 2.12.1 and 2.13) Restrictions subject to provisions of Section 1110 of ANILCA as applicable; see also Subsistence Access section above.					
Foot	Allowed	Allowed	Allowed	Allowed	Allowed
Dogs and Dog Teams	Allowed	Allowed	Allowed	Allowed	Allowed
Other Domestic Animals Includes horses, mules, llamas, etc.	Allowed	Allowed	Allowed	Allowed	Allowed
Nonmotorized Boats Includes canoes, kayaks, rafts, etc.	Allowed	Allowed	Allowed	Allowed	Allowed
Motorized					
Use of snowmachine, motorboats, airplanes and nonmotorized surface transportation methods for traditional activities and for travel to and from villages and homesites.	Allowed	Allowed	Allowed	Allowed	Allowed

**All activities in Designated Wilderness will be subject to a minimum requirements analysis.*

ACTIVITY	MINIMAL MANAGEMENT	MODERATE MANAGEMENT	INTENSIVE MANAGEMENT	MANAGEMENT of WILDERNESS	MANAGEMENT of WILD RIVERS
Highway Vehicles	Not allowed	May be allowed on designated roads.	Allowed on all-weather roads.	Not allowed	Not allowed
Off-Road Vehicles (All-Terrain Vehicles) Includes air boats and air cushion vehicles. (See sections 2.11.1 and 2.12.2)	Not allowed; with exceptions consistent with section 2.12.2.	May be allowed	May be allowed	Not allowed; with exceptions consistent with section 2.12.2.	Not allowed; with exceptions consistent with section 2.12.2.
Helicopters Includes all rotary-wing aircraft. (See section 2.12.3)	May be authorized	May be authorized	May be authorized	May be authorized; consistent with sections 1.5 and 2.18	May be authorized
PUBLIC USE, RECREATION, and OUTREACH ACTIVITIES Also see ACCESS and Commercial Recreation sections.					
Hunting, Fishing, Wildlife Observation, Wildlife Photography, Interpretation and Environmental Education Note: All activities listed are priority public uses (See sections 2 and 2.13)	Allowed	Allowed	Allowed	Allowed	Allowed
Trapping, Walking, Hiking, Camping at Undeveloped Sites, and Dog Sledding (See sections 2 and 2.13)	Allowed	Allowed	Allowed	Allowed	Allowed
General Photography See also COMMERCIAL USES. (See sections 2 and 2.13)	Allowed	Allowed	Allowed	Allowed	Allowed
Outreach Activities (See sections 1 and 2.15)	Allowed	Allowed	Allowed	Allowed	Allowed
Public Use and Recreation Facilities – level of development is consistent with management intent of the category (See section 2.14)					

**All activities in Designated Wilderness will be subject to a minimum requirements analysis.*

ACTIVITY	MINIMAL MANAGEMENT	MODERATE MANAGEMENT	INTENSIVE MANAGEMENT	MANAGEMENT of WILDERNESS	MANAGEMENT of WILD RIVERS
All Weather Roads And associated developments including bridges.	Not allowed	May be allowed	May be allowed	Not allowed	Not allowed
Unimproved Roads Note: while unimproved roads are not allowed in Minimal management, Wilderness and Wild Rivers, roads may exist. In these management categories, the roads would not be designated for use or maintained.	Not allowed	May be allowed	May be allowed	Not allowed	Not allowed
Designated Off-Road Vehicle (All-Terrain Vehicle) Trails and Routes	Not allowed	May be allowed	May be allowed	Not allowed	May be allowed
Roadside Exhibits and Waysides	Not applicable	May be allowed	May be allowed	Not applicable	Not applicable
Constructed and Maintained Airstrips	Not allowed	May be allowed	May be allowed	Not allowed	Not allowed
Cleared Landing Strips and Areas Includes unimproved areas where airplanes land. Minor brush cutting or rock removal by hand is allowed for maintenance.	May be allowed	May be allowed	May be allowed	Existing strips allowed to remain; new strips not allowed; see section 2.18*	May be allowed
Constructed Hiking Trails Includes bridges, boardwalks, trailheads, and related facilities.	May be allowed	May be allowed	May be allowed	May be allowed*	May be allowed
Designated Hiking Routes Unimproved and unmaintained trails; may be designated by signs, cairns, and/or on maps.	Allowed	Allowed	Allowed	Allowed	Allowed
Boat Launches and Docks Designated sites for launching and storing watercraft or tying up a float plane.	May be allowed	May be allowed	May be allowed	May be allowed*	May be allowed
Visitor Contact Facilities A variety of staffed and unstaffed facilities providing information on the refuge and its resources to the public; facilities range from visitor centers to kiosks and signs. (See section 2.13)	May be allowed	May be allowed	May be allowed	Generally not allowed; see sections 1.5 and 2.18*	May be allowed
Campgrounds Developed sites accessible by highway vehicles.	Not applicable	May be allowed	May be allowed	Not applicable	Not applicable

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ACTIVITY	MINIMAL MANAGEMENT	MODERATE MANAGEMENT	INTENSIVE MANAGEMENT	MANAGEMENT of WILDERNESS	MANAGEMENT of WILD RIVERS
Hardened Campsites Areas where people can camp that are accessible by vehicle or on foot but where the only facilities provided are for public health and safety and/or resource protection; may include gravel pads for tents, hardened trails, and/or primitive toilets. (See section 1)	Allowed	Allowed	Allowed	Allowed; consistent with section 2.18*	Allowed
Temporary Facilities Includes tent frames, caches, and other similar or related facilities; does not include cabins. See also SUBSISTENCE, COMMERCIAL USES, and Administrative Facilities. (See section 2.14.2)	May be authorized	May be authorized	May be authorized	May be authorized	May be authorized
Cabins – also other related structures such as outdoor toilets, food caches, storage sheds, and fish drying racks (See section 2.14.1)					
Public Use Cabin A cabin administered by the Service and available for use by the public; intended only for short-term public recreational use and occupancy.	Existing cabins allowed to remain; new cabins may be allowed	Existing cabins allowed to remain; new cabins may be allowed	Existing cabins allowed to remain; new cabins may be allowed	Existing cabins allowed to remain; new cabins may be allowed; consistent with section 2.18*	Existing cabins allowed to remain; new cabins may be allowed
Administrative Cabin Any cabin primarily used by refuge staff or other authorized personnel for the administration of the refuge. (See section 2.19.1)	May be allowed	May be allowed	May be allowed	May be allowed; consistent with section 2.18*	May be allowed
Subsistence Cabin Any cabin necessary for health and safety and to provide for the continuation of ongoing subsistence activities; not for recreational use.	Existing cabins allowed to remain; new cabins may be authorized	Existing cabins allowed to remain; new cabins may be authorized	Existing cabins allowed to remain; new cabins may be authorized	Existing cabins allowed to remain; new cabins may be authorized; consistent with section 2.18	Existing cabins allowed to remain; new cabins may be authorized

**All activities in Designated Wilderness will be subject to a minimum requirements analysis.*

ACTIVITY	MINIMAL MANAGEMENT	MODERATE MANAGEMENT	INTENSIVE MANAGEMENT	MANAGEMENT of WILDERNESS	MANAGEMENT of WILD RIVERS
Commercial Cabin Any cabin which is used in association with a commercial operation including but not limited to commercial fishing activities and recreational guiding services.	Existing cabins allowed to remain; new cabins may be authorized	Existing cabins allowed to remain; new cabins may be authorized	Existing cabins allowed to remain; new cabins may be authorized	Existing cabins allowed to remain; new cabins not allowed consistent with section 2.18	Existing cabins allowed to remain; new cabins may be authorized
Other Cabins Cabins associated with authorized uses by other government agencies.	May be authorized	May be authorized	May be authorized	May be authorized; consistent with section 2.18	May be authorized
Administrative Facilities (See section 2.19.1)					
Administrative Field Camps **Temporary** facilities used by refuge staff and other authorized personnel to support individual (generally) field projects; may include, but not limited to, tent frames and temporary/portable outhouses, shower facilities, storage/maintenance facilities, and caches.	May be allowed	May be allowed	May be allowed	May be allowed*	May be allowed
Administrative Field Sites **Permanent** facilities used by refuge staff or other authorized personnel for the administration of the refuge. Includes administrative cabins and related structures (see Cabins) and larger multi-facility administrative sites necessary to support on-going field projects, research, and other management activities. Temporary facilities, to meet short-term needs, may supplement the permanent facilities at these sites.	Use of existing sites allowed including replacement of existing facilities as necessary; new sites may be allowed	Use of existing sites allowed including replacement of existing facilities as necessary; new sites may be allowed	Use of existing sites allowed including replacement of existing facilities as necessary; new sites may be allowed	Use of existing sites allowed including replacement of existing facilities as necessary; new sites may be allowed; consistent with sections 1.5 and 2.18*	Use of existing sites allowed including replacement of existing facilities as necessary; new sites may be allowed
Refuge Administrative Office Complex Facilities necessary to house refuge operations, outreach, and maintenance activities, and associated infrastructure; includes staff offices, storage, maintenance, parking lots, and other similar facilities.	Not allowed	Not allowed	May be allowed	Not allowed	Not allowed

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ACTIVITY	MINIMAL MANAGEMENT	MODERATE MANAGEMENT	INTENSIVE MANAGEMENT	MANAGEMENT of WILDERNESS	MANAGEMENT of WILD RIVERS
Hazardous Materials Storage Sites including appropriate structures and equipment necessary for the storage and transfer of fuels and other hazardous materials used for administrative purposes; must be in compliance with all Federal and State requirements.	May be allowed	May be allowed	May be allowed	May be allowed	May be allowed
Residences Residential housing for refuge staff and their families; includes single and multi-family dwellings.	Not allowed	Not allowed	May be allowed	Not allowed	Not allowed
Bunkhouses Quarters to house temporary and similar employees, volunteers, visitors, and other agency personnel.	Not allowed	May be allowed	May be allowed	Not allowed	Not allowed
Aircraft Hangars and Facilities for Storage of Aircraft.	Not allowed	Not allowed	May be allowed	Not allowed *	Not allowed
Boat Launches and Docks Designated sites for launching and storing watercraft or tying up a float plane.	May be allowed	May be allowed	May be allowed	May be allowed*	May be allowed
Radio Repeater Sites Sites used to maintain radio communications equipment; may include helispots for access.	May be allowed	May be allowed	May be allowed	May be allowed*	May be allowed
COMMERCIAL USES Except as noted, a special use permit or other authorization is required for economic use of a refuge.					
Commercial Recreation – includes all forms of guiding, including those operated by nonprofit, educational, and other noncommercial groups (See section 2.16.1)					

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ACTIVITY	MINIMAL MANAGEMENT	MODERATE MANAGEMENT	INTENSIVE MANAGEMENT	MANAGEMENT of WILDERNESS	MANAGEMENT of WILD RIVERS
Guiding and Outfitting	May be authorized	May be authorized	May be authorized	May be authorized	May be authorized
Transporting	May be authorized	May be authorized	May be authorized	May be authorized	May be authorized
Fixed-Wing Air Taxis	May be authorized	May be authorized	May be authorized	May be authorized	May be authorized
Helicopter Air Taxis	May be authorized	May be authorized	May be authorized	Not allowed; with exceptions consistent with section 2.12.3	May be authorized
Bus and Auto Tours	Not applicable	May be authorized	May be authorized	Not applicable	Not applicable
Mineral Exploration (See section 2.16.2) **See section 2.20 for information on the Alaska Mineral Resource Assessment Program**					
Surface Geological Studies Includes surface rock collecting and geological mapping activities (includes helicopter or fixed-wing access).	May be authorized	May be authorized	May be authorized	Not allowed	May be authorized
Geophysical Exploration and Seismic Studies Examination of subsurface rock formations through devices that set off and record vibrations in the earth. Usually involves mechanized surface transportation, but may be helicopter supported; includes studies conducted for the Department of the Interior.	May be authorized	May be authorized	May be authorized	Not allowed	May be authorized
Core Sampling Using helicopter transported motorized drill rig to extract subsurface rock samples; does not include exploratory wells; includes sampling conducted for Department of the Interior.	May be authorized	May be authorized	May be authorized	Not allowed	May be authorized
Other Geophysical Studies Helicopter-supported gravity and magnetic surveys and other minimal impact activities that do not require mechanized surface transportation.	May be authorized	May be authorized	May be authorized	Not allowed	May be authorized
Mineral Development (see section 2.16.2)					

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ACTIVITY	MINIMAL MANAGEMENT	MODERATE MANAGEMENT	INTENSIVE MANAGEMENT	MANAGEMENT of WILDERNESS	MANAGEMENT of WILD RIVERS
Oil and Gas Leasing Leasing, drilling and extraction of oil and gas for commercial purposes. Includes all associated above and below ground facilities.	Not allowed	Not allowed	May be authorized	Not allowed	Not allowed
Sale of Sand, Gravel, and Other Common Variety Minerals Extraction of sand, gravel, and other saleable minerals for commercial purposes; includes commercial use by Federal, State, and local agencies.	Not allowed	May be authorized	May be authorized	Not allowed	Not allowed
Other Mineral Leasing Includes the extraction of coal, geothermal resources, potassium, sodium, phosphate, sulfur, or other leaseable minerals for commercial purposes. For cases of national need, see section 2.16.2.	Not allowed	Not allowed	Not allowed	Not allowed	Not allowed
Mining of Hardrock Minerals Development of valid (pre-ANILCA) mining claims (lode, placer, and mill sites) on refuge lands for the purpose of extracting hardrock minerals.	Allowed only on valid claims	Allowed only on valid claims	Allowed only on valid claims	Allowed only on valid claims	Allowed only on valid claims
Other Commercial Activities					
Commercial Filming, Videotaping, and Audiotaping (See section 2.16.6)	May be authorized	May be authorized	May be authorized	May be authorized	May be authorized

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ACTIVITY	MINIMAL MANAGEMENT	MODERATE MANAGEMENT	INTENSIVE MANAGEMENT	MANAGEMENT of WILDERNESS	MANAGEMENT of WILD RIVERS
Grazing (See section 2.16.7)	Not allowed	Not allowed	Not allowed	Not allowed	Not allowed
Agriculture (Commercial) (See section 2.16.7)	Not allowed	Not allowed	Not allowed	Not allowed	Not allowed
Commercial Fishery Support Facilities At or below 1979 levels. (See section 2.16.3)	Allowed	Allowed	Allowed	Allowed	Allowed
Commercial Fishery Support Facilities Above 1979 levels. (See section 2.16.3)	May be authorized	May be authorized	May be authorized	Not allowed	May be authorized
Seafood Processing (See section 2.16.3)	Not allowed	Not allowed	Not allowed	Not allowed	Not allowed
Aquaculture and Mariculture Support Facilities (See section 2.16.3)	Not allowed	Not allowed	May be authorized	Not allowed	Not allowed
Commercial Timber and Firewood Harvest (See section 2.16.4)	May be authorized	May be authorized	May be authorized	Not allowed	May be authorized
Commercial Gathering of Other Refuge Resources (See section 2.16.5)	Not allowed	May be authorized	May be authorized	Not allowed	Not allowed

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ACTIVITY	MINIMAL MANAGEMENT	MODERATE MANAGEMENT	INTENSIVE MANAGEMENT	MANAGEMENT of WILDERNESS	MANAGEMENT of WILD RIVERS
Transportation and Utility Systems Includes transmission lines, pipelines, telephone and electrical power lines, oil and gas pipelines, communication systems, roads, airstrips, and other necessary related facilities. Does not include facilities associated with on-refuge oil and gas development. (See section 2.12.7)	May be authorized; would require a plan amendment	May be authorized	May be authorized	Must be authorized by Congress	May be authorized
Navigation Aids and Other Facilities Includes air and water navigation aids and related facilities, communication sites and related facilities, facilities for national defense purposes and related air/water navigation aids, and facilities for weather, climate, and fisheries research and monitoring; includes both private and government facilities. (See section 2.12.11)	May be authorized	May be authorized	May be authorized	May be authorized*	May be authorized
Major Hydroelectric Power Development Hydroelectric dams creating a change in streamflow with an elevation change and reservoir behind the dam. (See section 2.16.7)	Not allowed	Not allowed	Not allowed	Not allowed	Not allowed
Small Hydroelectric Power Development Hydroelectric generation by low-head or instream structures that do not change the flow of the river. (See section 2.16.7)	Not Allowed	May be authorized	May be authorized	Not allowed	Not allowed

**All activities in Designated Wilderness will be subject to a minimum requirements analysis.*

Appendix K

Oral History of Off-Road Vehicle (ORV) Use Near the Kanuti National Wildlife Refuge

1. Part I

Interviews on traditional transportation methods on Kanuti National Wildlife Refuge
Merry Maxwell, Kanuti Refuge, April 2005.

Refuge Manager Mike Spindler, Deputy Refuge Manager Merry Maxwell and STEP student (biological technician) Curtis Knight traveled to Allakaket, Bettles, and Evansville to speak with elders and long-time residents of communities near Kanuti National Wildlife Refuge (Kanuti Refuge, refuge) about traditional transportation methods used on refuge lands prior to 1980. Former Kanuti Refuge Manager Tom Early was interviewed in Fairbanks by telephone. The following statements were recorded by Merry Maxwell:

April 28, 2005, Allakaket

> Pollack Simon, Sr. "…don't think they used 4-wheelers on the refuge. Three wheelers were used in the village before 4-wheelers. I don't have any memory of either being used on the refuge, only in town, too wet out there, never used 4-wheelers on the refuge."
>
> Moses Henzie and Marie Henzie "…no 4-wheelers used on the refuge, only in town, around here."
>
> David David and Kitty David, "…no 4-wheelers used on the refuge, only snowmachines."
>
> Johnson and Bertha Moses, "…3-wheelers and 4-wheelers used in town, not on the refuge."

April 28, 2005, Bettles

> Tom Holly, "…don't remember 3-wheelers or 4-wheelers being used except in town, on the roads."

April 28, 2005, Evansville

> Dugan Liners and Florence Nictune, "…three and 4-wheelers arrived in the community of Bettles in the late 80s. There was no road to Evansville then, and it was very expensive to bring stuff in. People didn't have stuff like they do now. People had stuff in Anuktuvuk Pass, but not here."

May 3, 2005, Fairbanks

> During a telephone interview, former (1988–2000), Kanuti Refuge Manager Tom Early stated that the 1988 narrative indicated *nothing to report* in the off-road vehicle section, and this generally indicates that no activity had occurred. Tom went on to say that as far as he knows, during Johnson Moses' years of service with Kanuti National Wildlife Refuge as biological technician and refuge information technician (1985–1993), Johnson reported no use of three-wheelers or four-wheelers on the refuge. Tom also recalls that he received no reports of three-wheelers or four-wheelers being used on the refuge and never saw any trails indicating they had *ever* been used on refuge lands. Tom recalls that snowmachine

and motor boat use were the common modes of transportation on Kanuti Refuge, and he believes that three- and four-wheeled vehicles were used exclusively in the villages and that use was confined to the road systems in those communities.

Discussion

Conversations recorded in the communities of Allakaket, Bettles, and Evansville support the report on traditional ORV use on Kanuti National Wildlife Refuge put together by Aaron Collins (draft document 2004, final 2006), with one exception. Collins makes reference to a 1982 Annual Narrative Report in which then Refuge Manager Ervin McIntosh reports: "…*off–road vehicling on Kanuti NWR is mostly directly associated with wildlife oriented activities. Snowmobiles, three wheelers, and dog sleds in winter, and outboard boats in summer are major ground transportation.*"

This statement appears for the first time in the 1981 Annual Narrative and continues to be inserted until 1987, which was the last report issued by Mr. McIntosh. The ORV statement inserted in 1981–1987 annual narratives coincides with Ervin McIntosh's management of Kanuti Refuge. In 1987, the Comprehensive Conservation Plan (Plan) for Kanuti Refuge was completed, and the document clearly states that in winter, snowmachines and dog teams are used for traveling between villages and to maintain traplines, and that three-wheeled vehicles are used in the *immediate* vicinity of communities (USFWS 1987a, p85). The Plan goes on to state (page 131) that no routes or areas for off-road vehicle use are proposed or designated in the Plan.

Conclusion

Ten local village interviewees, and the longest tenured refuge manager at Kanuti, Mr. Tom Early (1988–2001), stated that three-wheeler ORVs were not used for traditional subsistence activities within Kanuti Refuge, mainly because they were not capable of traversing the wet and boggy terrain outside the village in the absence of an improved trail. The 1987 Kanuti Refuge Plan stated that there were no designated or improved routes for these vehicles, and the refuge was closed to their use at that time. Another former refuge manager, Mr. Ervin McIntosh was probably referring to three- and four-wheeler use *within* villages near the refuge when he referred to them as "major ground transportation." He is the only person who *suggests* that use of off road vehicles occurred on Kanuti Refuge. At the time, his statement was first written in the 1981 Annual Narrative, Mr. McIntosh had just moved to Alaska from Florida, and it is likely that he generalized the "within village" use beyond that which really occurred. Without exception, all 10 long-time residents of Allakaket, Bettles, and Evansville who were interviewed said that three- and four-wheeled vehicle (ORV) use was confined to the communities of Allakaket, Alatna, Bettles, and Evansville—and did not occur on surrounding refuge lands. All 10 of these people lived in the communities during the time that three-wheelers were first introduced to rural Alaska.

2. Part II

Excerpts from *Traditional ORV use on lands managed by Kanuti National Wildlife Refuge* by Aaron Collins, 2004, 2006.

…During interviews in 1979, which were compiled into a book, Moses Henzie of Allakaket recalled the first snow machine was brought to the village in 1960 or 1961 (Henzie 1979). Mr. Henzie also recalled the first motorboat used in the villages, but did not mention the use of ATVs. Pictures in the book show canoes, sleds, snowshoes, and snowmachines, but no ATVs or other ORVs.

Frank Tobuk recalled the first snowmachine in Bettles, and also discussed snowshoeing, dog-sledding and the use of snowmachines and various powered and non-powered boats along the Koyukuk River during interviews conducted in 1978 (Tobuk 1980). Pictures in this book depict motorboats, snowmachines, snowshoes, sleds, airplanes, and show a jeep parked in front of the Bettles Lodge in 1978. There is no mention of ATVs or other ORVs.

In 1981 residents of Bettles, Evansville, Alatna, Allakaket, and Hughes who participated in a subsistence use survey reported using "whatever means of travel was practical for conditions during the particular season. Snowmachine travel was possible from November through April and boat travel possible on the rivers from May through October. Airplanes were used year-round (Marcotte and Haynes 1985)." People interviewed reported using each of these modes of transportation for fishing, hunting, wood cutting, berry picking and trapping. The survey questionnaire asked how many three-wheelers or other ATVs people owned, neither of which are mentioned as being used. Residents of Huslia who responded to a similar survey reported using snow machines and motorboats, but did not indicate they used airplanes or three-wheelers for subsistence purposes (Marcotte 1986)…

…In the 1983 Alaska Geographic titled "Up the Koyukuk" various forms of transportation are discussed including airplanes, helicopters, motorboats, snowmobiles, tracked vehicles, trucks, and jeeps. Pictures and narratives of the first caterpillar tractor and truck in Wiseman are included. There is no mention of ATVs, and no pictures show ATVs…

Appendix L

Landcover Classes

Table –L-1: Landcover Classification for the Kanuti National Wildlife Refuge

Classifications used for mapping landcover in Alaska including the Kanuti National Wildlife Refuge (modified from BLM et al. 2002).

FOREST

Needleleaf and Deciduous Trees–The needleleaf species generally found were white spruce (*Picea glauca*) and black spruce (*P. mariana*). White spruce tended to occur on warmer sites with better drainage, while black spruce dominated poorly drained sites. The needleleaf classes included both white and black spruce. The deciduous tree species generally found were paper birch (*Betula papyrifera*), aspen (*Populus tremuloides*) and cottonwood (*P. balsamifera and P. trichocarpa*). Black cottonwoods (*P. trichocarpa*) were generally found only in river valleys and on alluvial flats. Under some conditions, willow (*Salix* spp.) and alder (*Alnus rubra*) formed a significant part of the tree canopy. Deciduous stands were found in major river valleys, on alluvial flats, surrounding lakes, or most commonly, on the steep slopes of small hills. Mixed deciduous-coniferous stands were present in the same areas as pure deciduous stands. While needleleaf stands were extremely extensive, deciduous and mixed deciduous-coniferous stands were generally limited in size. The only exception to this rule was near major rivers, where relatively extensive stands of pure deciduous trees occur on floodplains and in ancient oxbows.

Classification	Description
Closed Needleleaf	At least 60% of the cover was trees, and ≥75% of the trees were needleleaf trees. Closed needleleaf sites were rare because even where stem densities were high, the crown closure remained low. Generally, closed needleleaf sites were found only along major rivers.
Open Needleleaf	From 25–59% of the cover was trees, and ≥75% of the trees were needleleaf. This class was very common throughout the interior of Alaska. A wide variety of understory plant groups were present, including low and tall shrubs, forbs, grasses, sedges, horsetails, mosses and lichens.
Open Needleleaf Lichen	From 25–59% of the cover was trees, ≥75% of the trees were needleleaf, and ≥ 20% of the understory was lichen.
Woodland Needleleaf	From 10–24% of the cover was trees, and ≥75% of the trees were needleleaf. Woodland understory was extremely varied and included most of the shrub, herbaceous, or graminoid types present in the study area.
Woodland Needleleaf Lichen	From 10–24% of the cover was trees, ≥75% of the trees were needleleaf, and ≥ 20% of the understory was lichen. The lichen often occurred in small round patches between trees. Within the study area, this class was generally found along ridge tops or on riparian benches.
Woodland Needleleaf Moss	From 10–24% of the cover was trees, ≥75% of the trees were needleleaf, and ≥ 20% of the understory was moss.
Closed Deciduous	At least 60% of the cover was trees, and ≥75% of the trees were deciduous. Occurred in stands of limited size, generally on the floodplains of major rivers, but occasionally on hillsides, riparian gravel bars, or bordering small lakes. This class included paper birch, aspen, or cottonwood.
Open Deciduous	From 25–59% of the cover was trees, and ≥75% of the trees were deciduous. There was generally a needleleaf component to this class though it was less than 25%. This was a relatively uncommon class.
Closed Mixed Needleleaf/Deciduous	At least 60% of the cover was trees, but neither needleleaf nor deciduous trees made up ≥75% of the tree cover. This class was uncommon and found mainly along the meanders of major rivers.
Open Mixed Needleleaf/Deciduous	From 25–59% of the cover was trees, but neither needleleaf nor deciduous trees made up ≥75% of the tree cover. This class occurred in regenerating burns, on hill slopes, or bordering lakes.

SHRUB

The tall and low shrub classes were dominated by willow (*Salix* spp.), alder (*Alnus* spp.), dwarf birch (*Betula nana* and *Betula glandulosa*) and *Vaccinium* species. However, the proportions of willow to birch and the relative heights of the shrub species varied widely, which created difficulties in determining whether a site was made up of tall or low shrub. As a result, the height of the shrub species making up the largest proportion of the site dictated whether the site was called a low or tall shrub. The shrub heights were averaged within a genus, as in the case of a site with both tall and low willow shrubs. Dwarf shrub was usually composed of dwarf ericaceous shrubs and *Dryas* species but often included a variety of forbs and graminoids. The species composition of this class varied widely from site to site. It is nearly always found on hilltops or mountain plateaus, and may have included some rock. Bureau of Land Management (BLM) biologists indicate that the dwarf shrub class is likely to contain rare plant species, although the presence of these rare species is probably not indicated in the field site database due to the helicopter sampling methods used for this project.

Classification	Description
Tall Shrub	Shrubs made up 40–100% of the cover and shrub height was $\geq$1.3 meters. This class generally had a major willow component that was mixed with dwarf birch and/or alder, but could also have been dominated by nearly pure stands of alder. It was found most often in wet drainages, at the head of streams, or on slopes.
Willow/Alder Low Shrub	Shrubs made up 40–100% of the cover, shrub height was 0.25–1.3 meters, and $\geq$75% of the shrub cover was willow and/or alder.
Other Low Shrub/Tussock Tundra	Shrubs made up 40–100% of the cover, shrub height was 0.25–1.3 meters, and $\geq$35% of the cover was made up of tussock-forming cotton grass *(Eriophorum vaginatum*). This class was found in extensive patches in flat, poorly drained areas. It was generally made up of cotton grass, ericaceous shrubs, willow and/or alder shrubs, other graminoids, and an occasional black spruce.
Other Low Shrub/Lichen	Shrubs made up 40–100% of the cover, shrub height was 0.25–1.3 meters, and $\geq$20% of the cover was made up of lichen. This class was found at mid-high elevations. The shrub species in this class were nearly always dwarf birch.
(Other) Low Shrub	Shrubs made up 40–100% of the cover, shrub height was 0.25–1.3 meters. This was the most common low shrub class. It was generally composed of dwarf birch, willow species, *Vaccinium* species, and *Ledum* species.
Dwarf Shrub/Lichen	Shrubs made up 40–100% of the cover, shrub height was $\leq$ 0.25 meters, and $\geq$20% of the cover was made up of lichen. This class was generally made up of dwarf ericaceous shrubs and *Dryas* species but often included a variety of forbs and graminoids. It was nearly always found at higher elevations on hilltops, mountain slopes and plateaus.
(Other) Dwarf Shrub	Shrubs made up 40–100% of the cover, the shrub height is $\leq$0.25 meters. This class was generally made up of dwarf ericaceous shrubs and *Dryas* species but often included a variety of forbs and graminoids, and some rock. It was nearly always found at higher elevations on hilltops, mountain slopes, and plateaus.

HERBACEOUS

The classes in this category included bryoids, forbs, and graminoids. Bryoids and forbs were present as a component of most of the other classes but rarely appeared in pure stands. Graminoids such as *Carex* spp., *Eriophorum* spp., or bluejoint grass (*Calamagrostis canadensis*) may have dominated a community.

Classification	Description
Lichen	Composed of $\geq$40% herbaceous species, $\leq$ 25% water, and $\geq$60% lichen or moss species, with lichen being the majority of the moss/lichen component.
Moss	Composed of $\geq$40% herbaceous species, $\leq$25% water, and $\geq$60% lichen or moss species, with moss being the majority of the moss/lichen component.

Wet Graminoid	Composed of ≥40% herbaceous species, 5% to 25% water, and where ≥ 60% of the herbaceous cover was graminoid, or ≥20% of the graminoid cover was made up of *Carex aquatilis*. This class represented wet or seasonally flooded sites. It was common throughout the lowlands in the study area, especially surrounding small lakes and ponds, but it was often present in stands too small to be mapped at the current scale.
Tussock Tundra	Composed of ≥40% herbaceous species, ≤25% water, where ≥50% of the herbaceous cover was graminoid, and ≥35% of the graminoid cover was made up of tussock-forming cotton grass. Tussock tundra often included ericaceous shrubs, willow and/or alder shrubs, forbs, bryoids, and other graminoids, and was usually found at lower elevations in flat, poorly drained areas.
Tussock Tundra - Lichen	Composed of ≥40% herbaceous species, ≤25% water, where ≥50% of the herbaceous cover was graminoid, and ≥20% of the cover was lichen, and ≥35% of the graminoid cover was made up of tussock forming cotton grass. Tussock tundra often included ericaceous shrubs, willow and/or alder shrubs, forbs and other graminoids, and was usually found at lower elevations in flat, poorly drained areas. This class included a major component of lichen.
Mesic/Dry Graminoid	Composed of ≥40% herbaceous species, ≤5% water, with ≥50% graminoids excluding tussock-forming cotton grass and *Carex aquatilis*. This class was not common and was found generally only at high elevations.
Mesic/Dry Forb	Composed of ≥40% herbaceous species, ≤5% water, with <50% graminiods. Regenerating burn areas dominated by fireweed *(Chamerion angustifolium)* fell into the mesic/dry forb category. However, forb communities without significant graminoid or shrub components were generally rare in the interior of Alaska.
AQUATIC VEGETATION	
The aquatic vegetation was divided into aquatic bed and emergent classes. The aquatic bed class was dominated by plants with leaves that float on the water surface, generally pond lilies (*Nuphar polysepalum*). The emergent vegetation class was composed of species that were partially submerged in the water, and included freshwater herbs such as horsetails (*Equisetum* spp.), marestail (*Hippuris* spp.), and buckbean (*Menyanthes trifoliata*).	
Classification	**Description**
Aquatic Bed	Aquatic vegetation made up ≥20% of the cover, and ≥20% of the vegetation was composed of plants with floating leaves. This class was generally dominated by pond lilies.
Emergent Vegetation	Aquatic vegetation made up ≥20% of the cover, and ≥20% of the vegetation was composed of plants other than pond lilies. Generally included freshwater herbs such as Horsetails, Marestail, or Buckbean.
WATER	
Classification	**Description**
Clear Water	Composed of ≥80% clear water.
Turbid Water	Composed of ≥80% turbid water.
BARREN	
This class included sparsely vegetated sites, e.g., abandoned gravel pits or riparian gravel bars, along with non-vegetated sites, e.g., barren mountaintops or glacial till.	
Classification	**Description**
Sparse vegetation	At least 50% of the area was barren, but vegetation made up >20% of the cover. This class was often found on riparian gravel bars, on rocky or very steep slopes, and in abandoned gravel pits. The plant species were generally herbs, graminoids and bryoids.

Rock/Gravel	At least 50% of the area was barren, ≥50% of the cover was composed of rock and/or gravel, and vegetation made up less than 20% of the cover. This class was most often made up of mountaintops or glaciers.
Non-vegetated Soil	At least 50% of the area was barren, ≥50% of the cover was composed of mud, silt or sand, and vegetation made up less than 20% of the cover. This type was generally along shorelines or rivers.
CLOUD/SHADOW At least 50% of the cover was cloud or shadow.	
Classification	**Description**
Cloud	At least 50% of the cover was made up of clouds.
Cloud Shadow	At least 50% of the cover was made up of clouds' shadows.
Terrain Shadow	At least 50% of the cover was made up of terrain shadows.
OTHER Sites that did not fall into any other category were assigned to Other. For example, sites containing 25–80% water, <25% shrub and <20% aquatic vegetation were classed as Other. Sites classed as Other may have also included extensive areas of vegetative litter, such as downed wood.	
Classification	**Description**
Snow/Ice	Ground surface and vegetation obscured by snow or ice.
Smoke	Ground surface and vegetation obscured by smoke.
Fire Scar	Areas where the signs of fire within recent history are visible. This classification is subdivided into the various vegetation classes described previously.

Appendix M

Fire Management Activities

Preparedness

Preparedness is the result of activities that are planned and implemented prior to wildland fire ignitions to ensure capabilities to provide safe, cost-effective fire management programs in support of land and resource management plans through appropriate planning, staffing, training, equipment, and management oversight.

Wildland Fire Suppression

Fire suppression activity is the work of confining, constraining, controlling, or monitoring a fire or portion of a fire to protect, prevent, or reduce the loss of identified values. Suppression takes place with the highest priority being the safety of firefighters and the public, using the appropriate management response based on values to be protected. The Alaska Interagency Wildland Fire Management Plan (AIWFMP), amended October 1988, is one of the guiding documents for suppression actions. The interagency plan establishes four management (suppression) options: critical, full, modified, and limited, which direct a range of wildland fire management responses. The Kanuti Fire Management Plan (FMP) provides specific details on fire management and is the primary document guiding suppression actions on the refuge. Refuge lands have been classified by fire management options for limited, modified, full, or critical suppression. While the majority of refuge lands have been designated as limited or modified, a few areas have been designated as full or critical protection areas (Figure M-1). These areas can also be viewed through the Alaska Fire Service Website (http://fire.ak.blm.gov/) under the Maps and Imaging section. The refuge reviews these classifications periodically and modifies them as appropriate.

The Bureau of Land Management, Alaska Fire Service (BLM/AFS) provides fire suppression services on refuge lands in Alaska. Services provided by BLM are guided by the refuge FMP, refuge manager, and the Memorandum of Agreement (MOA) between the BLM and the Service.

Wildland Fire Use

Wildland fire use is authorized under the approved Comprehensive Conservation Plan (Plan). Fire use is an appropriate management response to naturally ignited wildland fires that may be used to protect, maintain, or enhance natural and cultural resources, and as nearly as possible, be allowed to function in their natural ecological role. Operational management is described in the Wildland Fire Implementation Plan (WFIP).

The Wildland Fire Implementation Plan (WFIP) is a three-stage, progressively developed assessment and operational management plan that documents the analysis and selection of strategies and describes the appropriate management response for a wildland fire being managed for multiple objectives.

Prescribed Fire

Prescribed fires are ignited by management actions to meet specific wildland fuel, vegetation, or habitat management objectives. Prior to ignition, a written, approved plan outlining prescription conditions is required. The prescribed fire plan is the site-specific implementation document. It is a legal document that provides the agency administrator the information needed to approve the plan, and the prescribed fire burn boss with all the information needed to implement the prescribed fire. Prescribed fire projects must be implemented in compliance with the written

plan. The size and complexity of the prescribed fire project will determine the level of detail required. The prescribed fire plan template, found in the Interagency Prescribed Fire Planning and Implementation Guide, must be used.

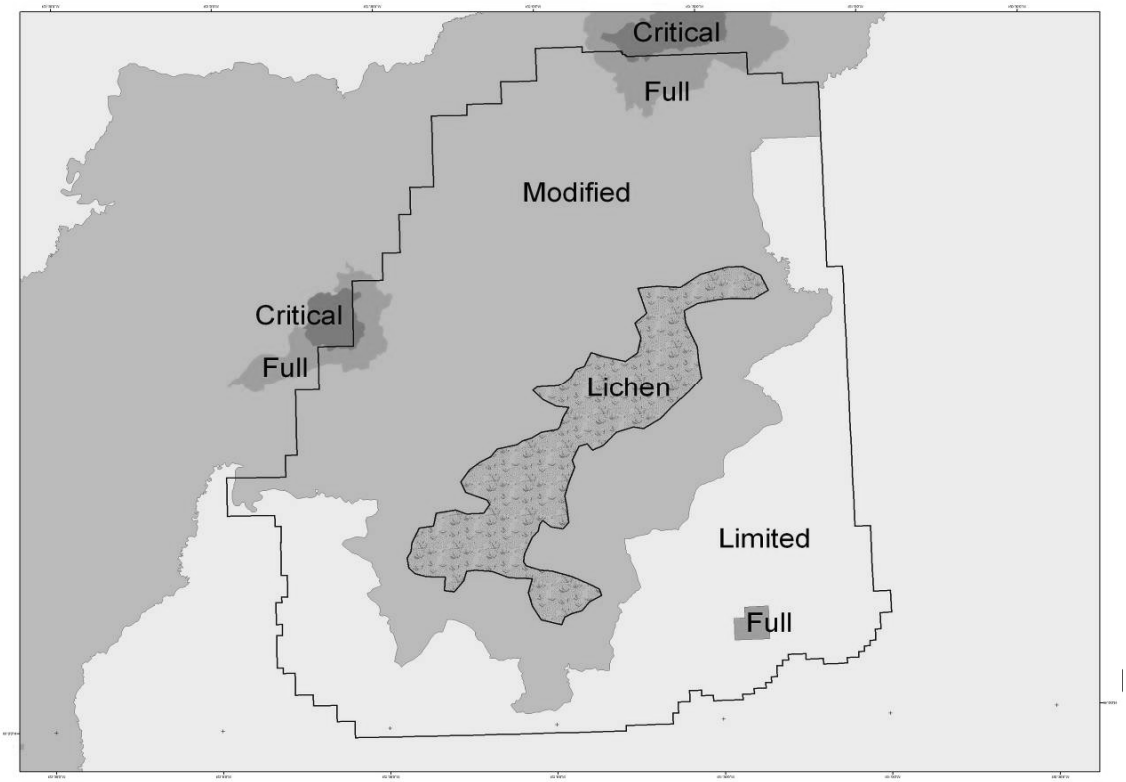

Figure M-1: Fire Management Options: Limited, Modified, Full, and Critical protection zones, on Kanuti Refuge and surrounding areas.

Outreach, Education, and Prevention

The primary focus of outreach is to promote an awareness of the Service as an agency experienced in applying cost-effective, science-based management to fire to restore and maintain healthy vegetation communities, while serving the interests of both people and wildlife. This will be achieved through the implementation of outreach projects using five basic communication strategies: 1) highlighting Service core values; 2) leveraging existing resources; 3) providing national coordination; 4) building effective relationships with stakeholders; and 5) monitoring plan effectiveness.

Education and fire prevention activities are designed to reduce the number of undesirable human caused ignitions, thus reducing damages and losses caused by unwanted wildland fires and reducing the suppression costs of wildland fires. Prevention programs can reduce damages and suppression costs during periods of average weather, fuels, and human activity.

Education activities include the use of signs, posters, school programs, radio, news releases, business contacts, exhibits, public meetings, and other avenues to provide information to the public about wildland fire and management of fire.

Inventory and Monitoring

The inventory and monitoring of fire management elements are integral to all fire management activities. In addition, through cooperation among Service programs and with the help of other natural resource managers, Service fire managers rely on fire-effects inventory and monitoring to help conduct ongoing assessment and improvement of firefighting and fuels treatment effectiveness.

The inventory and monitoring of plant growth before and after fire occurrences, or mechanical or chemical fuels treatments, is necessary to assess the responses of vegetation, including specific invasive species and threatened and endangered plants. Using the information obtained, fire management activities can be modified to meet desired land management objectives. The Service is expanding the practice of inventory and monitoring within its fire management program.

Emergency Stabilization and Rehabilitation

Emergency stabilization only includes emergency activities and treatments that can be carried out within one year of wildfire containment. These activities are undertaken to protect resources from further impacts of a wildland fire. Rehabilitation includes non-emergency activities and treatments that are compatible with approved unit management plans and can be accomplished within three years of wildfire containment. Rehabilitation activities may include trail clearing, seeding, erosion control, or other treatments that aid in the restoration of habitat.

Fuels Management

The focus of fuels management is the coordination and collaboration of community risk assessments, rural fire assistance (RFA) programs, fuels treatment projects, and prescribed burning activities statewide. Fuels management involves working with local communities and refuges to identify hazard fuels, assess the risks of wildland fires, and determine mitigation actions to reduce those risks. The goals are to create a buffer with reduced hazardous fuels around wildland-urban interface zones and to reduce heavy fuel accumulations on refuge lands. Reducing fuels creates areas where fires will be less intense, which allows firefighters a greater opportunity to protect homes, businesses, communities, and other values at risk.

Through the RFA program, funds may be provided to local fire departments to acquire training and/or equipment, and to conduct prevention activities.

Smoke

The goal of smoke management is to minimize the adverse effects of smoke on human health and welfare while maximizing the effectiveness of using wildland fire. Interagency regional smoke management guidelines and plans have been developed to address individual and collective smoke management objectives. The production, transport, and effects of smoke are considered in wildland fire, wildland fire use, and prescribed fire situations. Review of these parameters enables the fire program staff to refine existing smoke management strategies and to develop better smoke management strategies and programs. Prescribed fires must comply with the Alaska Enhanced Smoke Management Plan for Prescribed Fire (currently in draft) and the prescription parameters found within the prescribed fire plan. These plans provide guidance and direction concerning smoke issues related to prescribed fire.

Fire Trespass

Wildland fire trespass refers to the occurrence of unwanted and unplanned wildland fire on refuge lands where the source of ignition is tied to some human activity. Fire trespass is an illegal activity, and the appropriate Service or local law enforcement authorities should be contacted.

Research

The focus is to identify and prioritize fire research needs for the refuge system in Alaska and to facilitate the development and exchange of fire related information and applications to meet the needs. Another aspect is to develop cooperative relationship with research and seek funding to accomplish research projects.

Appendix N

Response to Comments

1. Kanuti National Wildlife Refuge Comment Summary

The Draft Revised Comprehensive Conservation Plan (Plan) and Environmental Assessment for Kanuti National Wildlife Refuge (Kanuti Refuge, refuge) was released for public review on May 15, 2007, with comments due July 15, 2007. Because of the busy Alaska summer season, the comment period was extended until September 15, 2007. Public meetings were held in Allakaket, Fairbanks, Bettles, Coldfoot, and Evansville. Refuge staff also conducted household visits in Alatna, Allakaket, Bettles, Evansville, and Wiseman. In Fairbanks, presentations were made at the Noel Wien Public Library, to the Sunrisers Rotary Club, Kiwanis Club, Chamber of Commerce Natural Resources Committee, and the full Chamber of Commerce. Over 200 people attended these meetings. Written comments were received from 44 individuals, the Allakaket Tribal Council, the State of Alaska, and eight organizations: Interior Alaska Gun Dog Association, Arctic Audubon, Friends of Alaska National Wildlife Refuges, Wilderness Watch, Northern Alaska Environmental Center, The Wilderness Society, Alaska Miners Association, and the Alaska Chapter of the Sierra Club. At least two-thirds of the comments were from Alaska.

Comments are summarized in the following table with responses as appropriate. Copies of the original comment letters and emails are available at the refuge headquarters and the Alaska Regional Office.

Comment	Response
VISION	
Many comments supported the refuge vision statement through specific comments to that effect or through comments such as "keep it wild." However, a number of people pointed out that the preferred alternative did not seem to match the vision. Typical comments supporting the vision, "The Kanuti–wild and untamed! That's what I expect of a 'refuge.'" "Please do everything that can be done to protect Kanuti and keep it wild." "I cannot stress enough the value that I believe this refuge has for us and for our children and grandchildren. As we are witnessing the decline of so many wildlife habitats and are contemplating the disastrous effects we may all face soon due to extinction of many species, I would like to request that you enact as stringent protections on this refuge as you possibly can." Comments pointing out apparent inconsistencies or recommending changes included: "The plan should specify that the area will be maintained in its natural, wild condition. The vision statement should include wildness, that is, maintaining not only natural diversity, but the freedom of the area's timeless ecological and evolutionary processes. It should specify that a primary goal is to ensure that future generations have the opportunity to experience this area in the natural condition it is in today."	The refuge's vision statement has been modified but retains the essential philosophy that the refuge will remain wild and natural. The general purposes of ANILCA [Section 101] states that all conservation units were established "(a) In order to *preserve (italics added)* for the future benefit, use, education, and inspiration of future generations…" One of Kanuti Refuge's ANILCA establishment purposes [Section 302 (4)(B)(1)] is "to *conserve (italics added)* fish and wildlife populations and habitats in their natural diversity." Our vision and the goals and objectives in the CCP stem from a blending of the general and specific purposes of ANILCA. We revised the Preferred Alternative in response to comments received from the public. These revisions (see response to comments about Recommended Changes to Alternative C below) result in a net increase in the acreage in minimal management of 14,432 acres. With more than 85% of the refuge designated as minimal management, the CCP

Comment	Response
"Your preferred Alternative C provides, in 15 percent of the Kanuti Refuge, for ATV use, all-weather roads, constructed and maintained airstrips, campgrounds, administrative bunkhouses, sale of sand and gravel, commercial gathering of other resources, and small hydroelectric. None of these are compatible with a Refuge or with Kanuti's overriding management goal (Kanuti National Wildlife Refuge will be managed for its natural unaltered character, biological integrity, and scientific values, as driven by biological and physical processes throughout time), and none of them should be allowed." "We [State of Alaska] also recommend the CCP better explain the rationale for the current management intent. For example, page 2-4 (of the draft) does not recognize either the apparent desire to maintain (or slow the decline of) caribou habitat to retain hunting opportunities, or the intentional effort to offset the impacts of climate change."	directs managers to provide stewardship in keeping with the refuge's wild and natural character, yet, where sustainable, allow compatible subsistence and recreational public uses. The State of Alaska recommended a better explanation of our fire management plan. We have revised the section on fire management direction (now 2.4.4) to clarify the intent of our fire management plan. See additional comments below.
Planning Context (1.2 page 1-4 of the draft) The draft fails to present the over-arching purposes of the Alaska National Interest Lands Conservation Act (ANILCA) which according to (Section 101) are to: "preserve unrivaled scenic and geological values associated with natural landscapes . . . Maintenance of sound populations of wildlife . . . Dependent on vast relatively undeveloped areas; to preserve in their natural state extensive unaltered arctic tundra, boreal forest and coastal rainforest ecosystems . . . To preserve wilderness resource values and related recreational opportunities . . . Within large arctic and subarctic wildlands and on freeflowing rivers and to maintain opportunities for scientific research and undisturbed ecosystems." It was in this context that Kanuti National Wildlife Refuge was created and within which it must be administered, and around which the revised plan should developed. We believe this historic context is vital for a successful plan and urge that the final plan include ANILCA purposes.	The vision statement in the plan has been clarified but retains the concept that Kanuti Refuge will be kept wild and natural. As specified in the general purposes in ANILCA [Section 101, *italics added*] all conservation system units were established "(a) In order to *preserve* for the future benefit, use education, and inspiration of future generations…" One of Kanuti Refuge's ANILCA establishing purposes [Section 302 (4) (B) (1)] is "to *conserve* fish and wildlife populations and habitats in their natural diversity." Our vision, goals and objectives in the plan stem from a blending of the general and specific purposes of ANILCA. With more than 86 percent of the refuge classified as minimal management, the refuge's character will remain wild and natural yet allow compatible subsistence and recreational public uses.
GOALS AND OBJECTIVES	
There were a few comments on the goals. Most comments expressed support such as, "The USF&W staff has worked hard to come up with an intelligent and thoughtful plan. Their goals and objectives make good sense and stress good stewardship of the land."	See previous comments regarding general and ANILCA-specific purposes of conservation units in Alaska. Federal law, U.S. Fish & Wildlife Service regulations and policies, and the goals and objectives in the plan direct

Comment	Response
Others provided suggestions to change the goals. "Where did the word 'protect' this place get lost in your goals? Why did [you use] the word 'conserve?'" "Goal 3 and 4 should be amended to specify that priority must be given to keeping the area in wilderness condition." One person said that the goals and objectives "do not provide enough for the general public."	managers to monitor, preserve and conserve refuge resources.
"The goal/objective regarding diversity should include language that concerns moose genetic diversity. ADF&G calls for 4 brow tines——this is just one strong phenotype. Results in one bull mating with lots of cows, the remainder of cows getting to breed with 2-3 year old bulls. Results in lightweight calves subjected to more and longer lasting predation. Same thing happened with the Mulchatna caribou herd. Brow tines are probably recessive, but moose population will degrade, resulting in higher mortality rate, particularly during snowy years. Especially since Bettles has a high rate of non-local hunters, would like the plan to address."	This State regulation restricts hunting of moose by non-resident hunters in Game Management Units 24A and 24B to bulls that have at least 50-inch antlers or four or more brow tines on one side. A November 2007 moose survey on Kanuti Refuge estimated a ratio of 60 bulls to 100 cows, and the ratio of large bulls (greater than or equal to 50" antlers) was 29 large bulls to 100 cows. Data on antler configuration are not available. The State of Alaska's Koyukuk River Moose Management Plan (2001) recommends that a ratio of 30–40 bulls to 100 cows be maintained for adequate breeding in low density areas. The current bull-cow ratio on the refuge exceeds this, and the large bull ratio is only slightly lower than the recommendation for total bulls. The number of non-resident hunters on the refuge is very low. If, during hunting season, moose are distributed similarly to during the November survey, most moose are inaccessible. While it is possible for selective harvests to negatively affect moose genetics, this does not currently appear to be a problem on the refuge. The effects of this regulation in other areas are beyond the scope of this plan. Service policy (601 FW 3) includes genetics in its definitions of biological diversity and integrity. Since we follow Service policy we did not find it necessary to specifically mention genetics in refuge goals. We currently lack sufficient information about species found on the refuge, including their genetics. While we would consider cooperating with researchers who want to conduct genetic projects on the refuge, exploring the genetic diversity of any species has not been identified as a high

Comment	Response
	priority project. Therefore, we do not believe it appropriate to add new objectives related to genetic diversity at this time, but will continue to focus on our existing objectives to determine species diversity on the refuge.
The Northern Alaska Environmental Center commented, "The FWS fails to include in its goals and objectives for this plan one of the four specific purposes of the Kanuti Refuge under ANILCA: protection of international treaty obligations. We urge you to give far more attention to this topic in this era of declining migratory bird populations, pressure on Yukon River salmon populations and other internationally shared salmon species, as well as other wildlife protected under treaties."	Although international treaties may not be specifically mentioned in the plan goals and objectives, several objectives specifically direct refuge staff to perform migratory bird and fisheries inventory and monitoring activities.
Support for the environmental education goal was expressed in several comments. One said, "Education of the public, as well as locals, will inspire respect for the land, and for those who depend on sustainability of wildlife populations. Summer science camps for local youth should include local elders. The summer science camp at Henshaw Creek is a good example of the success of a partnership with Tanana Chiefs Council and the USFWS. When students learn and participate in the biology, ecology and aesthetics of their own place, they become part of a movement to protect its unique diversity. This camp should continue to be funded and we encourage expanding this camp to more students of different ages."	Objectives and staffing levels recommended in the Plan demonstrate the Service's commitment to Environmental Education. Refuge staff will make every effort to continue supporting the Henshaw Creek Science Camp. Support is, however, dependent upon funding.
The Friends of Alaska National Wildlife Refuges commented, "Providing Informational Visitor Centers and Nature trails is another way to introduce locals and visitors to this public land. The Interagency Visitor Center in Coldfoot is a perfect destination for travelers on the Dalton Highway. Local wildlife, wild lands and the issues that come from natural and man-made changes can be thoughtfully considered. Archeological and cultural resources should be presented and traditional place names should be integrated into all interpretive sites. In Bettles there is a small visitor cabin with a ranger from the NPS available for part of the time. Bettles is somewhat of a hub of activity with people from all over the world landing at the airport and taking off from a small float plane lake a few miles out of town for hiking, hunting and scenic tours. Surrounding that lake is wetland with waterfowl and higher land with passerines and views of Kanuti NWR and Gates of the Arctic NP. It is a perfect place for a kiosk and trail allowing those in-transit to learn about the regulations, native plants, birds, wildlife and natural processes that can be found here. It could also add to safety and accessibility of the perimeter of the lake in events such as the airplane crash that occurred there in 2006."	These activities are allowed under all alternatives and are being pursued actively by refuge staff. Refuge staff, in partnership with local residents, recently completed a traditional place names map. We intend to incorporate Native names into outreach materials and displays wherever possible. The refuge is also working with the Alaska Department of Transportation to obtain permission to construct a kiosk and trail around VOR Lake (the float plane lake) in Bettles.
WILDERNESS & WILD & SCENIC RIVER REVIEWS	
Additional explanation for the not considering wilderness and wild and scenic river	After a thorough review of ANILCA Section 304(g) planning

Comment	Response
recommendations was requested. One commenter stated, "The draft does not reveal what the State of Alaska's concerns were that caused the Service to eliminate detailed consideration and alternatives for recommendations of rivers and lands for inclusion in the National Wild and Scenic Rivers Systems and National Wilderness Preservation System. The public deserves to know what these concerns were and how the Service arrived at a decision to eliminate such items of high public interest. The Kanuti Refuge is a National asset belonging to all Americans, not the State of Alaska." The State of Alaska said, "We also request the wilderness discussion explain that even though the refuge has some important wilderness values, the 1987 wilderness review process concluded that the Kanuti Refuge should not be recommended for wilderness designation because the refuge did not meet all criteria (e.g., lack of 'outstanding resources values')."	requirements and the Refuge System planning policy, the Service determined that, until our Wilderness review policy is complete, we can best meet the ANILCA requirements by identifying the special values of the refuge and providing clearer direction for how the refuge will be administered to protect these values without conducting a Wilderness review. See section 2.4 of the draft plan. After a thorough review of ANILCA Section 304(g) planning requirements and Refuge System planning policy, we determined that we would best meet ANILCA requirements by identifying the special values of the refuge without conducting a Wild and Scenic Rivers review. Section 2.3.1 of the plan provides the Service's rationale for not conducting Wild and Scenic River reviews.
Several organizations and individuals stated that the Service should have conducted wilderness and wild and scenic river reviews. Several comments asked the Service to recommend most or all of the Refuge for Wilderness designation. Specific comments follow. "In 1987 the Service had considered an alternative in the original CCP to designate 99.4% of Kanuti as federal Wilderness per section 1317 of ANILCA. Given the remote nature and undeveloped character of the refuge . . . I am disappointed that the Service did not allow a public process for 'detailed consideration' of any part of Kanuti for Wilderness designation in a current CCP alternative or any of the rivers in the refuge for Wild and Scenic River designation." "No recommendations for wilderness designation were made in the first CCP for Kanuti, and this draft revision fails to do so as well. While we [the Northern Alaska Environmental Center] are pleased the FWS has described the wilderness values for the refuge, we urge the agency to meet the wilderness review requirements of Section 1317 of ANILCA. Furthermore, we are disappointed to see the FWS describe the wilderness qualities within the refuge as many smaller 'units' because the great vision of ANILCA is the value of protecting wilderness on the landscape scale and we care about the ecosystem-side big wilderness values from rivers to wetlands, to hills and mountains. This is what is most unique about Alaskan wilderness." Similar comments were provided by other conservation organizations.	See above.

Comment	Response
One stated, "The Service's Refuge Planning Policy (65 Federal Register 33892, May 25, 2000), which 'applies to all units of the National Wildlife Refuge System' (i.e., it applies to refuges in Alaska) (602 FW 1.2), also requires that a new wilderness review be conducted as one of the required elements of all CCPs." "Additionally, 'Fulfilling the Promise: The National Wildlife Refuge System,' the Service's vision document, released in March 1999, guides administration of the Refuge System. That document directs in part that: the Service should evaluate lands added to the System since the Service completed its wilderness reviews and recommend suitable areas for designation. In addition, the Service should take a fresh look at areas previously studied for suitability as wilderness that were not recommended." "We believe the Service's decision not to review or recommend lands for wilderness [and wild and scenic river] recommendations is lacking and out of compliance with federal laws and agency regulations. We strongly urge the Service to complete wilderness reviews and recommendations in this comprehensive conservation planning process." "[T]here is no basis in law or U.S. Fish and Wildlife Service policy for allowing the State to, in effect, veto key congressionally-mandated refuge planning procedures [Wilderness and Wild and Scenic Rivers]."	
STAFFING	
There were a number of comments about staffing and funding. One person asked why we change managers so often. Of those commenting, all supported additional staffing and funding or identified that they would be necessary to implement the plan. Several people recommended specific positions that should be added to the refuge staff including a Refuge Management Technician in Allakaket, an additional pilot, more professional full-time staff such as Park Rangers and Biologists in rural communities, in addition to summer temporary positions and more youth education programs in the communities.	Additional staffing needs are identified in the plan (see section 2.4.11).
ALTERNATIVE A	
Two comments specifically opposed Alternative A. One group listed Alternative A as their second choice, after Alternative C. One comment said, "we strongly oppose Alternative A, No Action due to its larger amount of Moderate Management so that it does not adequately meet the ANILCA goals and purposes of the refuge."	All management categories were developed and are applied within the refuge consistent with the purposes of the refuge and ANILCA. See also the responses to Recommended Changes to Alternative C.
ALTERNATIVE B	
Of those commenting on a particular alternative, the greatest number (20 commenters) supported Alternative B. Representative comments appear in the following text. Arctic Audubon, Wilderness Watch, Northern Alaska Environmental	The public did express considerable support for both alternatives B and C. After evaluating the comments, Alternative C was revised to incorporate many

Comment	Response
Center, the Wilderness Society, and the Alaska Chapter of the Sierra Club all supported Alternative B. "Use Alternative B (minimal) or better yet, designate it Wilderness." "Alternative B is my personal choice for the simple reason that it is the alternative that best protects the wild character of the area and allows for natural processes to continue unhindered through the refuge. Alternative B also does not include those nefarious Moderate Management zones which would potentially permit so much development in the Refuge." "[We urge] the FWS to select Alternative B, which will best support protection of natural diversity at the 'refuge-size' scale, and to strengthen some of its management features to conserve fish, wildlife, and their habitats and meet the subsistence cultural purposes of the refuge." "I support Alternative B (focus on Minimal Management) because I think that maintaining natural processes (such as fire and flooding) and protection of habitat and water resources from human-caused degradation should be the main focus of wildlife refuges in Alaska. I am disappointed to see that even Alternative B could include sand and gravel extraction, all season roads, and construction of transmission lines or pipelines . . .The State of Alaska, Bureau of Land Management, and Alaska Native corporations have substantial ownership of lands surrounding Kanuti that should be adequate to supply infrastructure needs or access routes for extractive development or community expansion. The CCP does not have the ability to manage activities on non-federal lands directly, but it can protect refuge lands against development contrary to refuge purposes and minimize external impacts on refuges resources or values."	recommendations received from the public (see subsequent text).
ALTERNATIVE C	
Alternative C received a number of supporting comments (16 commenters, including the Interior Alaska Gun Dog Association and the Friends of Alaska National Wildlife Refuges). Representative comments include: "It is my conclusion that Alternative C is the best plan to adopt. It offers management flexibility, which allows for the protection of the resources in the refuge that should be protected, but also allows the use of the land where resources for the local residents can be utilized for their benefit." "The FWS should strive to balance consumptive recreational use (maximizing access) with subsistence abundance (maintaining yield, quality/quantity). Visitation encourages awareness, and so I very cautiously encourage an increase in accessibility to promote use (non-consumptive; particularly eco-tourism) by an educated public. It appears Alternative C considers these objectives." "The Preferred Alternative "C" is an opportunity for this beautiful, unspoiled refuge	See specific responses to comments about Alternative C below.

Comment	Response
to remain a wild and diverse habitat with ample fish and wildlife species to provide an ongoing subsistence lifestyle for its local residents as well as offer public use while minimizing conflict among user groups." "In a refuge, where 'wildlife comes first,' subsistence lifestyle depends strongly on sustainability of those resources needed by local people. Enforcement and education should continue to go hand-in-hand to protect those resources. Minimal management is by far the most desirable choice. But considering the location of in-holdings, and user groups that must access those areas, Moderate Management appears to be necessary in those areas." "The South Fork of the Koyukuk River needs to be in Moderate to access Native allotments, house logs, hunting, and fishing."	
RECOMMENDED CHANGES TO ALTERNATIVE C	
Others suggested changes to Alternative C, including: "Regarding the northern boundary of the refuge, it is partially in minimal not in moderate—it should be moderate, too (starting from bottom of private checkerboard)." "[Northern Alaska Environmental Center is] concerned that the 'preferred' alternative (Alternative C) includes an area of Moderate Management in the northwest portion of the refuge which would allow the construction of all-season roads as well as other incompatible activities which would allow the construction of all-season roads as well as other incompatible activities that harm fish and wildlife habitat and are not needed to support the purposes of the refuge. We understand that the Moderate Management classification is also designed to facilitate development of a transportation corridor from the Dalton Highway to the Kobuk region and northwest Alaska. Furthermore, we believe that the FWS gives more legitimacy to the claimed R.S. 2477 'trails' or 'roads' than warranted, and there should be a clearer caveat to their status in the graphics (furthermore, a court found the 'Hickel Highway' RS 2477 illegal). The potential direct and cumulative impacts of such all-season roads or a major transportation corridor were not adequately analyzed in this plan despite the potential for major, negative impacts to the refuge purposes, and there is a reasonable way to address potential rights-of-ways through Title 11 of ANICLA. The draft plan does not provide justification for Moderate Management in this area and we find that it constitutes a threat to the overall integrity of the refuge and so more Minimal Management lands should be added into any alternative." "Add some moderate by the Jim River."	In response to comments received, Alternative C was revised to change the classifications of several areas. Two areas near Bettles are reclassified from Minimal to Moderate Management and an area in the upper Henshaw creek drainage is reclassified from Moderate to Minimal Management. In comparison to Alternative C, these changes result in a net reduction of 14,432 acres of Moderate Management (from 189,357 to 174,925). With these changes, over 13 percent of Federal lands within the refuge boundary (or 10.5 percent of the total area) will be in Moderate Management. Prior to these changes, the Moderate Management area comprised 14.5 percent of Federal land (or 11.6 percent of the total area) within the refuge boundary. Acreage in Minimal Management increases from 1,100,261 to 1,114,693 acres, from 85 percent to over 86 percent. These changes are described in detail in section 1.12. These changes respond to public comments in which local individuals desired more land in Moderate Management near their lands and public comments from elsewhere that expressed a desire for an increase in Minimal Management. The area reclassified to Minimal Management includes important wildlife and fish habitats, while the two areas

Comment	Response
"I find that under C, that mechanized habitat manipulation is allowed. I can only conclude that there is an extraordinary or overriding need to have these permissions contained in the Plan, but to me they are incompatible with any wildlife refuge." "Need more moderate." "The Minimal Categories should be increased where possible. There is precious little acreage left outside of Alaska so we need the maximum where available. As the human population continues to increase, the need to protect what now remains of wild land is extremely important." "We [the Wilderness Society] do, however, encourage the Service to consider yet another alternative, which would place the Koyukuk river corridor in moderate management, but would not include the entire large tract of federal land to the north of the river in moderate management. We believe this additional alternative would provide a legitimate and workable compromise for meeting the human-use needs within the refuge and adjacent to private lands. We especially encourage the Service to take a conservative approach here to land management, as there is no designated wilderness within Kanuti National Wildlife Refuge, and no wilderness reviews were completed for this CCP revision process. We commend the Service for refraining from including any 'intensive management' lands in any of the alternatives."	converted to Moderate Management do not. Although Moderate Management could allow road construction, no proposals for road projects are anticipated within the life of this plan. Therefore, potential impacts were not analyzed. If we receive proposals for such roads, a plan amendment with a compatibility determination and an environmental impact statement would have to be prepared before the project could proceed.
Comments about climate change included: "Climate Change is one of the greatest threats facing ecosystems and wildlife populations today, and the Service should make this issue a priority, taking it into account and incorporating it into all planning and management strategies. The revised CCP will likely be in place a minimum of fifteen years. There is a clear scientific consensus on the impacts from climate, and many changes will no doubt take place within the CCP's timeframe due to climate change. It is imperative that the Service make climate change a priority for Alaska's refuges, for their administration, protection and service to the public." "The Service should incorporate studying impacts of climate change on water resources. Please refer to the recent UAF lake and surface water study related to lakes drying up in Alaska, 'Using Remote Sensing to Examine Changes of Closed – Basin Surface Water Area in Interior Alaska from 1950–2002, by Alan Riordan, and	The Service recognizes the importance of the issue of climate change. Changes in climate have the potential to profoundly affect the refuge's resources and the people who rely on them. Climate affects ecosystems at a very basic level. Growing seasons, water regimes, plant growth stages, and the phenology of plants and animals are all affected by climate. These affect water and fire, which more directly have been identified as the primary drivers of Kanuti's ecosystems. Thus, anything affecting climate will affect the resources within the refuge. The refuge uses adaptive management and is incorporating responses to climate change into its management. For example; Kanuti has worked with researchers to assess the effects of different fire management strategies using a model

Comment	Response
also the Kenai Refuge study.'" "The Service also should incorporate studying the impacts of climate change on erosion of archeological values, caused by rising sea levels, more violent storms, etc. The Wilderness Society commented that they feel "strongly that the Service should include climate change as one of the major concerns regarding refuge management and that it is a significant planning issue. The mission of the Service is to, '. . . conserve, protect and enhance fish, wildlife, plants and their habitats for the continuing benefit of the American people.' All of the purposes of the refuges, including all of the species listed, involved with this CCP will be affected by climate change."	that incorporates vegetation, fire, and climate predictions. Also, refuge staff have participated in projects using satellite imagery and aerial photos to assess changes in wetlands on all refuges in Alaska. The Kanuti Draft Plan identified climate change as a specific issue of concern (section 3.3.4, Threats to Fish and Wildlife Populations.") We did not feel that the Plan was the appropriate venue for a full discussion on climate change, so this section was relatively short but provided references. Climate-related changes to wetlands, including the report cited by one commenter, are noted in this section. In this document, the Revised Plan, climate change continues to be explicitly mentioned in several of the objectives under Goals 1 and 2 (section 2.4.10). The first objective under Goal 1 is to collaborate with other refuges, agencies, and research institutes to gain a better understanding of boreal forest ecosystems. The rationale under this objective notes that climate change, and other ecological processes that occur on a regional or larger scale, may be best addressed at scales that are larger than an individual land management unit. In these cases, the role of Kanuti would be to serve as one of many study sites for more extensive projects. Climate change is also mentioned in objectives to inventory and monitor resources on a refuge scale, including our current inventories of birds, vegetation, fire history, and insects. Because of its role as an ecological driver, we believe that climate change is implicit in all CCP objectives whether or not it is specifically stated. The refuge does not have any impediments to animal movement, and we do not anticipate that climate change will create any. There is no significant development immediately adjacent to the refuge to restrict options for animal movement. Though the Dalton Highway and Trans-Alaska

Comment	Response
	Pipeline are east of the refuge and four communities lie outside the refuge boundaries, these do not create impediments to movement. Therefore, there is no need to consider buffers around the refuge. If deemed necessary in the future, such buffers would require coordination of state, Federal, and private land managers. Classifying most of the refuge as minimal management limits human activities and the potential for human-induced effects. Modification of human activity implicated in climate change on a broader level is beyond the purview of the refuge.
"The Service should fully integrate these discussion points in the goals and objectives listed for the refuge. Further, an additional objective should be included where the Service incorporates studying impacts of climate change on subsistence resources and practices. Please refer to Dr. Kocan's studies on diseases in Yukon Chum salmon which have found that approximately 25% – 33% of salmon caught in the Yukon river is diseased. The refuge should also be: 1. Providing training on climate change and variability for all wildlife managers; 2. Encouraging wildlife managers to consider climate change and variability whenever long-range wildlife management plans and strategies are developed; 3. Implementing monitoring programs for impacts to wildlife and wildlife habitats expected to be most sensitive to climate change; 4. Educating the public about climate change and its effects on wildlife; 5. Establishing and maintaining migration corridors that allow species movement and vegetation shifts among islands of suitable habitat; 6. Increasing buffer zones around refuges that will increase options for species under various climate change scenarios; 7. Removing impediments to inland migration of coastal and wetland communities; and 8. Making the reduction and elimination of human-induced synergistic effects a top priority for refuge management."	See previous response.
PREDATOR MANAGEMENT	
There were a number of comments about predator management. Some individuals supported predator management with comments such as, "Take some grizzly bears	Appendix P details the requirements for conducting predator management on national wildlife refuges in Alaska. Though

Comment	Response
out of the refuge. Reduce the number of wolves. If you do this the moose population would go back up." Others opposed any predator management providing comments such as, "Natural diversity is important so there should be no predator control." Wilderness Watch requested that the relationship between refuge purposes and predator management as described in Appendix P be included in Chapter 2 of the plan. Other comments on predator control follow.	controversial, predator control is a tool for wildlife population management. The Service is directed to manage wildlife populations within their ranges of natural variation. Thus, there is a very high standard for conducting predator control. If predator management is considered on the refuge, a separate plan will be developed to consider all options for intervention in wildlife populations. Predator control would be one tool considered in that plan. That plan would be developed with full public participation as directed by the National Environmental Policy Act (NEPA).
"In the plan (section 2.4.5) it is stated that 'Public involvement in this process would likely take place through a separate step-down planning process.' Now is the time for public involvement in setting predator control program, not later when the Service will refer back to this plan stating that it is policy to follow what is contained in Appendix P. Appendix P of the plans appears to be a Service Predator Management Policy. A Service Predator Management Policy should be discussed publicly on its own and not buried in a refuge plan.	See response above.
"I am concerned that policies adopted under this plan will be copied in other refuge plans. This plan is a poor attempt by the Service to make it appear that predator control will be allowed. This plan places so many restrictions on a predator control program that a program will never be implemented. In the plan, section 2.5.3 states that concerns about the status of moose and caribou populations have prompted requests and proposals for predator control. It further states that predator control programs that follow certain criteria will be considered and that further discussion is in Appendix P. However Appendix P places so many criteria on a realistic predator control program on[e] is essentially very unlikely under any circumstances. Appendix P states 'The Service will not reduce predator populations solely to provide larger populations of prey species for hunters, including subsistence hunters.' When local residents talk about predator control they are talk[ing] about controlling predators to increase the prey populations that are used for subsistence. This document distorts predator control in a way that its primary focus is no longer to increase prey populations for subsistence users. If the Service will not allow predator control to increase prey populations solely for subsistence use they need to state that in section 2.5.3 of the (draft) plan. Also it would be reasonable for the Service to use a different title for their predator control program as it has a different meaning than what the general public understands as the purpose of a predator control program.	See response above.

Comment	Response
HUNTING AND TRAPPING	
Several people commenting opposed hunting on the refuge. Representative comments include, "No hunting, harassment of wildlife." "Let wildlife live freely and away from murderers." "There is no 'justification' for trapping. None at all. It needs to be banned totally." "Hunting is in no way a compatible activity." "Hunting distracts from the integrity of the idea and purpose of the refuge." Others supported hunting. A typical comment was, "You should protect wildlife populations while allowing subsistence and sport hunting." Others provided comments specific to "sport" hunting. "Keep the sports and air boat hunters out" was one comment. Others expressed concerns about hunters who only took horns and not the meat. Some suggested that sport hunters give the meat away in local communities. Another suggested banning all "tourist hunting and trapping. Monitor and fine locals who do not follow regulations."	Refuge purposes are presented in section 1.4 of the plan. One of these purposes is to provide *the opportunity for continued subsistence uses by local residents.* This includes subsistence use of wildlife and fish. ANILCA sections 302(1) and (2) specify that these activities will be allowed as long as they are consistent with the other refuge purposes of conserving fish and wildlife populations and habitats in their natural diversity and with meeting international treaty obligations. The National Wildlife Refuge System Administration Act identified six priority public uses to be facilitated on refuges when they are compatible with refuge purposes (draft plan section 2.4.7). These priority public uses include hunting, fishing, wildlife viewing and photography, and environmental education and interpretation. Recreational hunting, trapping, commercial big-game hunting guide services, and subsistence activities have been determined to be compatible with refuge purposes (see compatibility determinations, available elsewhere).
ACCESS AND TRANSPORTATION	
There were a number of comments about access and transportation from those supporting additional access to the refuge to those opposed to any additional access to the area. Some commented on the difficulty of accessing the refuge and recommended that the Refuge take action to make the refuge more accessible. A number of comments opposed use of off-road vehicles on the refuge and any development of roads and trails. "With strong concern for Kanuti's unaltered wildness, we do not want to see an ATV trail developed on the refuge. Enforcement would be difficult or nearly impossible. Izembek Refuge has faced similar difficulties with 4 wheel drive vehicles abusing Wilderness-protected areas. The Bettles winter road has its own hazards but is an important need for the communities of the area. Although Native Alaskan's have the right to develop trails on their land, the refuge must remain pristine, and consideration of access right of way will require diligent monitoring by as well as of the user groups." A number of comments opposed access by off-road vehicles or all-terrain vehicles.	Federal regulations (43 CFR 36.11) prohibit the use of off-road vehicles (ORVs) on national wildlife refuge lands for recreational purposes except on established roads, parking areas, or routes designated by the agency, or by permit. No roads, routes, or parking areas exist on the Kanuti Refuge; therefore, there are no designated areas on the refuge. No roads are proposed to be built by the Service under any of the alternatives nor are any proposals for development anticipated. Any proposal for development of a road or other transportation or utility corridor on the refuge under section 1102 of ANILCA would require a plan amendment, which would include NEPA compliance. The Service documented that prior to 1980, there was no

Comment	Response
One typical comment said, "We are very concerned about the damage ATV use would have on refuge resources and urge that the final plan prohibit use of ATVs on all refuge lands." The State of Alaska commented, "Laws and regulations governing off-road vehicle (ORV) use, especially for subsistence use, are omitted or sometimes mischaracterized, leaving the incorrect impression that the refuge has no leeway to allow ORV use for specific purposes or under specific circumstances. In particular, several locations in the plan state or imply that ORVs are prohibited, as if by refuge-specific regulation. […] See also Compatibility Determination comments for pages H-33 and H-63 of the draft plan."	history of ORV use on lands that became the refuge (Appendix K). According to the village patriarch and other elders, three-wheelers were used only on village roads prior to refuge establishment because at the time, four-wheelers with enough power to go cross-country on the refuge's wet terrain did not exist in Allakaket, the most subsistence-reliant community adjacent to the Refuge. Unless some future documentation and research shows otherwise, given the current known history, the Service is not obligated to provide ORV access on Refuge lands for subsistence purposes but could consider establishing specific routes. For example, should new information become available that establishes ORVs as a traditional mode of access for subsistence purposes on the refuge, the Service would manage the use in accordance with 50 CFR 36.12, including promulgating refuge-specific regulations if closures or restrictions are needed to protect refuge resources. Furthermore, 43 CFR 36.11 prohibits the use of ORVs on refuge lands for recreational purposes, except on established roads, parking areas, routes designated by the agency, or by permit. Any future establishment of routes would require an appropriate use determination, revision to the pertinent compatibility determination(s), a public involvement process, an amendment to the Plan, and very likely a separate environmental assessment. The winter road connecting Bettles with the Dalton Highway does not cross any Federal lands within the refuge boundary and is not within the purview of this plan. The Service has addressed the State of Alaska's specific comments in pertinent sections of the revised Plan.
At the public meeting in Allakaket, several local residents expressed support for constructing an off-road vehicle trail across private lands to access the refuge. After the public meeting, additional dialogue continued in the community and the following	**Allakaket ATV trail** A winter trail connects Allakaket with the Chalatna River and extends on to the Kanuti River. The community of

Comment	Response
comment was received. "The Allakaket Tribal Council did a survey to see how many people would want a 4-wheeler trail to Chalatna, and the majority of the people said that they would want the trail. We would like to build the 4-wheeler trail, on a corner of Federal land, and it is about a mile long. We would like the Kanuti Wildlife Refuge to change the map so we would be able to build the trail on a small part of Federal land."	Allakaket seeks to improve a portion of this trail (from Allakaket to the Chalatna River) into an all-weather trail capable of handling four-wheelers in summer. At the time of this Plan revision, the community was seeking funding to analyze costs and alternatives of this trail development. Development of this trail would present significant technical challenges as the land involved is mostly ice-rich permafrost, and it would involve numerous wetlands and stream crossings. This trail would be almost entirely on Native corporation lands (Doyon or K'oy itl'ots'ina). The portion that would cross refuge lands would connect parcels of corporation lands. ANILCA section 1110 provides for access to private inholdings within refuge lands. The Service must provide "adequate and feasible" access 'subject to reasonable regulations' to protect natural and other values…" If the Service were to receive a specific proposal for this trail, a separate environmental assessment (following the NEPA process) would be required prior to making any decisions. If a decision were made to authorize a trail across refuge lands for access to private lands, the Plan would be amended. **Surface Damage** Kanuti Refuge seeks to prevent surface damage from occurring on any refuge lands and would work with other landowners to minimize surface damage on their lands that are adjacent to the refuge. Surface damage on adjacent lands could affect the refuge through erosion, sedimentation, or hydrologic alterations. It has been well documented that long lasting surface damage is likely when ORVs are used in summer on permafrost terrain in Arctic and subarctic Alaska.
The Wilderness Society commented, "Congress created limited exceptions in ANILCA to the restrictions normally implemented for motorized uses in conservation system units, including designated wilderness. These were important exceptions designed to accommodate and maintain opportunities for legitimate subsistence uses,	Compatible public recreational activities are allowed on Alaska refuges under 50 CFR 36.31(a). We have not defined "traditional" as it applies to this refuge; however we have found recreational use to be a compatible use at current

Comment	Response
which honor Alaska Natives and other rural Alaskans and their subsistence way of life. Specifically, ANILCA allows for subsistence purposes the use of snowmachines, motorboats and 'other means of surface transportation traditionally employed for subsistence.' In addition, ANILCA allows snowmachines, motorboats and fixed-wing aircraft to be used in designated wilderness and other conservation system units for 'traditional activities' and travel to and from homesites. As outlined in the ANILCA Report of the Senate Committee on Energy and Natural Resources, traditional activities include 'traditional and customary activities,' such as subsistence and sport hunting, fishing, berry picking, and travel between villages and homesites (Senate Report 96-413, 1979). Congress never intended to include recreational activities in the category of traditional activities." "It is unclear to us from the Draft CCP whether the Service is proposing to allow snowmachines and other motorized travel for traditional activities only, as is authorized by Section 1110(a) of ANILCA or if they will be allowed for recreational activities as well. [The Wilderness Society] strongly encourage the Service to prohibit recreational use of snowmachines and ORVs within the Refuges. The Service must clarify specifically what types of motorized use are being allowed on the refuges and for what purposes. In doing so, it should prohibit recreational use of snowmachines and ORVs." "Until the Service defines traditional activities, the agency must clarify that snowmachine and powerboat use is allowed on the Refuges for traditional activities as authorized under ANILCA Title XI or for subsistence as authorized under ANILCA Title VIII. The rulemaking process for defining traditional activities adopted for snowmachine use in the Old Park of Denali must be followed by all Alaska federal land managing agencies, including the U.S. Fish and Wildlife Service. The Draft CCP deviates from this planned approach. [The Wilderness Society] believe[s] that the Service should not authorize recreational snowmachine or powerboat use, as is done in the DEIS, until the Service defines traditional activities for the Refuges in a separate rulemaking process."	levels. We have also found current and projected use of motorboats, snowmobiles, and airplanes compatible with refuge purposes (see compatibility determinations).
"Appendix K of the draft plan established that there is no evidence that ATVs were ever used for subsistence purposes on refuge lands. The primary subsistence access to refuge lands today is by boat, airplane, or snow machine; therefore, expansion to ATV's would be a major change that would require substantially greater analysis that has been done in this plan. We are concerned that the use of ATVs could result in permanent changes to habitats in the refuge and urge the FWS to seek other	See previous responses to comments about Access and Transportation; and in particular, the response about history of ORV/ATV use.

Comment	Response
alternatives to address the subsistence purposes of ANILCA."	
"[The Wilderness Society is] concerned that the Service may allow motorized use in the revised plan, as is indicated by Appendix J of the draft, such as ORV, use which includes air boats and air cushioned vehicles, none of which have been traditionally employed on the refuge. This is a great concern for TWS. The draft EA clarifies at p. 2 – 9: . there is no history of ORV use on the refuge (Appendix K of the draft), and no routes or areas have been designated for them within the refuge. Air boats and air-cushion vehicles would not be allowed on refuge lands or waters but would be allowed on navigable waters within the boundaries of the refuge because State law allows airboats." While the clarification is encouraging to TWS, this management direction is not incorporated into Appendix J, the state-wide template for refuge management, and the discrepancies here need to be clarified further in terms of what direction has ultimate authority in Kanuti Refuge (Appendix J or statements in the EA). TWS strongly opposes allowing any new motorized uses within the refuge, such as ORVs or creating an ORV trail, and we strongly encourage the Service to maintain restrictions on the types of motorized uses that have been employed up to now. The Service has a clear-cut opportunity here to close Kanuti Refuge to ORV uses, and the Service should take advantage of this opportunity.	At this time, there is no documented history of subsistence use of ORVs on the refuge (see Appendix K). Other use of ORVs, including airboats, is not allowed on the refuge under current regulations, which prohibit their use except on designated routes (or areas) or under permits. Currently, there are no designated routes (or areas) or permits authorizing their use. See previous response about how we would address a request for establishing an ORV trail on the refuge.
Studies have shown that ORV use, for example, causes compaction and displacement of soils, erosion and sedimentation of riparian areas, air pollution, spread of invasive species, habitat destruction and fragmentation, and displacement and stress to wildlife populations. Studies in Wrangell St. Elias National Park and Preserve found that low levels (10 passes) of ATV use over tussock-shrub terrain causes substantial resource damage [National Park Service, U.S. Department of the Interior, "Response of Tussock-Shrub terrain to Experimental All-Terrain Vehicle Tests in Wrangell-St. Elias National Park and Preserve, Alaska, A Progress Report," by Charles H. Racine and Gary M. Ahlstrand. 1985.]. We believe that cross-country, disbursed ATV travel and the resultant proliferation of user-developed routes are especially damaging to Refuge lands. The Service has a responsibility to take protective measures before damage occurs. U.S. Fish and Wildlife Service regulations implementing ANILCA Section 811 stated: The Refuge manager may restrict a route or area to the use of snowmobiles, motorboats, dog teams and other means of surface transportation traditionally employed by local rural residents engaged in subsistence uses if the Refuge Manager	See response above.

Comment	Response
determines that such use is causing or is likely to cause an adverse impact on public health and safety, resource protection, protection of historic or scientific values, subsistence uses, conservation of endangered or threatened species, or other purposes and values for which the refuge was established. 50 CFR Sec. 36.12(b).	
ANILCA Section 811 and U.S. Fish and Wildlife regulations at 50 CFR 36.12 directed the Service to proactively manage subsistence ATV use to prevent adverse impacts. On average, national ATV sales have increased 10 percent each year since 1996, and the vehicles are now going faster and further into the backcountry than ever before. It is widely accepted among land managers, scientists, and the general public that disbursed ATV use causes adverse impacts. [T]he compatibility standard must be applied to all transportation activities in refuges.	At this time, there is no documented history of subsistence use of ORVs on the refuge. Should new information become available that establishes ORVs as a traditional mode of access for subsistence purposes on the refuge, we will manage the use in accordance with 50 CFR 36.12, including promulgating refuge-specific regulations if closures or restrictions are needed to protect refuge resources. Compatibility determinations address subsistence uses and transportation within the refuge.
[T]he traditional motorized modes of transportation allowed under Section 1110 of ANILCA should not exceed the levels that existed at the time ANILCA was passed. This limitation is stated very clearly in the legislative history: Even in wilderness, access by airplane and motorized boat may be permitted at existing levels of intensity. (Sen. Rep. No. 96-413 p. 247) These approaches are consistent with the wilderness management concept that motorized intrusions are to be minimized or eliminated as appropriate. While the Congressional compromises made in ANILCA included certain accommodations to allow, where necessary, traditional uses at levels existing in 1980, this does not exempt refuge management from responsible management of motorized access or the requirements of the Wilderness Act or the National Wildlife Refuge System Administration Act. Management is still bound by guidelines set forth in the Refuge Manual and the Wilderness Handbook, which were written in conformance with these laws. For these and other reasons, [The Wilderness Society] strongly support[s] the closure of ORV use within Kanuti Refuge.	Current and projected uses of airplanes and motorboats within the refuge have been found compatible, and there is no need to regulate their use at this time (section 2.4.8). The Refuge would follow the regulatory process, as described in 50 CFR 36.42, if use increased to levels thought to be detrimental to resource values of the refuge.
"Creation of the Kanuti Controlled Use Area and subsequent closure of that Area to moose hunting by non-local residents focuses other moose hunters on the tributary rivers of the refuge. Public access to the refuge via the South Fork of the Koyukuk River has included airboats, which can legally operate on navigable waters but not refuge lands. Although rising cost of fossil fuel may reduce airboat traffic, it may	Objective 37 in the Plan directs the refuge to work with communities and other authorities to "develop a comprehensive law enforcement program with an emphasis on educating visitors to prevent violations." The refuge staff has implemented, and will continue to provide, an effective

Comment	Response
nonetheless become a primary means of access from the Dalton Highway if climate change results in lower water level in autumn. The refuge should continue law enforcement patrol of the South Fork during moose hunting season to detect airboats that enter the wetland complexes by traveling overland beyond ordinary high water. Such traffic can disrupt patterns of water flow by cutting channels in fens or bogs, as has been documented on the Tanana Flats south of Fairbanks (C.H. Racine, J.C. Walters, and M.T. Jorgenson. 1996). Airboat use and disturbance of floating mat fen wetlands in interior Alaska, U.S.A. Arctic 51:371–377. (http://pubs.aina.ucalgary.ca/arctic/arctic51-4-371.pdf) A high-quality wilderness hunting experience should be possible on Kanuti Refuge outside of the KCUA by paddling or taking a motorized canoe into the extensive wetlands once hunters get into the refuge by airboat or jet boat."	field law enforcement program to prevent resource damage and ensure continued compatibility of public uses. Wherever appropriate and compatible with refuge purposes, Service policy directs refuge managers to provide opportunities for all six priority wildlife-dependent recreational uses (including hunting), while maintaining quality of experience (605 FW 1.6, 1.9 and 1.10). These policy goals are also reflected in the justification sections for such uses in the Kanuti Refuge compatibility determinations.
"The Service should clarify that airboats are prohibited on the Refuges because they were not found to be a traditional mode of access under ANILCA Title XI. The preamble to 50 CFR 36.39(i)(3)(i), a U.S. Fish and Wildlife Service regulation implementing ANILCA Title XI (as referenced in the preamble to the 2000 NPS Personal Watercraft Rule) states, "[w]ith respect to airboats, section 1110(a) of ANILCA and its legislative history indicate that motorboats were the only methods of motorized water transport that were to be given special access to conservation units." [Personal Watercraft Use Within the NPS System, 65 Fed. Reg. 15082, 15082-3 (April 20, 2000).] [The Wilderness Society] objects to all airboat use on any Alaska refuges because of their significant impacts to fish, wildlife, natural soundscapes, vegetation, and soils. The Service also needs to review impacts from airboat use on navigable waters in the Draft CCP. If the use of airboats on navigable waters would disturb wildlife, then the Service has the authority, grounded in its Property Clause authority, to manage the public lands and to restrict the use of airboats even if the state has regulatory authority over the navigable waters."	Section 2.5.6 and appendix J, section 2.12.2 of the draft plan present a discussion of access, including regulations about airboat use.
"Regardless of the national policy being determined by the Service at this time, jet-skis should not be allowed on Alaskan Refuges. These joy-riding machines fall far outside the purposes of the Refuges, are nontraditional, and are known to disrupt sensitive wildlife, subsistence activities, and other recreational experiences. [The Wilderness Society] encourages the Service to ban jet-skis from Kanuti Refuge."	The use of jet skis on refuges is being debated. However, as the jurisdiction of navigability on many Alaska waters is in dispute, jet-skis would likely fall under State jurisdiction. At this time we have not documented any use of jet-skis within the Refuge. If policy is developed on their use, the Plan will be reviewed to determine if an amendment is necessary. Before any restrictions could be implemented, the Service would have to go through the rulemaking procedures and develop regulations.
One person commented that no airstrips should be allowed. Another requested that	There are no plans to develop airstrips on the refuge;

Comment	Response
the Refuge be kept open to aircraft access and that there be no aircraft restrictions. The Wilderness Society commented, "[we] are concerned that the Service is not stating clearly in the draft CCP the agency's intent with regard to recreational helicopter access. We believe that there should exist a prohibition on recreational helicopter access in all refuges in Alaska. We believe that the social and ecological impacts from this type of access are significant and will alter the overall wilderness and natural character of the Refuge."	however, they are allowed under current regulations. Service policy is that applications for permits to land helicopters for recreational purposes shall be considered on a case by case basis.
"For many years I have wondered why the Kanuti flats was effectively being managed to exclude all except local residents as users. That is because of the ban on access by air; that being the only practical method for those of us not resident in the village of Allakaket to access the Kanuti flats for moose hunting purposes. This has created a totally unfair situation of duck hunters being allowed to fly in but not to take moose. I suggest a change to the management to allow moose hunters air access to this wonderful moose haven. You may wish to provide a buffer non-aircraft zone around the village of Allakaket to avoid conflicts with local users."	The Kanuti Controlled Use Area was established by the State of Alaska's Board of Game and may only be modified or removed by them. Repealing or revising these restrictions is beyond the scope of this Plan. The State Board of Game is Alaska's regulatory authority and adopts regulations to manage Alaska's wildlife resources. The Board is charged with making allocations and regulatory decisions using a process dependent on public input provided through advisory committees. Due to low moose densities in the area, the Kanuti Controlled Use Area (KCUA) was established in 1981. The KCUA prohibits airplane access for moose hunting in most of the western two-thirds of the refuge. ANILCA directs that rural residents of Alaska be given a priority for subsistence uses of fish and wildlife. In 1989, the Alaska Supreme Court ruled that this rural subsistence priority violated the Alaska Constitution. Due to the resulting conflict between ANILCA and State law, the Federal government stepped in to manage subsistence activities and to provide for the subsistence priority on Federal public lands in Alaska. The Federal Subsistence Management Program was established in 1990 to carry out this responsibility. This is a multi-agency effort that provides for public participation through the Federal Subsistence Board and Regional Advisory Councils. In 1991, the Federal Subsistence Board closed Federal lands within the KCUA to moose hunting except by residents of

Comment	Response
	Game Management Unit 24 and the communities of Koyukuk, Galena, and Anaktuvuk Pass. Both the State Board of Game and the Federal Subsistence Board periodically review the appropriateness and need for controlled use areas. The public may submit proposals to eliminate or modify these restrictions; such proposals are considered on a biennial cycle.
HABITAT	
One comment said, "Do not allow habitat manipulation." There were a number of comments about managing for natural diversity. The State of Alaska commented, "The plan indicates that the refuge will be managed 'for its natural diversity - both wildlife and habitat. We interpret this to mean on a refuge-wide scale.' This interpretation established the context for how 'diversity' is applied in the draft CCP (e.g., section 3.3.1 on page 3-29) and directs management actions to maintain ecological diversity at the refuge scale. However, understanding diversity requires a baseline assumption of the chosen time period used to frame the range of natural processes. The Ecosystem Management Approach (section 1.2.1 in Appendix A) describes 'the effective conservation of natural biological diversity through perpetuation of dynamic, healthy ecosystems.' However, certain management decisions in the CCP (e.g., fire management favoring caribou habitat) appear to present an intent to maintain a static system. This intent could, in the long run, require substantial management intervention to maintain the targeted, intact diversity of plants and animals currently representative of the Kanuti Refuge, especially with climate change driving ecosystem dynamics. The definition of a fixed diversity standard also has potentially lasting implications for management of individual refuges and for overall ecosystem management, such as potential management actions that might need to be considered in the future to maintain viable populations in arctic and subarctic ecosystems. The role that national wildlife refuges in Alaska will play in species migration in response to changing vegetation is an important topic deserving of further consideration by the Service at the refuge and regional level. Ultimately, the CCP needs to rectify the seemingly conflicting objectives of maintaining current species diversity while maintaining naturally-occurring changes in a dynamic ecosystem."	Section 2.4.4 was revised to clarify that the goal regarding fire management is to maintain refuge habitats in their natural diversities by allowing natural processes, including fire, to mold them. We feel that large fires in the last few years have created a situation that warrants a different approach. These fires eliminated a substantial portion of the old growth lichen-spruce woodlands on the refuge. Subsequent fires, if left unchecked, could eliminate the remainder of this habitat. With the intent of maintaining natural diversity, with a variety of representative habitat types on the refuge, discussions ensued with peer biologists and managers about possible strategies for maintaining this habitat. Section 2.4.4 clarified that the intent in establishing the 290,000-acre special area is not solely for "fire management favoring caribou habitat" but instead has the broader goal of conserving a scarce habitat (old growth lichen-spruce woodlands) and the flora and fauna that use it. Further, it clarified the intent is not solely "to maintain a static system" by eliminating fire but to manage fire more precisely with a goal of allowing natural ignitions to burn no more than five percent of the special area each year for a 20-year period, allowing time for adjacent areas to recover from earlier fires. Climate change poses challenges to resource managers. The Service may not have the resources to achieve habitat

Comment	Response
	management goals and objectives in extreme fire years when fire suppression resources are devoted to the protection of human lives and property.
INVASIVE SPECIES	
There were a number of comments about invasive species. Several were from individuals who had participated in "weed-pulls" near the refuge. The following comment is typical. "The Friends group supports education and assisting in eradication of invasive plants and animals. After two summers with three weed-pull events, it is obvious that pulling the weeds is not enough. The huge expanse of white sweet clover from Fairbanks north must be addressed not only by the four agencies (BLM, USFWS, and NPS with assistance from Ameri-Corps and the Friends) who have fought so diligently to keep it out of Kanuti Refuge water ways but needs to be addressed by the state of Alaska DOT. It will most likely take chemical as well as physical means to control this danger to native habitat. It is with considerable concern that the treatment must be less dangerous than the problem-invasive that Friends recommends more aggressive treatment, especially since these plants are very close to entering the refuge's Kanuti River." All comments on the subject supported removal of invasive plants, but some opposed the use of chemicals. A typical comment, "do not support including any wording that allows pesticide use. While the language used is 'may,' it is permissive. USFWS does not have the resources to contend with industry's claims of non-harm. Wildlife refuges do not exist to provide a lab test for pesticide use. The language prohibiting such use in the first plan needs to be retained."	The Service manages invasive plants because they have the potential to degrade habitats and in turn, adversely affect the wildlife that we are mandated to protect. The Service's Biological Integrity, Diversity, and Environmental Health Policy (601 FW 3.16) specifically addresses management of invasive species, stating that "we develop integrated pest management (IPM) strategies that incorporate the most effective combination of mechanical, chemical, biological, and cultural controls while considering the effects on environmental health." This IPM approach is a science-based decision-making process that "coordinates the use of pest biology, environmental information, and available technology to prevent unacceptable levels of pest damage by most economical means, while posing the least possible risk to people, property, resources, and the environment." At present, no invasive plants are known to be within the boundaries of the refuge (section 3.3.4). However, pineapple weed (*Matricaria discoidea)* has been found and hopefully eradicated. Also, invasive white sweet clover *(Melilotus alba)* and other non-native plants have colonized the Dalton Highway corridor and threaten to move into the refuge via waterways that cross the highway and flow into the refuge. We are working with the Bureau of Land Management, Alaska Department of Transportation and Public Facilities, and other partners to control and eradicate white sweet clover and other invasive plants colonizing the corridor to prevent them from moving into the refuge. Two years of significant manual weed pulling efforts in the Dalton Corridor have shown that only a large-scale integrated approach that includes the potential use of herbicides and other control methods will prevent white sweet clover from

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	spreading.
FIRE	
Several individuals recommended that there should be no fire management or fire control except to protect structures. Others commended the refuge on the current fire management strategy. One comment objected to the amount of money spent on fire management nationwide. Another comment said all fires "should be controlled and limited." Several local residents commented that fire should be controlled to protect winter caribou habitat in the Ray Mountains but allowed to burn for moose habitat. The State of Alaska and others commented on an apparent inconsistency between the new fire management plan and the refuge vision statement. Specifically, the State commented that in 2006, the refuge staff converted the fire management option from Limited to Modified in nearly one-fifth of the Kanuti Refuge (290,000 acres). The purpose of this change was to protect some of the remaining lichen woodland on the refuge as late-seral wildlife habitat, specifically caribou winter range. This change is apparently in response to more than 50 percent of the refuge receiving wildland fire disturbance in the last 20 years. It is commonly understood that fire is generally beneficial to the primary subsistence species on the refuge (moose) and other early-seral birds and mammals, while caribou rely on late-seral spruce woodland. Given the chronic low abundance of moose in the area over the last decade, residents of Allakaket and Alatna desire to hunt caribou when the opportunity arises. Local residents also desire to protect larger white spruce in riparian corridors from fire for their use as building materials and as desirable camping spots. In addition, the refuge appears interested in maintaining late-seral habitat to maintain the current diversity of wildlife species in the face of increased wildland fires that may, over time, alter this diversity. While the State recognizes these valid interests, the extension of Modified fire management may not be realistic or desirable for the following reasons: ▪ Current wildland fire trends associated with climate change suggest future increases in fire occurrence and effect, making the Kanuti Refuge an unlikely place to successfully manage for caribou or other late-seral species. ▪ Habitat protection for caribou on the Kanuti Refuge is not critical for conservation of either the large, widely ranging Western Arctic Herd or the small Ray Mountain Herd, the latter of which winters primarily south of the	See previous response regarding fire management. **Species management.** We used moose and caribou only as example beneficiaries from habitat management objectives and will not, in general, undertake single species management. Our intent is to manage for natural diversity refuge-wide with a specific exception for one area to maintain old growth lichen-spruce woodland habitat. This exception is to help meet the 'establishment purpose' of conserving habitats in their natural diversity. **Inconsistency with vision statement.** We have revised the refuge vision statement to better explain our intentions. We changed "natural unaltered character" to "wild and natural character," recognizing that 1) people have lived here for thousands of years and have modified populations and habitats; 2) that the landscapes show signs of human use (trapping cabins, trapline trails, native allotment survey lines, firelines, etc.); and 3) because active habitat management may occasionally be necessary. We addressed the apparent inconsistency between our fire management goals and our vision statement in two ways: (1) the vision statement was modified; and (2) we have clarified that we will, in general, manage for natural diversity with all natural processes unimpeded on the refuge *except* where needed to maintain a limited resource, the old-growth lichen-spruce woodland. We have designated a 290,000-acre old-growth lichen-spruce woodland area, where natural fire ignitions will be managed with the goal of allowing no more than 5 percent of the area to burn in any year. It should be noted that this objective from the Fire Management Plan was not implemented until after 50 percent of the area was burned in 2004 and 2005. This criterion will be evaluated during the each revision of the Fire Management Plan.

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refuge. ▪ Increased short-term emphasis on fire suppression may have longer-term costs and consequences associated with large, catastrophic fires. Most importantly, other management options are available, even under Limited fire management, that allow the benefits of fire on the broader landscape while reducing the potential for unwanted fire on specific habitat areas, Native allotments, and other identified values for which protection is desired. We recognize that decisions about fire management on the Kanuti Refuge are not made in the CCP. We provide this background and context because we did not have an opportunity to present these concerns in another context, and because we see a key inconsistency between the refuge's desire to manipulate natural fire disturbance levels and the Refuge Vision proposed in the CCP to manage Kanuti for its natural unaltered character...as driven by biological and physical processes through time (page 1-9, section 1.4.2). Specifically, the CCP does not account for the fact that the refuge's fire management program is a significant departure from the Vision Statement. To rectify the situation, the refuge has several options, including revisiting the Fire Management Plan, changing the Vision Statement, or creating and explaining a specific exception to the Vision Statement to address fire management. While the State might prefer the first choice, we will assume for the purposes of these comments on the CCP that the refuge will likely identify a fire management exception to the Vision statement. Under the projected scenario, we [State of AK] also recommend the CCP better explain how the current fire management objectives are consistent with Minimal management. The basic description of Minimal management, similar to the Vision Statement, says "Habitats should be allowed to change and function through natural processes" (page J-6, section 1.3). Yet direction affecting fire management in the Table (page J-39) demonstrates flexibility in Minimal management for on-the-ground management needs. The Table allows for various forms of habitat manipulation and the full suite of fire management tools, including prescribed burning, if they are otherwise consistent with management objectives or further refuge goals. Some specific discussion about the application of Minimal management in the context of fire management in Chapter 2 will clarify the seeming inconsistency with the "Habitats..." sentence quoted above.	**Review of fire plan.** As early as 2002, refuge staff discussed with ADF&G habitat and area biologists, and with BLM-AFS, possible strategies for maintaining old-growth spruce-lichen woodland habitats in certain areas of the refuge. We regret that because of an oversight due to tight deadlines, a formal review of the Kanuti Fire Management Plan by ADF&G did not occur. The Alaska Interagency Wildland Fire Management Plan will be revised in the future and there may be changes in Federal fire management policy. ADF&G will be invited to participate when the Refuge's Fire Management Plan is revised. **Consistency of fire management objectives with Minimal Management.** The Service strives to be sensitive to the wishes of adjacent land owners and works as a partner in the Alaska Wildland Fire Coordination Group (AWFCG) to arrive at fire management designations acceptable to the greatest number of partners. Minimal Management would allow full suppression when justified based on human safety and property concerns. Even during fire management operations, our regulations, policies, and refuge goals direct that we use methods having the least impacts.
The State of Alaska also commented, "In most instances throughout the CCP, we request references be made to wildland fire 'management,' not 'suppression.' The Alaska Interagency Wildland Fire Management Plan (AIWFMP) refers to fire management options and all the participating agencies agreed to use this	Section 2.4.4 emphasizes that "fire management" is a tool that can be used to achieve habitat management objectives. We eliminated mention of "fire suppression" except where needed to describe a specific tactic.

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terminology. 'Fire management' is a broader term that allows more flexibility and avoids the negative bias inherent in 'fire protection' or 'suppression.' The AIWFMP allows managers options and flexibility to manage fires to help achieve a variety of land and resource management objectives." The State provided an attachment with suggested language to be used in the plan.	
MINERALS, MINING, OIL, & GAS	
There were a number of comments about mineral development, especially oil and gas development. Generally, comments opposed mineral development on the refuge. The Alaska Miners Association commented, "The AMA [Alaska Miners Association, Inc.] supports the management guideline under Alternative C (preferred alternative) that would allow for the sale of sand and gravel and other common variety minerals. We recommend keeping as many options open as possible for use of local materials as this will ultimately result in lower construction costs for facilities developed in the Refuge." Comments from the Sierra Club and others opposed sand and gravel extraction on the refuge. "[W]e [Alaska Chapter of the Sierra Club] oppose the new less restrictive guideline that would allow commercial sand and gravel extraction in moderate management areas. Sand and gravel extraction is not allowed under the current CCP. Extensive private (Native corporation) land holdings within and adjacent to the refuge can provide for this use." Generally, comments opposed oil and gas development on the refuge; however, some comments supported it with comments such as "The AMA [Alaska Miners Association, Inc.] does not support the proposed management prescription in Alternative C that would disallow oil and gas leasing in the refuge. We are aware the refuge is currently believed to have low potential for economic concentrations of oil and gas. However, future and exploration concepts could change our understanding of the geology of the region. We recommend that the option for oil and gas be kept open."	Oil and gas development is currently prohibited on the refuge. Appendix J Section 2.16.2 provides additional information on the circumstances under which oil and gas leasing would be considered on the refuge. Sand and gravel extraction could be allowed in Moderate Management areas, if compatible with refuge purposes, to support construction and maintenance projects on or near refuge lands if no reasonable sites exist off refuge lands.
Comments in opposition to and in support of small hydro-power were received. The Alaska Chapter of the Sierra Club commented, "Another new less restrictive guideline would allow 'small' hydroelectric power projects 'that do not change river flow.' Although what the Service has in mind is not spelled out, presumably such projects are in-river turbines, since dams and run-of-the-river hydro projects modify river flows. Therefore in the final RCCP, please outline in more detail the new guideline for small hydro, including the potential effects on fish and wildlife, especially fish. Licensing of in-river hydropower projects prior to Congress's consideration of wilderness and wild & scenic river recommendations would	There is little likelihood of small hydro-power applications being received during the life of this plan. Any applications would be evaluated under current State and Federal requirements and would have to meet the appropriate use and compatibility standards. Effects would be evaluated under site-specific NEPA analysis.

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undermine the integrity of the review process by disqualifying the area or river for potential inclusion in their respective systems. We [Alaska Chapter of the Sierra Club] recommend retention in the final RCCP of the more restrictive existing refuge policy on hydro power."	
OTHER DEVELOPMENT & COMMERCIAL USES	
A few comments about development were received. Comments included requests for no development, including bunkhouses, temporary facilities, docks, campgrounds or other facilities. One comment said, "Only signs that are absolutely necessary should be posted." Local residents asked about collecting shed antlers and expressed an interest in being able to sell antlers to pay for gas for hunting. One comment opposed logging on the refuge. One individual commented about hunting guides: "Ban commercial guides for hunting - turn them into peaceful guides for wildlife watching, which is much more profitable instead of killing guides."	No development is planned on the refuge during the life of this plan. Commercial collection of antlers is allowed in moderate management and requires a special use permit under 50 CFR 27.51. Commercial logging is not anticipated during the life of this plan and would only be allowed to meet objectives in an approved fire management plan. All development proposals would be subject to site specific appropriate use, compatibility, and NEPA analysis.
ENVIRONMENTAL CONSEQUENCES ANALYSIS	
The Northern Alaska Environmental Center commented, "The plan only includes seven pages of analysis of environmental consequences and this cursory look is woefully inadequate. We urge the plan to more fully cover impacts from potential activities that could be allowed under the various management classifications and alternatives. We urge FWS to address climate change impacts to the refuge habitats in greater detail and also outline a more detailed plan for incorporating science surveys—including Traditional Ecological Knowledge—and public input into the CCP."	The draft plan included analysis only of those activities we are proposing. Other activities that *could be* allowed under the management policies and guidelines section of the plan (Appendix J) but are not currently occurring or proposed may require additional site-specific NEPA analysis and a plan amendment, if they are to be proposed in the future. We address climate change in Section 3.3.4. We realize the importance of this topic but are unable to predict precisely what the effects will be on refuge lands. We anticipate drying and the potential for more frequent fires. However, as wind patterns shift, microclimates will change. We do not have nor know of models which can predict impacts at this local level. Refuge staff will continue to work with experts in climate change at various scales and if models suitable for the use in refuge management become available, these models would be used in future analyses. Much of the information used in the plan was obtained through scientific study and analysis. The public, including local Native peoples, was encouraged to provide input and comment on the plan at several stages.

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SUBSISTENCE	
[The Northern Alaska Environmental Center] is also concerned that FWS conducted a superficial and inadequate analysis of subsistence, both in this analysis of impacts as well as in the Section 810 analysis which is just a few pages. Additionally, further scientific information on changes to wetlands and other habitats due to global warming would be required as part of your analysis of subsistence. Given that subsistence is one of the four specific purposes of the Kanuti Refuge, and there are four Alaska Native communities adjacent to the refuge, this is very disappointing. Furthermore, we believe that the public would be better served if there were formal hearings (including Sec. 810) on the draft plan so that accurate documentation of citizen's concerns, whether in local communities or in Fairbanks were documents (in addition to the fine informal meetings explaining the plan its changes, and what the FW has been doing in terms of research, etc.). We appreciated the good presentation and discussion at the Fairbanks meeting on the Kanuti plan; but 'planning' is more than one or two meetings in a community.	We have expanded the subsistence section (the analysis of impacts) (sections 3.4.4 and 3.4.5) **Subsistence:** We do not anticipate that the management we are proposing will change or impact subsistence uses on the refuge. For this reason, the analysis was straightforward and not lengthy. Our analysis, directed by ANILCA section 810, determined that no alternative would have any effect on subsistence resources or significantly restrict subsistence uses. Therefore, the threshold that would require holding formal public hearings was not met. **Climate Change:** All resources within the refuge will be affected the same way by climate change, regardless of alternative. Our management approach under the different alternatives will not affect how climate change affects resources. **Public Meetings:** Public meetings were held in Fairbanks and in the communities near the refuge. Additionally, in an effort to be certain local opinions were included, refuge staff interviewed numerous people in the local communities. Though many concerns were expressed, the majority were outside of the purview of the Service or this plan. We are confident that we have captured all concerns which pertain to the plan.
One individual commented, "I support cooperative management with officially designated tribal entities and cooperative management for subsistence."	The Service strives to cooperate with our partners, land owners, and refuge users. The refuge has consulted and will continue to consult with tribes on matters relating to refuge and Service management, including subsistence. Staff members conduct several meetings each year in the communities to gather input on subsistence issues and discuss refuge activities. We have contracted with the

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	Allakaket Tribal Council to provide a part-time rural representative and subsistence liaison to work with the refuge. The refuge has twice provided technical assistance to the Allakaket Tribe to help them compete for Tribal Wildlife Grants aimed at developing wildlife management experience within the tribe.
We [Alaska Chapter of the Sierra Club] recommend that the new guideline for subsistence house log and firewood collection on refuge land be amended to provide for permits only when refuge managers determine that house logs and firewood are not available on adjacent Native corporation or other private lands.	Subsistence gathering of house logs is guided by regulations in 50 CFR 36.15. These regulations were adopted in 1986 after extensive public review and comment.
INVENTORY & MONITORING PLAN	
The State of Alaska commented, "The State endorses the efforts by Kanuti Refuge to conduct ecological inventory and monitoring (e.g., Goals 1 and 2 in section 2.9 and systematic mini-grids for multiple species on page 3-23 of the draft). We are very concerned, however, by the incremental delays in completing these inventory and monitoring plans. The 1987 Kanuti CCP recommended detailed management plans to implement the CCP, including resource inventory and analysis (page 9). Service policy 701 FW 2 requires these plans, and several national wildlife refuges in interior Alaska have approved plans (some dating back to the early 1990s) that could be used as prototypes. When the Biological Review Team for Kanuti Refuge met in 2002, it recommended completion of wildlife inventory and monitoring plans as a top priority to ensure application of scientific methods with appropriate and repeatable study designs, particularly given that the framework of monitoring has already been defined (Table 6-1) and numerous inventory projects are underway. The 2005 report by the committee of the Biological Program Review recommended that the refuge complete the plans by 2006. Now the draft CCP variously reports that the Inventory and Monitoring Plan (albeit as step-down portions thereof) is proposed to be completed in 2009 (page 2-28) and alternatively in 2010 (page 6-2). We [State of AK] strongly recommend completion of inventory and monitoring plans before any new field projects are initiated.	The Inventory and Monitoring (I&M) Plan for the refuge is scheduled to be completed in 2009 and the date has been corrected. Previous schedules for completing the I&M Plan were not met because changes were being made to I&M plan format on the national level.
"Is there a browse inventory? Anything regarding trophic compensation? Not addressed in plan either. Critical moose habitat (winters!) should be addressed, identified and protected. Bottom of valley floors. Moose will move 75 linear miles to go to critical habitat. Document where they are."	In late March 2007, the refuge cooperated with ADF&G to conduct a moose browse survey on the refuge following methods used elsewhere in interior Alaska. This survey is described in section 3.3.3. Moose winter distribution was mapped during late winter aerial surveys 1998–2001 (section 3.3.3). Moose were radio-

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	collared in March 2008 to track movements in a cooperative project involving the refuge, Gates of the Arctic National Park and Preserve, ADF&G, and BLM.
"Grayling should be monitored more. Homogenous species, moving in and out of Dalton Highway corridor at a high rate, go to Kanuti in the winter. Do more research on seasonal movements."	Obtaining additional information about the seasonal distribution of fish, including grayling, has been identified as Objective 9 under Goal 1 (section 2.4.10).
PAGE SPECIFIC COMMENTS	
Page 1-8, Figure 1.4 (of the draft). The legend categories are hard to differentiate. We [State of AK] recommend alternating patterns of transparent shading for clarity if the final copy is to be in black and white.	These changes have been made.
Historical perspective (1.51. page 1-10): As drafted this section presents only a historic fact, not a perspective. An appropriate perspective would briefly describe the historic national movement which led to passage of ANILCA. It would tell how people from all over the country realized that the wild landscapes of Alaska were becoming vulnerable to threats such as mining, oil and gas development, logging, road building, commercial tourism and land disposals, and that Congressional action was necessary to preserve for all time, the most important areas in their natural condition as National Parks, Wildlife Refuges, Wilderness Areas, Wild Rivers and Conservation Areas. These citizens also realized that in Alaska there was still a chance to avoid the land use mistakes that had been made in the other states where wild areas have been destroyed or greatly compromised by human occupation and development. It is in this context that the revised draft plan for Kanuti Refuge should be presented.	We expanded the text in Section 1.3 (Refuge Establishment) to include the historic background of the passage of ANCSA and ANILCA.
Page 2-3, 2.5.1, Subsistence Management, second paragraph, last sentence. We [State of AK] request revision of the last sentence as follows, to be consistent with the general Management Policies and Guidelines and federal regulations: "Snowmobiles (with adequate snow cover), motorboats, and other means of surface transportation traditionally employed for subsistence purposes are allowed, subject to reasonable regulation." All access rights and methods are pertinent in this context.	We have expanded the referenced sentence (now in section 2.4.3) to read: Snowmobiles (with adequate snow cover) and other traditional means of access will continue to be allowed, subject to reasonable regulation.
Fire Management (pages 2-3 and 2-4): We [Wilderness Watch] are very concerned that the refuge fire management plan was recently changed (apparently with little or no public involvement) from 'limited' to 'modified' categories of fire suppression for some 290,000 acres of Kanuti Refuge. This also appears to contradict the refuge vision statement ('managed for natural unaltered character . . . As driven by biological and physical processes'). Wildfire in interior Alaska has functioned as a natural process shaping a diversity of habitats over vast areas and long time frames. It should be allowed to continue to function 'unaltered' by refuge management and	See previous responses to comments concerning fire management.

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policy to the maximum extent.	
In reference to page 2-4, second paragraph, line 4: 'The suppression of human-caused...wildland fires.' We [State of AK] recognize that national U.S. Fish and Wildlife Service policy requires suppression of human-caused fires, although under state policy, the decision on how a fire will be managed is guided solely by land and resource management objectives, irrespective of the source of ignition. In light of efforts within the federal sector to similarly modernize this aspect of national fire policy, we recommend the CCP avoid explicitly distinguishing human-caused fires. The phrase 'unwanted wildland fires' is broad enough to include human-caused fires without specifically mentioning them.	As directed by the Interagency Standards for Fire and Aviation Operations handbook and Department of Interior policy, we will attempt to suppress all human-caused fires until changes in policy direct otherwise.
Chapter 2: Refuge Management Direction and Alternatives, page 2-4: It was suggested that we change our terminology from fire suppression to fire management, as below. The Kanuti Refuge Fire Management Plan (USFWS 2007) provides specific information on the application and management of fire on the refuge. Additionally, the Alaska Interagency Wildland Fire Management Plan (Alaska Wildland Fire Coordination Group 1998) provides a cooperative framework and operational guidelines for the suppression management of wildland fires. The suppression of human-caused and unwanted wildland fires and the use of natural-caused wildland fires and prescribed fires as management tools are important management prerogatives on the refuge. We will also manage fire to maintain habitat diversity at the older end of the post-burn vegetation succession spectrum. Approximately 290,000 acres in the central portion of Kanuti Refuge have been designated a special area where we intend to limit or exclude wildland fire from burning old growth lichen and spruce. We will manage this area to maintain old growth lichen-spruce habitat through a change in the fire management options protection level from "limited Limited" to "modified Modified" suppression Management. By utilizing suppressing more aggressive fire suppression options fire starts early in the fire season, we hope to reduce the potential of large fire growth during the latter part of the fire season, hence maintaining an area of unburned lichen-spruce habitat (USFWS 2006, page 47). This action will favor wildlife species that inhabit areas that have not burned for more than 80-100 years. For example, lichen woodland areas that have not burned in 80-100 years are important to caribou (Rupp et al. 2006).	We revised the referenced text as recommended. See section 2.4.4.
Page 2-8, 2.5.5, Public Use, first paragraph, fifth sentence. To be more consistent with federal subsistence law, we [State of AK] request that "non-residents" be changed to "non-residents and non-local residents."	We have revised the referenced text (now 2.4.7) to read: This prohibits people who do not reside within GMU 24 or the three identified communities from moose hunting in the

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	western two-thirds of the refuge.
Page 2-8, 2.5.5, Public Use, second paragraph. This says, without qualification, that no roads, trails or visitor facilities would be developed. To be consistent with the parallel statement on page 2-3 under 2.5, second paragraph, we request the addition of '...unless needed to prevent degradation of resources.' Or delete the entire sentence as duplicative of the Elements Common to All Alternatives.	We deleted the sentence.
Page 2-9, 2.5.6, last paragraph. First, this paragraph mischaracterizes opportunities for transportation and utility systems (TUS) under ANILCA Section 1102, and generally confuses this topic with roads in general. For example, a plan amendment is only applicable to TUS proposals in Minimal management, instead of Moderate. Including a simple cross reference to the TUS discussion in 2.12.7 on page J-26 is all that is necessary in this section. To supplement the direction in Appendix J, we recommend this paragraph be revised as follows: 'No roads exist on federal lands within refuge boundaries and no new roads would be built by the Service under any of the alternatives. A proposal for a new road or other transportation or utility corridor pursuant to Section 1102 of ANILCA would be addressed as described in Section 2.12.7.'	We have revised the referenced text to read: If a proposal for a road is received, pursuant to section 1102 of ANILCA, it would trigger a plan amendment and NEPA analysis as described in Appendix J.
Page 2-9, 2.5.6, Access, first paragraph, first sentence: Please specify that 43 CFR 36.11 concerning ORVs refers to recreational use to avoid the implication that it applies to subsistence use as well.	We have clarified the sentence (now 2.4.8).
Page 2-9, 2.5.6, Access, first paragraph, fourth sentence: The reference to the history of ORV use is relevant to ANILCA Section 811 and the discussion about subsistence use at the beginning of the next paragraph and we therefore suggest it be moved. (The reference in the same sentence to allowing ORVs on designated trails or by special use permit is appropriate within the context of recreational use and should remain in the first paragraph.) We also request a clarification in the final plan that if additional information comes to light about the existence of traditional use of ORVs for subsistence purposes on the refuge, the Service will manage this use, and will develop regulations if restrictions are needed to protect refuge resources. We also maintain our view that a larger-scope study of all pre-ANILCA activities and access would shed more light on historical use and would establish a stronger foundation for any future access regulations that may be needed. See also page-specific comment for page 2-38.	Section 2.4.8 The access section was revised as requested by the State of Alaska. We practice adaptive management. If new information regarding ORV use becomes known in the future we would take it into consideration. Should funding become available we would work cooperatively with all interested partners toward the goal of a more comprehensive and extensive study.
Page 2-5, 2.4.2, Fish, Wildlife, and Habitat Management, first paragraph. Per the general Management Policies and Guidelines in Appendix J, native fish introductions may be allowed in all management categories. If the intent here is that the refuge itself does not plan to introduce native fish, then this section should be so clarified.	Appendix J of the draft plan, Section 2.10.6(Reintroductions) states that "a species may be introduced on a refuge *only if that species is native to the refuge* (a reintroduction)." "Native species" is more thoroughly defined in the glossary

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	(Appendix I). No native fish species have been eradicated from the refuge, so reintroductions are not currently needed.
Page 2-31, 2.9, Refuge Goals and Objectives, Objective 13. Because wolves and their prey have life cycles that take them on and off the refuge, we request the objective specify that any studies will be conducted in cooperation with neighboring management agencies during both development and implementation stages.	Service policy directs us to strive to cooperate with our partners, landowners, and refuge users whenever possible. We recognize that wildlife and ecological processes do not recognize political boundaries. Since they do not recognize political boundaries, it is more important that our survey efforts be cooperative.
2-32 - we don't want to 'liberalize' bear killing. We want all bear killing banned. Stop encouraging human killers who are depraved, perverted, and of violent personalities.	See prior response to comments regarding hunting.
The proposed refuge objective to index bear abundance (#16 on page 2-32) is a start in the right direction to address concerns over a decline in bear abundance if hunting regulations are liberalized. However, to be effective, performance indicators or statistical parameters are needed to determine if bear populations have declined and subsequently to determine any effect of change in bear abundance on ecosystem processes so that management decisions are based on objective information.	We recognize the need to have data on bears within the refuge. However, obtaining a statistically rigorous population estimate of bears in a forested region is extremely difficult and currently cost prohibitive. An index would provide some information but would not be adequate for statistically assessing changes in population size. Hunting pressure on bears in the refuge is low and is unlikely to increase in the near future even if regulations are changed—given the difficulty and expense of hunting on the refuge.
Page 2-37, 2.9, Refuge Goals and Objectives, Objectives 33 and 34. We request these objectives clarify that the Service will coordinate their work with the Alaska Department of Fish and Game as a whole, and not just the Division of Subsistence. Coordination and consultation with the Division of Subsistence is appropriate and encouraged, but several other divisions may have information relevant to these objectives.	We value our partnership with the State of Alaska and its various agencies and work with them whenever feasible.
Page 2-38, 2.9, Refuge Goals and Objectives, Objective 38. While we support this objective, we would prefer that it be broadened to encompass a refuge-wide assessment of access for traditional activities prior to and following the passage of ANILCA. The methodology for a joint federal/state study is available and has been tested in other conservation system units.	We agree and would be willing to work cooperatively with all interested partners toward the goal of a more comprehensive and extensive study should funding become available.
Page 2-40, 2.9, Refuge Goals and Objectives, Objective 47. At the end of the first sentence, we request adding '..., including information from the State Office of History and Archaeology.'	Revision unnecessary. The sentence reads "…to include all known historical and archaeological sites, place names, and paleontological locality information." That would encompass the State Office of History and Archaeology.
Pages 2-42 and 2-43, 2.10, Comparison of Alternatives, Table 2.6. The table needs to be updated to be consistent with the general Management Policies and Guidelines in Appendix J. In particular, we [State of AK] note inconsistencies related to improved	A discussion of the alternatives evaluated in the draft plan is not included in the Revised Plan. This table does not appear in the final Plan.

Comment	Response
sites for docking and storing a float-equipped airplane, and off-road vehicles. For off-road vehicles, please update the preferred alternative entry to 'May be allowed on designated routes in Moderate management or by special use permit' to be consistent with text on page J-25.	
Table 2-7. We [State of AK] understand that the intent of the table is to give readers an understanding of how proposed management direction is different from current management. However, summarizing how issues were addressed in the 1987 plan, without also considering regulations and/or policies either in effect at the time or established during the life of the plan, could result in differences that would not necessarily carry forward should the 'No Action' alternative be considered. For example, the information provided in 'Collection of other plant materials for subsistence' may imply that the 1987 plan does not allow this activity, when such collection was then allowed by ANILCA. In comparing alternatives, there would essentially be no change in management direction; however, the 'Comments' column implies there is a new allowance with Alternatives B and C. To address this issue, we request the introduction to the Table (Section 2.12.1) clarify that the 1987 plan predates numerous subsequent laws and policies, so implementation of the 'No Action' alternative would not actually match the 1987 plan.	We agree, but this table does not appear in the final Plan.
Page 2-45, Table 2-7, Habitat management. The information included under Alternatives B and C is incomplete. Please revise the phrase about mechanical treatment to: 'mechanical treatment is allowed in Moderate management and not allowed in Minimal management, subject to exceptions in Appendix J under 1.3.'	This table does not appear in the final Plan.
Page 2-45, Table 2-7, Fish and wildlife species introductions. The column 'Alternatives B and C - Revised Conservation Plan,' only addresses the reintroduction of native species on the refuge. We [State of AK] recommend also including native fish introductions, fishery restoration and fishery enhancement as they also fall under this broad category.	This table does not appear in the final Plan.
We would like to see more maps showing the habitats used by 'Kanuti' salmon, bird, and other species at other times of the year to understand better what other places they depend on, and how humans enjoy and rely on them at those times. Maps showing bird banding/satellite information would be very helpful to understand the life-stage connections of the Kanuti habitats with those elsewhere.	Generalized information on species distribution is available from other sources, such as the Kanuti Land Protection Plan (available from the planning division at http://alaska.fws.gov/nwr/planning and in the ADF&G anadromous fish catalog at http://www.sf.adfg.state.ak.us/SARR/awc). More specific information is in project reports and step-down plans available from the refuge at kanuti_refuge@fws.gov.
The sand and gravel extraction are contrastingly described as being allowed only in	Sand and gravel extraction can only be allowed in Moderate

Comment	Response
Moderate Management in Table 2-7 (page 2-46).	Management.
Page 3-69, Adjacent Timber Harvest and Mining. The EA states that commercial timber harvest and mining are not allowed on the refuge. Consistent with Appendix J (see also Table 2.7), commercial timber harvest is allowed when utilized to meet management objectives and mining is allowed on valid claims. Even though, per 3.13, there are no longer valid claims on the refuge, the blanket statement is misleading. We [State of AK] recommend the following revision to the second sentence: 'The refuge does not anticipate using commercial timber harvesting as a tool to meet refuge management objectives, and the lack of mining claims on the refuge precludes mining activity. Nonetheless, if these activities...'	Commercial timber harvesting could only be allowed to meet refuge management objectives as identified in an approved fire management plan. As there are no valid mining claims on the refuge, mining is not allowed.
Page 3-104, 3.4.6, Transportation and Access, Off-Road Vehicles. In the first sentence, we request clarification that 43 CFR 36.11 prohibits the recreational use of ORVs. Similarly, we request clarification that the illegal ORV activity referenced in the second paragraph is relative to 43 CFR 36.11 and recreational use of ORVs. We also request recognition of ANILCA Section 811(b) that indirectly addresses the allowance of ORV use if traditionally employed for subsistence purposes. Alternatively, this section could simply refer the reader to page 2-9, 2.5.6 Access for a discussion of subsistence access once it has been edited for accuracy.	We clarified within the text in section 3.4.6 to indicate that 43 CFR 36.11 prohibits recreational use and that the referenced illegal ORV activity is relative to 43 CFR 36.11 and recreational use of ORVs. We have referred the reader to the Access section (2.4.8) for a discussion of subsistence access.
Section 3.4.8 on page 3-110 notes local resident concerns about potential fish habitat damage from use of air boats and shallow water jet boats. Including this statement is unnecessary since 1) we understand the primary concern is airboats and, as noted, these are not allowed per Service regulation on non-navigable waters where the Service has jurisdiction; and 2) it unnecessarily implies a documented distinction between recreation and subsistence use of motorboats. Issues listed in the Affected Environment should have some documented basis besides anecdotal comments. We [State of AK] suggest that if the Refuge perceives this as a real issue that studies be proposed.	These were concerns voiced by the public during scoping and were included in the Draft Plan for that reason. This concern was added to the fisheries objective (10).
3-104 requires business providing commercial services within refuge to submit monthly reports and verify them. The public is cheated by yearly reports - they 'forget.'	We do not believe that there is a problem with commercial service providers reporting information. Penalties for non-compliance with requirements could include revocation of current and/or denial of future permits, and thus business, to the provider. Permit stipulations for all commercial activities require permittees to keep accurate records and report client use days (listing arrival and departure dates and the number of clients in each group or activity) on or before the dates stated

Comment	Response
	in their permits; see section 3.4.7. These reports are used to compute annual client use day fees and to estimate public use. Failure to submit accurate and timely reports, with due process, is considered grounds for immediate revocation of the permit and could result in denial of future permit requests for lands administered by the Service.
Page 3-113, Figure 3-60, Arctic Interagency Visitor Center, Visitation 1989-2006. To avoid misunderstandings about the spike in visitation in 2003, we recommend the figure description point out the correlation with construction of the new visitor center.	We added the following text to the figure caption: "The increase in visitation starting in 2003 is likely related largely to the opening of the new facility that year."
Page 3-117, Outstanding Opportunities for a Primitive and Unconfined Type of Recreation. Consistent with the Kodiak CCP, and in recognition that ANILCA provides for motorized and mechanized activity in both Wilderness and non-Wilderness areas, we request the following minor revision: 'Primitive and unconfined recreation use does not require motorized or mechanized activity and occurs in an undeveloped setting...'	ANILCA clearly states that, "The terms 'wilderness' and 'National Wilderness Preservation System' have the same meaning as when used in the Wilderness Act" (section 102)." The meaning of 'primitive recreation' is clear in the history and purposes of the Wilderness Act, and in the Act's explicit general prohibition on the use of motor vehicles and motorized equipment. ANILCA allows for continued use of specific types of motor vehicles for traditional activities and motorized surface transportation traditionally used for subsistence. The Wilderness Act allows continued use of aircraft and motorboats in Wilderness areas where those uses had previously become established. However, these provisions do not change the meaning of 'primitive recreation' provided in the Wilderness Act for the purposes of describing wilderness values.
The section on predator control (page 3-70) noted that Ricketts, [Ricketts et al. 1999.] (incorrectly cited in the draft CCP) identified 'potential overharvest or overemphasis of management on game/commercial wildlife species outside of natural range of variation' as a threat in ecoregion 83 (lowland taiga in Alaska and western Yukon). When this statement is used to emphasize concern with predator management programs conducted by the State of Alaska, as it is in this section, we request the following clarifications: ▪ definition of 'natural range of variation' for moose density, given that humans have been hunting big game prey and their large predators in the Kanuti region with modern firearms and trapping wolves for over a century; and ▪ indicators or standards the refuge will be monitoring (or identified in a biological monitoring plan) to ascertain whether any degradation of ecosystem function has occurred if a predator control program is conducted.	The citation has been corrected. The section in question notes concerns regarding fish and wildlife populations and refers the reader to section 2.4.5 for additional information on Service policy regarding predator control. Section 2.4.5 outlines situations under which predator control can be considered as a management tool and indicates the need for a separate planning process and environmental assessment. It is difficult to define a "natural range of variation" for most species—given limited historical data, the effects of climate change, and other ecological and human influences. We will monitor predators and prey in accordance with the biological objectives outlined in the plan and objectives anticipated in the refuge inventory and monitoring plan.

Comment	Response
Table 6-1 page 6-9, includes the postulated question, "Is recreational use on the refuge displacing subsistence users?" We [State of AK] appreciate the Service's interest in developing a better understanding of locally- perceived concerns about displacement because making management decisions based on anecdotal reports is unwise. We recommend posing the question in a more neutral manner, such as: "What is the relationship between recreational and subsistence use on the refuge?" The corresponding "Measured Characteristics" could be framed as "Number and type of user conflicts observed or reported" and the "Sampling Procedure" would be revised to "Collect information from refuge users, guides, air-taxi operators, and staff."	We have made the suggested revision to the text.
6.1.5 Fire Management Plan, page 6-3: Suggested changes in the section to read, "A fire management plan describes how a refuge would respond in a wildland fire situation. Refuge fire management needs were classified with regard to land and resource management objectives, and resources and structure protection needs. This plan was completed in 2007."	We have revised the text as recommended.
Page 6-5: Interagency cooperation is crucial when undertaking fire management activities. The BLM Alaska Fire Service (AFS) provides fire management services for Department of Interior agencies and is in charge of detecting, monitoring, and, when appropriate, managing fires *to protect identified values or meet land and resource management objectives* on Federal lands in Alaska. The refuge's fire management officer works closely with AFS when developing fire management plans, attends AFS briefings during the fire season, and coordinates with AFS on activities on the refuge.	The Service manages fire on refuge lands in Alaska. The Bureau of Land Management–Alaska Fire Service provides suppression on refuge lands.
APPENDIX D	
Page D-5, Map entitled "Proposed Revised Statute - 2477 'Rights-of-Way'". We [State of AK] request removing the term "proposed" from the title. Obviously the CCP is not proposing these routes, nor are they "proposed" by the State. "Asserted" also has inappropriate connotations. We recommend labeling the map "RS 2477 Rights-of-Way Identified by the State of Alaska" or, as used by BLM: "State-recognized RS 2477 Routes."	No change needs to be made. The use of proposed and asserted in the text and map is consistent with our other comprehensive conservation plans.
Page D-4, Table D-1. These data on RS 2477 routes are attributed to a 1995 date. The list has since been reevaluated by the State and an updated list, circa 2001, is provided for reference in the final plan (Attachment B). No new routes have been added, but the descriptions can help supplement the discussion and complete any missing information in the Table.	The only change here is in substituting 2001 for 1995 as to DNR's data. The omitted information on the adjacent trails is due to the lack of land status off of the refuge—not the trail description.
[The Wilderness Society] agree with the Service that the identification of RS 2477 rights-of-way by the State of Alaska does not automatically make them valid; rather,	No response necessary.

Comment	Response
such claimed rights-of-way are not valid until they have been determined to be so through a legitimate process applying the proper standards. Under no circumstances may section line easements be legitimate RS 2477 rights-of-way. We appreciate the Service's attempt to disclose the States assertions regarding RS 2477.	
Page D-3, Proposed RS 2477 "Highways." This section is out of date and inconsistent with the 2006 policies issued by Secretary Norton. We [State of AK] request removal of unsubstantiated and subjective statements, such as "Roads or highways developed in these locations would increase public access, but would fragment important habitats within the refuge, seriously affecting fish and wildlife." We also recommend including a clarification about the technical term "highway" since it is at least as likely that any given RS 2477 route would be developed by the State as a trail instead of a road. Specifically, we request inclusion of the following sentence that BLM uses in its plans when discussing RS 2477 rights-of-way: "'Highways' under state law include roads, trails, paths and other common routes open to the public."	Highway is the term used in the law. No change is needed here.
Page D-7, 17(b) Easement Map. Since 17(b) easements are not necessarily reserved based on existing uses, we [State of AK] request they not be distinguished as "existing" or "proposed," as it may infer that a legal or regulatory difference exists in their respective management. If an on-the-ground distinction is warranted for certain trails, to be consistent with terminology in 43 CFR 2650, we request using "reserved" when referring to "proposed" easements.	Per the definition of "Public Easement" in 43 CFR 2650.0-5(q), use of "reserved" only pertains to existing ANCSA 17(b) easements and not to "proposed" easements.
RS 2477 Routes Identified by the State of Alaska (c. 2001) Within the Kanuti National Wildlife Refuge ▪ RST 289: Tanana-Allakaket Trail (~200 miles) The trail runs from Tanana to Allakaket. This is an historic trail, originally used as a mail route from Ft. Gibbon (aka Tanana) to Bettles. ▪ RST 450: Hickel Highway (Livengood-Sagwon)(~547 miles) The trail originates in Livengood and terminates at a landing strip in Sagwon, passing through Anaktuvuk Pass. The route was developed as an access route to the North Slope oil fields for truck transportation, and had previously been used as a winter trail. ▪ RST 1611: Bergman-Cathedral Mountain Trail (~285 miles) The trail originates in the Brooks Range near the Arctic Circle, from the site of Bergman on the Koyukuk River, to the Dalton Highway, near Cathedral Mountain. It was used as a winter supply route to mines in the Koyukuk-Chandalar region.	The historical information on routes identified by the State of Alaska under RS 2477 is not needed for this document.

Comment	Response
Routes Adjacent to the Refuge ▪ RST 105: Alatna-Shungnak Trail (~148 miles) The trail runs from Alatna to Shungnak. The route has been described as a 1920's reconnaissance for the selection of a winter route between the Koyukuk and Kobuk rivers. The trail was used by the "area Natives", prospectors and trappers to get from the Kobuk River to the Alatna River. ▪ RST 209: Bettles-Coldfoot Trail (~53 miles) The trail begins in Evansville on the Koyukuk River and terminates at the Dalton Highway, approximately 2 miles south of Coldfoot. This is an historic winter trail, which connected the town of Bettles, head of navigation on the Koyukuk River, with the mining activities on the Upper Koyukuk at Coldfoot. The route was also part of the mail trail from the Yukon River to the upper Koyukuk district. ▪ RST 308: Hughes-Mile 70 Trail (~53 miles) The trail is from Hughes to Mile 70 of the Tanana-Allakaket Winter Trail. ▪ RST # 289. This is an historic trail which served as an outlet for miners and prospectors on the lower Koyukuk River. ▪ RST 412: Slate Creek Trail (~58 miles) The approximately 100-foot wide route runs from Coldfoot to the intersection with the Hickel Highway, ▪ RST # 450. The trail was used historically as a winter access route between Coldfoot and Wiseman, and also to access state mining claims.	
R.S. 2477: Who would make the decision [about] what uses can this can be used for? Intertie for power? From natural gas turbines, etc.	No response necessary.
APPENDIX E	
Page E-4, Preparers. Brandon McCutcheon is listed as Brandon Ducsay, please note the name change.	The change has been made.
COMPATIBILITY DETERMINATIONS, APPENDIX H **Note: Compatibility Determinations are not included in this Comprehensive Conservation Plan. They have a different review period than this document and would become out of date during the life of this plan. Compatibility Determinations are available online at http://alaska.fws.gov/nwr/planning/completed.htm or from the refuge office.**	
An individual commented that pages H-6, 12, 15, 53, 68 and 80 contain, "typical outdated bibliographies used in planning for future. It is so old it is completely ineffective in making plans for the future. Using information from 10–50 years ago shows no real information that is useful for 2035."	We find references from the past are useful for current management.
We [State of AK] understand many of the compatibility stipulations are also regional permit conditions. We have brought the following comments to the attention of the Region to address in a region-wide review of permit stipulations. We provide them	The Service's regional special use permit conditions are being reviewed in a separate process and comments on them have been forwarded to those working on this task.

Comment	Response
here for your information within the context of this review. These comments address regional stipulations in the following Kanuti CDs: Subsistence and Trapping Cabins, Subsistence Harvest of House Logs , Scientific Research, Helicopter Landings, Commercial Transporter Services, Commercial Big Game Hunting Guide Services, Commercial Recreational Fishing Guide Services, Commercial Recreational Guide Services, Reburial of Archeological Human Remains.	Comments on regional special use permit conditions are not addressed here. The special use permit conditions are displayed in compatibility determinations for activities that require permits as examples only. Special conditions appear on a permit when it is issued.
When regional permit conditions are included as stipulations, we [State of AK] suggest including an introductory statement. This will help to clarify that the conditions listed are typical of issued permits and may vary relative to a specific proposal or user group, such as: 'A special use permit with stipulations is required for this use. The following are typical stipulations, some of which are necessary for compatibility.'	The requested changes have been made. The Compatibility Determinations now include the following language, *"A special use permit, with stipulations, is required for this use. In the following text are typical special use permit stipulations, some of which are necessary for compatibility."*
'The permittee will take no action that interferes with subsistence activities...' As written, this stipulation provides no allowance for accidental incidents or instances where a permit holder is not aware they are interfering with subsistence uses. For clarification and enforcement reasons, we suggest inserting 'intentionally' before 'interferes.'	This stipulation was removed from all of the CDs and retained a similar but more appropriate regional condition that addresses conflict avoidance among all user groups.
'The permittee or his/her primary users shall notify the refuge manager during refuge working hours in person or by telephone before beginning and upon completing activities allowed by this permit.' It may be useful to include more specific timeframes in which notification must occur.	See prior response about regional special use permit conditions.
General Comment - The term 'high quality' is found throughout the CDs. The inherent difficulty in defining 'high' quality is a long standing state comment and we suggest performing a word search on all CDs to remove these qualifiers when they may indicate or imply a management standard.	We removed the word "high" from the document where it modifies the word "quality." The Refuge intends to manage recreation experiences to comply with national direction to provide quality wildlife-dependent recreation programs, as described and defined in national policy (USFWS Service Manual, 605 FW 1) and the National Wildlife Refuge Administration Act, as amended. We added language that refers to the national policy defining quality wildlife-dependent recreation programs to the justification in each of the compatibility determinations for wildlife-dependent recreation uses.

Comment	Response
We [State of AK] also question the inclusion of 'pets' as a fairly frequent secondary use - both in terms of why 'pets' is considered a 'use' and also why it is so widely applicable (especially for activities such as scientific research).	Pets, in this instance, is generally meant to include dogs, as many people in Alaska travel with their pet dogs. Our intent is to make it clear that pets are allowed to accompany people engaging in these activities.
Page H-5, CD for Subsistence Activities. No stipulations are required for subsistence use, such as determining sustainability of practices through harvest monitoring, enforcement, etc. In contrast, similar activities by the small fraction of recreational hunters have such stipulations (page H-14). An explanation of these inconsistencies is warranted.	We made these conditions consistent among user groups by adding the stipulations about harvest monitoring and law enforcement to the subsistence activity CD.
Page H-5, CD for Subsistence Activities. The final paragraph in Anticipated Impacts of the Use states: 'Because a portion of Kanuti Refuge (southeastern quarter) is wind-blown and adequate snow cover usually does not remain on the ground, a great increase in intensity of snowmobile use might have to be addressed by restrictions to protect resources in this area.' We [State of AK] suggest either deleting this sentence or clarifying that snowmobile use is currently only allowed during periods of adequate snow cover and the refuge manager already has authority to announce when conditions are or are not adequate for snowmobile use on the refuge based on resource conditions per 43 CFR 36.11. Such administrative seasonal openings and closings are routinely made, for example, at the Kenai Refuge and Denali National Park and Preserve. As written, it seems to imply that an additional process may be necessary to implement restrictions on snowmobile use based on anticipated impacts due to lack of snow cover. Also, the ability to manage for adequate snow cover need not be tied to levels of use. This same comment also applies to Page H-28 in the CD for Snowmobiling.	We revised the text as recommended.
H-24 - trapping - conserving wildlife is certainly not a result of trapping. Using deceptive words like 'conservation' when you mean killing or murdering an animal is so deceptive to people who read these reports. You try to evade what you are truly doing to animals - killing and murdering them with abandon. Trapping decimates and destroys wildlife in the most horrible fashion and needs to be banned totally.	See response to the general comments about hunting and trapping.
H-26 - there is no 'justification' for trapping. None at all. It needs to be banned totally.	See response to the general comments about hunting and trapping.
Pages H-27 through H-30, CD for Snowmobiling. There is no mention of ANILCA provisions in this CD. We [State of AK] recommend including a reference to both Sections 811 and 1110(a) for context about these access provisions.	We have added the referenced legal citations to the CD.
We [State of AK] appreciate that subsistence and trapping cabins are found to be compatible (page H-31) even in light of the intent to preserve the refuge's wild character. This CD does not, however, provide a threshold of cabin abundance or	At the July meeting in Fairbanks, the refuge manager was referring to "public use cabins" as those specifically constructed for public recreational use on a rental basis (e.g.,

Comment	Response
density that would begin to threaten the wild character or other resources of the refuge. Yet in the July public meeting refuge staff reported that public use cabins would be incompatible with the refuge's 'keep it wild' philosophy. This appears to be an inconsistent and subjective treatment of uses that lacks standards for establishing an overall level of human use or cabin density that could occur while maintaining the wild character of the refuge. An objective and transparent strategy to balance refuge values can be based on factors such as a pre-determined level of user-days for hunting, fishing, trapping, recreation, etc., or the probability of encountering another group engaged in a similar activity. We believe appropriate cabin use guidelines can be established for any allowable cabin type that will protect refuge resource values while maintaining opportunities for subsistence activities on the refuge.	cabins provided by Kenai and Kodiak refuges and the National Forests in Alaska). We evaluated the need for and appropriateness of such cabins within Kanuti Refuge and have determined that there is little demand for such facilities. Further, such facilities would not be keeping the theme of 'keeping the refuge wild and natural' as requested by the public during scoping. If additional requests are made for subsistence or trapping cabins on the refuge, we will determine eligibility and need on a case-by-case basis in accordance with 50 CFR 36.33. The Service will revisit cabin regulation on a region-wide basis in the future, and the State's concerns about consistency and subjectivity can be addressed at that time.
Page H-31, CD for Subsistence and Trapping Cabins. We [State of AK] question why 'temporary camps' has been included in the 'Primary Use' sub-heading since there is no other reference to temporary camps in the document. Additionally, the CD mixes references to 'trapping cabins' and 'subsistence trapping cabins.' Trapping in Alaska is simply considered a use and is not differentiated between user groups (subsistence, commercial, recreation, etc.). Furthermore, trapping cabins are not limited to subsistence use; and conversely, subsistence cabins are not limited to trapping uses. For these reasons, we request the 'Primary Use' heading match the CD title: 'Subsistence and Trapping Cabins.' The remainder of the CD supports this change.	For consistency, we have added "temporary camps" to the text on pages H-32, H-34 and H-35, as we do permit temporary camps associated with subsistence and trapping activities. We also added "and Temporary Camps" to the CD title, and corrected the Primary Use heading to read "Subsistence and Trapping Cabins and Temporary Camps."
Page H-31, Description of Use, last sentence. We [State of AK] request 'local rural residents' be changed to 'other trappers' because use of trapping cabins is not limited to local rural residents.	We revised the referenced text as recommended.
Page H-33, Regional Standard Special Conditions. The sixth bullet states that the use of off-road vehicles is 'prohibited on Kanuti Refuge unless specifically authorized in writing in this permit.' There are no regulations 'prohibiting' subsistence ORV use on the refuge, as use of the term would imply. The regulation at 43 CFR 36.11 is apparently the basis for including this regional stipulation; however, this regulation addresses recreational use of ORVs, not subsistence use. We therefore request this condition be deleted. If subsistence use of ORVs needs to be addressed in this CD, we recommend addressing this in the Description of Use with a reference to ANILCA Section 811 and a clarifying statement similar to the following: 'Based on the Oral History of ORV Use in Appendix K, there is no known history of subsistence use of ORVs on the refuge.'	See previous response about regional special use permit conditions.

Comment	Response
Page H-52, regarding helicopter landings. Under Justification, the CD indicates the 1987 CCP states 'use of helicopters is not permitted for recreational activities; other uses require a special use permit.' The referenced page in our copy of the final 1987 CCP/EIS instead indicates helicopters 'may be permitted but only by special use permit.' We [State of AK] request the Service verify the source of the quote and make any needed corrections. In addition, the correct regulatory citation at the beginning of this section is 43 CFR 36.11(f)(4) (emphasis added).	We have deleted the sentence referencing the 1987 plan as unnecessary.
Page H-47, CD for Scientific Research. We [State of AK] agree with the statement in the Justification section that 'scientific research is not one of the specific purposes...of the Kanuti Refuge,' based on the listing of purposes in ANILCA Section 302(4)(B). However, Section 101 describes additional purposes for setting aside all refuges in Alaska, which include, 'maintain opportunities for scientific research.' We recommend including this very relevant purpose in this CD.	We revised the referenced text as recommended.
Page H-59, CD for Commercial Transported Services, Refuge Specific Special Conditions, third bullet. We [State of AK] understand and support the intent of this condition to enlist the help of commercial transporters to reduce potential conflicts between user groups on refuge lands; however, the approach is inappropriate and unenforceable. For example, it is inappropriate to suggest that non-local refuge visitors cannot camp on selected land not yet conveyed to Native corporations; these are still refuge lands subject to general public access. Also, this condition establishes de facto hunting closures with no basis in state or federal regulation. Replacing this entire condition with a refuge commitment to develop and distribute (through, in part, voluntary efforts of commercial transporters) a public use brochure is one way to address this concern and has been used successfully in other locations. Such a brochure could include how local subsistence users, non-local hunters and other refuge visitors can have a satisfying refuge experience that respects the interests of each user group, as well as outlining select state and federal regulations for the area	We agree that asking that selected lands be treated as conveyed lands is inappropriate. Selected lands are Federal property, whereas conveyed lands are private property. This error has been corrected in all compatibility determinations. A more appropriate regional special condition that addresses conflict avoidance among user groups has been substituted.
Page H-63, CD for Commercial Big Game Hunting Guide Services. The second to last paragraph in Description of Use states that the use of off-road vehicles by guides and/or their clients is 'prohibited' on Kanuti Refuge. Since regulations at 43 CFR 36.11(g) include exceptions under which ORV use could be allowed (i.e. on designated ORV trails and by permit), it would be more appropriate to indicate that ORVs 'are not authorized.' 'Use of off road vehicles (except snowmachines) is prohibited except in designated areas.' 50 CFR 36.2 specifically excludes snowmachines from the definition of ORVs. Including 'except snowmachines' in this stipulation inaccurately implies snowmachines are ORVs. We request the phrase in parentheses be removed and if necessary, snowmachine use be addressed by separate stipulation(s).	We have changed the Description of Use text to indicate that ORVs "are not authorized", as recommended. See previous response about regional special use permit conditions.

Comment	Response
Page H-67, CD for Commercial Big Game Hunting Guide Services, Refuge-Specific Special Conditions, fifth bullet. Please insert the underlined text for clarity: 'However, driftwood, standing dead trees and brush may be used for firewood, but standing vegetation may not be cut within 200 feet of streams or lake shores.'	We revised the referenced text as recommended.
Page H-86, CD for Reburial of Archaeological Human Remains per State and Federal Guidelines, Regional Condition, second to last bullet. It is unclear why this CD includes a condition prohibiting helicopter use when it can be allowed by special use permit under 43 CFR 36.11(f)(4). We request the condition be removed or reworded to reflect the regulatory allowance.	We have revised the text to reflect the suggested change. This paragraph now reads; *The use of helicopters may be authorized, provided that landing is prohibited except for the direct support of the activity covered by this permit and emergencies (no recreational use of helicopters is permitted), and no clearing of vegetation for landing/takeoff is permitted.*
MANAGEMENT POLICIES & GUIDELINES, APPENDIX J	
There were several comments about the regional management policies and guidelines. One commented, "I also urge US F&G to avoid cookie cutter management templates for our refuges. Our refuges are not McDonald franchises. They all have unique values, characteristics, and circumstances and should be managed accordingly. This means management policy and guidelines that are specifically tailored to each." "The template idea is not getting anywhere near the public scrutiny and consideration it warrants. It's coming late in the process without advance notice, on project that has not (I expect) garnered broad public participation. Please drop the template idea." Another commented, ". . . the Kanuti is not comparable to the Arctic Refuge, and I think it is entirely inappropriate to use the same management template. The apparent end product of Issue 2 is to 'ensure that refuge management actions are consistent throughout Alaska.' It is not appropriate for US F&W Service to contemplate applying to the Arctic Refuge the same management policies that it develops for the Kanuti. I don't see any management actions (with the possible exception of Wild Character for Alternative B) that are presented for Kanuti as being applicable to the Arctic Refuge. Clearly, the active management of habitat, along with ATV use, all-weather roads, constructed and maintained airstrips, campgrounds, administrative bunkhouses, sale of sand and gravel, commercial gathering of other resources, and small hydroelectric are inappropriate for the Arctic Refuge."	Management policies and guidelines for National Wildlife Refuges in Alaska are described in Appendix J. As explained in Appendix J, the primary sources of this direction are the laws governing the National Wildlife Refuge System and the regulations, policies, and other guidance—both national and regional—developed to implement these laws. Although each refuge is unique, it is only one piece of the system. These policies and guidelines help insure consistent management of the system, while allowing for individual variation among refuges when necessary. Public review of these policies and guidelines is provided in each draft comprehensive conservation plan.
[The Wilderness Society] submitted lengthy comments regarding the Statewide Management Template in our comments on the Alaska Peninsula/Becharof Draft CCP. Please refer to our Alaska Peninsula CCP comment letters for clarification of all of our concerns regarding the template, which we can forward under separate cover upon request. We have outlined a number of specific concerns regarding the template and the Kanuti CCP revision above. Overall, we continue to have concerns	We responded to those comments in our response to comments for the draft Alaska Peninsula/Becharof comprehensive conservation plan.

Comment	Response
regarding many issues related to the Template, and encourage the Service to use the Template with a degree of caution and clarify very specifically where individual refuge management direction differs from the Template.	
The Northern Alaska Environmental Center commented, "We are concerned that the FWS has included revised Management policies and guidelines in this document that have had little public review and to our knowledge no coverage in an EIS. Many of the environmental and cultural impacts of the changes in management that will be incorporated in the CCP alternatives do not receive site specific impact analysis. In particular, we are concerned that an increased focus on commercial timber harvesting could be very detrimental to salmon, migratory bird habitat and other wildlife, as well as subsistence harvest yet there was inadequate analysis of this in the plan."	While the revised management policies and guidelines received only limited public review outside of the comprehensive conservation planning process, they have been reviewed for each revised comprehensive conservation plan as part of the appropriate National Environmental Policy Act document. Site specific analysis would be conducted at the time of a proposed action for an activity with likely site-specific impacts. There are no plans for commercial timber harvesting on the refuge. As identified in Appendix J Section 2.16.4, commercial timber harvesting would only be allowed to meet refuge management objectives when an approved fire management plan identifies the need to reduce fuel loads in an area. Appropriate Federal and State of Alaska management guidelines for timber harvesting would be followed. These guidelines would ensure protection of other refuge resources and uses including subsistence harvest.
The discussion of power development by damming or in-stream structures (Appendix J, Table J-1, page J-50) seems to be a State issue if it involves navigable rivers. Refuge jurisdiction would apply where cables or infrastructure occur above ordinary high water, but this is not apparent in the table or narrative.	Service management applies to those activities over which the Service has jurisdiction. The specifics of any in-stream structures would be evaluated on a case-by-case basis. Locating a dam within the refuge would involve a number of State and Federal regulatory agencies, including the refuge.
APPENDIX M	
The State of Alaska requested that "Appendix M include a map of current fire management options. Many members of the public are either unaware that such maps are available on-line or do not have access to them."	We revised the appendix to include a map of the current fire management options.
OTHER COMMENTS	
Pg. 2-18 - 2.7.3. Fish - change word 'conserving' to 'protecting' in every instance everywhere it appears in this book. The word 'conserving' is one of those deceptive words that the animal killing industry uses to change the status of animals from living beings to widgets in factories able to be easily killed at will. It is a disgusting attempt to fool the public.	The term 'conservation' and its variants are used in the establishing legislation and mission statements under which we operate. Refer to chapter 1, section 1.2 for the Service and Refuge System mission statements and refuge purposes, all of which use the term 'conserve.' Refer also to previous response to the hunting and trapping

Comment	Response
	comment.
I remain concerned about activities beyond the borders of this refuge (whether at the boundary or not) that degrade and harm the water, air, flora and fauna, thereby harming the folks who hunt, fish, hike and other wise use the refuge. It would be refreshing to hear that refuge management will stand up in other forums and planning arenas to protect the refuge from those kinds of activities.	We are concerned about activities that occur beyond the boundaries of the refuge. It is Service policy to work cooperatively with adjacent landowners and other partners whenever possible, especially when resources within the refuge may be affected by their activities or management actions. Refer to Appendix A: Legal and Policy Guidance, Coordination with the State of Alaska, specifically section 1.2.1 (Ecosystem Approach to Management).
The State of Alaska commented, "Some aspects of the plan give an impression of unnecessary favoritism toward local subsistence users in contrast to non-local or recreational refuge visitors. While we recognize that subsistence is the predominant use of the refuge and we applaud the refuge's efforts to work with this importance constituency, we request selected revisions that avoid the appearance that that the refuge may be unnecessarily discouraging recreational users without a basis for doing so."	We have addressed this concern through revisions made in response to other more specific comments.
There were comments asking how the refuge could help contribute to the local economy. Two local residents expressed the wish to bring in more permanent residents to Bettles—not primarily hunters, but people to live there to keep the place from becoming a summer city only. Another asked, "Do your proposed management actions keep people from the villages from moving away?"	As outlined in chapter 2 (section 2.4.11 and table 2-3) the refuge proposes adding some permanent and some seasonal positions to field locations in the local communities. In two recent cases, the refuge has used the local-hire authority in ANILCA to hire local residents. Future hiring would be dependent on funding and would generally be prioritized in accordance with the needs identified in Table 2-3. In 2008, the refuge constructed a bunkhouse in Bettles to replace the one lost to fire. The refuge also operates, in conjunction with the National Park Service, a visitor information center.
Law Enforcement Program. Confine program to Alatna and Allakaket and to moderate management areas. Exclude from this program Evansville and Bettles, as these locations are primarily private lands and minimal management in the refuge area.	Refuge law enforcement activities must be applied equally to all users of the refuge.
One of the concerns I have is during hunting season is we have too many [law enforcement] planes flying over boats and stopping people out on the river to check on licenses and permits. Our people are paying $6.00 a gallon for gas and are being stopped by where they are going to hunt, and the airplane is scaring the game away. Another one is stopping by an elderly couple who are in their seventies more than	Refuge law enforcement patrol flights are normally conducted at altitudes of 1500–2000 feet above ground level—specifically so that hunters or wildlife are not disturbed. Only if violations are suspected do officers with airplanes descend and land. Refuge officers do not

Comment	Response
once. These people are proud enough to try get their own meat and are harassed by airplane flying around where they are hunting.	intentionally check hunters more than once during a season.
On the summary, there is a typo on the 2nd. Page. 'Living off the land.' First, it should be noted that airplane is used only by Bettles residents or 'outside' hunters guided by Bettles residents. 'Local residents live a partial subsistence life…' It should say local residents living at Allakaket, Alatna, and Evansville live a mostly subsistence lifestyle. . ."	The text in the summary was not intended to refer to modes of transportation used by local residents within the refuge. Rather, in an attempt to make it clear to readers that the communities are remote and not accessible by road, the text states that access to the communities is primarily by airplane, boat, or snowmachine, We should have made it clearer that local residents in Allakaket, Alatna, and Evansville live a mostly subsistence lifestyle.
Would like to encourage state to get into a Tier II situation with moose where only residents can hunt moose in GMU-24B.	Authorizing and/or implementing a Tier II hunt is not within the authority of the refuge manager. Tier II hunts may only be authorized through the Alaska State Board of Game regulatory process. Refer to the previous response to the Access and Transportation comment suggesting we change management to allow moose hunters air access to the Kanuti Controlled Use Area.

Appendix O

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O. References Cited

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Appendix P

Predator Management

This document outlines the current understanding of policy and the process the U.S. Fish and Wildlife Service would have to follow to undertake predator management on Kanuti National Wildlife Refuge (Kanuti Refuge, refuge).

The U.S. Fish and Wildlife Service (Service) is responsible for managing national wildlife refuges. As the responsible land manager for these refuges, the Service acknowledges that wolves and bears can significantly affect prey population levels. The Service considers predator management a legitimate conservation tool when applied in a prudent and ecologically sound manner, and when other alternatives are not practical. When predator management proposals or actions are in conformance with laws, regulations, and agency policies that govern management of national wildlife refuges, they would be considered by the Service. (See sections 1.9 and 2.4.5 for further discussion.)

The low abundance of moose and high abundance of wolves were raised as issues in scoping meetings for this comprehensive conservation plan. Responding to this, we have decided that we will use this appendix to outline the process necessary to consider individual predator management proposals. This would most likely be conducted in a subsequent detailed step-down plan and environmental analysis. We would consider guidelines prescribed by the legal and biological context to describe how such a step-down plan and environmental analysis could analyze a predator management proposal and what questions would likely need to be answered prior to authorizing a predator management program on a national wildlife refuge.

The Alaska Department of Fish and Game (ADF&G) is recognized as the agency with the primary responsibility to manage fish and resident wildlife populations within the state, including refuges, unless that management is superseded by Federal law. ADF&G has developed specific processes regarding the implementation of predator management programs. Any proposals for a predator management program would be evaluated in cooperation with ADF&G to ensure that they are in substantial agreement with State wildlife management plans, unless they are formally determined to be incompatible with the purposes of the refuge.

The Legal Context—What laws, regulations, and policies govern refuge decisions on predator management?

The principal Federal statutes affecting our management of predators and their prey on refuges are the Alaska National Interest Lands Conservation Act (ANILCA); the National Wildlife Refuge System Administration Act, as amended, (Refuge Administration Act); and the National Environmental Policy Act (NEPA). We follow the regulations and policies that implement those laws. Key provisions of these laws that pertain to refuge decisions on predator management follow.

1. ANILCA –ANILCA established the Kanuti National Wildlife Refuge and set forth the primary purposes for which it was established. One purpose is "to conserve fish and wildlife populations and habitats in their natural diversity…" Another is to provide, "in a manner consistent with" the conservation of wildlife populations in their natural diversity, "the opportunity for continued subsistence uses by local residents." These purposes are described in section 1.4.1.

2. Refuge Administration Act, as amended by the National Wildlife Refuge System Improvement Act of 1997 (Refuge System Improvement Act), mandates that, in administering the National Wildlife Refuge System (System) and the purposes of each refuge, the Service shall "provide for the conservation of fish, wildlife, and plants, and their habitats" and "ensure that the biological integrity, diversity, and environmental health of the System are maintained for the benefit of present and future generations of Americans." The Refuge Improvement Act and ANILCA require uses of refuges be compatible with their purposes.

The Refuge Improvement Act does not diminish the authority, jurisdiction, or responsibility of the States to manage, control, or regulate fish and resident wildlife under state law.

In 2001, to implement provisions of the Refuge Administration Act, as amended, the Service established the Biological Integrity, Diversity, and Environmental Health Policy to describe the relationships among refuge purposes; the mission of the refuge system; the biological integrity, diversity, and environmental health of refuge resources; and the resolution of the conflicts among them. Biological integrity is defined as the biotic composition, structure, and functioning at genetic, organism, and community levels comparable with historic conditions, including the natural biological processes that shape genomes, organisms, and communities (601 FW 3.6B). The policy provides guidance on maintaining these elements of diversity and on restoring lost or degraded elements of integrity, diversity, and environmental health at the refuge scale (and other appropriate landscape scales where it is feasible) and supports the achievement of refuge purposes and the System mission (601 FW 3.7D). Under this policy, the Service favors management that restores or mimics natural ecosystem processes or functions to achieve refuge purposes (601 FW 3.7E).

Wildlife populations, including predators and prey, are to be managed for natural densities and levels of variation using historical conditions as the frame of reference. Information on those conditions may be historical, archaeological, or other. Historical information can include the written—and in some cases, the pictographic—accounts of Native Americans, explorers, surveyors, traders, and early settlers. Archaeological information comes from collections of cultural artifacts maintained by scientific institutions. We may obtain other data from a range of sources including research, soil sediments, and tree rings (601 FW3.13 A).

The Biological Integrity, Diversity, and Environmental Health Policy requires that refuge managers:

A) Identify the refuge's purpose(s), legislative responsibilities, and roles within the ecosystem and the System mission.

B) Assess the current status of biological integrity, diversity, and environmental health on the refuge through baseline surveys and studies.

C) Assess historic conditions and compare them to the current conditions. This will provide benchmarks to evaluate the relative intactness of ecosystem functions and processes. The assessment should include the opportunities and limitations to maintaining and restoring biological integrity, diversity, and environmental health.

D) Consider the refuge's importance to biological integrity, diversity, and environmental health at refuge, ecosystem, national, and international landscape scales.

E) Consider the relationships among refuge purposes and biological integrity, diversity, and environmental health, and resolve conflicts among them.

F) Through the comprehensive conservation planning process, interim management planning, or compatibility reviews, determine the appropriate management direction to maintain and, where appropriate, restore biological integrity, diversity, and environmental health, while achieving refuge purposes(s).

G) Evaluate the effectiveness of our management by comparing results to desired outcomes. If the results of our management strategies are unsatisfactory, assess the causes of failure and adapt our strategies accordingly.

3. National Environmental Policy Act (NEPA)

Predator management of wolves and/or bears on national wildlife refuges is an action subject to National Environmental Policy Act (NEPA) requirements, which could require preparation of an environmental assessment (EA) or an impact statement (EIS). As part of NEPA compliance, the Service would evaluate predator management in a legal context, such as conformity with the purposes of the refuge; the Refuge Administration Act, as amended; and the Service's Biological Integrity, Diversity, and Environmental Health Policy. NEPA and other laws, regulations, and policies would require a comprehensive analysis and public involvement process prior to implementing any predator management program. Additionally, as part of the NEPA process and documentation, we would evaluate the effects of proposed predator management actions on subsistence uses and needs as required by section 810 of ANILCA.

The Biological Context— What do we need to know about predators and prey to consider requests /proposals for predator management on the Kanuti National Wildlife Refuge?

1. Consideration of requests and/or proposals for predator control on national wildlife refuges in Alaska:

The refuge manager is the Service representative who determines whether a proposed predator management program is consistent with the refuge purposes; the Biological Integrity Diversity, and Environmental Health Policy; and other laws, regulations and policies. The refuge manager would need to assess the status of predator and prey populations and their habitats in relation to their historical abundance and fluctuations. A thorough evaluation must be given to substantiate the intended benefits of any predator management efforts. Alternatives to direct control must be evaluated as a practical means of achieving management objectives. Where there is insufficient predator, prey, or habitat information to make such an assessment, population surveys or other biological studies will be needed. The Kanuti National Wildlife Refuge is presently conducting some of these studies. The need for additional studies and availability of funds for such work will be assessed by the refuge manager.

The Service favors management that relies on natural ecosystem processes or functions to achieve refuge purposes. If prey densities are determined to be significantly reduced below historical levels as a result of predation (not including human harvest) and reduction of predators would be reasonably expected to benefit prey abundance, active management may be authorized. We would also need to evaluate whether habitat conditions have been or would be a limiting factor on prey populations before implementing any active management to reduce predator populations. The refuge would also coordinate with Alaska Department of Fish and Game to determine how a predator management program on the refuge would affect current or future wildlife management plans in the region. The refuge would consider the following questions, among others, to analyze a predator management proposal:

- What roles do the subject predator and prey have in contributing to the natural diversity of the refuge? Are human influences, including landscape level changes

like global warming, altering that diversity? Are there other refuge purposes to consider?

- What are historical levels of predator and prey populations? Historic conditions are defined as the "composition, structure, and functioning of ecosystems resulting from natural processes that...were present prior to substantial human related changes to the landscape." In many parts of Alaska, less than 100 years of information would be available for analysis of historical levels.
- Humans have been and still are a part of the living and functioning landscape.
- Are habitat conditions significant in limiting prey abundance regardless of predator levels? Lack of cover, nutritional value of forage during key seasons, and abundance of trails favoring access by predators are examples of habitat conditions that could be significant for a season or a vulnerable prey age class. Assessing carrying capacity of a habitat is a daunting endeavor and may not be necessary. However, if a particular age and/or gender class of prey is considered most important to population recovery, habitat conditions affecting that class could be examined.
- Does the refuge provide habitat of regional, national, or international significance for threatened or endangered species, or other species of concern? Would predator management help in recovering these populations?

Requests received by the Service, from Regional Advisory Councils (RAC's) and subsistence users for predator management on refuges assert that predation has reduced prey populations to the extent that it is difficult for subsistence users to provide for the nutritional and cultural needs of themselves and their families. Some RACs contend that meaningful subsistence harvests of moose and caribou from refuge lands are not being provided, and therefore, the refuge purpose of providing for continued opportunities for subsistence uses justifies predator management. As previously stated, for a predator management program to be authorized on a refuge, it would need to be consistent with the conservation of predators and prey in their natural diversity. Predators will not intentionally be reduced below a level consistent with the low-end of natural population cycles. The Service would not reduce predator populations solely to provide larger populations of prey species for hunters. To assess the issue of human impact on prey populations, the refuge will likely consider the following questions.

- How does harvest by humans affect the prey population? Have levels of harvest, and their effects on the prey population, changed over time? Does this target specific age and/or gender classes to the detriment of the population?
- Have reductions in harvest by humans been attempted? Did the prey population respond?
- Have there been significant changes in local harvest of predators?

2. Implementation: Once these determinations and assessments are completed and a predator management program is initiated, associated actions and efforts would be monitored and evaluated by the Service—and adjustments made as appropriate—to meet program objectives. If the Service were to authorize predator management programs on refuges, we would either conduct the effort ourselves or cooperate with the State or private citizens as our agents. In either case, the action would be considered a refuge management activity and not subject to a compatibility determination.

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September 2008



