U.S. Fish & Wildlife Service

# Comprehensive Conservation Plan

## Summary

# Kanuti

## National Wildlife Refuge

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.

Front cover photograph: Steve Hillebrand, USFWS. *Beaver, or "noye'e" in Koyukon Athabascan, are common throughout Kanuti Refuge.*
Back cover photograph: Steve Hillebrand, USFWS. *Short-tailed weasel, called "koghozene" in Koyukon Athabascan.*

# Revised Comprehensive Conservation Plan for the *Kanuti National Wildlife Refuge* Summary

**September 2008**

Prepared by:
Region 7
U.S. Fish and Wildlife Service

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Steve Hillebrand/USFWS

## The Mission of the U.S. Fish and Wildlife Service

*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.*

## The Mission 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 Improvement Act of 1997

## The Purposes of Kanuti Refuge

*The major purposes include:*

> *"...(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 uses by local residents; and*
>
> *(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."*

Alaska National Interest Lands Conservation Act of 1980

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Wild North Photography/USFWS

# Introduction to the CCP

**What are comprehensive conservation plans (CCP)?** Comprehensive conservation plans (CCPs) guide overall refuge management. They ensure that management actions and refuge uses comply with the purposes for which a refuge was established and with other legal mandates such as the mission of the National Wildlife Refuge System. They define long-term goals and objectives toward which refuge management activities are directed.

**Why do we update CCPs?** The Alaska National Interest Lands Conservation Act (ANILCA) of 1980 as amended directs us, the U.S. Fish and Wildlife Service, to prepare, and from time to time, to revise a comprehensive conservation plan for each refuge in Alaska. This document is a summary of the 2008 revision of this plan. This CCP will provide direction for management of Kanuti Refuge for the next 15 years.

**Revising the CCP allowed us to:**

- update management guidelines according to national and regional policies and Federal laws concerning refuge management;
- incorporate new scientific information on refuge resources;
- reevaluate current refuge management guidelines based on changing public demands for the use of the refuge and its resources;
- ensure that all interested parties have an opportunity to participate in the development of management guidelines;
- establish broad management guidelines for refuge programs and activities;
- provide continuity in refuge management;
- provide a basis for budget requests; and
- provide a basis for evaluating accomplishments.

Wild North Photography/USFWS

# Refuge Description

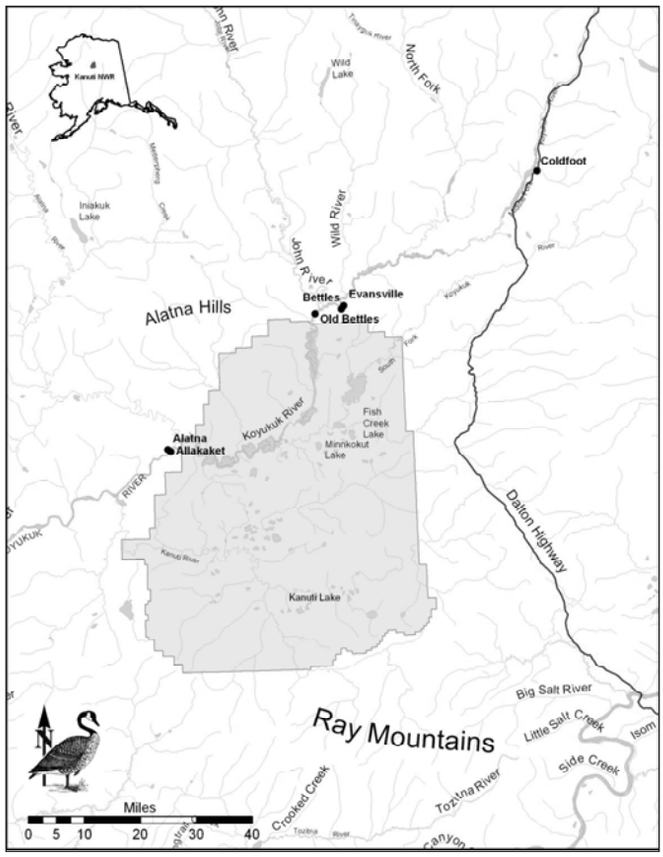
## Location

Kanuti Refuge covers 1.6 million acres and lies on the Arctic Circle nearly 150 miles northwest of Fairbanks between the Brooks Range and the Ray Mountains. It is part of a broad basin formed by the Koyukuk and Kanuti rivers. The refuge 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. Elevations range from 500 feet to over 3,000 feet.

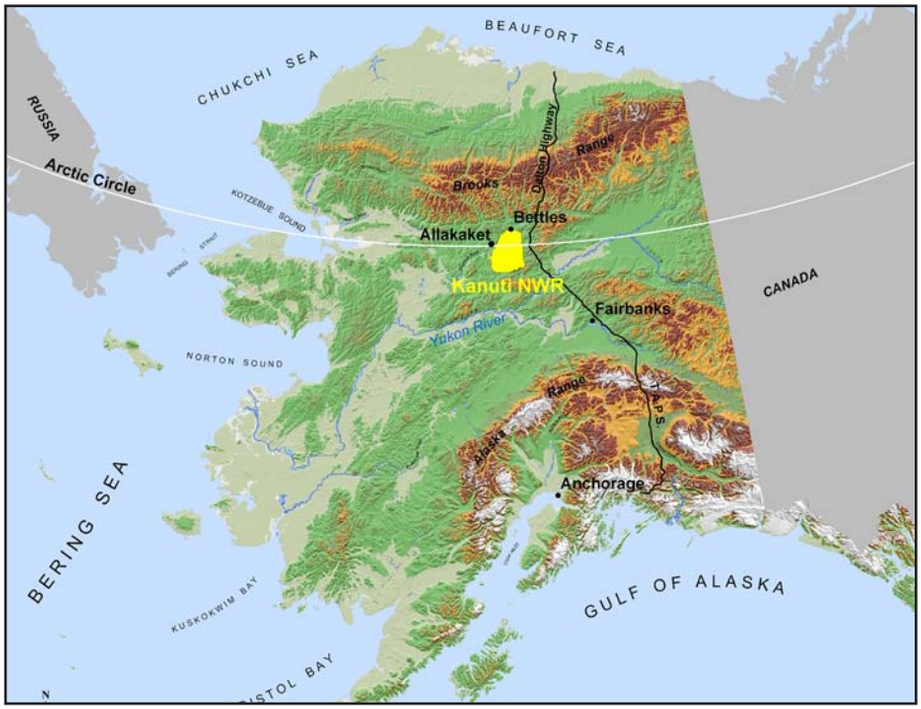
## Establishment

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 river systems in Alaska. Official agency proposals and final environmental impact statements (EIS) were completed in 1974.

Following controversy and congressional debates, President Jimmy Carter signed into law the Alaska National Interest Lands Conservation Act (ANILCA) on December 2, 1980. Section 302 of this act established Kanuti National Wildlife Refuge as part of the National Wildlife Refuge System.




*Kanuti Refuge is in close proximity to the Dalton Highway Corridor which includes the Alyeska Pipeline. During some winters, depending on snow and ice conditions, supplies can be transported to Bettles on a winter road.*



# Planning Procedures

## Requirements

We are required by ANILCA to identify and describe:

- populations and habitats of the fish and wildlife resources of the refuge;
- special values of the refuge;
- areas within the refuge suitable for use as administrative sites or visitor facilities;
- present and potential requirements for access; and
- significant problems which may adversely affect the populations and habitats of fish and wildlife.

ANILCA further requires that in each CCP we:

- designate areas within the refuge according to their resources and values;
- specify the programs for conserving fish and wildlife within each such area;
- specify the uses within each such area that are compatible with the purposes of the refuge; and
- present opportunities which will be provided within the refuge for fish and wildlife-oriented recreation, ecological research, environmental education, and interpretation of refuge resources and values.

Chris Harwood/USFWS

*Lichen on birch tree*

Bill Raften/USFWS

*The Kanuti River, called* Kk'oonootne *in Koyukon Athabascan, exhibits stunning fall colors.*

Wild North Photography/USFWS

*Great Gray Owls breed on the refuge.*

## The Planning Process

CCPs follow a process guided by planning requirements identified in ANILCA, the National Wildlife Refuge Improvement Act, the National Environmental Policy Act (NEPA), and U.S. Fish and Wildlife Service policies. In this process we:

Preplan and design the planning process

**Done: 2004**

↓

Ask public for their ideas
Identify planning issues

**Done: 2004**

↓

Develop goals, objectives, and alternatives to address the issues

**Done: 2005**

↓

Analyze impacts of and compare alternatives

**Done: 2006**

↓

Publish draft plan and environmental assessment
Ask public to review

**Done: 2007**

↓

Analyze and address public comments

**Done: 2007/08**

↓

*We are here*

Make decision and publish final plan

**Done: 2008**

↓

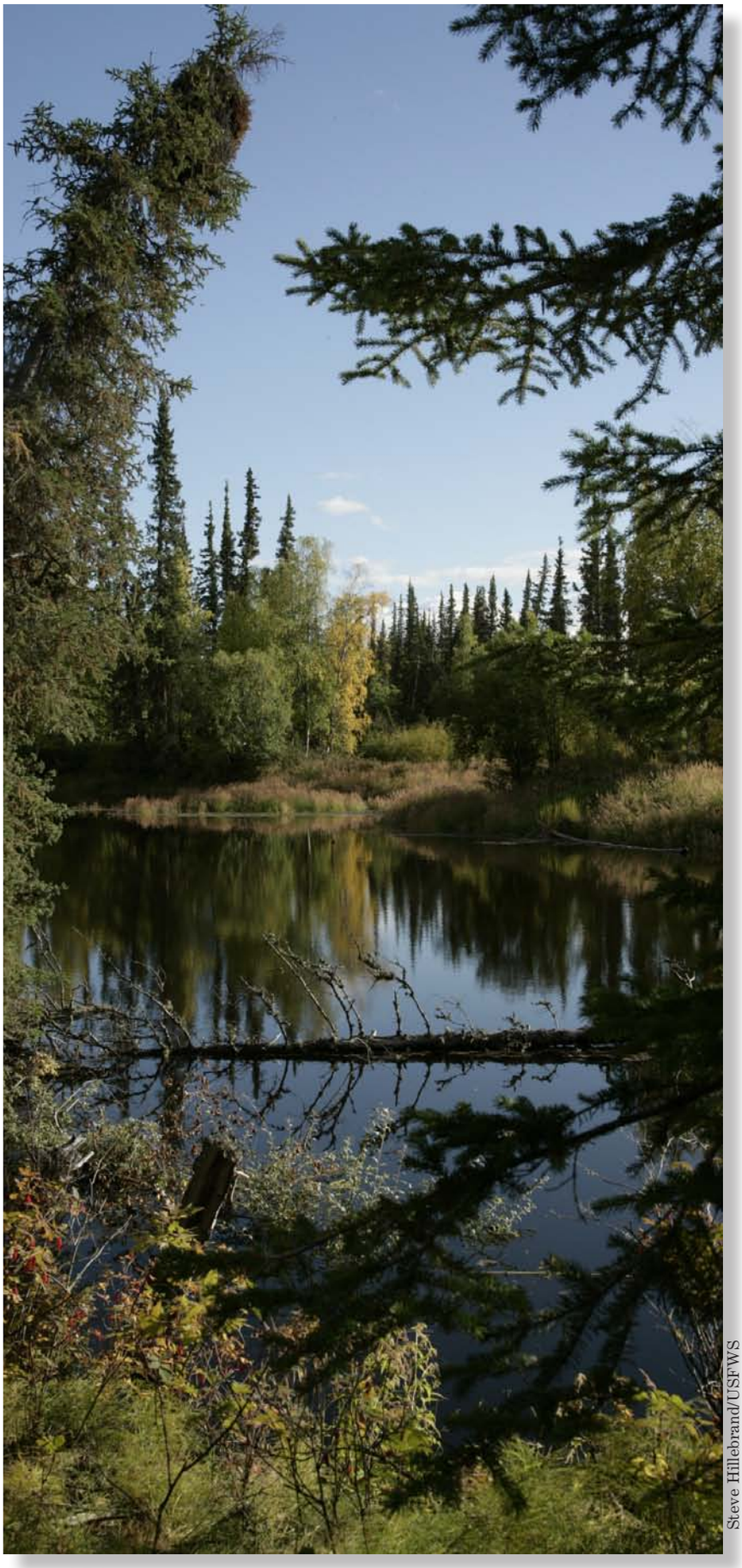
Implement the plan and monitor and evaluate it

**Starting: 2008**

↓

Review and revise the plan

**Starting: 2023 or earlier if necessary**



Steve Hillebrand/USFWS

*Kanuti River*

# Refuge Assets

Wild North Photography/USFWS

*Beaver or* noye'e *in Koyukon Athabascan are abundant on Kanuti Refuge. They play a vital role in shaping the environment.*

## Biological Resources

The refuge contains prime examples of Alaska's boreal forest ecosystem where black and white spruce, birch, and poplars are interspersed with lakes, wetlands, and open areas. The landscape is primarily shaped by fire, ice, and flooding. The refuge is home to a variety of wildlife, fish and plants that interact much as they did thousands of years ago. It provides natural lands and waters for breeding birds including ducks, geese, swans, loons, and other migrants. It provides habitat for moose, caribou, wolves, bears, beaver, muskrat, and other mammals. Rivers and seasonally flooded streams are home to several fish species among which are salmon, arctic grayling, and whitefish.

Wild North Photography/USFWS

*The climate is continental and temperatures can range from over 90 degrees Fahrenheit in summer to minus 70 degrees Fahrenheit in winter.*

Steve Hillebrand/USFWS

*An Allakaket resident harvests chum salmon on the Koyukuk River.*

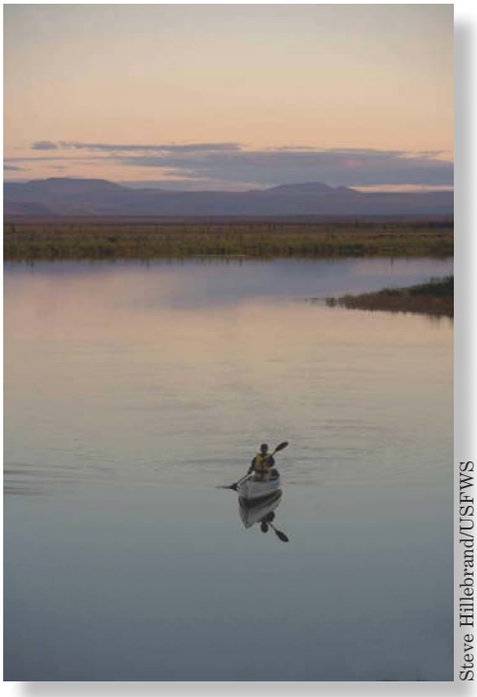
## Human Uses

There are no permanent roads or residences within the refuge. Access for visitors is limited by pathless terrain and rivers that are challenging to travel. We estimate that fewer than 20 non-local visitors use the refuge each year. They primarily access the refuge by airplanes equipped with floats or skis. The primary users of Kanuti Refuge are local residents of the four communities closest to the refuge: Allakaket, Alatna, Bettles, and Evansville. Access from the road system to these communities is mainly by commercial aircraft. Boats and snowmobiles are frequently used for local travel. About 250 people, the majority of whom are Koyukon Athabascan and Kobuk Nunamiut, live in these communities. Local residents live a partial subsistence lifestyle, relying on natural resources like moose, caribou, salmon, whitefish, ducks, and geese.

## Special Values

According to ANILCA, the U.S. Fish and Wildlife Service is required to identify and describe "special values" of the refuge. Refuge staff has determined the following features of the refuge to be of special value:

- Kanuti Canyon, a scenic stretch of the Kanuti River cutting through cliffs up to 400 feet high;
- the remote and essentially pristine character of the refuge, providing outstanding opportunities for people seeking solitude in their wilderness experience;
- the Hulgothen Bluffs, potentially containing numerous Pleistocene fossils;
- the subsistence way of life which is still actively practiced by many local residents, providing people with a livelihood which affects kinship, group cohesion as well as personal identity;
- cultural resources such as pre-Athabascan and Athabascan sites and remnants of turn-of-the-century mining activities; and
- Sithylemenkat Lake, with its sand beaches and rocky outcrops, one of the most scenic areas within the external refuge boundaries.

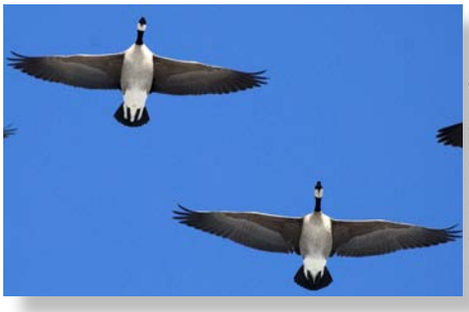


Steve Hillebrand/USFWS

*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.*

Steve Hillebrand/USFWS

*The Kanuti Canyon, or* Kk'oonootne Tlaalooł Yeet, *which means "in the throat of rocks or canyon" in Koyukon Athbascan, can be difficult to pass during low water or during extreme high water. South-facing sides of the canyon are warm and dry in summer and contain plant and bird communities not found elsewhere on the refuge.*

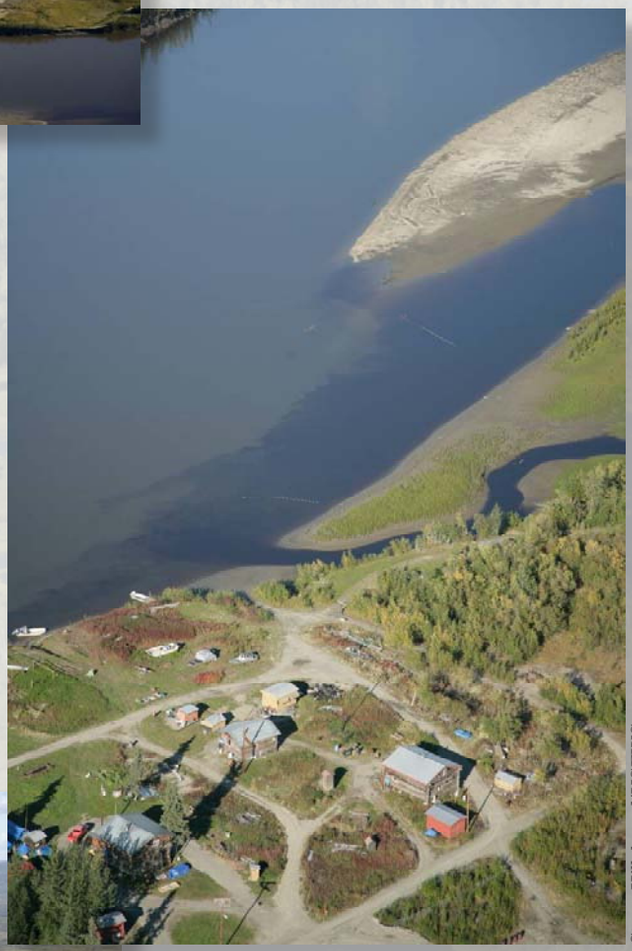


Luke Smithwick/USFWS

*Waterfowl are a highly valued subsistence resource, particularly in the spring when fresh fowl provides a welcome change in diet.*

Steve Hillebrand/USFWS

*Allakaket (*Alaakkaakk'et, *which means "the mouth of the Alatna River") is located along the Koyukuk River at its confluence with the Alatna River. The old part of Allakaket lies on the shore of the river. Allakaket is mainly a Koyukon Athabascan village.*



Steve Hillebrand/USFWS

*Buildings of the old City of Allakaket along the shore of the Koyukuk River* (Kk'ʉyetl'ots'ene) *are prone to flooding during break-up in the spring.*

Steve Hillebrand/USFWS

*The new part of Allakaket was built on higher ground after severe flooding in August 1994 washed away part of the city.*

Steve Hillebrand/USFWS

*The village of Evansville (left) and the City of Bettles (right) are two adjoining communities along the Koyukuk River between the Wild and John rivers. They are located three miles north of the refuge boundary (which intersects VOR Lake, the float plane base for the refuge in Bettles and pictured in the background).*

Steve Hillebrand/USFWS

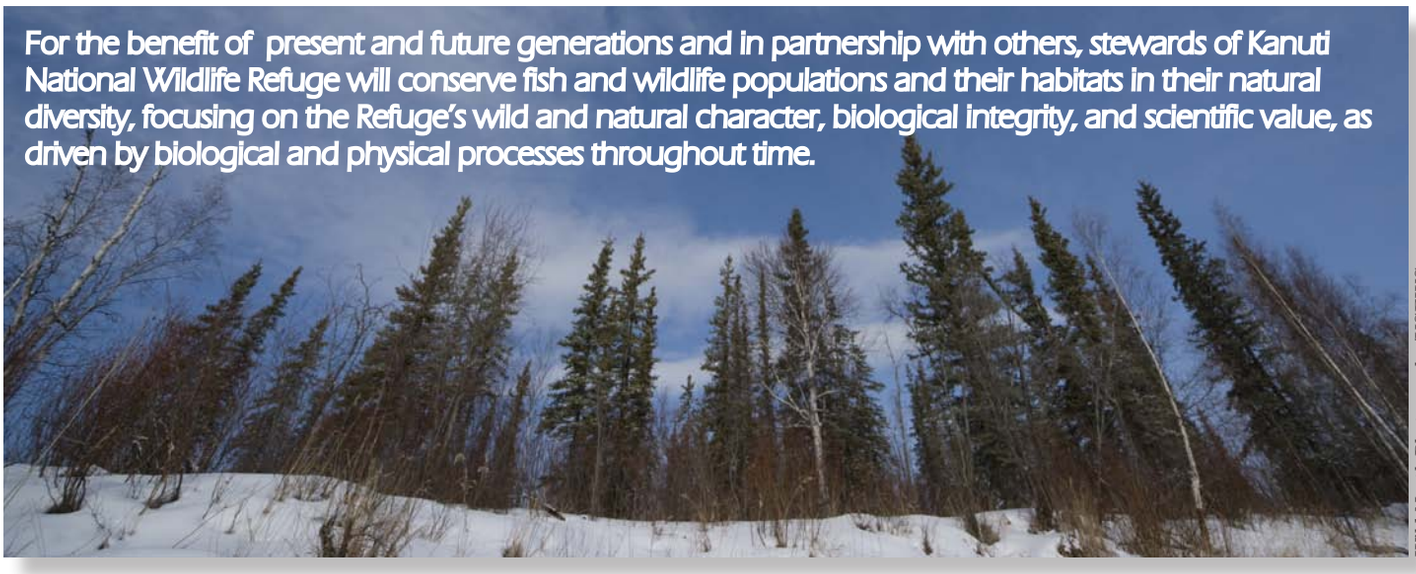
*The village of Alatna is named after the river of the same name and includes mainly descendents of Kobuk River Nunamiut Eskimos. Allakaket can be seen on the east bank of the Koyukuk River, opposite its confluence with the Alatna River. Both communities lie just a couple of miles west of the external boundary of the refuge.*

Howard C. Anderson/http://www.astroshow.com

*The nearest road-based community is Coldfoot on the Dalton Highway, 40 miles northeast of the Refuge. Kanuti staff represent the Service and the Kanuti, Arctic, and Yukon Flats National Wildlife Refuges at the Arctic Interagency Visitor Center in Coldfoot. An average of 8000 visitors stop annually.*

*Kanuti wetlands. Photo by Steve Hillebrand/USFWS*

# Refuge Vision




Wild North Photography/USFWS

# Issues

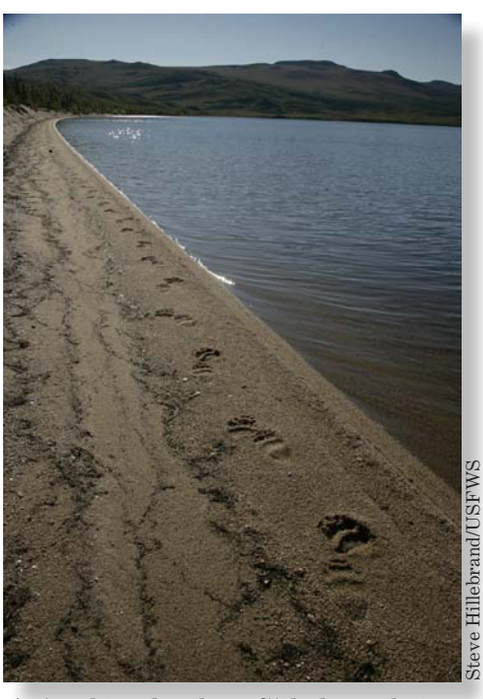
### What are Issues?

In the context of the CCP we define an issue as any unsettled matter, such as 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, we collected comments at meetings, in response to planning updates, and through visits with community elders and leaders. Issues were also identified based upon concerns by Fish and Wildlife Service staff.

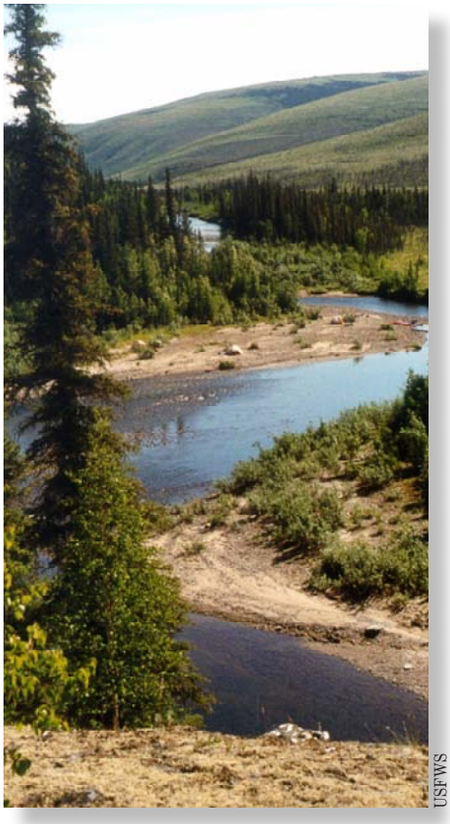
We initially identified a broad range of topics that became more focused as more information was gathered. Issues identified during the first round of public involvement were refined and clarified during later rounds.

Several issues were raised that were outside the scope of this revision process, and thus are not treated in the plan. Issues outside the scope of the plan include those a) already addressed by existing laws and policies, b) outside the scope of refuge management, and c) addressed similarly regardless of the management alternative selected.



Steve Hillebrand/USFWS

*Animal tracks along Sithylemenkat Lake*



USFWS

*The stretch of the Kanuti Kilolitna River* (Kk'oonootne Kk'eeyh Degheleetne) *where it enters the refuge, epitomizes the fundamental qualities of wilderness.*

## Kanuti Refuge Issues

We encountered two significant issues that were considered in the plan. These were incorporated into the management alternatives we developed and presented in the draft plan.

### Issue 1: Conservation of the Natural, Unaltered Character of the Refuge.

Many people expressed desire that the refuge remain in a natural, wild state. They wanted minimal intrusion on natural systems and for 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 the course of a visit. It can also mean the absence of roads, trails and towns or villages. The Kanuti Refuge is one of the few refuges in Alaska that is both roadless and without communities inside its boundaries. These characteristics help to maintain the wild character of Kanuti Refuge. Following are some 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."*

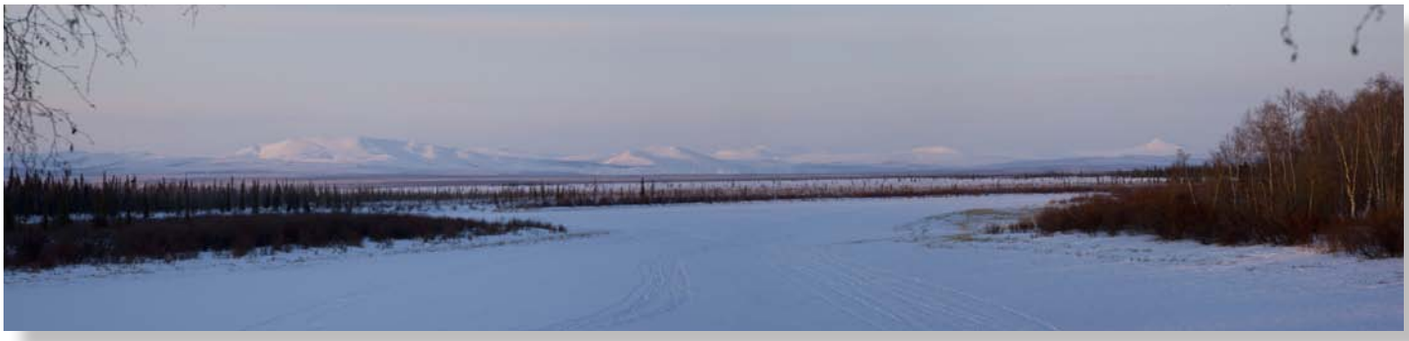
*"I would like to see you keep Kanuti wild with minimum facilities. Have something for visitors in Bettles but not on the refuge. Wildlife should come first. Isn't that why the refuge was established?"*

*"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...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."*

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

This issue came from within the Fish and Wildlife Service. The new management policies and guidelines were developed as part of the Alaska-wide refuge comprehensive planning effort. These policies and guidelines will ensure that refuge management actions are consistent throughout Alaska.

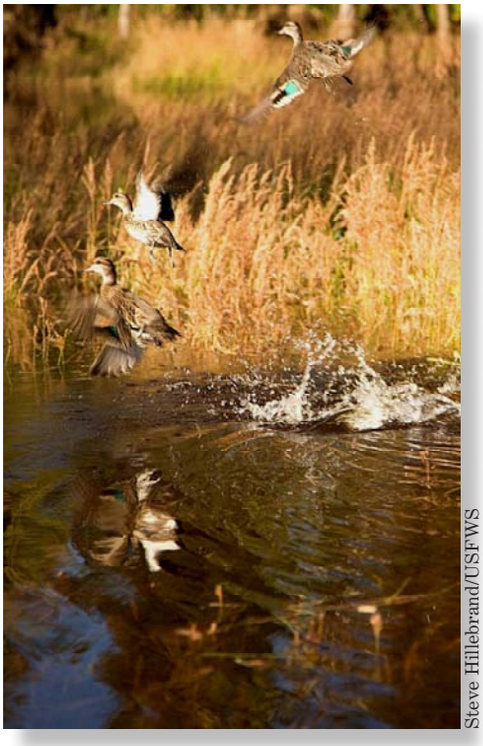


Wild North Photography/USFWS

*Winter scenery on Kanuti Lake* (Kk'oonoo Benkk'e)

## How does the Refuge address the Issues?

ANILCA requires us to designate areas within a refuge according to their resources and values and to specify programs and uses within those areas. To meet this requirement, Minimal, Moderate, and Intensive Management categories were established as part of the Alaska-wide planning effort. For each management category, appropriate activities, public uses, commercial uses, and facilities were identified. Only the Minimal and Moderate Management categories apply to Kanuti Refuge. Minimal Management maintains the natural environment with very little evidence of human-caused change. Moderate Management allows actions and uses that may result in temporary or permanent changes to the natural environment but are small in scale and do not disrupt natural processes.



Steve Hillebrand/USFWS

*Green-winged Teal* (k'etsutl) *are one of the most common ducks on the Refuge.*

**Issue 1: Conservation of the Natural, Unaltered 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.

Steve Hillebrand/USFWS

*The Kanuti Flats (left) provide a wide variety of wetland habitats for nesting waterbirds. The intervening uplands offer diverse vegetation ranging from dwarf shrub to coniferous and deciduous forest and are inhabited by numerous songbird species.*

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

The new Management, Policies, and Guidelines for National Wildlife Refuges in Alaska are governed by Federal laws (i.e., the National Wildlife Refuge System Administration Act of 1966 and ANILCA), by regulations implementing these laws, by treaties, by Service policy, and by principles of resource management. All these establish standards for resource management or limit the range of potential activities that may be allowed or authorized in the different management categories on refuges.

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

USFWS

*The Blackpoll Warbler is on the list of "Species of Special Concern" for the State of Alaska.*

## Alternatives

Federal law required that we develop a range of reasonable alternatives. Alternatives represent different management options for future actions. They are different ways to respond to issues, management concerns, and opportunities. Each of the three Alternatives we presented in the draft plan was developed with the Refuge System mission and the refuge's purposes in mind.

Our first Alternative A ("no action") was legally required and presented no difference from the Management Alternative in the 1987 plan. It designated 67 percent of the refuge within Minimal Management and 33 percent within Moderate Management. The second Alternative (B) put all federal lands within the refuge boundary in Minimal Management. Our third and preferred Alternative (C) designated 85 percent of the refuge as Minimal Management and the remainder of the refuge along and north of the Koyukuk River as Moderate Management.

The Alternatives we presented in the draft plan generated a number of public comments. 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.

Deborah Webb/USFWS

*Discussion of the draft CCP with Kanuti Refuge staff and members of the communities of Allakaket and Alatna in April 2007.*

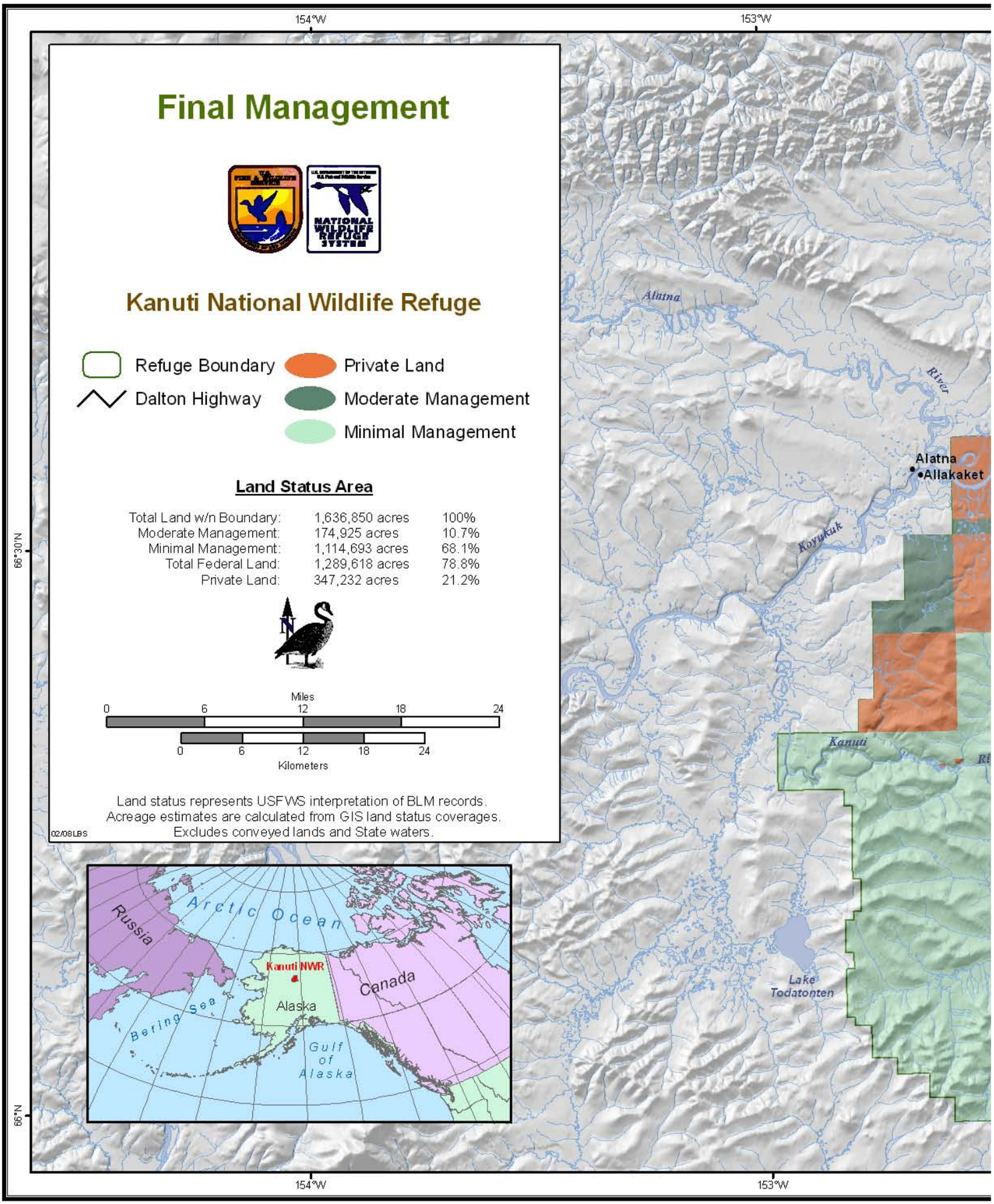
Of the commenters who preferred a particular Alternative a majority indicated that they preferred Alternative B because the entire refuge would be in Minimal Management. Slightly fewer commenters preferred Alternative C. People commented that they liked the flexibility of what may be allowed in Moderate 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.

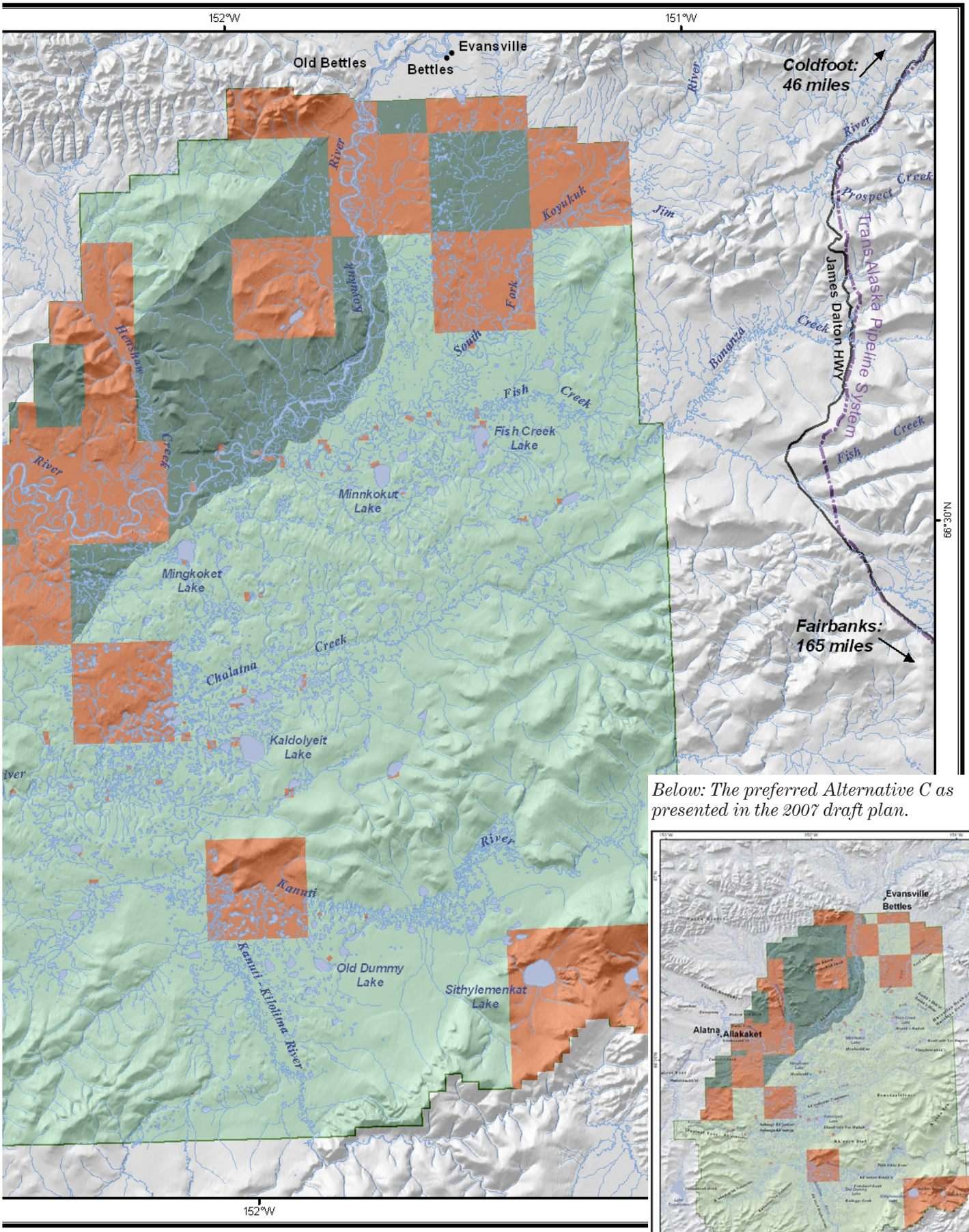
As a result of these comments we modified, and have adopted, a version of Alternative C (see maps on next two pages).

We believe that this alternative strikes a balance in maintaining the wild character over the majority of the refuge while allowing for more intensive human uses in areas near the communities.

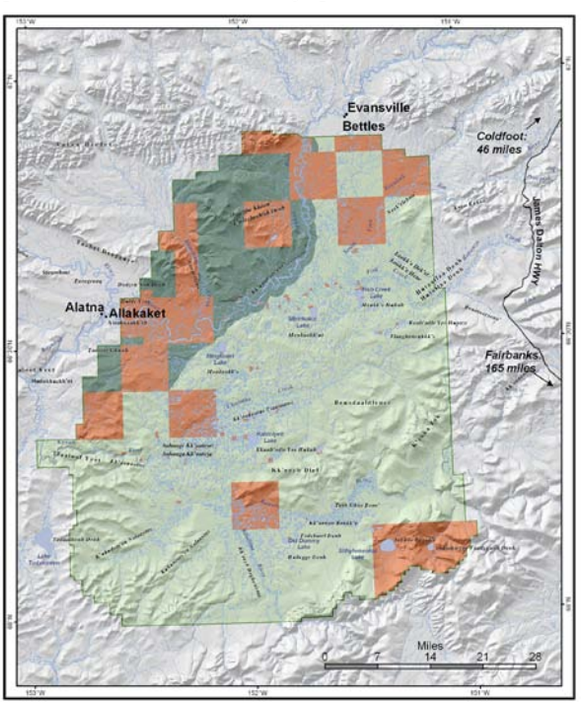
Christopher Harwood/USFWS

*Refuge manager Mike Spindler presenting the draft CCP to the Fairbanks Chamber of Commerce in July 2007.*


154°W
153°W
66°30'N
66°N
Final Management
Kanuti National Wildlife Refuge
Refuge Boundary
Dalton Highway
Private Land
Moderate Management
Minimal Management
Land Status Area
Total Land w/n Boundary: 1,636,850 acres 100%
Moderate Management: 174,925 acres 10.7%
Minimal Management: 1,114,693 acres 68.1%
Total Federal Land: 1,289,618 acres 78.8%
Private Land: 347,232 acres 21.2%
Miles
0 6 12 18 24
Kilometers
Land status represents USFWS interpretation of BLM records.
Acreage estimates are calculated from GIS land status coverages.
Excludes conveyed lands and State waters.
02/08LBS
Alatna
River
Alatna
Allakaket
Koyukuk
Kanuti
Lake Todatonten
Russia
Arctic Ocean
Kanuti NWR
Canada
Alaska
Bering Sea
Gulf of Alaska




*Below: The preferred Alternative C as presented in the 2007 draft plan.*



# Kanuti Refuge Management

Management of Kanuti Refuge will generally continue to follow the same course of action that it has previously. The new vision statement and goals (see page 31), developed specifically with low impact management as philosophy, will be incorporated. The regional management direction (see page 23 and Appendix J in the full document) will be incorporated.

Refuge management will strive to maintain the ecological integrity of the refuge with little evidence of human-caused change. Disturbances to resources from public uses, economic activities, and facilities will be minimized. Habitats will generally be allowed to change and function through natural processes. Because activities that could have been allowed under Moderate Management in the previous plan of 1987 were never implemented, the public will see little or no change from the existing situation despite changes in land classification.

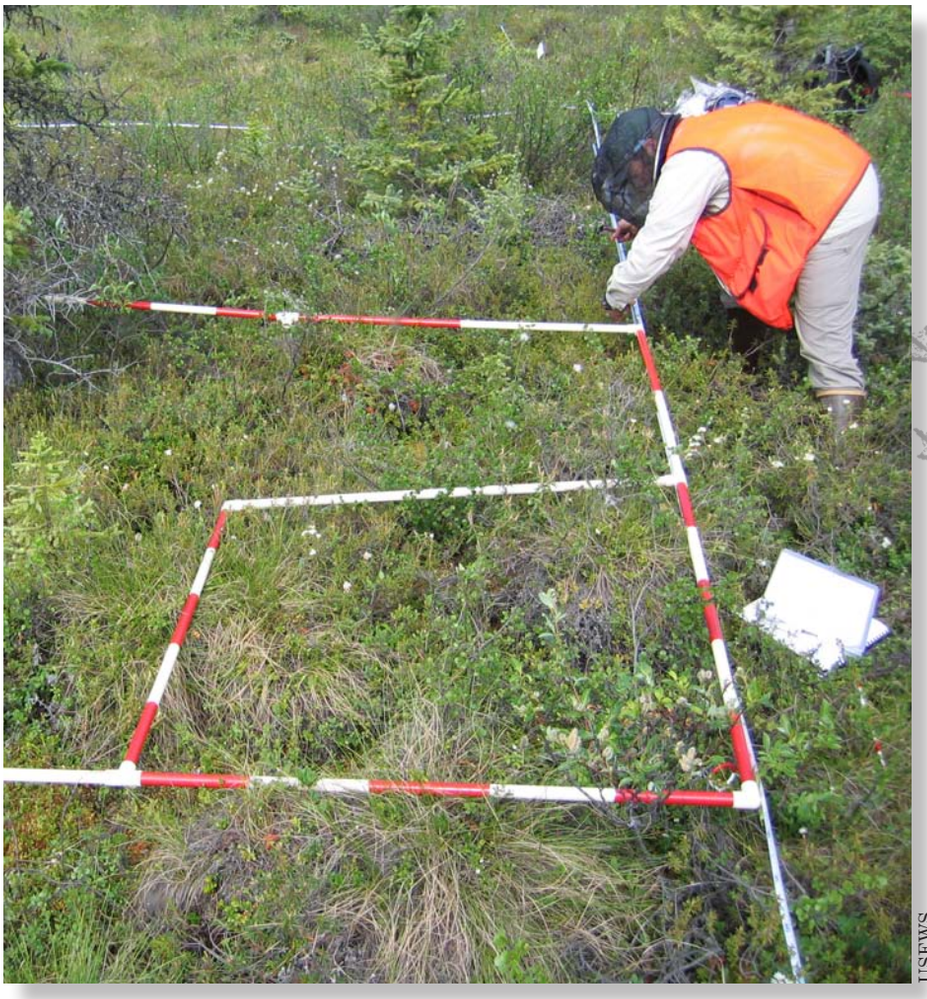
Pages 19-22 present a summary of Kanuti Refuge management followed by a management categories table which introduces specifics of the regional management direction relevant to Kanuti Refuge.

Wild North Photography/USFWS

*Trumpeter Swan taking off from a frozen lake.*

Adam Kokx/USFWS

*Sundew (Drosera rotundifolia) is a carnivorous plant. It attracts insects with its red glandular hairs which are covered in a sugary sticky substance. It is often found in bogs and marshes.*



USFWS

*Habitat management within the refuge largely includes inventory and monitoring of vegetation biodiversity.*

Christopher Harwood/USFWS

R. Craig/USFWS

*Habitat alteration resulting from fire: These two photos, taken from the same point on the Minnkokut Alaska Landbird Monitoring Survey plot in June 2003 (top) and June 2005, illustrate habitat alteration from the 2004 Clawanmenka fire.*

## Fish, Wildlife, and Habitat Management

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 mainly using manual treatments. Chemicals may be used in accordance with policy and regulations if there are no other feasible techniques available.

## 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 (where natural ignitions are allowed to burn for resource benefits), prescribed fire, outreach, eduction, monitoring, and prevention and enforcement of fire trespass. Fire management options range from "Limited Suppression" where fires are allowed to burn to benefit wildlife habitat, to "Modified Suppression," to "Full Suppression" where most fires are suppressed. All of these management options could be applied in either of the Minimal or Moderate Management categories. ANILCA requires that we manage the refuge for its natural diversity, including wildlife and habitat. In the next 10-15 years we will manage fire both as a natural process that is essential in maintaining the natural variety of vegetational development stages typical of Kanuti and interior Alaska, and also to maintain a higher proportion of habitats at the older end of the post-burn vegetation succession spectrum. The latter will allow vegetation within a specially designated area (290,000 acres in the center of the refuge southeast of Allakaket) to recover from earlier fires and will favor wildlife species that inhabit areas that have not burned for more than 80-100 years. Such areas are limited on the refuge. The Kanuti Refuge Fire Management Plan provides specific information regarding the use and management of fire on the refuge.

## Subsistence Management

ANILCA stipulates that rural Alaska residents who are engaged in subsistence lifestyles will have priority uses 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 will be allowed for traditional activities when adequate snow cover is present. Many aspects of subsistence management and harvest regulations are not within the jurisdiction of the refuge and are thus not within the scope of this plan. However, the refuge will continue to work with the State and other Federal agencies and stakeholders in harvest and resource monitoring programs to ensure the health and viability of wildlife populations.

Wild North Photography/USFWS

*Firewood is an important resource for people in the communities surrounding the refuge.*

## Predator Management

Rising public concerns about the status of moose and caribou populations prompted requests and proposals for predator control to the State, to the Federal Subsistence Board (FSB), and to individual refuges. The 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. We consider predator control a legitimate management tool provided that it is scientifically justified, used in a prudent and ecologically sound manner, and is consistent with the laws and policies governing refuge management. If these conditions occurred, predator control could be considered by the Fish and Wildlife Service. Public involvement in this process would take place through a separate planning process and environmental assessment.

Adam Koks/USFWS

*Moose* (deneege) *are an important subsistence resource. They are also sought by recreational hunters visiting the refuge. The estimated moose density on the refuge has ranged between 0.22-0.76 moose per square mile between 1989 and 2007. The lowest estimated population occurred most recently in 2007.*

Bill Raften/USFWS

*Subsistence hunters usually hunt moose along the rivers in September. The average number of days it takes a subsistence hunter to harvest a moose has increased in recent years, perhaps due to lower moose density or effects of climate change (see page 22).*

## Biological Integrity Policy

Whereas most refuges in the United States are concerned with restoring biological diversity and integrity, refuges in Alaska generally support intact ecosystems. 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 the refuge's goals and objectives. 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." Kanuti Refuge's first purpose 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.

Steve Hillebrand/USFWS

*Henshaw Creek (*Saagedleno', *which means "creek of Saagedle" [big mountain]), is an important salmon spawning stream that drains into the Koyukuk River* (Kk'ʉyetl'ots'ene) *approximately 23 miles above Allakaket and Alatna.*

Christopher Harwood/USFWS

*Wildlife Observation: The Kanuti Refuge, particularly on or along waterways like the Kanuti River, offers challenging, yet rewarding opportunities for wildlife observation and photography.*

## Public Use

There are no roads or permanent residences within the refuge. The terrain is pathless; rivers are challenging to travel. Restrictions on off-road vehicle travel within the Dalton Highway corridor just east of the Refuge limit access for visitors. We estimate that fewer than 20 non-local visitors use the refuge each year. However, the refuge does provide year-round opportunities for visitors who seek wildlife-dependent recreation in a remote environment. The refuge will continue to 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) as long as they remain compatible with refuge purposes. State regulations will govern the harvest of fish and game unless those activities are further regulated by the Federal Subsistence Board.

## Access

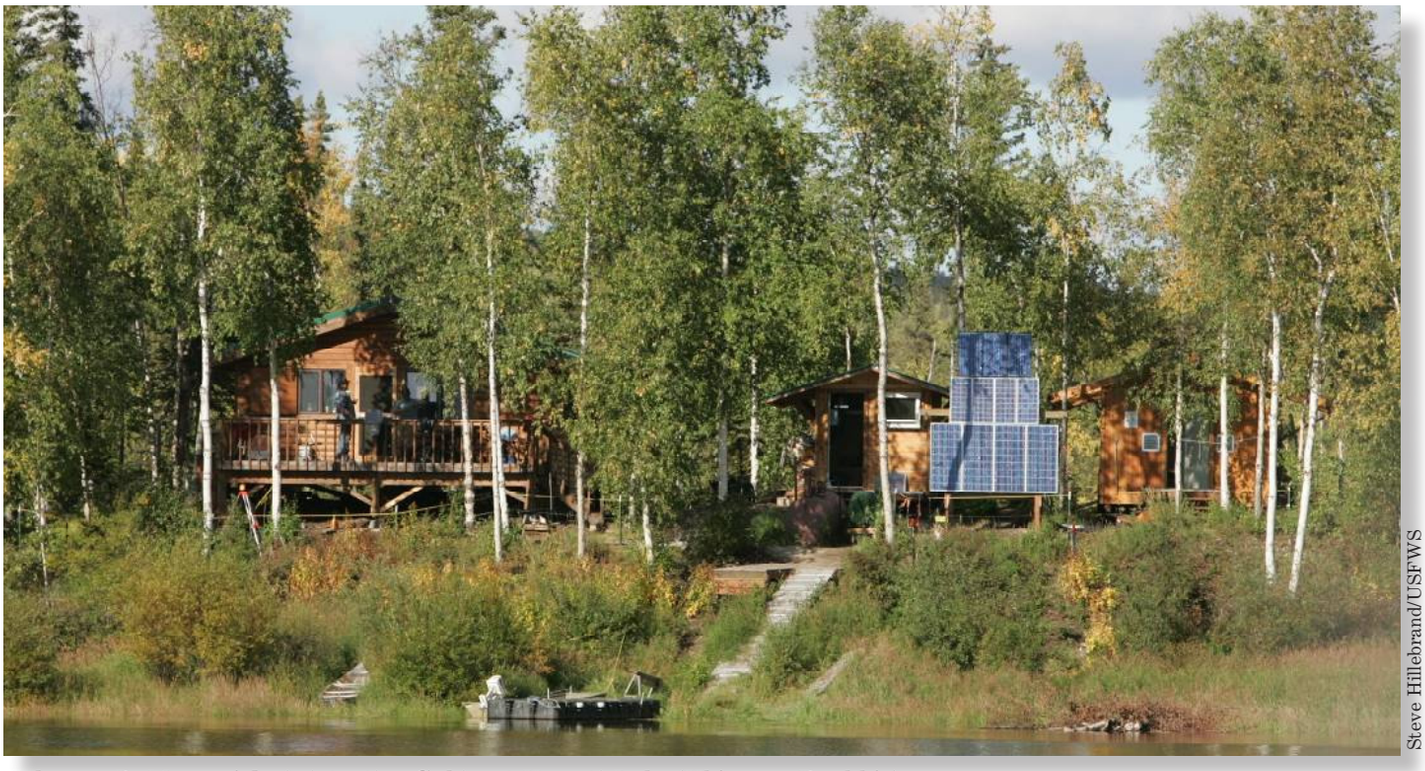
Access to the refuge from outside the local area is most frequently by chartered airplane. Fixed wing airplanes can land in many areas of the refuge, on water in summer or on ice or snow in winter. Airplane landings will be allowed throughout the refuge and will not be limited. The use of off-road vehicles (ORVs) other than on established roads and parking areas is prohibited except on designated routes or areas or with a valid permit under the Code of Federal Regulations. Currently there are no roads, no parking areas, and no 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 the Code of Federal Regulations excludes snomobiles; it includes airboats, air cushion vehicles, and other motorized vehicles. ANILCA allows appropriate use of snowmobiles (during adequate snow cover), motorboats and other means of surface transportation methods for traditional activities, and for travel to and from villages and homesites, subject to reasonable regulation. 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 the Code of Federal Regulations, including establishing refuge-specific regulations if closures or restrictions are needed to protect refuge resources.

Wild North Photography/USFWS

*Snowmobiles are allowed on the refuge on waterways and over land where snow cover is sufficient.*

## Refuge Infrastructure and Administration

Refuge headquarters is located in the Federal Building in Fairbanks. The refuge operates an airplane based at the Service hangar at the Fairbanks International Airport and maintains a storage shed, fuel storage, and airplane slip at the airport float pond. The refuge operates a sub-headquarters in Bettles, where a residence, bunkhouse, hangar, workshop, boatyard, fuel storage shed, floatplane dock and storage shed are maintained. The refuge shares office and visitor contact space with the National Park Service at a newly constructed building in Bettles. The Johnson B. Moses administrative cabin, located within the refuge at Kanuti Lake, supports field work activities. Another cabin, used as housing for summer employees working at the Arctic Interagency Visitor Center is located along the Dalton Highway approximately five miles north of Coldfoot. The Service has no plans for infrastructure projects on refuge lands.



Steve Hillebrand/USFWS

*Johnson B. Moses Administrative Cabin at Kanuti Lake* (Kk'oonoo Benkk'e)

## Climate Change

The climate in Alaska has warmed by about 4 degrees Fahrenheit since the mid-1950s, including a 7-degree Fahrenheit increase during winter in interior Alaska. Climate models project that the greatest warming will continue to occur in the arctic region. Data indicate that arctic summers are now warmer than at any other time in the last 400 years and that the snowfree period is lengthening. A warming climate will have numerous effects on habitat, hydrology, and species occurrence that could fundamentally change the boreal forest as we know it. These effects could include melting permafrost, changes in rain and snow patterns, drying wetlands, increased occurrence of wildland fire, shifts in the distribution and composition of plant communities, lengthening of plant growing seasons, changes in the ranges and breeding behavior of wildlife species, increased likelihood for invasive plant establishment, and increased possibility of wildlife disease and insect outbreaks. These changes in habitat and wildlife due to climate warming will, in turn, affect the arctic and subarctic people who rely on natural resources for food, fur, and cultural identity.

Changes in wetlands are of particular concern due to their abundance within the refuge, their contribution to the refuge's biodiversity, and their importance to numerous fish and wildlife species. Scientists found that a decrease in the surface area of closed-basin ponds in interior Alaska ranged between four and 31 percent between 1950 and 2002. These changes occurred even though there was no significant trend in the amount of total annual amount of rain and snow recorded at nearby weather stations. The authors believed that the following factors contributed to the observed changes in wetlands: increased loss of water due to both evaporation and transpiration by plants caused by warmer, longer growing seasons; melting permafrost that allows lakes to drain; and increased incidence of wildland fire that accelerates warming of permafrost.

Research and monitoring efforts can help determine the extent of climate related changes on the refuge. Since changes occur on a much broader scale than the refuge, the most appropriate role for the refuge in these investigations is likely to participate in larger, landscape-level efforts to monitor climate change and its effects on wildlife and habitats. Though there may be little that refuge staff can do to mitigate these changes, awareness of their long-term effect may result in reprioritization of issues and changes in management strategies. Communication with resource users regarding evolving information about environmental changes and discussion of potential management approaches will be increasingly important as conditions change. For example, in areas of Moderate Management we would be allowed to erect water control structures to enhance waterfowl habitat or mitigate potential wetland loss due to climate change.

## Management Categories Table

This table gives an overview, by management category, of activities, public uses, commercial uses, and facilities according to the new management direction. It has been adapted to show only activities and categories that apply to Kanuti Refuge. For the complete table refer to the full-size document.

The following are definitions of terms used in the table:

**Allowed**—The activity, use or facility is allowed under existing laws and regulations.

**May be allowed**—Activity, use or facility may be allowed subject to site-specific National Environmental Protection Act (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.

**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 the Service Manual. Hunting, fishing, wildlife observation and photography and environmental education and interpretation are considered appropriate by national policy with no further analysis required.

**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.

**Temporary**—A continuous period of time not to exceed 12 months, except as specifically provided otherwise.

**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.

Steve Hillebrand/USFWS

USFWS

Steve Hillebrand/USFWS

*Blueberries* (geege), *lowbush cranberries* (dinaaɬakk'aza) *and rosehips* (hus) *are part of the diet for people who use the refuge for subsistence.*

| ACTIVITY | MINIMAL MANAGEMENT | MODERATE MANAGEMENT |
|---|---|---|
| **ECOSYSTEM, HABITAT, AND FISH AND WILDLIFE MANAGEMENT** | | |
| **Ecosystem and Landscape Management** | | |
| **Collecting Information on and Monitoring Ecosystem Components**<br>Data gathering, monitoring and maintaining a comprehensive database of selected ecosystem components (plants, animals, fish, water, air). | Allowed | Allowed |
| **Research and Management**<br>Access and collection of data necessary for management decisions or to further science by the Service. | Allowed | Allowed |
| Access and collection of data necessary for management decisions or to further science by ADF&G. | Allowed | Allowed |
| Access and collection of data necessary for management decisions or to further science by other researchers. | May be authorized | May be authorized |
| **Research and Management Facilities**<br>May be permanent or temporary structures or camps including weirs, counting towers and sonar counters. | May be allowed | May be allowed |
| **Fish and Wildlife Habitat Management** | | |
| **Describing, Locating, and Mapping Habitats**<br>Development of quantitative, written, and graphic descriptions of fish and wildlife habitat including water, food, and shelter components. | Allowed | Allowed |
| **Habitat Management**<br>*Mechanical Treatment* Activities such as cutting, crushing or mowing of vegetation; water control structures; fencing; artificial nest structures. | Not allowed; with exceptions (see full document) | May be allowed |
| *Chemical Treatment* Use of chemicals to remove or control nonnative species. | May be allowed | 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 |
| **Aquatic Habitat Modifications**<br>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. | May be allowed | May be allowed |
| **Fire Management—Prescribed Fires**<br>Fire ignited by management actions to meet specific management objectives. | May be allowed | May be allowed |
| **Fire Management—Wildland Fire Use**<br>The planned use of naturally occurring fires to meet management objectives. | May be allowed | May be allowed |

| ACTIVITY | MINIMAL MANAGEMENT | MODERATE MANAGEMENT |
|---|---|---|
| **Fire Management—Fire Suppression**<br>Management actions intended to protect identified resources from a fire, extinguish a fire, or alter a fire's direction of spread. | Allowed | Allowed |
| **Nonnative and Pest Plant Control**<br>Monitoring, extirpation, control, removal and/or relocation and other management practices for pest and nonnative plant species. | May be allowed | May be allowed |
| **Water Quality and Quantity Management**<br>Monitoring of water quality and quantity to identify baseline data and for management purposes; includes installation of gauging stations. | Allowed | Allowed |
| **Fish and Wildlife Population Management** | | |
| **Reintroduction of Species**<br>The reintroduction of native species to restore natural diversity of fish, wildlife and habitats. | May be allowed | May be allowed |
| **Fish and Wildlife Control**<br>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. | May be allowed | May be allowed |
| **Nonnative Species Management**<br>The removal or control of nonnative species (including predators). | May be allowed | May be allowed |
| **Pest Management and Disease Prevention and Control**<br>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. | May be allowed | May be allowed |
| **Fishery Restoration**<br>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. | May be allowed | May be allowed |
| **Fishery Restoration Facilities**<br>Fisheries facilities may be permanent or temporary and may include hatcheries, fish ladders, fish passages, fish barriers and associated structures. | May be authorized | May be authorized |
| **Fishery Enhancement**<br>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. | May be allowed | May be allowed |

| ACTIVITY | MINIMAL MANAGEMENT | MODERATE MANAGEMENT |
|---|---|---|
| **Fishery Enhancement Facilities**<br>May be permanent or temporary and may include hatcheries, egg incubation boxes, fish ladders, fish passages, fish barriers and associated structures. | May be authorized | May be authorized |
| **Native Fish Introductions**<br>Movement of native fish species within a drainage on the refuge to areas where they have not historically existed. | May be allowed | May be allowed |
| **Nonnative Species Introductions**<br>Introduction of species not naturally occurring within the refuge. | Not allowed | Not allowed |
| **SUBSISTENCE** | | |
| **Subsistence Activities** | | |
| **Fishing, Hunting, Trapping, and Berry Picking**<br>The taking of fish and wildlife and other natural resources for personal consumption, as provided by law. | Allowed | Allowed |
| **Collection of House Logs and Firewood**<br>Harvesting live standing timber greater than 6 inches diameter at breast height for personal or extended family use. | May be authorized | May be authorized |
| **Collection of House Logs and Firewood**<br>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 |
| **Collection of Plant Materials**<br>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 |
| **Temporary Facilities**<br>Establishment and use of tent platforms, shelters, and other temporary facilities and equipment directly related to the taking of fish and wildlife. | Allowed | Allowed |
| **Subsistence Cabins – See Cabins** | | |
| **Subsistence Access - subject to regulations under provisions of Section 180 of ANILCA** | | |
| Use of snowmobiles, motorboats, and other means of surface transportation traditionally employed for subsistence purposes. | Allowed | Allowed |
| **ACCESS**<br>Restrictions subject to provisions of Section 1110 of ANILCA as applicable; see also Subsistence Access section above | | |
| **Foot** | Allowed | Allowed |
| **Dogs and Dog Teams** | Allowed | Allowed |
| **Other Domestic Animals** | Allowed | Allowed |

| ACTIVITY | MINIMAL MANAGEMENT | MODERATE MANAGEMENT |
|---|---|---|
| **Nonmotorized Boats**<br>Includes canoes, kayaks, rafts, etc. | 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 |
| **Off-Road Vehicles (All-Terrain Vehicles)**<br>Includes air boats and air cushion vehicles. | Not allowed; with exceptions (see full document) | May be allowed |
| **Helicopters**<br>Includes all rotary-wing aircraft. | May be authorized | May be authorized |
| **PUBLIC USE, RECREATION, and OUTREACH ACTIVITIES**<br>Also see ACCESS and Commercial Recreation sections. | | |
| **Hunting, Fishing, Wildlife Observation, Wildlife Photography, Interpretation and Environmental Education**<br>Note: All activities listed are priority public uses | Allowed | Allowed |
| **Trapping, Walking, Hiking, Camping at Undeveloped Sites, and Dog Sledding** | Allowed | Allowed |
| **General Photography**<br>See also COMMERCIAL USES. | Allowed | Allowed |
| **Outreach Activities** | Allowed | Allowed |
| **Public Use and Recreation Facilities - level of development is consistent with management intent of the category** | | |
| **All Weather Roads**<br>And associated developments including bridges. | Not allowed | May be allowed |
| **Unimproved Roads**<br>Note: while unimproved roads are not allowed in Minimal management, roads may exist. In these management categories, roads would not be designated for use or maintained. | Not allowed | May be allowed |
| **Designated Off-Road Vehicle (All-Terrain Vehicle) Trails and Routes** | Not allowed | May be allowed |
| **Constructed and Maintained Airstrips** | Not allowed | May be allowed |
| **Cleared Landing Strips and Areas**<br>Includes unimproved areas where airplanes land. Minor brush cutting or rock removal by hand is allowed for maintenance. | May be allowed | May be allowed |
| **Constructed Hiking Trails**<br>Includes bridges, boardwalks, trailheads, and related facilities. | May be allowed | May be allowed |

| ACTIVITY | MINIMAL MANAGEMENT | MODERATE MANAGEMENT |
|---|---|---|
| **Designated Hiking Routes**<br>Unimproved and unmaintained trails; may be designated by signs, cairns, and/or on maps. | Allowed | Allowed |
| **Boat Launches and Docks**<br>Designated sites for launching and storing watercraft or tying up a float plane. | May be allowed | May be allowed |
| **Visitor Contact Facilities**<br>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. | May be authorized | May be authorized |
| **Temporary Facilities**<br>Includes tent frames, caches, and other similar or related facilities; does not include cabins. See also SUBSISTENCE, COMMERCIAL USES, and Administrative Facilities. | May be authorized | May be authorized |
| **Cabins – also other related structures such as outdoor toilets, food caches, storage sheds, and fish drying racks** | | |
| **Public Use Cabin**<br>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 |
| **Administrative Cabin**<br>Any cabin primarily used by refuge staff or other authorized personnel for the administration of the refuge. | May be allowed | May be allowed |
| **Subsistence Cabin**<br>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 |
| **Commercial Cabin**<br>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 |
| **Other Cabins**<br>Cabins associated with authorized uses by other government agencies. | May be authorized | May be authorized |
| **Administrative Facilities** | | |
| **Administrative Field Camps**<br>**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 |

| ACTIVITY | MINIMAL MANAGEMENT | MODERATE MANAGEMENT |
|---|---|---|
| **Administrative Field Sites**<br>**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 |
| **Hazardous Materials Storage**<br>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 |
| **Boat Launches and Docks**<br>Designated sites for launching and storing watercraft or tying up a float plane. | May be allowed | May be allowed |
| **Radio Repeater Sites**<br>Sites used to maintain radio communications equipment; may include helispots for access. | May be allowed | May be allowed |
| **COMMERCIAL USES**<br>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** | | |
| **Guiding and Outfitting**[a] | May be authorized | May be authorized |
| **Transporting**[b] | May be authorized | May be authorized |
| **Fixed-Wing Air Taxis**[c] | May be authorized | May be authorized |
| **Mineral Exploration - see full plan for information on the Alaska Mineral Resource Assessment Program** | | |
| **Surface Geological Studies**<br>Includes surface rock collecting and geological mapping activities (includes helicopter or fixed-wing access). | May be authorized | May be authorized |
| **Mineral Development** | | |
| **Oil and Gas Leasing**<br>Leasing, drilling and extraction of oil and gas for commercial purposes. Includes all associated above and below ground facilities. | Not allowed | Not allowed |
| **Sale of Sand, Gravel, and Other Common Variety Minerals**<br>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 |
| **Other Mineral Leasing**<br>Includes the extraction of coal, geothermal resources, potassium, sodium, phosphate, sulfur, or other leaseable minerals for commercial purposes. | Not allowed | Not allowed |

[a, b, c] for definition refer to text section in full document

| ACTIVITY | MINIMAL MANAGEMENT | MODERATE MANAGEMENT |
|---|---|---|
| **Other Commercial Activities** | | |
| **Commercial Filming, Videotaping, and Audiotaping**[a] | May be authorized | May be authorized |
| **Commercial Timber and Firewood Harvest**[b] | May be authorized | May be authorized |
| **Commercial Gathering of Other Refuge Resources**[c] | Not allowed | May be authorized |
| **Transportation and Utility Systems**<br>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. | May be authorized; would require a plan amendment | May be authorized |
| **Navigation Aids and Other Facilities**<br>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. | May be authorized | May be authorized |
| **Small Hydroelectric Power Development**<br>Hydroelectric generation by low-head or instream structures that do not change the flow of the river. | Not Allowed | May be authorized |

[a, b, c] for definition refer to text section in full document

Steve Hillebrand/USFWS

*The upper Kanuti River receives scant boat traffic, it is rare that a boat wake disturbs the calm waters and reflections.*

# Refuge Goals and Objectives

The refuge vision, purposes, and management alternative provided a framework for developing goals and objectives for managing the refuge. Many of the objectives important for managing subsistence activities and public use of the refuge require monitoring or improving our knowledge of the natural resources linked to these activities. Objectives addressing baseline knowledge of refuge natural resources are mainly listed under Goals 1 and 2. Most of the objectives for subsistence or public use are listed under Goal 3 or 4, which are focused on improving our knowledge of the public's use of the refuge's resources. The ordering of the goals and objectives below is not intended to imply prioritization. Some of these objectives may not be addressed during the life of the plan, depending on funding and personnel available. Each objective is based on an in-depth and explicit rationale. Full-length rationales can be found in Chapter 2 of the full document.

## 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.

**Objectives:**

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).

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. The I&M plan will document the rationale, techniques, and schedule for routinely conducted inventories and monitoring efforts and ensures that information is collected in a biologically and statistically sound manner.

3. Complete an inventory of breeding birds and their habitats, vascular plants, fire history, and terrestrial insects within the refuge within 20 years of adotpion of the plan using an integrated plot-based approach.
*Rationale:* The refuge is mandated by ANILCA to conserve its fish and wildlife populations and habitats in their natural diversity, yet data are lacking to adequately describe this diversity. A basic biological inventory also was recommended by a panel of experts during a 2002 review of the Refuge's biological program.

4. Obtain a moose population estimate for the refuge at 1-3 year intervals, 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.

T. Cambier

*Kanuti Refuge biologist and State of Alaska Fish and Game biologist are taking measurements from a moose before collaring it.*

5. Obtain baseline information about late winter availability and use of moose forage species.
*Rationale:* Moose are an important resource in the refuge, and we currently have relatively little information on the availability and use of forage species, primarily willows. Browse information will give us a better understanding about the potential for the habitat to support growth in the moose population.

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. The plan provides management strategies and objectives that enable the Service to conserve, protect, or enhance habitats as well as address human health and safety issues.

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:* Our 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 received high priority during a 2002 review of the refuge's biological program.

8. Conduct surveys to determine if non-native, invasive plant species are becoming established on the refuge.
*Rationale:* Non-native invasive plants can out-compete native plants and often have little or no value for wildlife. Currently, non-native white sweetclover is a common plant along the Dalton Highway, and seeds of this plant could disperse along rivers crossed by the highway.

Research Institute for Fodder Crops, Ltd./Troubsko

*Non-native white sweetclover (Melilotus alba) could pose a threat to Kanuti Refuge.*

Mike Spindler/USFWS

*Measuring snow depth and density on the refuge.*

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 (1993) documents issues and concerns regarding fisheries resources on the refuge, including an objective "to determine resident fish abundance and distribution in three major drainages of the Kanuti 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 (1993). Information gathered so far does not address spawning areas on the Koyukuk River above Henshaw Creek or in tributaries of the Kanuti River. If airboat or jetboat use increases significantly cooperative studies may be undertaken 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 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 5-10 year intervals.
*Rationale:* Beaver are an important resource for large predators and people, and their water manipulation activities influence habitats 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 regular monitoring activities.

13. Estimate the number of wolves on the refuge in late winter at three- to five-year intervals.
*Rationale:* 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 and can provide hunting opportunity for humans and prey for wolves.

15. Continue long-term studies of fire effects on small mammals and vegetation to document changes through different stages of forest succession during the life of the plan or until results indicate that the population and habitat has stabilized.
*Rationale:* Both projects were started following large wildland fires in the early 1990s and contribute to the understanding of fire effects on vegetation and wildlife populations in interior Alaska.

Glenn Stout/ADF&G

*Aerial view of moose: Biologists conduct moose counts from low flying aircraft in late October to mid-November, as soon as there is a base of 10" of snow on the ground. The estimated moose population on the refuge has ranged from 588 to 2010, 1989–2007.*

USFWS

*Beaver lodge on Kanuti Refuge*

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. 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. 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 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 not only implementation, but assistance in the refinement and testing of procedures.
*Rationale:* Conservation of migratory birds in their natural diversity is part of the purposes of Kanuti Refuge. Migratory birds are also a Trust species of the Service.

Randy Brown/USFWS

*Results from studies using radio transmitters like this one on a broad whitefish* (taaseze) *showed that some whitefish within Kanuti Refuge migrate seasonally.*

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. Biologists have been concerned about a possible decline in numbers of these geese.

20. Assist USFWS-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.

21. Determine current species composition of swans on the refuge.
*Rationale:* Both Trumpeter and Tundra Swans occur on the refuge. An intensive survey of nesting swans will determine if the species representation occurs in the same proportion as it did 20 years ago.

22. Replicate (and where necessary, modify) the 1997 expanded aerial waterfowl breeding pair survey, in cooperation with USFWS-Migratory Bird Management, within the life of this plan. The survey should be conducted regularly (e.g., every five years) thereafter. The survey(s) should ensure adequate sampling for dabblers and divers/sea ducks.
*Rationale:* Waterfowl are a Trust species and specifically mentioned in the refuge's purposes. The aerial line transect surveys of breeding waterfowl, conducted annually on the refuge since 1957 as part of the North American Waterfowl Breeding Pair Survey, are likely not representative of the refuge, nor do they take into consideration the potential necessity for different survey timing for dabbling ducks and diving/sea ducks.

Wild North Photography/USFWS

*White-fronted geese* (k'edot'aagge')

USFWS

*Northern Pintail* (k'edzonule)

Luke Smithwick/USFWS

*Hudsonian Godwit*

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:* Examples of such species 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.

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:* Little is known about temporary habitats for inland migrants and/or breeders. Also, populations of some boreal forest-breeding shorebird species are declining on a continental level. Investigation of habitats used and development of monitoring techniques will contribute to a more complete inventory of shorebirds and their habitats within the refuge.

25. Design and implement a long-term waterfowl and waterbird production survey on the refuge.
*Rationale:* A long-term study could provide information on relative abundance, productivity, survival, mortality, and habitats of waterfowl and other waterbirds and may be indicative of changes in the ecosystem, caused for example, by climate change.

Adam Kokx/USFWS

*Northern Shoveler nest*

## Goal 2: Ensure the natural function and condition of water resources necessary to conserve fish and wildlife populations and habitats in their natural diversity.

**Objectives:**

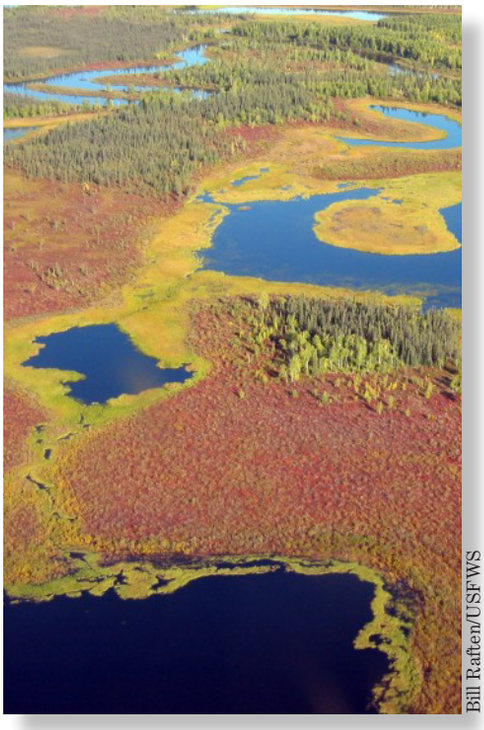
26. Develop a water resource inventory and assessment study plan in conjunction with the Service's Water Resources Branch within the life of this plan.
*Rationale:* This will aid in identifying and coordinating water research and data collection efforts on the refuge and will provide baseline water quality and quantity information. It will help our understanding of the significance of the hydrologic cycle in the refuge ecosystem.

27. At the conclusion of the initial assessment, evaluate the need to continue monitoring streamflow and/or water quality conditions to support research or management objectives.
*Rationale:* Sufficient water quality and quantity is critical to support fish, wildlife, and plants on the refuge. Few data are currently available about water resources.

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:* Lakes and wetlands within refuge boundaries need to be described, including the plants and wildlife dependent on them, and a baseline for comparison for future conditions needs to be established.

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:* Waters flowing through the refuge need to be described, including the natural hydrologic processes that create the dynamic habitats necessary to support the plants, wildlife and fisheries on the refuge.

30. Assess the feasibility of developing a hydrologic model for the refuge.
*Rationale:* A hydrologic model would allow the refuge to track and predict changes in water resources, such as may be caused by climate change, and evaluate the effect of these changes on fish, wildlife, plants and people.


Bill Raften/USFWS

*Fall colors around wetlands on Kanuti Refuge*

Bill Raften/USFWS

*The confluence* (Hʉdokkakk'et) *of the Kanuti River and the Koyukuk River is about 16 miles below Allakaket and Alatna and just outside of the refuge.*

Luke Smithwick/USFWS

*Spring harvest of waterfowl is considered a customary and traditional part of subsistence and has been legalized with a recent amendment to the Migratory Bird Treaty Act.*

Steve Hillebrand/USFWS

*Fishcamp after season: Salmon fishing occurs from July through September, then the emphasis shifts toward whitefish until ice starts flowing in October.*

Steve Hillebrand/USFWS

*Blueberry abundance varies from year to year.*

## Goal 3: Provide opportunities for local residents to pursue their subsistence lifestyle.

**Objectives:**

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 communities are the most effective forum for reviewing Federal subsistence harvest regulations 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/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 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:* 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 as well as 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 us to conserve migratory birds for continued subsistence use and document traditional migratory bird harvest levels. 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.

## 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.

**Objectives:**

35. Review methods of monitoring levels and types of public use, and implement new methodology if determined appropriate.
*Rationale:* Accurate public use data is a critical component in evaluating existing levels of service to the public, and in 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 which 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 and 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.

Steve Hillebrand/USFWS

*Most local residents use outboard motorboats for river travel. Much of the Koyukuk River* (Kk'ʉyetl'ots'ene) *is easy to navigate, but even wide, long stretches can be challenging during low water levels because of submerged sandbars.*

USFWS

*Most non-local visitors travel rivers within the refuge by inflatable raft, canoe, or small motorized boat. Camping along one of the many rivers within the refuge is a unique and memorable experience.*

Steve Hillebrand/USFWS

*Commercial air taxi operators and transporters provide the most common means of access for recreational visitors.*

## Goal 5: Provide outreach, environmental education, and interpretive programs to develop/increase a sense of stewardship for wildlife, cultural resources, and the environment, and to enhance visitor experiences on the refuge.

Steve Hillebrand/USFWS

*The Kanuti Refuge provides U.S. Fish and Wildlife Service representation at the Arctic Interagency Visitor Center in Coldfoot.*

**Objectives:**

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.

41. Continue to provide the public with timely and accurate information about the refuge through a wide variety of communication tools; re-evaluate the tools utilized and update and correct information at least twice annually.
*Rationale:* Currently the refuge utilizes a variety of communication tools (e.g., an internet website, newsletter, brochures, etc.). These tools can provide the public with accurate 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:* The Arctic Interagency Visitor Center is located in the Dalton Highway Corridor and in recent years, has hosted more than 8,000 visitors annually. It presents an invaluable opportunity to inform the public about all aspects of the Kanuti Refuge.

Mike Spindler /USFWS

*The visitor facility in Bettles shared with the National Park Service is as close as many people will ever come to the refuge.*

Barry Whitehill /USFWS

*Refuge staff assisted young hunters at the FWS-sponsored Steel Shot Clinic in Allakaket in 2005.*

Mike Spindler /USFWS

*The bunkhouse in Bettles was built in cooperation with the National Park Service in 2008.*

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 provides opportunities to inform the public, and to build community support for the refuge.

44. Expand opportunities for individuals, organized groups, and families to learn about the refuge through activities including environmental education programs, nature walks, and interpretive programs.
*Rationale:* Such opportunities can prepare visitors to have safe and enjoyable experiences on the refuge, as well as educate a variety of 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 general public.

46. Work closely with the National Park Service to operate and maintain the bunkhouse and other facilities built in Bettles in 2008 to replace the facility that burned in January 2004.
*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 facilites 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.

**Objectives:**

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 Kanuti 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 and the quality of work completed.

49. Update the refuge's Cultural Resources Guide by 2011 (15 years after it was first completed).
*Rationale:* 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 or 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, historical 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 as well as the refuge, recognizing the significant role of local people in the natural and cultural heritage of the refuge.

Adam Kokx/USFWS

*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 (~1½") and we assume that it may have been used for fine skin work by the ancestors of the Koyukon people roughly 1,000 years ago.*

USFWS

*Pump and pulleys at the Union City Townsite - remnants of turn-of-the-century mining activities on the refuge.*

# 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 staffers were assigned to the Kanuti Refuge but shared among Kanuti, Arctic, and Yukon Flats Refuges. In addition, a fire management officer (FMO), and 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 Fairbanks-based refuges. Additional law enforcement officers at Arctic and Yukon Flats Refuges assist Kanuti Refuge when needed. Kanuti Refuge's base budget in FY2008 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 CCP Goals and Objectives, and Refuge Operational Needs System (RONS) to accommodate anticipated increases in subsistence and recreational demands.

Currently identified essential staffing, mission-critical projects, and an increase in recurring base funds to implement projects include: (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 will be combined with a biologist, manager or maintenance worker; it may be based in Bettles or in 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 in Fairbanks;
- An increase of $72,000 to provide for and support a general biologist for aquatic environments to address important objectives in this plan; and
- 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 2,900 hours of service. The refuge was fortunate in 2008 and it is not likely that this level of volunteer assistance will be sustainable in the long-term. It is more likely that some of these duties will have to be performed by paid employees or that the projects will be put on hold.

| 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** | 9.6 | 15.1 |
| **Permanent Part-Time (PPT) assigned to Kanuti** | 1 | 2 |
| **Permanent Full Time Kanuti NWR employees not shared with other Fairbanks-based refuges:**<br>Refuge Manager/Pilot<br>Deputy Refuge Manager<br>Lead Wildlife Biologist<br>Wildlife Biologist (Avian)<br>Administrative Support Assistant<br><br>**Long-term positions to be added (RONS proposals):**<br>Airplane Pilot/Park Ranger or Airplane Pilot/Biologist - PFT- Bettles or Fairbanks<br>Maintenance Worker - PFT - Bettles<br>Interpretive Park Ranger or Outreach Specialist - PFT - Bettles<br>Biologist (aquatics or fisheries) - PFT - Fairbanks<br>Refuge Information Technician - PPT- Allakaket or Alatna[b] | 5 | 9.5 |
| **Permanent Kanuti NWR employees shared with both Yukon Flats and Arctic NWRs:**<br>Administrative Officer<br>Fire Management Officer<br>Assistant Fire Management Officer - PFT - Fairbanks<br>Fire Management Specialist - PFT - Fairbanks<br>Interpretive Park Ranger (Coldfoot - PPT - 24 hr./week)<br><br>**Long-term positions to be added (RONS proposals):**<br>Office Automation Clerk - PFT - Fairbanks | 4.6 | 5.6 |
| **Permanent Yukon Flats NWR employees shared with both Kanuti and Arctic NWRs:**<br>Subsistence Coordinator<br>Law Enforcement Officer | 2 | 2 |
| **Permanent Arctic NWR employees shared with both Kanuti and Yukon Flats NWRs:**<br>Information Technology Specialists (2)<br>Maintenance Worker/Pilot<br>Law Enforcement Officer | 4 | 4 |
| **Seasonal Employees assigned to Kanuti NWR**[c] | 2 | 4 |
| **Seasonal Volunteers assigned to Kanuti NWR**[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 the Tribe rather than filled as a Service employee.

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

# Implementation and Monitoring

## Step-down Plans

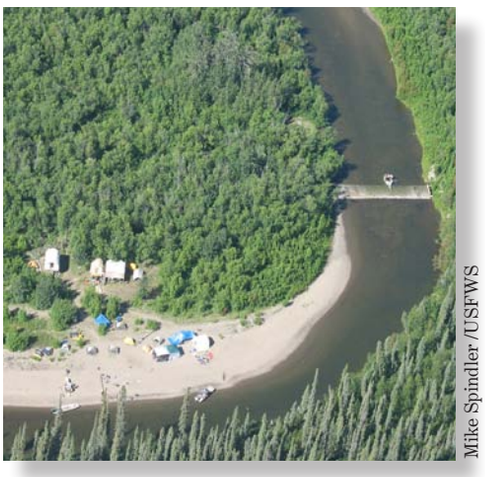
Implementation of the Kanuti National Wildlife Refuge Comprehensive Conservation Plan will be accomplished, in part, through various step-down plans, each with its own program focus. Step-down plans deal with specific management strategies and implementation schedules and provide details necessary to implement management strategies identified in the CCP. Step-down plans for Kanuti Refuge include the following:

### Fisheries Management Plan

The 1993 Kanuti Fisheries Management Plan (FMP) 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 goals, provides objectives for each goal, and lists tasks designed to meet the objectives. Many of the 11 objectives listed in the 1993 FMP have not or only partially been addressed. Progress has been made in the following areas:

- monitoring escapement of salmon stocks with the operation of Henshaw Creek weir;
- determining resident fish abundance and distribution in three major drainages using radio telemetry in whitefish; and
- monitoring and evaluating subsistence harvest of fish species within the refuge.

The FMP is to be updated every five years.



Mike Spindler /USFWS

*Kanuti Refuge cooperates with the Office of Subsistence Management, Fisheries Resources, and Tanana Chiefs Conference to support a salmon escapement monitoring project at the Henshaw Creek fish weir.*

### Inventory and Monitoring Plan

An Inventory and Monitoring plan (I&M plan) consist of two main components:

- a discussion of a refuge's biological priorities and objectives and how these were determined; and
- protocols for meeting these priorities and objectives.

The refuge does not have an I&M plan, but it is scheduled to be completed by 2009. Biological priorities were discussed during a 2002 review of the refuge's biological program which will form the basis for the discussion portion of the I&M plan.

Christopher Harwood /USFWS

*Spruce Grouse*

### Cultural Resource Guide

The 1996 Cultural Resource Guide assists refuge staff in meeting legal requirements to protect and manage the cultural resources of the refuge. It describes the current state of knowledge of the prehistory and history of the region and outlines roles and responsibilities. It includes a list of projects that would fill in gaps in knowledge or complete existing work. This guide is to be updated in 2012.

### Environmental Education and Interpretative Plan

The 1992 Environmental Eduction and Interpretative (EE&I) Plan gives guidance to refuge staff regarding educational and outreach programs. It describes efforts within the communities near the refuge, specifically within schools. This plan will be rewritten after the completion of this Comprehensive Conservation Plan.

Wild North Photography/USFWS

*Windswept snow surface*

### Fire Management Plan

The Fire Management Plan describes how the refuge would respond in a wildland fire situation. Refuge fire management needs have been classified with regard to land and resource management objectives, and resource and structure protection needs. This plan was completed in 2007.

### Land Protection Plan

The 2002 Kanuti Refuge Land Protection Plan focuses on private lands within the refuge boundaries with the goal of identifying and conserving high-quality habitat on those lands. Land conservation measures will be pursued only with landowners who are willing to work with the Service. The refuge and landowners are not obligated to undertake any of the measures identified.

### 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. All plans are reviewed annually.

### Water Resources Inventory and Assessment: Plan of Study

This plan guides a six-year inventory and assessment of the water resources on 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.

### Environmental Management Plan

This plan was updated in 2005 and then again in 2008. It identifies and ranks field station activities, products, and services that affect the environment, and it sets goals and measurable targets to improve environmental performance relative to field station operations and impacts.

### Spill Prevention, Control and Countermeasure Plan

This 2000 plan outlines the procedures, methods, and equipment used at the refuge to comply with Environmental Protection Agency oil spill prevention, control, and countermeasure standards. This plan is reviewed every three years by the Regional Spill Coordinator.

Steve Hillebrand/USFWS

*Horsetail is widespread in the boreal forest.*

Wild North Photography/USFWS

*Red fox hunting for voles under the snow.*

## Partnership Opportunities

The CCP implementation process also includes identifying partnership opportunities that may assist in accomplishing refuge objectives. 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. We recognize that the public, organizations and other governmental agencies have interests in the refuge. Implementation of many refuge programs requires involvement from these interested parties. Among others, refuge staff has coordinated activities with the following:

- State of Alaska
- Other Federal Agencies (e.g., National Park Service, Bureau of Land Management)
- 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 (e.g., Friends of Alaska National Wildlife Refuges, Alaska Natural History Association, Ducks Unlimited, Alaska Bird Observatory, Friends of Creamer's Field)

Luke Smithwick/USFWS

*Aerial surveys of wolves and their tracks to estimate wolf abundance on the refuge are done in cooperation with the Alaska Department of Fish and Game (ADF&G).*

Steve Hillebrand/USFWS

*The Arctic Interagency Visitor Center in Coldfoot, which opened in 2003, is operated by the Bureau of Land Management in cooperation with the National Park Service and the Fish and Wildlife Service.*

Friends of Alaska National Wildlife Refuges

*Members of Friends of Alaska National Wildlife Refuges and Americorps, in cooperation with the Bureau of Land Management, the National Park Service, and the Fish and Wildlife Service have helped fight invasive weeds on the Dalton Highway to reduce risks to the refuge.*

## 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. Many of the objectives in refuge step-down plans involve collection of baseline data that may lead to additional monitoring efforts. The step-down plans will provide detailed methods and frequencies for inventory and monitoring activities.

Wild North Photography/USFWS

*Muskrat* (bekenaale) *on Kanuti Refuge*

Steve Hillebrand/USFWS

*Refuge scenery*

## Plan Amendment and Revision

Periodic review and revision of this comprehensive conservation 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 uses, 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 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, anticipate potential problems, and 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 conservation plan will occur every 15 years.

Luke Smithwick/USFWS

*The wood frog* (noghuye) *has the ability to freeze as much as 35 to 45 percent of its body during the cold winter months.*

U.S. Department of the Interior

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http://www.fws.gov
http://alaska.fws.gov/nwr/planning/index.htm
http://alaska.fws.gov/nwr/planning/kanpol.htm
http://alaska.fws.gov/nwr/kanuti/index.htm

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