

Kanuti National Wildlife Refuge Annual Report

Fairbanks, Alaska
Calendar Year 2006



S. Hillebrand photo

Refuge Manager

Date

Refuge Zone Supervisor

Date

Regional Office Approval

Date

Kanuti National Wildlife Refuge: The Year 2006 at a glance...

Calendar Year 2006 again marked a busy year for the Refuge. Deputy Refuge Manager Fox and Wildlife Biologist/Planner Webb joined the staff in early spring and collaborated with Refuge Manager Spindler and Wildlife Biologist Saperstein throughout much of the year in producing an internal draft of the revised Comprehensive Conservation Plan. Our staff completeness was short-lived, however; Park Ranger DeMeyere and Biological Technician Knight left in April and August, respectively. While no wildland fires occurred on/near the Refuge this summer (in stark contrast to 2004 and 2005), staff expended considerable effort in fire-related projects, including: completion of the Fire Management Plan; a fuels reduction project in Evansville; and stabilization, rehabilitation, and post-fire assessment of the 2005 Old Dummy burn (part of the “Burned Area Emergency Response” program). The absence of fire made possible the first aerial survey of Greater White-fronted Geese in three years; however, an absence of early winter snow forced a cancellation of the annual moose survey. Wildlife Biologist Saperstein helped organize, as well as presented two posters at, The Wildlife Society’s annual conference held in Anchorage. Facilities-wise, the Refuge received legal title to the 3-bedroom residence that serves as our field station in Bettles. In addition, major progress was made in securing funding for and designing an office/visitor center and permanent bunkhouse in Bettles, in cooperation with the National Park Service. Finally, USFWS photographer Steve Hillebrand visited in August and provided the Refuge with >5,000 photos of wildlife, habitats, subsistence, and recreational activities, many of which can be seen in this report.



Buckbean (*Menyanthes trifoliata*) is common along pond margins. (A. Kokx photo)

Table of Contents

Kanuti National Wildlife Refuge: The Year 2006 at a glance.....	iii
Table of Contents.....	iv
Introduction.....	1
Highlights for 2006.....	3
Climate.....	5
Overview.....	5
2006 Climatological Highlights.....	6
Natural and Cultural Resources.....	8
Overview.....	8
Biological Planning.....	9
Inventory and Monitoring Surveys.....	12
Research Studies and Investigations.....	23
Cultural Resources.....	25
Management.....	29
Overview.....	29
Revision of the Kanuti NWR Comprehensive Conservation Plan.....	29
Fire Management	31
Intra- and Interagency Cooperation	34
Tribal Cooperation.....	37
Permits.....	38
Administration.....	40
Budget.....	40
Personnel.....	40
Public Use.....	45
Overview.....	45
Subsistence.....	45
Arctic Interagency Visitor Center.....	54
Wildlife Dependent Recreation and Education.....	56
Law Enforcement.....	60
Facilities and Equipment.....	62
Bettles Bunkhouse and Office	62
Kanuti Lake Administrative Cabin.....	62
Airplane/Airplane Support.....	66
Refuge Communications.....	67
Literature Cited.....	68
Section Credits.....	69
Photography Credits.....	69
Refuge Manager’s Feedback.....	70

Introduction

Kanuti National Wildlife Refuge (NWR; Fig. 1) straddles the Arctic Circle in north-central Alaska, encompassing an area slightly larger than Delaware. The Alaska National Interest Lands Conservation Act of 1980 (ANILCA) set aside millions of acres of public land in Alaska, including 6,625 km² (or 1.637 million acres) for Kanuti NWR.

According to ANILCA, the Refuge was established for the following four purposes, which serve as guiding principles for refuge management:

1. 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;
2. To fulfill the international treaty obligations of the United States with respect to fish and wildlife and their habitats;
3. To provide, in a manner consistent with the purposes set forth in subparagraphs (1) and (2), the opportunity for continued subsistence uses by local residents; and
4. To provide, in a manner consistent with the purposes set forth in paragraph (1), water quality and necessary water quantity within the refuge.

Kanuti NWR is one of 16 refuges in Alaska and 545 nationwide. This network of refuges forms the National Wildlife Refuge System (System), which is administered by the U.S. Fish and Wildlife Service. The mission of the System is: *to preserve a national network of lands and waters for the conservation and management of the fish, wildlife, and plants of the United States for the benefit of present and future generations.* The vision for the System stresses the following principles: 1) wildlife comes first; 2) ecosystems, biodiversity, and wilderness are vital concepts in refuge management, 3) refuges must be healthy; and 4) growth of the System must be strategic.

The mission of Kanuti NWR is three-tiered, mindful of: 1) the Refuge purposes set forth in ANILCA, 2) the mission of the System, and 3) the following Kanuti NWR draft vision statement, developed by the staff:

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

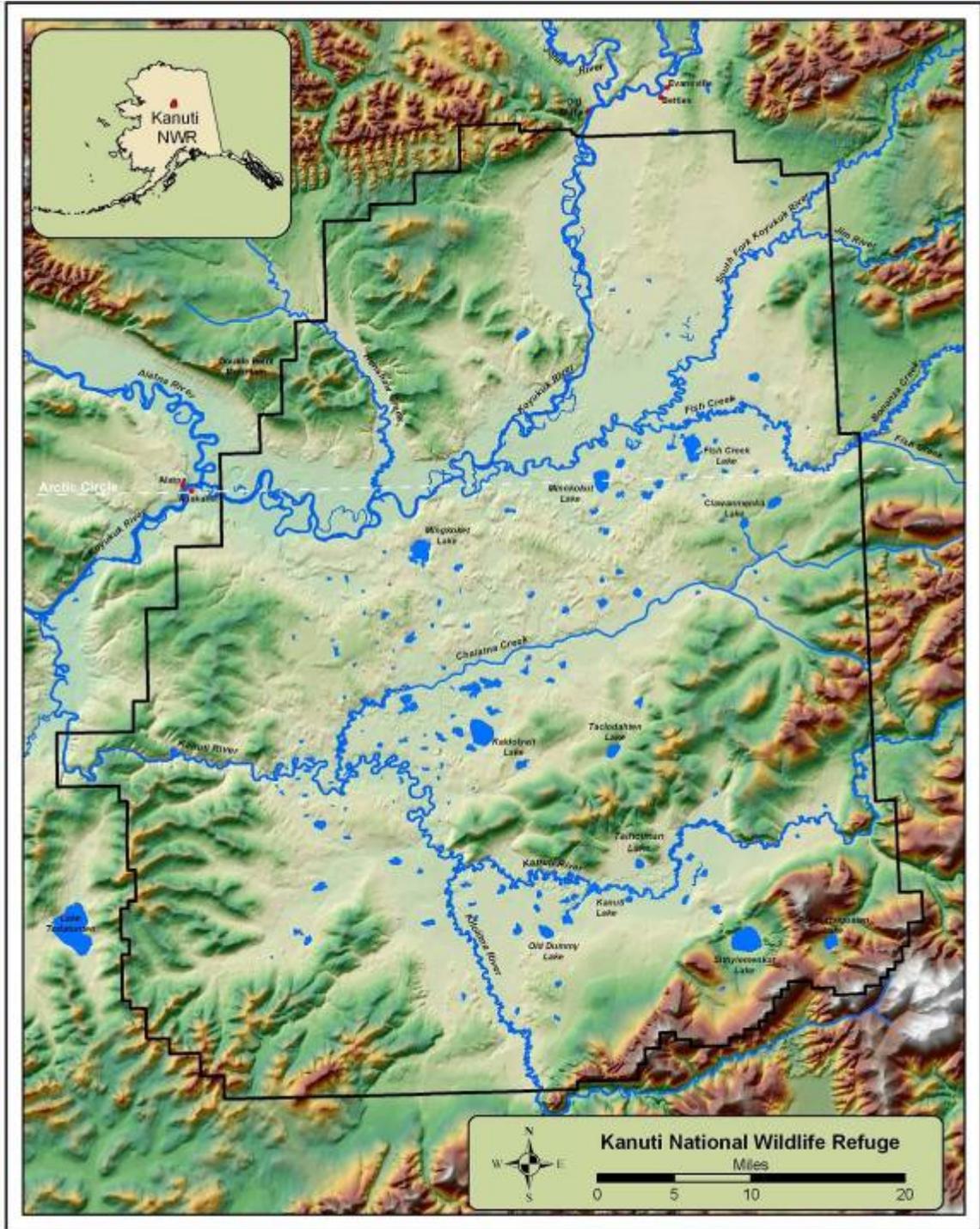


Figure 1. Map of Kanuti NWR, including major topography and hydrography.

Highlights for 2006

- After contributing to record fire seasons in Alaska the previous two years, no wildfires occurred on the Refuge in 2006. (Page 7)
- Wildlife Biologist Lisa Saperstein secured considerable funding through the Burned Area Emergency Response (BAER) program to investigate and mitigate for post-fire effects of the 2005 Old Dummy burn. A set of mammoth tusks and an ancient scraping tool were discovered during BAER activities. (Pages 9, 21, 24, 25, 64)
- Wildlife Biologist Saperstein helped organize, as well as presented two posters at, The Wildlife Society's annual conference held in Anchorage. (Page 11)
- Two plots were completed, while another two were initiated, as part of the Refuge's biological inventory program. (Page 12)
- The absence of wildfires allowed the first Greater White-fronted Goose aerial survey in three years, while the absence of early snow forced the cancellation of the annual moose survey. (Page 16)
- Contract pilot Harley McMahan conducted a wolf survey on the Refuge in March, replicating methods used in 2005. (Page 18)
- The Allakaket/Alatna Place Names project was resurrected from the 1980s, prompting considerable collaboration between the villages and the Refuge. (Page 27)
- Kanuti staff met or exceeded all Comprehensive Conservation Plan (CCP) deadlines. A near-finished internal review draft was submitted at year's end, in preparation for a final public review draft in spring 2007. (Page 29)
- The Kanuti Fire Management Plan was completed, awaiting merely signatures. (Page 31)
- The first half of a Wildland-Urban Interface (WUI) fuels reduction project in Evansville was completed as scheduled. (Page 31)
- Administrative Support Assistant Robinson completed a 30-day detail in southern Mississippi in support of the Hurricane Katrina recovery effort. (Page 34)
- Biological Technician Knight assisted in the response to a fuel spill resulting from the crash of a recreational aircraft at VOR Lake in Bettles in June. (Page 35)
- Working with BLM, volunteers from the "Friends of Alaska Refuges" assisted in a weed pull along the Dalton Highway in trying to keep several established invasive plants, including white sweetclover, out of the Kanuti and Koyukuk drainages. (Page 36)

- Joanna Fox filled the deputy refuge manager vacancy and Deborah Webb was hired as a planner to assist with the CCP. (Page 40)
- Valuable staff members, Park Ranger Jody DeMeyere and Biological Technician Curtis Knight, resigned in April and August, respectively. (Page 40)
- Refuge staff produced the first on-time annual narrative in a decade and made it available via the Web! (Page 58)
- Photographer Steve Hillebrand (USFWS) obtained >5,000 images of the Refuge during a 3.5-day aerial tour of the Refuge and the Coldfoot/Marion Creek area. (Page 59)
- Considerable improvements were made to the administrative cabin at Kanuti Lake, including leveling the foundation and hooking up solar power; however periods of low water level in the lake threaten long-term access to the cabin. (Page 62)
- The Refuge received legal title to the 3-bedroom residence that serves as our field station in Bettles. (Page 62)
- Major progress was made in securing funding for and designing an office/visitor center and permanent bunkhouse in Bettles in cooperation with the National Park Service. (Page 62)
- The Refuge took delivery of its new aircraft (Scout) in April. (Page 66)



This handsome short-tailed weasel image was just one of some 5,000 photos that Photographer Steve Hillebrand took during a few days on and near the Refuge in August.

Climate

Overview

The Refuge's climate is cold and continental, with slightly higher precipitation than other areas of interior Alaska. Low and high temperatures range between -56°C and 34°C (-69° , 93°F). Periodic flooding of the Koyukuk and Kanuti rivers is an important hydrological driver of the ecosystem. Temperatures and topography are quite conducive to extraordinary summer lightning activity, and consequently, an active wildfire regime. The nearest weather station to the Refuge is the National Weather Service Station at Bettles Field, three miles outside the Refuge's northern boundary; however climatic conditions on the Refuge often vary from those of Bettles, as well as throughout the Refuge itself.



Wildfires are a major driver of the Refuge's ecosystem (USFWS photo)

2006 Climatological Highlights

Table 1. Monthly Temperature and Precipitation summaries (highs in red, lows in blue), Bettles Field, Alaska, 2006.

Month	Temperatures (°F)				Precipitation (inches)			
	Max.	Min.	Avg.	Depart.	Precip.	Depart.	Total Snowfall	Snow Pack (month's end)
January	07	-53	-23	-12	0.04	-0.80	1	19
February	37	-44	4	+11	1.94	+1.33	21	29
March	27	-47	-4	- 8	0.24	-0.31	5	28
April	42	-22	18	- 5	0.63	+0.25	8	25
May	75	14	46	+ 2	0.21	-0.64	0	0
June	54	78	28	- 4	2.34	+0.91	0	0
July	81	43	57	- 3	3.73	+1.63	0	0
August	69	31	51	- 2	3.41	+0.87	0	0
September	68	25	47	+ 6	0.90	-0.92	0	0
October	50	-11	28	+ 9	1.94	+0.86	9	trace
November	16	-34	-7	- 7	0.11	-0.79	4	7
December	30	-39	-2	+ 6	0.76	-0.11	10	12
Totals					16.25	2.28	58	

Hydrology Review

Breakup for the Koyukuk River was May 8, 11, and 12 for Wiseman, Bettles/Evansville, and Allakaket, respectively. The first ice reported on the Koyukuk River at Allakaket and Wiseman was October 14 and 13, respectively. The river at Allakaket became safe for human and snowmachine traffic on October 29 and 31, respectively. The river at Wiseman became safe for human and snowmachine traffic on November 6 and 15, respectively. Break-up and freeze-up data were not available for Bettles/Evansville this year.

Snow Markers

Snow depths during the winter of 2005 – 2006 were more typical than the record snow depths and density recorded in many areas of interior Alaska the previous winter. The deepest snow recorded on the Refuge was 34 inches at snow marker 2, located near Minnkokut Lake (Table 2). Up to 27 inches of snow persisted at some markers by May 1. Average percent snow density was measured at marker 2 and marker 4 (Nolitna) on March 29. Density data were previously collected at snow marker 5, but this lake was too small to access reliably. Density averaged 18.6% at marker 2 and 19.6% at marker 4. The intention has been to move snow marker 6 at Taiholman Lake due to consistently windblown conditions; however, attempts to do so in the summers of 2004 and 2005 were thwarted by persistent smoke from wildland fires that prevented flights to the Refuge. Time constraints prevented the move in 2006.

Table 2. Aerial estimates of snow depth (inches) at snow markers (SM), 2006.

Date	SM1	SM2	SM3	SM4	SM5	SM6
2/10/06	19	18	24	24	21	8
3/03/06	20	18	30	28	26	5
3/28/06	21	34	28	25	23	2
5/01/06	13	27	19	14	13	0
12/08/06	10	11	10	14	14	4

Wildland Fires Review

After some 25 percent of the Refuge burned over the previous two years in what were Alaska’s largest (2004) and third largest (2005) fire seasons on record, no wildland fires occurred on the Refuge in 2006. Figure 2 illustrates Kanuti’s recent fire history (1950-2005). Investigations into post-fire effects on biological and cultural resources within the perimeter of the large 2005 Old Dummy fire are found throughout this document.

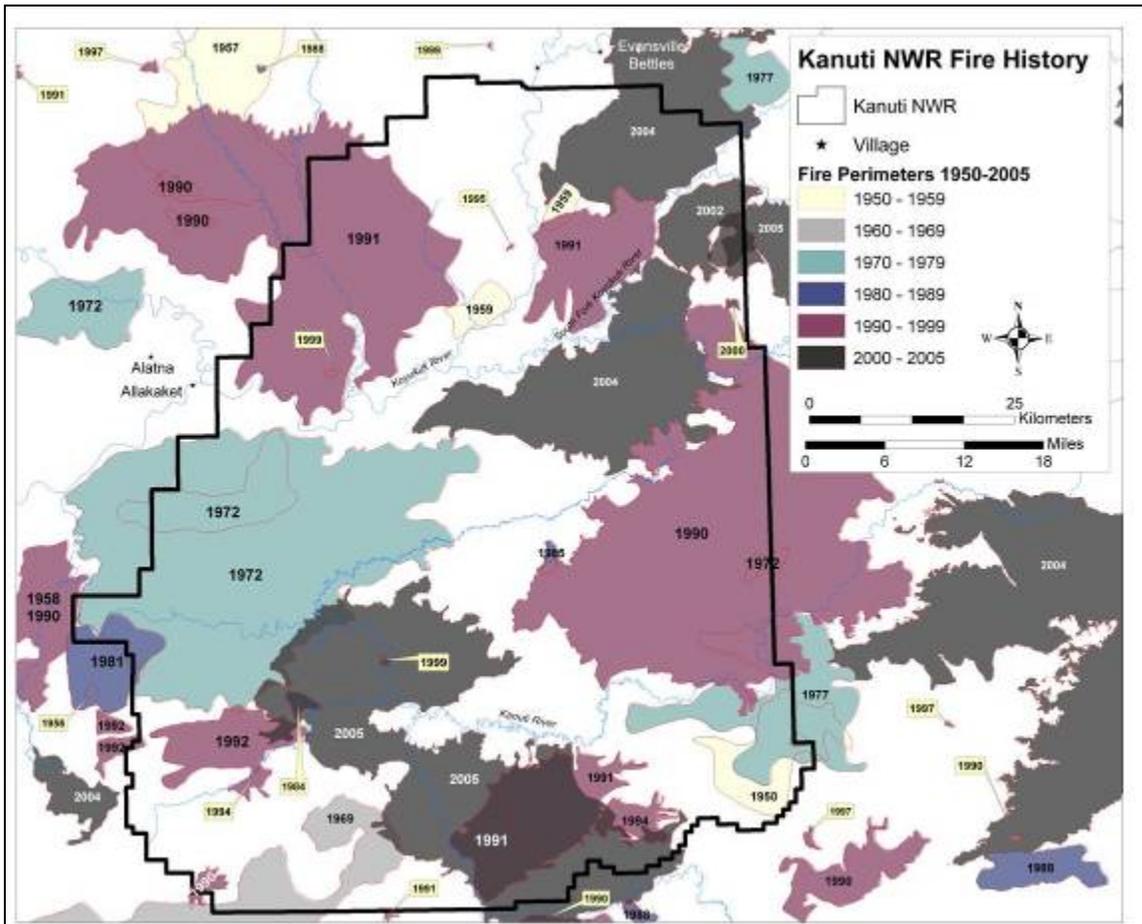


Figure 2. Fire history map of Kanuti NWR, current as of 2006.

Natural and Cultural Resources

Overview

The primary ecological drivers shaping the habitats and wildlife of Kanuti NWR are hydrology, fire, and climate. The mosaic of different vegetation types on the Refuge is the visible culmination of complex interactions among the drivers mentioned above, along with other factors such as topography, soils, permafrost, and flooding. Vegetation plays a role in determining the distribution of wildlife species, but the activities of herbivores such as moose, hares, insects, and beaver also can have a profound influence on vegetative patterns. One hundred twenty-eight species of birds, 37 species of mammal, and 15 species of fish are known to occur within the Refuge. Some of these are migratory and can only be found at certain times of the year. For example, of the 128 species of birds, only about 20 are year-round, permanent residents. Likewise, caribou, which occasionally number in the thousands in winter when the Western Arctic Caribou Herd migrates from northern calving grounds, are virtually absent from the Refuge during summer.



The Refuge's water resources are critical to its diversity of habitats and wildlife.
(S. Hillebrand photo)

Biological Planning

Burned Area Emergency Response (BAER) Plan Proposal

The Refuge submitted a proposal for BAER funds in November 2005 to investigate the 2005 Old Dummy Fire (see “Wildland Fires Review” section [page 7] for additional fire details and fire history map). The proposal consisted of two plans, a Burned Area Emergency Stabilization Plan and a Burned Area Emergency Rehabilitation Plan. The stabilization plan addressed issues such as: 1) a spring assessment to assess fire effects, 2) collection of fire severity data, 3) removal of hazardous trees from burned portions of a winter trail, 4) inventorying burned areas for the introduction of non-native invasive plant species, and 5) determining if cultural resources were affected by the fire. The rehabilitation plan addressed issues such as: 1) determining fire effects on rare or sensitive plant communities, 2) continued monitoring of safety hazards on the winter trail, and 3) additional monitoring for invasive species in subsequent years, should such plants be detected in 2006. The plans were approved in January 2006. Refuge Manager Spindler, Wildlife Biologist Saperstein, and Regional Archaeologist Debbie Corbett held a meeting in Allakaket on February 14 to discuss the fires of 2004 and 2005 as well as the post-fire projects funded by the BAER Plan. Some projects were moved from the Stabilization Plan into a Post-Fire Assessment Plan, which has a different funding source. These projects were: burn severity mapping and validation of severity map, an aerial spring assessment of the burn, an assessment of fire effects on Kanuti Lake hydrology, and an assessment of fire effects in sensitive plant communities. Table 3 presents a summary of projects for each plan and funding, although in some cases the allocated amount was not fully used. Individual project summaries, excerpted from reports completed in February 2007, may be found in the following sections: Inventory and Monitoring Surveys (page 21), Research Studies and Investigations (page 24), Cultural Resources (page 25), and Kanuti Lake Administrative Cabin (page 64).



Member of Allakaket BAER crew removes downed spruce, killed by the 2005 Old Dummy fire, from the Allakaket-Taiholman winter trail. (Refuge photo)

Table 3. Breakdown of funding per project and plan for the Burned Area Emergency Response proposal for the 2005 Old Dummy fire.

Plan	Project	Funding	Comments
Emergency Stabilization	Assess damage to winter trail	\$3,476	Determine if trail clearing is necessary
	Remove hazards from winter trail	\$10,772	Accomplished via contract with Allakaket Tribe
	Plan development and assessment	\$9,504	Mostly salary costs
	Cultural resources assessment and treatment	\$17,947	Conducted by regional archaeologist
	Invasive species inventory	\$26,087	
Emergency Rehabilitation	Plan development and assessment	\$1,436	Mostly salary costs
	Fish telemetry site replacement	\$8,300	Not needed; telemetry tower not damaged
	Monitoring of winter trail hazard tree removal	\$10,783	Fiscal year 2007; deemed unnecessary
	Invasive plant species monitoring	\$17,326	Fiscal year 2007
	Post-Fire Assessment	Burn severity mapping for planning	\$5,000
Validation of burn severity map		\$32,227	
Post-fire spring assessment		\$39,145	
Hydrology assessment of Kanuti Lake		\$5,009	Conducted by hydrologist from the water resources division
Assessment of fire severity in sensitive plant communities		\$22,251	Contract developed with Alaska Natural Heritage Program botanist
Total Funding		\$209,263	

Joint Fire Science Proposals

A pre-proposal for a project entitled, “Variability of boreal forest fire regimes and potential impacts on caribou winter range,” was submitted to the Joint Fire Science Program (JFSP) in November 2006. The principal investigator was Dr. Feng Sheng Hu of the University of Illinois, and Dr. Scott Rupp of the University of Alaska Fairbanks was a co-principal investigator. Federal cooperators were Wildlife Biologist Saperstein and Regional Fire Ecologist Karen Murphy. The project built on work from a previous JFSP project conducted by Dr. Rupp. Goals of the project were to use lake coring to provide managers with information on (1) the spatio-temporal patterns of boreal fire regimes in the late Holocene and (2) the natural fire-regime variability and its potential impacts on habitat diversity, in particular caribou winter range. Requested funding for the project, which would have taken place 2008 – 2010, was \$392,598. The pre-proposal was declined by the JFSP board and a full project proposal was not developed.

Refuge Biologists’ Workshop

Wildlife Biologists Saperstein and Harwood attended the Third Alaska Refuge Biologists’ Workshop, held March 28-30 at the Alaska Islands and Oceans Visitor Center in Homer, AK. Saperstein was not only part of the workshop planning committee, but also participated on the regional team to develop a template for writing refuge inventory and monitoring plans. Part of the workshop entailed a preliminary showing and critiquing of posters destined for a special Alaska National Interest Lands Conservation Act (ANILCA) session at The Wildlife Society national meeting (held in Anchorage in September). Harwood and Saperstein’s poster on Kanuti’s biological inventory program won “2nd place” in an informal contest judged by their peers attending the workshop.

The Wildlife Society

The national conference of The Wildlife Society was held September 23 – 27 in Anchorage. Wildlife Biologist Saperstein attended the conference and was a member of the organizing committee. She was co-chair for the Student Quiz Bowl event. Kanuti NWR presented two posters at the conference; abstracts follow.

1. An Inventory of Natural Diversity on Kanuti National Wildlife Refuge: Another Step towards Fulfilling ANILCA. Authors: Christopher M. Harwood and Lisa B. Saperstein. Abstract: Kanuti National Wildlife Refuge’s (KANWR) first establishing purpose in ANILCA guides refuge management 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 . . . , and furbearers.*” A rigorous, comprehensive *identification* of KANWR’s major terrestrial resources is a big step in addressing the *conservation* of these resources, especially for those not explicitly mentioned. In 2004 we initiated a biological inventory program designed to further catalog the Refuge’s diversity of breeding birds, terrestrial habitats, small mammals, terrestrial invertebrates, fire history, and, where appropriate, recent fire severity. In the program’s pilot phase (four of 64 inventory mini-grids surveyed), we have documented a new bird species for the Refuge (and Alaska’s second summer record), as well as a new damselfly species for Alaska.

2. A Geostatistical Estimate of Beaver Food Caches on the Kanuti National Wildlife Refuge, Alaska. Author: Lisa B. Saperstein. Abstract: Aerial surveys of beaver food caches were conducted on the Kanuti National Wildlife Refuge (NWR) in north-central Alaska, 23-26 September 2002 and 8-10 October 2003. Survey design and analysis were based on the GeoSpatial Population Estimator (GSPE) method originally designed for moose population surveys. The refuge included 508 survey units, approximately 13.7 km² in size, 406 of which were considered to contain beaver habitat and thus were included in the survey area. Units were stratified as either high or low beaver density based on water quantity and previously collected beaver cache data. A random sample of 54 high density and 45 low density units was surveyed in 2002, and 76 units (46 high density, 30 low density) were surveyed in 2003. The GSPE analysis provided a 2002 estimate of 1,135 caches (± 112.5 , 90% CI). The 2003 survey resulted in an estimate of 1,337 caches (± 184.3 , 90% CI). Given previous data indicating that an average of 5 beaver are associated with a food cache, the refuge beaver population was estimated to be about 5,675 in 2002 and 6,685 in 2003.

Boreal Partners in Flight (BPIF)

Wildlife Biologist Harwood volunteered to serve as representative for the “Northwestern Interior Forest” Bird Conservation Region (BCR 4), one of the five BCRs in Alaska. BPIF is the Alaska/Northwest Canada chapter of *Partners in Flight*, an organization of professionals and amateurs dedicated to the conservation of landbirds (e.g., songbirds, raptors, owls, woodpeckers, upland game birds) in the Americas. BPIF is currently revising their Landbird Conservation Plan.

Alaska Shorebird Group (ASG)

Wildlife Biologist Harwood again volunteered to serve as representative for the “Northwestern Interior Forest” Bird Conservation Region (BCR 4). ASG is also in the process of revising the Alaska Shorebird Conservation Plan so Harwood was tasked with leading the section dedicated to BCR 4.

Inventory and Monitoring Surveys

Project: Kanuti NWR Integrated Biological Inventory

The Refuge initiated an inventory of select terrestrial resources in 2004. A pre-existing, systematically random sampling scheme, originally developed for the statewide Alaska Landbird Monitoring Survey (ALMS; Handel 2003), was adopted to ensure widespread, unbiased, refuge-wide coverage. This resulted in an array of 64 “mini-grids,” separated by intervals of 10 km (Fig. 3), that will be surveyed over the next 10 – 20 years, given current staffing and funding levels. Each mini-grid consists of 12 survey points, arranged in a 3 x 4 array. Mini-grids were stratified by elevation (39 lowland [≤ 250 m elevation] and 25 upland [> 250 m elevation] mini-grids) to allow completion and analysis of one elevation type within a shorter time period (i.e., rather than having to wait for all 64 to be completed). Lowland mini-grids will be surveyed first because wetland habitat was one of the reasons for establishment of the Refuge.

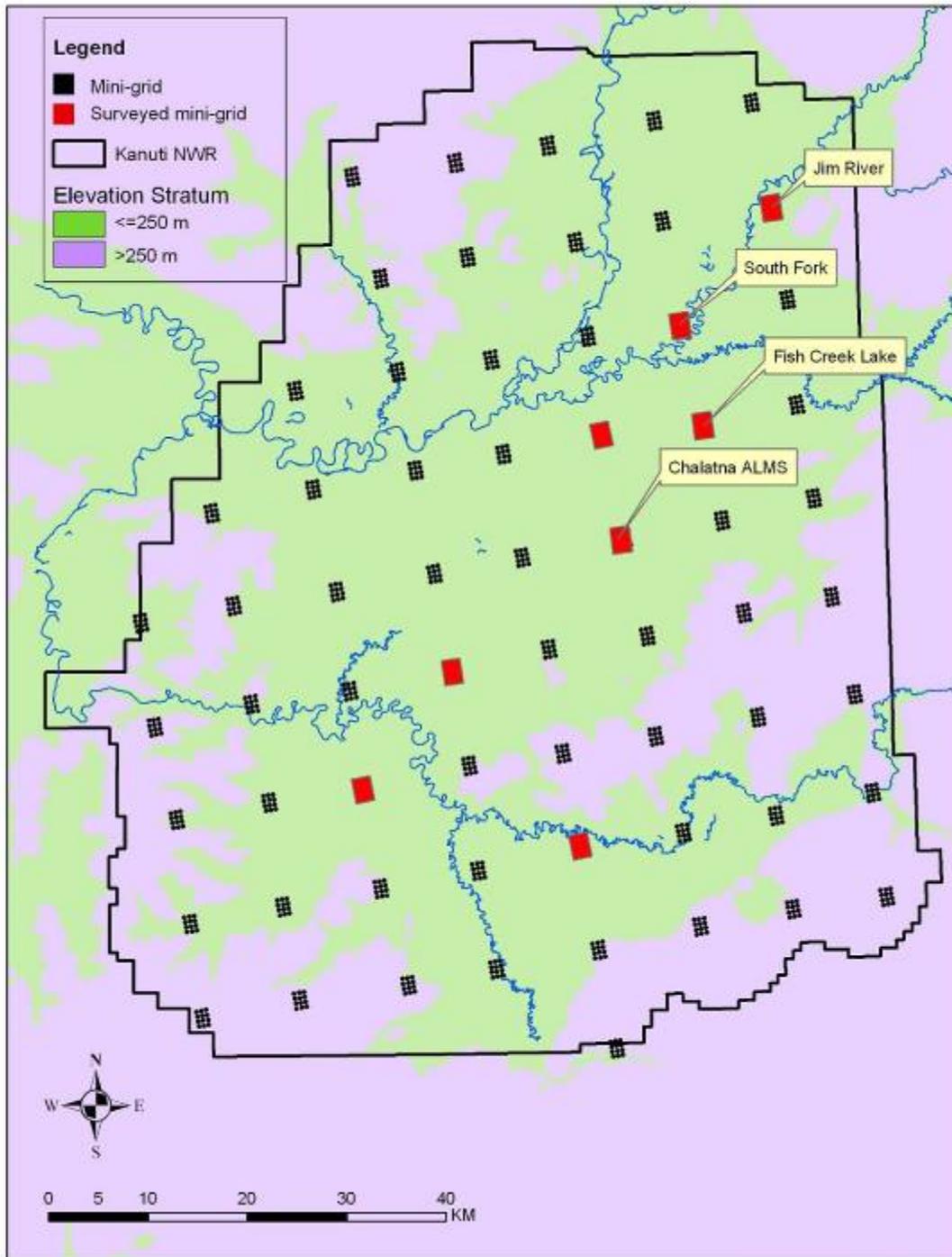


Figure 3. Location of inventory plots by elevation type (stratum). Mini-grids surveyed in 2006 grids are labeled. The Jim River and South Fork mini-grids were surveyed for vegetation and insects only and will be surveyed for birds in 2007.

Survey methods were “borrowed” from several sources. Bird point-count survey methods and an associated habitat protocol were adopted from ALMS. The Refuge also adopted more rigorous vegetation survey methods developed for the Central Alaska

Network of National Parks and Preserves (Roland et al. 2004), with minor modifications. Small mammal and insect collection techniques were garnered from a variety of sources, including recommendations from the University of Alaska Fairbanks (UAF) museum. Trees are aged from increment borings from large trees or trunk cross-sections from smaller trees that are felled. Age is generally presumed to be the time since the last fire. For plots that have burned within the last two years, fire severity data are collected using the standardized Composite Burn Index (CBI) (Key and Benson 2004).

Two mini-grids (Fish Creek Lake and Chalatna ALMS) were surveyed for birds and habitat in June 2006 and two (Jim River and South Fork) were surveyed for habitat only in August. The Fish Creek Lake mini-grid and portions of the South Fork mini-grid burned in 2004, requiring collection of CBI data. The other two mini-grids were unburned. The Jim River and South Fork mini-grids were accessed by floating down the Jim River, accessed from the Dalton Highway, to the South Fork Koyukuk River. The surveys were conducted when salmon were running, and the field crew had ample opportunities to observe salmon as well as brown and black bears feeding on the fish carcasses. Small mammals were not collected on these plots because trapping equipment could not fit on the inflatable kayaks. It was decided that small mammal trapping would be subsequently dropped from the protocol for future plots due to the logistics of checking traps in addition to bird, vegetation, and insect surveys. Small mammal trapping may be resumed in the future if the refuge can afford to hire more seasonal employees.

Reportable results from the inventory program thus far are minimal, pending finalization of databases and subsequent data entry. No unusual species were encountered in 2006, although insects have not yet been identified.

Project: Alaska Landbird Monitoring Survey (ALMS)

While the continental Breeding Bird Survey (BBS) program is currently the best tool for monitoring landbird trends in Alaska, the BBS's inherent biases (e.g., mostly samples roaded areas even though most of Alaska is roadless) preclude inference to much of the state's landmass. The Alaska Landbird Monitoring Survey (ALMS; Handel 2003) was developed to complement the BBS and serve as a more scientifically/statistically robust tool to monitor many of Alaska's landbirds, including providing inference to roadless areas. Because ALMS is not road-based, nor does it permit "convenience sampling" of roadless areas (e.g., picking sites near rural gravel strips, large lakes with floatplane access, etc.), access to designated survey sites has proven expensive for prospective land managers in the program (U.S. Fish and Wildlife Service, National Park Service, Bureau of Land Management, U.S.D.A. Forest Service, Alaska Department of Fish & Game). Since its inception in 2003, participation in the program has been at best patchy (good participation by the Forest Service in southeast Alaska). Some areas, however, including interior Alaska in which Kanuti NWR resides, have shown little to no participation.

Nevertheless, Kanuti NWR, which is responsible for monitoring two of 100 statewide sites (each visited every two years), has participated every year in ALMS. In 2006, Wildlife Biologist (WB) Harwood and Biological Aid Kokx surveyed the "Chalatna

ALMS' plot (24 count points) for birds and habitat from June 18-23. WB Saperstein and Biological Technician Kropidlowski assisted with the habitat assessments. This is the second time this plot has been visited. Harwood surveyed birds there in 2003, though the points then were 250, rather than 500, meters apart. Because ALMS' monitoring value is from a statewide, not refuge-specific, perspective (and statewide participation has been lacking so far) and because our annual participation/investment compromises progress in our Refuge's integrated biological inventory (see section above this one), we continue to assess our future participation in ALMS.

Project: Breeding Bird Surveys (BBS)

Wildlife Biologist Harwood and Biological Technician Knight conducted the Kanuti Canyon BBS and the Kanuti Lake BBS on June 11 and 12, 2006, respectively. Harwood served as observer while Knight served as boat driver for both days. They recorded 631 individuals of 43 species on the Kanuti Canyon BBS, while recording 716 individuals of 51 species on the Kanuti Lake BBS.

There has been some question as to whether both routes were being analyzed within the continental dataset, given that they are river- and not road-based routes. We have now been assured that both routes are being considered "legitimate" routes. The current continental BBS coordinator has some concern with the legitimacy of using survey data from river routes, as these routes are not randomly deployed (unlike routes within the road system). River routes had been encouraged in Alaska to make up for the limited road system, which has since been saturated with routes. River routes do offer the benefit of covering some habitats not accessible within the road system, thus increasing the likelihood of detecting certain under-represented species (e.g., Solitary Sandpiper, Olive-sided Flycatcher, Blackpoll Warbler, Rusty Blackbird). We have been assured that should river routes ever be rejected in the continental analysis, we would be notified immediately so we can decide whether to continue our BBS effort. The value of the two BBSs in terms of the Kanuti Refuge's monitoring program is limited; they are of greater value when used in the greater continental context.



The Kanuti Canyon (left) and Kanuti Lake BBS routes offer areas of significant habitat differences: from relict sagebrush-juniper steppe (left [canyon]) to white spruce boreal forest. (S. Hillebrand photos)

Project: Greater White-fronted Goose monitoring

During July 6-9, 2006, Refuge Manager/Pilot Spindler and Wildlife Biologist Harwood conducted aerial surveys documenting numbers and distributions of primarily, molting Greater White-fronted Geese (*Anser albifrons*; “white-fronts”), and incidentally, Canada Geese (*Branta canadensis*). The crew surveyed 101 aerial line transects overlaying goose habitat on the Refuge, as well as nearby Lake Todatonten and the terminus of the Kanuti River (Fig. 4). Totals of 403 white-fronts (332 adults and 71 young) and 203 Canada Geese (108 adults and 95 young) were observed. Most white-fronts were again found in the traditional “Mud Lakes” area; fewer were detected at Lake Todatonten than in the past. In addition, 219-227 adult swans (Trumpeter [*Cygnus buccinator*] and Tundra [*C. columbianus*]) were counted during the survey, with many still either nesting or brooding young. This was the first time in three years that smoke- and fire-free conditions prevailed on and around the Refuge to allow surveying.



Flock of molting Greater White-fronted Geese and swans observed in the traditionally important “Mud Lakes” area. (C. Harwood photo)

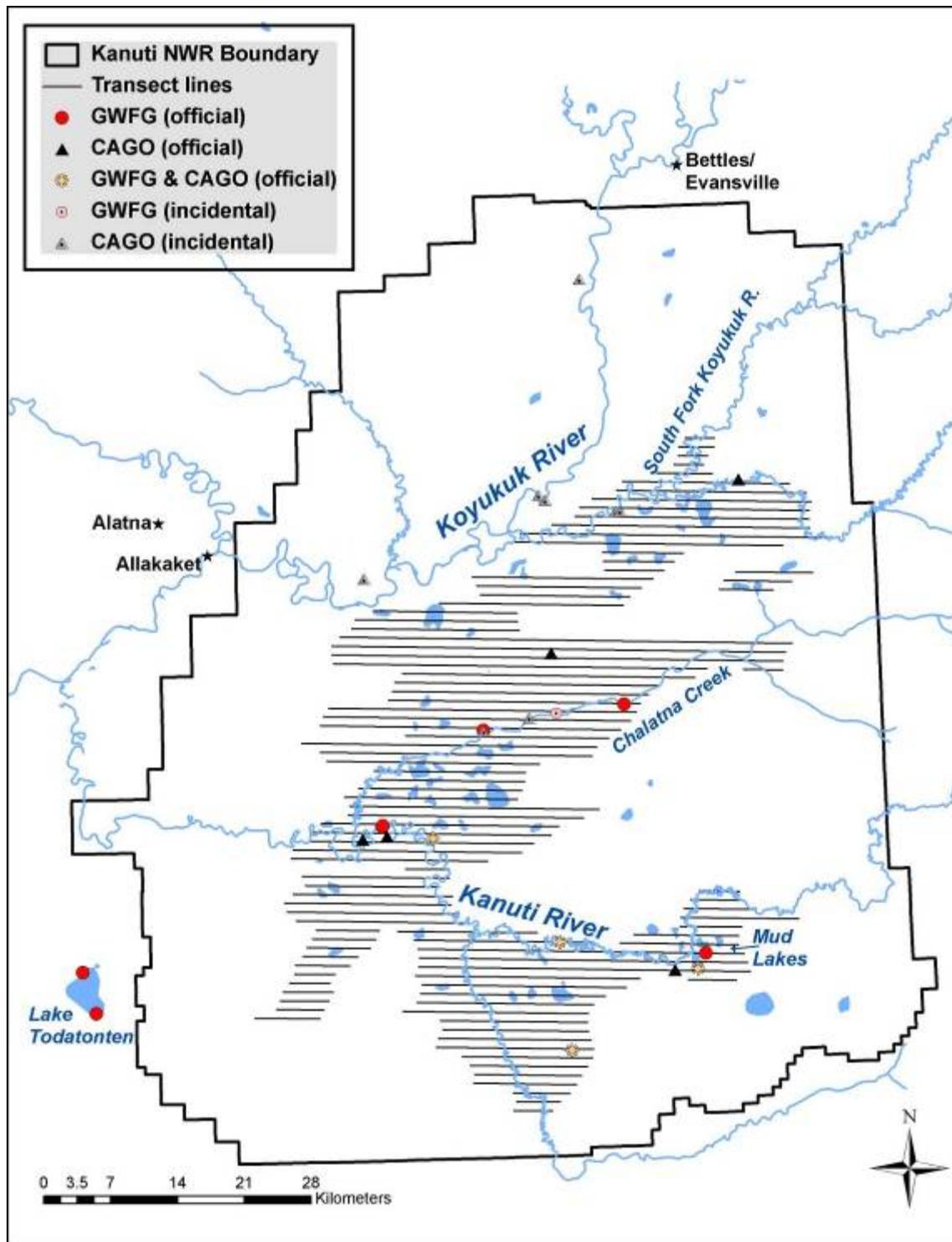


Figure 4. Locations of aerial transect lines and goose observations, July 6-10, 2006, Kanuti NWR. [GWFG = Greater White-fronted Geese, CAGO = Canada Geese; “official” = observed during official survey period and according to protocol; “incidental” = observed after official survey]

Project: Kanuti NWR Moose population survey

The 2006 Kanuti moose survey was cancelled due to insufficient snow. The survey, estimated to take about a week, was scheduled to occur between October 25 and November 22, once the Refuge had received at least 10 inches of snow. (Snowpack in Bettles never exceeded 8 inches.) The Refuge and adjacent state and federal land managers plan to use the unused survey funds to purchase radio-collars for moose. Refuge Manager/Pilot Spindler and Wildlife Biologist (WB) Saperstein met with WBs Jim Lawler (National Park Service [NPS]) and Tim Craig (BLM) on November 22 to discuss plans for the cooperative effort. NPS has at least 50 radio collars that can be used for the project. The collars will need to be refurbished, but this will cost considerably less than purchasing new collars.

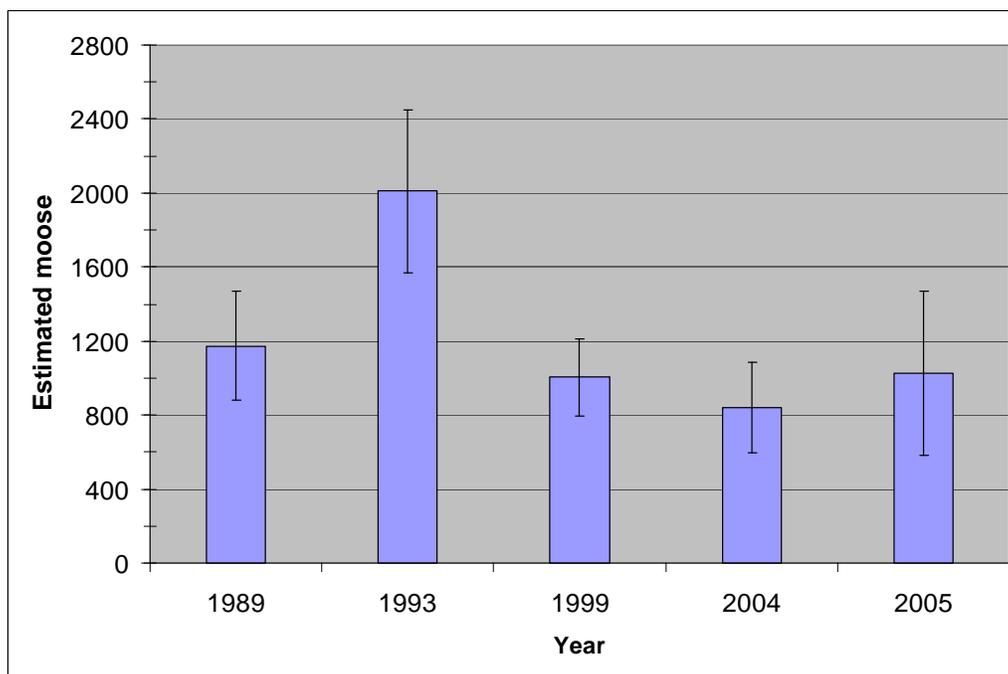


Figure 5. Moose population estimates for Kanuti National Wildlife Refuge, 1989 – 2005. Error bars represent the range of the 90% confidence interval. Insufficient snow precluded a survey in 2006.

Project: Aerial Wolf Survey

Pilot Harley McMahan was contracted to conduct a late winter aerial survey of wolves in and immediately adjacent to the refuge. McMahan had also conducted the survey in winter 2005, and a similar survey was conducted by refuge staff in 2001. Density of wolves during these three surveys ranged between 14 – 28 wolves per 1,000 square miles (Fig. 6). These surveys provide a minimum count of wolves, with no statistical measure of precision. Results are highly dependent on snow and light conditions, the expertise of surveyors, and the number of wolves within the survey area boundaries during the survey. McMahan has extensive experience tracking wolves, but snow conditions were not ideal in 2006 due to windswept areas and lack of fresh snow. Nevertheless, McMahan counted 71 wolves, an increase over 2005. The density estimate was just

under 28 wolves/1,000 mi² compared to 17 wolves/1,000 mi² in 2005 (Fig. 6). Part of this increase may be explained by the number of wolves found outside of the survey area boundaries. If tracks originate within the survey area but wolves are located outside of it, the number of wolves in the pack is reduced by 50% to account for the fact that their territory extends beyond the survey area and only part of their time may be spent within it. In 2005, more wolves were found just outside the survey boundary. If, due to chance, these had all been located within the survey area in 2005, the density estimate would have increased to 20 wolves/1,000 mi². Because of issues like this, results of this survey are highly variable but currently represent the best data that the refuge can obtain on a regular basis.

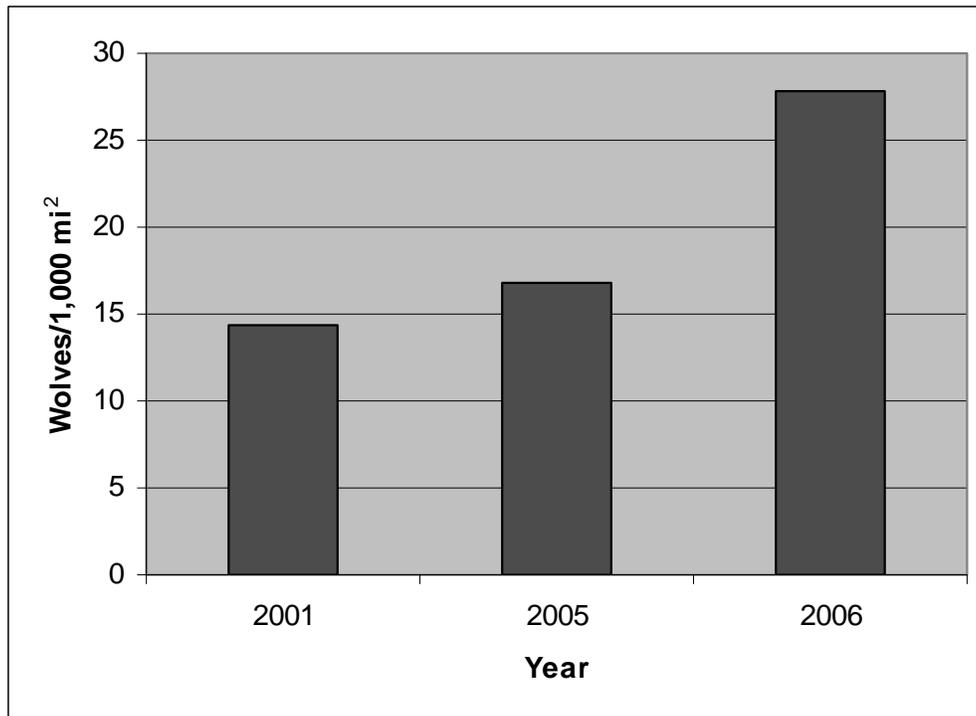


Figure 6. Wolf density estimates for Kanuti NWR, 2001, 2005-06.

Project: Small mammal trapping

Small mammals were trapped in a 1990 burn as part of a long-term project to investigate changes in small mammal communities following fire. Trapping is currently done at two-year intervals but has been conducted annually in the past. Specimens are given to the University of Alaska Fairbanks (UAF) Museum of the North for species verification and are retained in their permanent collection. A total of 396 small mammals was trapped on four trapping grids, each consisting of 100 trapping stations set with two snap traps and one pitfall trap. Each grid was checked for three trap-nights. Trapping results, by species (pending UAF species verification) and year, are displayed in Figure 7. More small mammals were trapped in 2006 than during the last trapping effort in 2004, which was an unusually dry year with numerous fires throughout the state. Trapping success was lower than in 2002, but higher than efforts in 1999 – 2001. The large, colonial yellow-cheeked voles (*Microtus xanthognathus*) continued to be the primary species

trapped while shrew (*Sorex* spp.) captures were the lowest since 1992. Captures of *Microtus* other than yellow-cheeked voles (typically meadow voles [*M. pennsylvanicus*] and tundra voles [*M. oeconomus*]) were higher than they have been since yellow-cheeks started to dominate the community in 1997.

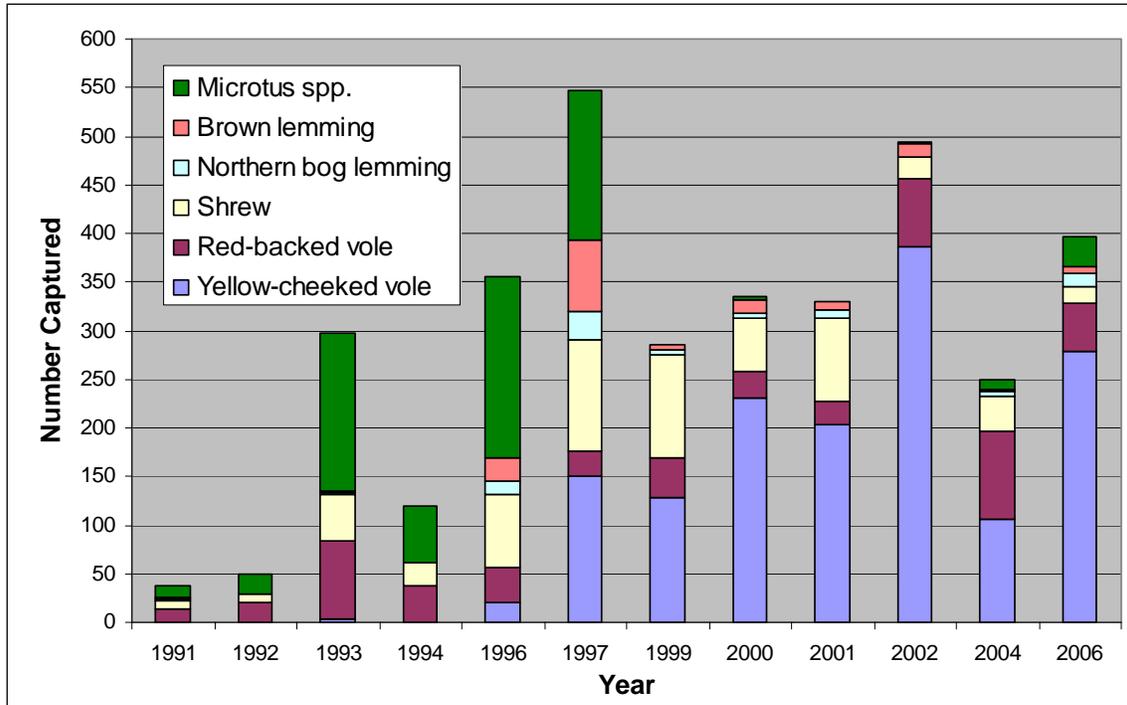


Figure 7. Small mammal trapping results on trapping grids in a 1990 burn, 1991 – 2006. Two grids were trapped in 1991 and 1992; four grids were trapped 1993 – 2006.



Yellow-cheeked voles (*Microtus xanthognathus*) are known to colonize burned-over areas on the Refuge. (L. Saperstein photo)

Project: Burned Area Emergency Response (BAER) program

Two elements of the BAER plan (see page 9) included inventories of: a) potential invasive plants and b) sensitive plant communities within or near the perimeter of the 2005 Old Dummy burn. Summaries of these inventories follow.

Invasive plants: Select areas of the burn were surveyed for non-native plants in July 2006 (Saperstein 2007a). Sites of known human activity and/or of high burn severity were targeted for the survey. Plant data were collected from 15 plots. Three plots were outside but near the burn perimeter and one was a cabin site about 14 km northwest of the burn. Composite Burn Index (CBI) scores were also determined for 10 of the plots as part of a concurrent effort to ground-truth a remotely sensed burn severity map. An additional 53 plots were visited as part of the ground-truthing project, providing additional information about non-native plants. Only one non-native plant species, *Matricaria discoidea* (pineappleweed), was located during the entire survey. A single individual was removed from just outside the burn perimeter, at the Refuge's administrative cabin on Kanuti Lake.



Alaska Natural Heritage Program botanist Rob Lipkin removes *Matricaria discoidea* (pineappleweed) at the base of the Kanuti Cabin. This was the only non-native plant discovered during a search for invasives. (L. Saperstein photo)

Sensitive plant communities: The Old Dummy fire burned areas thought to be important to the Refuge in terms of biodiversity, including plant communities that might be sensitive to fire. Of specific interest were woodland lichen communities that serve as caribou winter range, sage (*Artemisia* spp.) communities on gravel bars along the Kanuti Kilolitna River, and alpine habitat near the Refuge's southern boundary.

Fieldwork was conducted July 13–18. Plant specimens are still being processed, but some generalizations can be made. The species of sage found on Kanuti Kilolitna gravel bars was *Artemisia alaskana*. According to Alaska Natural Heritage Program botanist

Rob Lipkin, this species is not common, but is widely distributed in Alaska. It is not typically found with carnation (*Dianthus repens*) and lupine (*Lupinus arcticus*), as it was on the Refuge. While this association of species is interesting and unusual, background research would be required to find out if it is uncommon. This community was fairly consistent; each gravel bar visited supported similar species. From a fire standpoint, it is probably not at very high risk since the gravel bars generally did not burn. Some were growing near the forest edge, but expanses of sand or gravel provided protection from fire due to the absence of fuels. These communities are regularly disturbed by flooding and manage to persist. Plants found in alpine sites were botanically of more interest. *Thlaspi arcticum*, found at several sites, was identified as a Category 2 species for listing under the Endangered Species Act in 1987. Category 2 species include taxa that may be threatened or endangered, but additional population data would be required before making a proposal to list them. *Papaver nudicaule* ssp. *americanum*, endemic to Alaska and neighboring territories, was also found. There appeared to be two different communities in the uplands. One type was found in areas with exposed, highly oxygenated gravel that exhibited a distinct orange color. The other type was found in areas with a more typical acidic substrate that supported more common upland species. Although many of the upland sites were protected from fire due to low fuel levels, some received patchy burns. Most of the burned uplands were not covered by the draft burn severity map because the fire had not reached its full extent when the satellite imagery was acquired in August 2005. Burned alpine sites may provide an opportunity to monitor post-fire succession in interior Alaska alpine habitat. It is uncertain if such studies have been conducted elsewhere. A final report is pending.



Gravel bar along the Kanuti Kilolitna River with sage (*Artemisia alaskana*) and carnation (*Dianthus repens*). (L. Saperstein photo)

Project: Henshaw Creek fish weir

A resistance board weir has been operated on Henshaw Creek from 2000 until the present. The six-year average run of summer chum salmon for 2000 - 2005 was 72,344 fish, with a range of 21,400 - 237,481 (Van Hatten 2004, Berkgigler and Elkin 2006). The 2000 - 2003 average of Chinook salmon was 844, ranging between 193 - 1,091 fish (Van Hatten 2004). Results from 2005 estimated that 237,481 summer chum salmon and 1,059 Chinook salmon passed through the weir. The 2006 weir season was not successful due to high water.

Research Studies and Investigations

Project: A radio telemetry and traditional ecological knowledge study of the seasonal migrations and important habitats of humpback and broad whitefish in the Kanuti National Wildlife Refuge

Fishery Biologist (FB) Randy Brown (Fairbanks Fish and Wildlife Field Office) continued his project investigating seasonal migrations and three important habitats (spawning, over-wintering, and feeding) of humpback and broad whitefish in the upper Koyukuk River drainage. This project approaches these objectives from two different perspectives: one based on traditional ecological knowledge of those living in the region (not reported here) and the other based on seasonal locations of radio-tagged fish (carried out by FB Brown;).

Fieldwork in 2006 consisted of tracking flights in the winter, spring, and fall to identify seasonal habitats used by humpback whitefish tagged in the South Fork Koyukuk and Kanuti rivers in 2005 (no additional radio tags were deployed in 2006). Transmitters deployed in these fish were programmed to run for brief periods when fish were expected to be in feeding (May and June), spawning (September and October), and overwintering (January and February) habitats. By reducing the transmission time in this way, transmitter lifespan was extended to encompass more than 1.5 years. This allowed FB Brown and colleagues to identify between-year habitat fidelity behavior, as well as the occurrence of sequential year spawning for these fish.

Most humpback whitefish tagged in the South Fork Koyukuk River remained in that river throughout the entire 1.5-year tracking period. They spawned in a braided, swiftly-flowing, gravel-bottom stream reach in the South Fork Koyukuk River, upstream from the mouth of Fish Creek and downstream from the mouth of the Jim River. They overwintered in the South Fork Koyukuk River between the mouth of Fish Creek and the Koyukuk River. Most tagged fish returned a year following tagging to feed in the same lake where they were initially tagged, exhibiting a high level of fidelity to the habitat. The total annual migration range for most fish, from farthest upstream to farthest downstream, was less than 47 miles. About half of the fish that were spawning in 2005 were in the spawning area again in 2006, indicating a high incidence of sequential year spawning for the population.

In contrast to the South Fork Koyukuk River fish, humpback whitefish tagged on the

spawning grounds in the upper Kanuti River in 2005 overwintered across a wide geographic range. They were distributed from just downstream of the spawning area (approximately 125 miles upstream from the Kanuti River mouth) to the Koyukuk River near the village of Hughes (62 miles downstream from the Kanuti River mouth), a total range of more than 187 miles. During feeding season most of the Kanuti River humpback whitefish were located in the Mud and Kanuti lake systems in the upper Kanuti River, in lake systems of the upper Kanuti Chalatna River, and in Lake Todatonten, which drains into the lower Kanuti River. Only 2 of the original 21 fish returned to the spawning area the second season, indicating a low incidence of sequential year spawning for that population.

Project: Burned Area Emergency Response (BAER)/Burn severity mapping

One major element of the BAER plan (see page 9) investigated burn severity within the perimeter of the 2005 Old Dummy burn. To that end, an overflight of the burn within the Refuge was conducted May 23 – 24 to aerially assess the accuracy of a satellite (Landsat) burn severity map. Differenced Normalized Burn Ratio (dNBR; a metric based on change in reflectance values between pre- and post-fire Landsat TM imagery) values on the map were collapsed into four categories to represent unburned, low, moderate, and high burn severity. The survey was conducted in a Cessna 206 (C206) and took about six flight hours to complete. Two methods were used to record burn severity in the field. Data were recorded on a paper burn severity map and data were also entered into a computer connected to a GPS unit using the program ArcPad. Observers noted that some sites were burned more severely than indicated on the draft severity map while others were burned less severely. Correlation matrices showing observed versus mapped severities supported this. The C206 was not a good platform for conducting the survey; it was difficult to obtain accurate GPS locations due to the speed of the plane and its wide turning radius. Also, the wide body of the 206 made it difficult for observers to see features on the opposite side of the plane from where they sat.

In July, the burn severity map derived from satellite imagery was then ground-truthed for accuracy. Burn severity on the map was quantified using the differenced Normalized Burn Ratio (dNBR). Two satellite burn severity maps were developed. One used a pre-fire 1999 image and a 2005 image acquired while the fire was still active; this map was used to select field validation sites. The second map was developed using 2001 and 2006 imagery. The Composite Burn Index (CBI) was calculated for field plots, and the relationship between CBI and dNBR was assessed with a regression analysis. CBI data were collected from 63 field sites, five of which were unburned. The correlation between CBI and dNBR values was poor for both maps, with adjusted R^2 values of 0.48 for the 1999/2005 imagery and 0.24 for the 2001/2006 imagery. Details of this investigation can be found in Saperstein (2007b).



This site, with considerable patches of exposed mineral soil, illustrates an area of “high” burn severity within the 2005 Old Dummy burn. Despite the high severity, green-tongue liverwort (*Marchantia polymorpha*) and fireweed have begun to colonize the site within a year. (S. Kropidowski photo)

Cultural Resources

Project: Burned Area Emergency Response (BAER) program

Several elements of the BAER plan (see page 9) investigated post-fire effects on historical and contemporary cultural resources within or near the perimeter of the 2005 Old Dummy burn. They include the following:

Trail clearing: The fire burned about 18 kilometers of a regularly used winter trail, prompting concern that fallen and leaning trees could pose a safety hazard. Removal of trailside trees by burning may have also obscured the route, increasing the likelihood that people could get lost. The Refuge contracted with the Allakaket Tribal Council to hire a crew to clear the trail and post reflective markers in late winter 2006. The required work was completed, and it will not be necessary to hire a crew for additional clearing in 2007.

Prehistoric sites: Very little archaeological work has occurred on the Refuge. The major source of cultural and historical information for the refuge is the place names collected by Eliza Jones and Wendy Arundale from elders in Allakaket, Alatna, Hughes and Huslia

(see page 27). This archive of information is a largely untapped source of information on historic land use, economics, mythology, and folklore. Regional Archaeologist Debbie Corbett and Wildlife Biologist Saperstein located and recorded five prehistoric sites within or near the Old Dummy fire perimeter, three on the refuge and two on adjoining BLM lands, during September 13-15. Four historically used camps were also recorded within the burn. Many if not all of these were probably used in the late prehistoric period as well. A cabin foundation was recorded but probably dates to the late 20th century. Alaska Heritage Resources Survey site cards were completed for each site visited. Details of this investigation can be found in Corbett (2006).

Ancient tool:

Assessment of fire severity resulted in a rather unexpected finding of an artifact in July when field crews were checking the accuracy of the satellite-derived fire severity map. One of the tasks was to determine depth of the "duff layer", the layer of decomposing vegetation present before burning. This involved digging through the duff down to mineral soil and then measuring the depth. In one area of particularly deep, wet, peaty duff - where there was not a single rock exposed - Biological Aid Kokx reached in about a foot deep and pulled out a roughly 1.5-inch long piece of rock that had obviously been worked by a human. The site was revisited a month later by Regional Archaeologist Corbett, who identified the artifact as a side scraper, probably used to do fine skin work by the ancestors of the Koyukon people roughly 1,000 years ago.



This roughly 1,000-year old, 1.5-inch long side scraper was amazingly found by Biological Aid Kokx while removing a duff plug during a burn severity survey.
(A. Kokx photo)

Project: Biological Inventory

Another interesting discovery was made in early August on the South Fork Koyukuk River when a field crew was floating downriver to access an inventory plot. During a routine break at a gravel bar, Wildlife Biologist Saperstein noticed part of a mammoth tusk lying fully exposed on the gravel. Mammoths went extinct about 10,000 years ago. The tusk was later transported back to Fairbanks and will eventually be cleaned and used in an educational display.



Wildlife Biologist Saperstein shows off the mammoth tusk she discovered on a gravel bar along the South Fork Koyukuk River. (S. Kropidlowski photo)

Project: Traditional place names map

In remote parts of Alaska, place names are important to biologists, hunters, fishers, and Native elders alike. Early map makers often tried to use local Native names, but the meanings were often lost when translated into English. The result is often a long word that many people cannot pronounce and that has meaning to few. Native speakers have trouble understanding the English-translated word, and non-native speakers have equal trouble pronouncing and understanding the correct Native word. Just imagine the confusion when people of two cultures are trying to communicate about geographically-related hunting and fishing regulations! That is one reason why cultural resource scientists are now studying “place names.”

In the late 1980s and early 1990s, Koyukuk River resident and elder Eliza Jones guided

efforts to gather information about Native place names in the area of the Kanuti Refuge around the villages of Allakaket and Alatna. She worked closely with then Refuge Information Technician Johnson B. Moses, an elder with extensive local knowledge of Refuge resources. In 1997, the names were compiled and documented on maps and in a report written by Eliza and University of Alaska Fairbanks staff. This year Refuge staff worked with Eliza again to update and compile approximately 300 of these names into a GIS database. This has facilitated the Service's proper use of Native place names on maps. Refuge staff members joined Eliza to present draft maps in Alatna and Allakaket in August, and as a result of those meetings, were able to finalize a Native place name map to be included in the Kanuti Refuge Revised Comprehensive Conservation Plan. These maps will now be used to help clarify hunting regulations and make additional outreach projects more relevant to residents who live near and use the Refuge regularly.



(L to R) Assistant Planner Webb, Refuge Manager Spindler and Allakaket residents, Steven Bergman and Edison Williams, discuss the traditional Native place names map.
(W. Brown photo)

Management

Overview

The management of Kanuti NWR is guided by a Comprehensive Conservation Plan developed in 1987; however, we are in the midst of revising it, and hope to release a public review draft in 2007. The process of developing a vision statement, goals, objectives, and a range of alternatives, helped us focus ourselves on the main management priorities. These priorities were again revisited in the fall when we re-evaluated our staffing in the context of recent turnover and threatening declines in future budgets. We aim for: high-quality land stewardship based on sound science; involving, coordinating, and cooperating with neighbors and stakeholders; and being responsive to local, regional, and national clientele.

Revision of the Kanuti NWR Comprehensive Conservation Plan

Considerable progress was again made toward completing the draft revised Comprehensive Conservation Plan (CCP). Refuge staff completed a comprehensive review of the plan in February, after not having seen the document for more than five months. The plan then went back to the Regional Office for internal review.

In September, SCEP student Deborah Webb was converted to a full-time position as an Assistant Planner, and made responsible for helping ensure timely completion of the plan. The position was funded through the Region 7 Division of Planning, but will remain stationed at Kanuti Refuge until our CCP is completed, at which time Deborah will be reassigned to another station starting their CCP revision process.

Refuge staff spent the remainder of the year addressing internal review comments and editing the document so it would be ready to submit to a contracted format editor early in 2007. By the year's end, the bulk of the public review draft was back in the hands of the Regional Office planning team. Refuge staff had several minor tasks remaining as we staff looked forward to releasing the final draft to the public in May 2007.

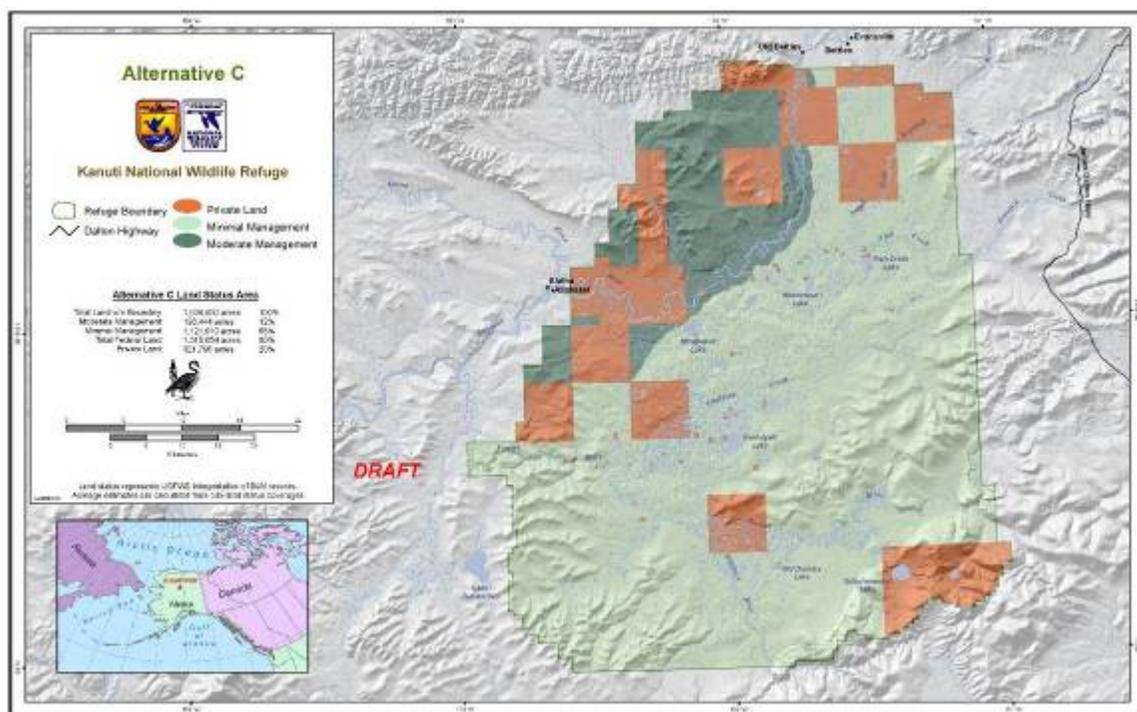
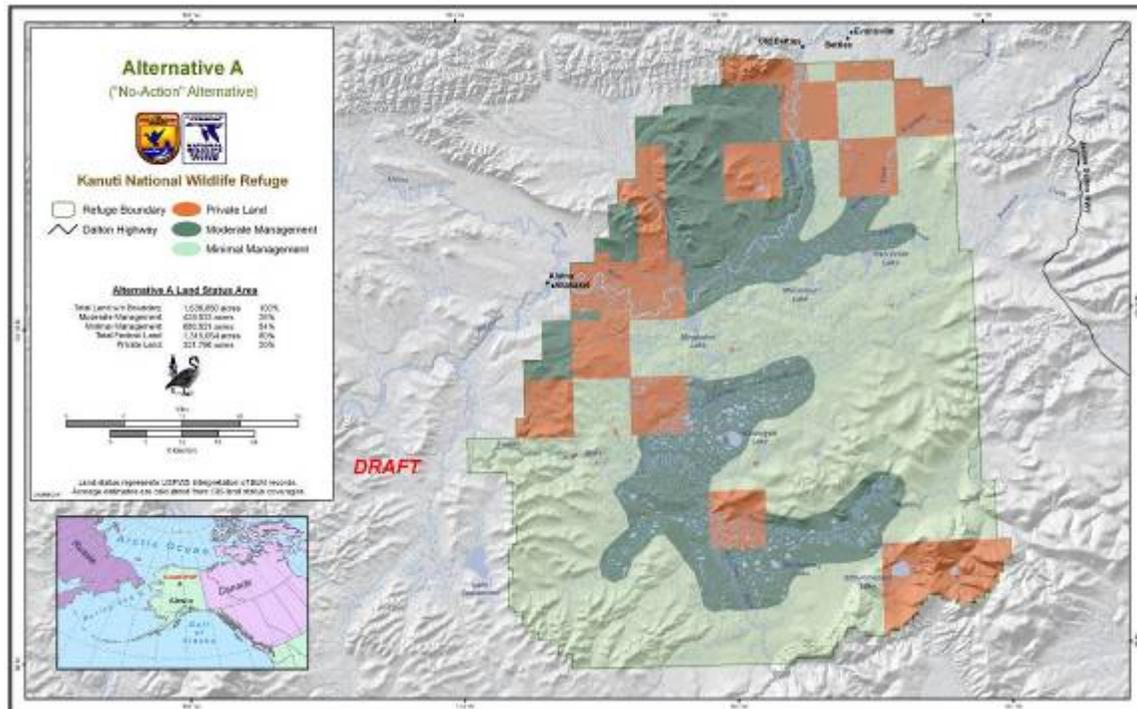


Figure 8. Significant Planning Alternatives. Federal lands are in light green (“minimal management”) or dark green (“moderate management”). Private lands are in orange. “Alternative A” (top; the “no-action” alternative) has been the status quo since 1987, with 33% of federal lands within Kanuti NWR in “moderate management.” The proposed “preferred” management “Alternative C” for the draft revised CCP (bottom; i.e., 15% of federal lands in “moderate management”) better reflects the fact that the entire Refuge has always been managed with a lighter touch, as if most federal lands were in “minimal management.”

Fire Management

Fire Management Plan

By year's end, Fire Management Officer Patten had completed all requested revisions to the Kanuti NWR Fire Management Plan (FMP). The FMP was subsequently accepted by the regional Fire Management branch. The only remaining detail for early 2007 was for final signatures of Refuge Manager Spindler and the regional directorate.

One of the benefits of the FMP is that it will allow wildland fire use and/or prescribed fires to be conducted on the Refuge, as appropriate, in the future. Without an approved FMP, the Refuge has not been able to use these two tools to further its habitat management goals to date. Importantly, this FMP includes revisions to suppression zone boundaries on the Refuge to protect its last remaining small areas of unburned lichen-spruce woodlands (Fig. 9). This change is intended to maintain a diverse assortment of habitats, including old growth lichen-spruce woodlands. The extent of lichen habitat on the Refuge has diminished in recent years due to large wildland fires in 1990-91 and 2004-05; this has reduced available forage for wintering caribou.

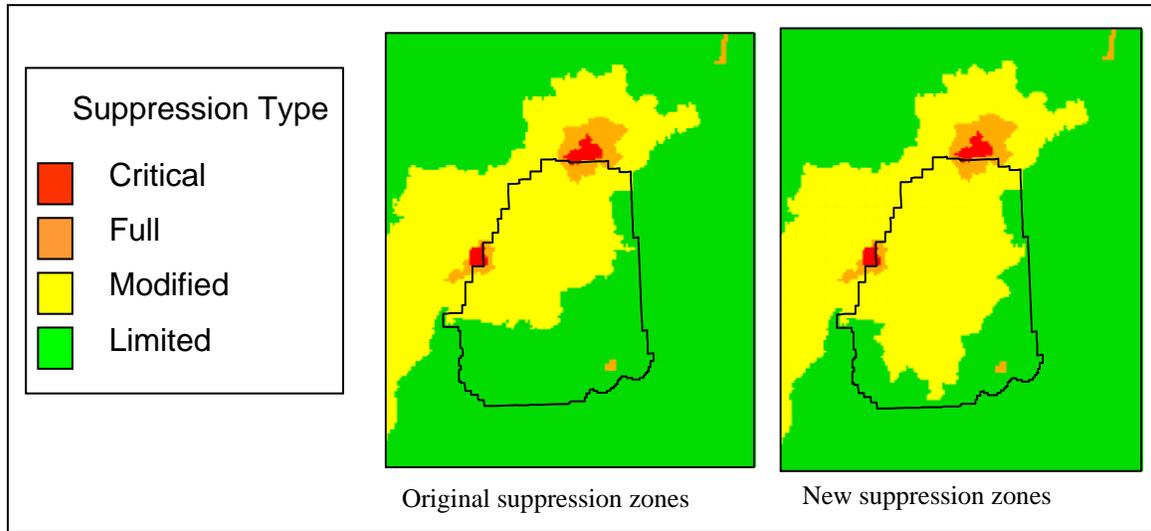


Figure 9. A “modified suppression zone” was extended into the southern portion of the refuge to protect old-growth lichen, used as winter forage by caribou. Fire personnel will attempt to put out fires in “modified suppression zones” if they ignite before July 10; ignitions after July 10 may be allowed to burn.

Wildland-Urban Interface fuels reduction project in Evansville

In early 2006, Fire Management Officer Patten initiated plans for a Wildland-Urban Interface (WUI) fuels reduction project in Evansville. The project targets 27 acres of mechanical thinning by a locally-hired chainsaw crew. Target areas include the lands surrounding the residences in Evansville, and thinning and widening along the existing Caterpillar tractor trail, which was cut as a firebreak to the east of Bettles during the 2004 Evansville Fire. This should reduce the risk of a wildland fire moving from federal lands

into the inhabited area of Bettles and Evansville.

The project began in September and rapid progress was made in thinning the priority area at the north end of Evansville. Because the black spruce stand there was extremely dense, large amounts of slash were generated during the thinning process. Most black spruce were removed from this area, while deciduous aspen, poplar, and birch have been left standing. The slash was transported to a large open gravel bar by the Koyukuk River to await suitable burn conditions in October.

On October 16, the fire crew burned 16 large piles in prescription and according to plan. Evansville was to continue thinning until snowfall and then resume in the spring. Funding was 33% expended to date and 12 of 27 target acres were completed. Another pile burn was being contemplated in spring before breakup. This WUI fuels reduction contract is administered through the Evansville Tribal Council and is scheduled for completion by spring 2007.



Evansville fire crew member burning a slash pile, generated from the WUI thinning project, on a gravel bar along the Koyukuk River. (S. Patten photo)

Burned Area Emergency Response (BAER) program

Investigations into post-fire effects on biological, cultural, and administrative resources within the perimeter of the large 2005 Old Dummy fire, under the auspices of the BAER program, are found throughout this document.



Before (top) and after photos of thinning near a residence in Evansville. Bottom photo shows thinning of black spruce immediately around house, with stand to right also targeted for clearing. (Wayne Knight [Evansville Tribal Council] photo)

Intra- and Interagency Cooperation

Hurricane Katrina recovery detail

Administrative Support Assistant (ASA) Kimberly Robinson was detailed to southern Mississippi for the month of March to assist in Hurricane Katrina recovery efforts. Kimberly assisted FEMA and the Corps of Engineers in overseeing contractors' invoices, goods, and services, and supervising clean-up teams.



ASA Robinson served a detail in Mississippi, assisting with Hurricane Katrina recovery efforts. (L. Maloney photo)

International Migratory Bird Day talk at Yukon Delta NWR

Wildlife Biologist Harwood was invited to Bethel, Alaska, to present a talk on boreal forest birds at Bethel's International Migratory Bird Day Festival on May 26-27. Harwood's phone interview on May 22 with local radio station KYUK served as a promotion for his 90-minute PowerPoint presentation, "Move over Birds of the Yukon-Kuskokwim Delta—It's the Birds of the Yukon-Kuskokwim Taiga!" on May 26. Approximately 20 Bethel residents attended the talk which was co-sponsored by the Bethel Audubon Society (paid for his airfare), University of Alaska – Kuskokwim Campus (provided space and equipment for talk), and Yukon Delta NWR (provided lodging, car, etc.). Harwood then served as bird guide on an all-day birding boat trip up a local boreal forest river on May 27. Harwood used to lead annual spring birding boat trips up this river when he was employed at Yukon Delta NWR.

Plane crash at VOR Lake in Bettles

On June 22, Biological Technician (BT) Knight worked with Yukon Flats Assistant Refuge Manager (ARM) Jimmy Fox to respond to a wetlands fuel spill. The spill at the VOR Lake floatplane facility in Bettles was the result of a private floatplane crash the evening previous. BT Knight and ARM Fox contacted all of the required spill response officials and agencies per the refuge spill contingency plan and made available our pre-staged spill response materials to the on-scene response team in Bettles, comprised of local residents and businesses, as well as Gates of the Arctic National Park and Preserve personnel. Knight and Fox's efficient and effective response helped minimize fuel damages to resources near/adjacent to the Refuge. The pilot and passenger of the plane sustained serious injuries, but thankfully survived the crash. Alaska Department of Transportation officials believed that major resource degradation had largely been mitigated and that natural processes, rather than a large cleanup effort, would best address the spill in the long run.



On-scene responders deployed this Refuge-supplied boom to contain fuel leaking from this private plane that crashed on the shore of VOR Lake in Bettles in June.

(Susan Holly [Ace Supply, Bettles] photo)

Invasive Weed Pull on Dalton Highway

There has been growing concern that exotic plants making their way north along the Dalton Highway may invade outlying lands and waters (including those of the Refuge) by dispersing seeds into the many streams and rivers that intersect the highway. During July 10 – 13, two crews of volunteers pulled and dug out white sweetclover (*Melilotus alba*), oxeye daisy (*Leucanthemum vulgare*), common tansy (*Tanacetum vulgare*) during a BLM-sponsored invasive species weed pull along the Dalton Highway corridor. Volunteers from “Friends of Alaska's Refuges” (Friends) and the Tribal Civilian Community Corps (through the Tanana Chiefs Conference) assisted BLM and National Park Service employees along a targeted extent of the highway which included areas where multiple prominent waterways that traverse Kanuti Refuge intersect the highway. Targeted river crossings included Fish Creek, Kanuti River, Jim River, and Bonanza Creek, as well as other areas between the Kanuti River and Coldfoot.

BLM reported that the volunteers were efficient, enthusiastic and great people. The Friends had such a good time many of them want to come back next year. BLM is already working on plans for the second annual weed pull to revisit the pull sites from this year and perhaps expand farther south within the Dalton Management Unit. The eight Friends volunteers contributed 482 hours during the weed pull. Approximately 100 garden-sized bags of weeds were filled during the effort.



BLM and NPS staff, as well as volunteers from “Friends of Alaska's Refuges” and the Tribal Civilian Community Corps, proudly display their haul of invasive weeds pulled from the Dalton Highway near the Jim River crossing. The Jim River flows into the northeast corner of Kanuti NWR. (BLM photo)

Cooperative moose work

Wildlife Biologist Saperstein co-authored a report of the 2004 moose survey in the upper Koyukuk River region. This was a cooperative effort with the Gates of the Arctic National Park and Preserve, BLM, and ADF&G. The report was published in the National Park Service Technical Report Series. The full citation is:

Lawler, J.P., L. Saperstein, T. Craig, and G. Stout. 2006. Aerial moose survey in upper Game Management Unit 24, Alaska, Fall 2004, including State land and lands administered by the Bureau of Land Management, Gates of the Arctic National Park and Preserve, and Kanuti National Wildlife Refuge. Project Report NPS/AR/NR/TR-2006-55. 31 pp.

After the fall 2006 moose surveys were cancelled due to lack of snow, the three agencies planned a moose telemetry project using shared funds. Planning and discussion occurred in 2006; the moose will not be collared until late winter 2007.

Selawik NWR swan survey

Refuge Manager Spindler joined a Migratory Bird Management and Selawik NWR crew in Kotzebue to capture Tundra Swans for banding and avian influenza sampling in August. Spindler was loaned to the project for a week because of his previous experience capturing swans near Kotzebue.

Tribal Cooperation

Subsistence waterfowl harvest survey

The refuge contracted with a local small business owner, P.J. Simon, who is originally from the village of Allakaket, to conduct field sampling of waterfowl harvest in the villages near Kanuti Refuge. Simon was contracted to conduct door-to-door household interviews in the villages of Allakaket, Alatna, Bettles, and Evansville during the hunting seasons in 2006. Three separate surveys were conducted: (1) spring harvest, survey conducted by the end of June; (2) summer harvest, survey conducted at the end of August; and (3) autumn harvest, survey conducted after freeze-up (early October) once all migratory birds have departed.

We experienced significant delays in this project mainly stemming from problems due billing, travel, and conflicting schedules. Simon did complete the field work at the end of the bird hunting seasons in 2006, and final data forms were submitted to the Alaska Migratory Bird Co-Management Council. Results appear in Subsistence section (page 53).

Native place names map

Refuge staff worked with Koyukon linguist Eliza Jones again to update and compile Native place names into a GIS database for mapping purposes. See Cultural Resources section (page 27) for details.



(Clockwise from top) Alutna residents, Eddie Bergman and Harding Sam, point out traditional place names with Koyukon linguist Eliza Jones, Refuge Manager Spindler, and Asst. Planner Webb. (W. Brown photo)

Tribal assistance grant

Refuge Manager Spindler and Wildlife Biologist Saperstein reviewed and helped edit a tribal assistance grant developed by Pollock Simon, Jr. The title of the grant was “Building tribal expertise and capacity through subsistence planning and education for a safer future.” The grant was not funded.

Clearing winter trail

Burned Area Emergency Response funds were allocated to clear the Allakaket-Lake Taiholman winter trail, damaged by the 2005 Old Dummy fire. See Cultural Resources section (page 25) for details.

Permits

In 2006, one special use permit was requested and issued to conduct commercial air taxi/transporter operations. The Refuge receives a limited number of special use permit requests for this activity for the following reasons: (1) the Kanuti Controlled Use Area occupies a large section of the refuge, and under State regulations this area is closed to the use of aircraft for hunting moose, including the transportation of moose hunters, their hunting gear, or parts of moose; and (2) moose densities within the refuge are low, and hence the refuge is not a popular destination for many moose hunters, who often comprise the bulk of air taxi/transporters’ business volume.

Big game guide permits on the Kanuti Refuge, as well as on the other 15 National Wildlife Refuges in Alaska, are awarded through a competitive selection process. Permits for exclusive guide use areas are awarded for a five-year period with an option

for one five-year extension contingent upon no violations and satisfactory performance. Areas are offered periodically as permits expire or as incumbents choose to discontinue their operations. Qualified Alaska big game guides may apply for up to three areas when they are publicly offered. In 2005, the Refuge offered its only exclusive guide use area, which encompasses the refuge in its entirety, for competition. The Refuge received only one application for the area. Early in 2006, a ranking panel consisting of Service employees evaluated the application in accordance with regional guidance, determined the applicant met the requirements identified in the Refuge prospectus, and recommended that he be considered for final selection as the big game guide in the area. After evaluating the application and talking with the applicant, Refuge Manager Spindler awarded the big game permit for the area to him. Because of the low moose densities and competition between local subsistence hunters and other hunters within the refuge, the guide is permitted to provide commercial grizzly bear, black bear and wolf hunts to no more than six clients annually through December 2011.



Water arum (*Calla palustris*) (A. Kokx photo)

Administration

Budget

Fiscal year 2006 saw a change in the organization of funding, making comparison with previous years problematic. Thus, 2006 funding figures are given separately from the previous five years (Table 4).

Year 2006

Refuge Operations (1261)	611,000
Maintenance (1262)	281,000
Visitor Services (1263)	399,000
Law Enforcement (1264)	4,000
CCP Planning (1265)	45,000
Subsistence (1332)	26,000
Fire	<u>256,000</u>
Total Funding	\$1,623,000

Table 4. Funding for Kanuti NWR, Fiscal Years 2001-2005.

Year	Total Funding	Refuge Operations	Maintenance/ Construction	Fire	Subsistence	Challenge Cost Share
2001	\$ 845,000	\$769,000	\$ 18,000	\$20,000	\$26,000	\$12,000
2002	\$ 973,000	\$905,000	\$ 24,000	\$18,000	\$26,000	-----
2003	\$ 916,000	\$825,000	\$ 42,000	\$18,000	\$27,000	\$ 4,000
2004	\$1,044,000	\$876,000	\$103,000	\$19,000	\$27,000	\$19,000
2005	\$1,010,000	\$871,000	\$ 80,000	\$23,000	\$26,000	\$10,000

Personnel

Staffing

Considerable staff turnover occurred in 2006 (see Table 5), including:

- **Joanna Fox**, most recently refuge operations specialist at Arctic NWR, filled Kanuti's vacant deputy refuge manager (DRM) position in March. Joanna has also worked at Charles M. Russell, Koyukuk/Nowitna, and Selawik NWRs.
- SCEP (Student Career Experience Program) Student Trainee, **Deborah Webb**, joined the Kanuti staff in April and finished up her Master's thesis. Upon graduation, she was converted (September 14) to a permanent position as an assistant planner (AP), working on the Kanuti Comprehensive Conservation Plan.
- Park Ranger (PR) **Jody DeMeyere** resigned in April. Jody planned to pursue extensive travel with her family during her hiatus from the Service.
- Wiseman (Alaska) resident, **Kristin Lyle**, was selected under the emergency local hire program to fill the vacant interpretive park ranger position at the Arctic Interagency Visitor Center for the summer, entering on duty in May.
- **Stefan Kropidowski** and **Adam Kokx** were hired for the summer as seasonal biological technician (BT) and biological aid (BA), respectively.

- **BT Curtis Knight** landed a permanent full-time job as a GIS specialist with the Alaska Department of Natural Resources,. He started August 7 in his new position, but was finishing up work with Kanuti throughout the month. Curt planned to volunteer for the Refuge as time permits.
- Fire Management Officer (FMO) **Sam Patten** was converted to fire management specialist (prevention and mitigation) in November. Patten's new responsibilities will focus on outreach and Wildland-Urban Interface projects. He will continue to be shared among the Fairbanks refuges, though officially supervised through Yukon Flats NWR. The new FMO position will be advertised no earlier than January 2007; however, it will now be supervised by Kanuti, while still being shared with Arctic and Yukon Flats NWRs.



Top row (L to R): DRM Fox, PR Lyle, AP Webb
 Middle row (L to R): PR DeMeyere, BT Knight
 Bottom Row: (L to R): BA Kokx, BT Kropidlowski

Table 5. 2006 Kanuti NWR Staff (includes permanent, shared, Student Temporary Employment Program [STEP], Student Career Experience Program [SCEP], seasonal, and emergency hire positions).

Employee Name Title	Entered On Duty	Departed
Mike Spindler Refuge Manager/Pilot	03/06/05	
Joanna Fox Deputy Refuge Manager	03/05/06	
Lisa Saperstein Wildlife Biologist (Supervisory)	09/27/98	
Chris Harwood Wildlife Biologist	03/10/03	
Jody DeMeyere Park Ranger	10/22/02	04/28/06
Almeda Gaddis Administrative Officer ¹	10/26/97	
Lorna Young Administrative Support Assistant ¹	10/21/03	
Kimberly Robinson Administrative Support Assistant ¹	10/21/03	
Lou Maloney Administrative Support Assistant ¹	11/15/04	
Wennona Brown Subsistence Coordinator ²	12/30/01	
Sam Patten Fire Management Officer ^{2, 4}	01/13/02	
Nancy Reagan Information Technology Specialist ³	10/05/03	
Carlette Smith Information Technology Specialist ³	07/16/00	
Curtis Knight Biological Technician (STEP)	05/19/02	09/11/06
Deborah Webb Student Trainee (SCEP) ⁵	04/10/06	
Stefan Kropidlowski Biological Technician	05/15/06	09/01/06
Adam Kokx Biological Aid (STEP)	05/15/06	10/11/06
Kristin Lyle Park Ranger (emergency hire)	05/14/06	07/14/06
Doug Holton Maintenance Worker (emergency hire)	05/28/06	10/30/06

¹ position paid by Kanuti NWR, but shared with Arctic and Yukon Flats NWRs

² position paid by Yukon Flats NWR, but shared with Arctic and Kanuti NWRs

³ position paid by Arctic NWR, but shared with Kanuti and Yukon Flats NWRs

⁴ converted to Fire Management Specialist (Prevention and Mitigation) November 11

⁵ converted to Assistant Planner (permanent) September 14

Volunteers

The work of the Refuge also greatly benefited from the significant efforts of these volunteers:

- Interpretive Park Ranger Kristin Lyle contributed 720 hours at the Arctic Interagency Visitor Center immediately following her emergency hire stint.
- Eight members of the “Friends of Alaska Refuges” collectively contributed 482 hours assisting in the BLM-sponsored weed pull along the Dalton Highway.
- “Friends of Alaska National Wildlife Refuges” vice-president Carl Stanley contributed an additional 47 hours, including hosting the Far North Conservation Film Festival and scanning original photos and slides for inclusion in the Refuge’s digital image library.
- Curtis Knight still managed to contribute to the Refuge nearly 60 volunteer hours after accepting a permanent position with the State. Curt worked mostly on GIS projects, including providing maps for the CCP and moose hunt.
- Former Kanuti Refuge Manager Bob Schulz (retired) contributed 20 hours in August ferrying biological crews by jet boat back to Bettles from the South Fork Koyukuk River.
- David Spindler contributed 20 hours assisting the crew with clean up and maintenance at the administrative cabin at Kanuti Lake in June.
- Refuge staff were saddened to hear of the August 24 death of Ronald Dettmers on the Dalton Highway. Mr. Dettmers was a BLM volunteer working at the Arctic Interagency Visitor Center for the summer. He was a very personable retiree from Wisconsin who volunteered for the entire summer, and really helped out with greeting and informing visitors, and worked closely with our employee, Park Ranger Lyle.

Awards/Recognition

Deputy Refuge Manager Fox received her 10-year pin and certificate in March.

Wildlife Biologist Harwood received a STAR award for producing the 2005 Kanuti Annual Narrative, the first narrative the refuge has completed on time in over a decade. He received another STAR Award for superior year-round performance.

Biological Technician/student Curtis Knight was featured in a story on the University of Alaska Fairbanks Web site during the month of April. The story, complete with lots of photos, detailed his senior thesis project which was done on the Refuge. It also recounted his winning of the Regional Director’s award in December 2005.

Biological Aid Kokx received a STAR award for his initiative and perseverance in pinning thousands of insects collected during the Refuge’s inventory project.

Biological Technician Kropidlowski received a STAR award for his efforts to organize

the Bettles bunkhouse and facilitate logistics for field personnel passing through Bettles.

Wildlife Biologist Saperstein received a STAR Award from Danielle Jerry, Chief of Natural Resources, for her involvement in the March 2006 regional biologist workshop in Homer. She received another STAR Award for her participation in organizing The Wildlife Society annual meeting and a quality step increase for year-round performance.

Professional Development

All staff attended and completed all mandatory training for their respective positions. Supplemental training, workshops, and conferences for several staff members included:

- DeMeyere: Interpretative Writing workshop; Fire Information Officer training
- Fox: Applied Supervision training
- Gaddis: Coaching Skills training
- Harwood: Alaska Bird Conference; Regional Refuge Biologist Workshop
- Knight: Wilderness First Aid
- Maloney: Light Urban Search & Rescue, Post-disaster Damage Assessment, Disaster Response Plan, and Wilderness First Aid trainings
- Patten: Regional Safety Officers' Conference
- Robinson: SAMMS; Employee Foundations
- Saperstein: Regional Refuge Biologist Workshop; The Wildlife Society Conference
- Spindler: Fire Management Leadership Training; Flight Instructor Refresher Clinic
- Webb: CCP training
- Young: Wilderness First Aid; SAMMS



Admin. Support Assistant Maloney qualifies for bear/firearms safety. Lou has subsequently been trained as an instructor. (C. Knight photo)

Public Use

Overview

Pursuit of subsistence activities (e.g., hunting, fishing, trapping, berry picking) by local residents continues to be the primary public use of the Refuge. Given subsistence's prominence in the public use realm of the Refuge, considerable staff effort is expended in its behalf (e.g., moose and wolf surveys, law enforcement patrols, newsletters to village residents, village meetings, etc.). While the Refuge does not monitor use quantitatively, it is believed that non-subsistence usage is generally light; the Refuge's remoteness and general inaccessibility likely are major deterrents to recreational use by non-locals. Still, there is some sport hunting done every year by hunters flying in via their own aircraft or air taxi services, or by accessing the Refuge (e.g., jet boats, rafts, airboats) by rivers that intersect the Dalton Highway. Most, if not all, sport fishing, wildlife observation, and wildlife photography are likely done incidentally to sport hunting. The Refuge contributes one staff member to the recently erected Arctic Interagency Visitor Center (AIVC) in Coldfoot (260 mi/415 km north of Fairbanks) along the Dalton Highway. The AIVC is centrally located to inform public about not only Kanuti NWR, but also Yukon Flats and Arctic NWRs, Gates of the Arctic National Park and Preserve, and BLM-held lands such as the Dalton Highway Corridor and the National Petroleum Reserve Alaska. Considerable environmental education and interpretation is done in Fairbanks as well, in cooperation with such groups as the Alaska Department of Fish and Game, Alaska Public Lands Information Center, University of Alaska Fairbanks, and non-governmental organizations like the Alaska Bird Observatory, Arctic Audubon, and Friends of Creamer's Field.

Two sets of hunting regulations apply to the Refuge: 1) the general State harvest regulations and 2) federal subsistence regulations that only apply to federally qualified subsistence users on federal lands. Qualification as a federal subsistence user is based on residency in rural villages. In most cases, the State and federal regulations are the same, but there are exceptions where additional subsistence opportunity is necessary.

Subsistence

Subsistence Overview

Providing the opportunity for continued subsistence use by local residents is one of the ANILCA purposes of Kanuti Refuge. The Federal Subsistence Board, through its rulemaking process, addresses seasons, harvest limits, and determinations on customary and traditional use. The Federal Subsistence Board's jurisdiction includes hunting (excluding migratory birds), trapping, and fishing. The Federal Board established regional advisory councils to provide for meaningful public input to the rulemaking process. Kanuti Refuge is within the area represented by the Western Interior Federal Subsistence Regional Advisory Council (Western Interior RAC), and under State authority, the area represented by the Koyukuk River Fish and Game Advisory Committee (Koyukuk River AC).



2006 was a good year for blueberry picking. (S. Hillebrand photo)

Concerns/Issues

1) Low moose numbers

The most frequently expressed concern of village residents throughout interior Alaska continues to be the low moose population and high number of wolves. Local residents continue to ask for predator control (intensive management) on both State and federal lands. They also have asked for wolf surveys on the Refuge and predator/prey relationship studies. Related concerns or possible contributing factors to low moose numbers, that have been expressed at recent subsistence meetings include the following:

- Global warming – local residents feel that warmer weather later into the fall is affecting moose movements. Moose are staying at higher elevations where they are less accessible during the fall hunting season.
- Low water conditions – traditional hunting grounds along the rivers are inaccessible by boat because of unusually low water conditions in the fall. River freeze-up is occurring later in the fall, which also affects access to traditional hunting and trapping areas.
- Illegal guiding and transporting – in some areas guides and transporters are illegally taking clients into closed areas.
- Local residents have to hunt longer in the fall season to get their moose for winter, and with gas prices up to \$6.00/gallon, they are having a harder time meeting their subsistence needs.

2) Increased fire frequency and severity

Some village residents expressed concern about the extent and severity of fires, most recently from the 2004 and 2005 seasons, and the subsequent effects on some fish and wildlife populations and their habitats. For example, valuable old growth lichen habitat on the Refuge, which provides winter forage for caribou, was consumed in 2004. Ash

deposition may be affecting water quality for fish and their eggs. Concerns, however, were not confined to animals; some residents lamented the loss of large trees in the riparian areas. This concern emanated from not only a practical point of view (decrease in house/cabin logs), but even more from an aesthetic/emotional point of view.

3) *Senate Bill 85*

Concern continued this year regarding the bill to open the Dalton Highway Corridor for off-road all-terrain vehicle (ATV) access introduced in 2005 by state Senator Ralph Seekins (R – Fairbanks). It should be noted that the highway is just eight miles east of the eastern Refuge border at places. Rural residents throughout interior Alaska have expressed serious concerns that this will allow urban-based hunters easy access to remote wildlife populations. Concerns center on the absence of a definition for what constitutes an “ATV,” which could allow anything from a four-wheeler to off-road trucks. In some areas, local residents are already seeing many caribou wounded and not retrieved, and they feel this situation would get worse with increased access.

4) *Decline in whitefish*

Local residents feel that the whitefish population is going down fast; they are not very abundant any more. Also reports were noted of a parasite in whitefish that makes the head rotten, which locals said they had never seen before. Some residents feel that part of the reasons is habitat being blocked by beaver dams.

5) *Avian influenza*

Continued concerns about avian influenza were voiced by some residents and whether or not it is safe to harvest and eat waterfowl.



Because opportunities are often serendipitous, black bears are generally taken incidentally during other subsistence activities like fishing, berry picking, and moose hunting. (S. Hillebrand photo)

Big Game Harvest and Hunting Regulations (Subsistence)

Subsistence harvest is typically under-reported under the State harvest system (via green mail-in cards). Most of the harvest on the Refuge is by subsistence users living in area villages. In 2006, an extended five-day hunting season was available for federally qualified subsistence hunters from September 26-October 1. The Refuge contracted with the local license vendor in Allakaket to issue federal fall moose permits and collect harvest reports for the extended season. Forty-eight federal permits were issued in Allakaket/Alatna for the extended season on Kanuti Refuge. Eleven moose were harvested during the fall State general hunt, and one additional moose was harvested during the five-day federal hunt. The ADF&G area biologist determined that an additional three moose were reported harvested on State “green” harvest tickets in the general hunt that were not accounted for in the tally compiled by the license vendor. Therefore the total estimated harvest for the fall 2006 hunt is 15 moose. According to the license vendor, there was no moose hunting activity in Alatna and Allakaket during the State’s December 1-10 general hunt.

Special regulations are currently in effect on the Refuge regarding moose hunting. The State Board of Game established the Kanuti Controlled Use Area in 1981. In the Controlled Use Area, aircraft access for moose hunting is prohibited. In 1992, the Federal Subsistence Board restricted moose hunting on federal lands within the Kanuti Controlled Use Area to residents of Game Management Unit 24, Anaktuvuk Pass, Galena, or Koyukuk.

Under the discretionary authority granted by the Federal Subsistence Board in 2005, Refuge Manager Spindler, in conjunction with the Gates of the Arctic National Park/Preserve Superintendent and the Central Field Office Manager of BLM, closed the 2006 fall cow moose season, consistent with State and other federal managers’ actions. He also did not open the discretionary March 1-5 season in 2006.

In 2006, the Western Interior RAC took action on numerous proposals that would affect hunting in the Kanuti Refuge. Two statewide proposals regarding handicrafts were supported: 1) restrict commercial sale of handicrafts made from bear claws (Council in favor of instituting most restrictive language); 2) allow sale of handicrafts of non-edible by-products of wildlife other than bears (Council modified to add definitions of “trophy” and “big game”). The Federal Subsistence Board (FSB) rejected the proposal to restrict sale, and adopted the proposal to allow sale of handicrafts from non-edible by-products, with the Council’s recommended modification.

The Council also voted to support the following proposals:

- simplify Unit 24 sheep hunting regulations based on the January State Board of Game (BOG) decision to divide Unit 24 into 4 sub-units; (FSB adopted)
- change the closing dates for the fall moose seasons in Units 21A, 21B, 21D, 21E, and 24 from Sept 25 to Oct 1 and in the Koyukuk CUA in Units 21D and 24, from Sept 20 to Oct 1; however, if the BOG provides additional hunting time in August for Unit 21B, we will not go to the FSB with an extension request to October 1; if the BOG does not approve the August season, our original proposal

- stands; (FSB adopted as modified by Western Interior RAC);
- modify moose regulations for Unit 24 to reduce the regulatory complexity, based on the new sub-units of Unit 24 (FSB adopted).

At the March Western Interior RAC, Benedict Jones, member from Koyukuk, was presented a plaque honoring his service to the Council. Jones was retiring from the Council in 2006, and the plaque was presented when the meeting was held in his home village. At the October meeting in Ruby, members Jack Reakoff (Wiseman) and Ray Collins (McGrath) were each presented with a Citizen's Service Awards from USFWS Director Dale Hall for their service as charter members to the Western Interior RAC.



Charter WIRAC members, Ray Collins (L) and Jack Reakoff (R), receive Service Citizen's Awards, presented by FWS Subsistence Council Coordinator Vince Mathews. (W. Brown photo)

The State Board of Game (BOG) also met in March to hear proposals affecting hunting in interior Alaska. The Koyukuk River Advisory Committee (KRAC) took the following actions on proposals affecting the Kanuti Refuge:

- set the hunting season for brown bear in Units 21 and 24 as August 1 through June 30 (KRAC supported; BOG failed);
- divide Unit 24 into 4 subunits (KRAC supported; BOG passed)
- codify sheep regulations for the Unit 24 subunits (KRAC supported; BOG passed)
- create drawing permits for moose in 21B, 21C, 21D, and 24 (KRAC took no action; BOG took no action)
- extend moose season to October 1 for Units 21A, 21B, 21D, 21E and 24 (KRAC

- supported for Unit 24B; BOG failed)
- align the moose seasons with new Unit 24 subunits (KRAC supported; BOG passed)
- establish intensive management objectives for each of the new subunits in Unit 24 (KRAC supported; BOG passed)
- annual re-authorization of the antlerless moose season in Unit 24 (KRAC supported; BOG failed)
- open a wolf hunting season in Units 21 & 24, 9 days earlier in August (KRAC opposed; BOG amended to increase bag limit to 10 and passed)
- allow snowmobiles to pursue wolves for harvest in Units 21 and 24 (KRAC supported; BOG amended to position hunter and not harass wolves and passed)
- allow use of bait to hunt wolves (KRAC took no action; BOG failed)
- eliminate prohibition on using aircraft in Koyukuk CUA (KRAC opposed; BOG tabled)
- allow snaring and trapping of black bears from March 1 – June 10 season in Unit 24, with 3 bear limit (KRAC opposed; BOG took no action)
- allow taking wolves from a moving snowmachine (KRAC supported; BOG took no action)

Fishing Harvest and Regulations (Subsistence)

In 2004, Alatna residents harvested an estimated 16 summer chum salmon. Allakaket residents harvested an estimated 3,417 salmon, with the following breakdown: 65 Chinook, 2,367 summer chum, 968 fall chum, and 17 Coho. Bettles and Evansville residents had no reported salmon harvest (Busher et al., In prep. A). In 2005, Alatna residents harvested 5 summer chum. Allakaket residents harvested an estimated 3,365 salmon, with the following breakdown: 68 Chinook, 2,535 summer chum, 557 fall chum, and 206 Coho. Bettles residents harvested an estimated 57 salmon, with the following breakdown: 3 Chinook, 4 summer chum, and 50 fall chum. Evansville residents did not report any harvest (Busher et al., In prep. B).

Estimated harvest of fish other than salmon in Koyukuk River villages for 2004 and 2005 is presented in Table 6. No data were reported for Evansville.

Table 6. Non-salmon fish species harvested by the Koyukuk River villages, 2004-05.

Village	Whitefish *	Pike *	Sheefish *	Grayling **	Burbot **	Suckers **	Arctic Char**	Total
2004¹								
Allakaket	580	461	545	20	7	12	0	1625
Alatna	0	0	0	0	0	0	0	0
Bettles	0	0	45	4	0	0	12	61
2005²								
Allakaket	2340	619	480	174	208	572	1	4394
Alatna	100	8	0	20	0	6	0	134
Bettles	0	0	6	6	0	0	4	16

¹Data from Busher et al., In prep. A *Expanded to estimate village harvest

²Data from Busher et al., In prep. B **Reported subsistence harvest (not expanded)



Allakaket resident, Steven Bergman, caught this northern pike in his net set in the Koyukuk River (S. Hillebrand photo)

Subsistence salmon fishing opened on June 11 in the Koyukuk River drainage 24 hours per day/7 days per week. Fisheries biologists described the 2006 Chinook salmon fishing season as 5 days later than normal in timing, and average in run strength. The summer chum run was estimated at 3.7 million fish, well above the historic average. The fall chum run had four distinct pulses of fish, with estimated season total of 800,000 fish. Most subsistence fishers were determined to have met their needs in 2006.

The Federal Subsistence Board (FSB) reviewed these regulatory proposals at its January 2006 meeting. Regulations approved took effect in the 2006/07 season.

- Statewide proposal to permit the sale of handicrafts made by rural Alaskans from the nonedible by-products of subsistence-harvested fish or shellfish was supported by Western Interior RAC at its fall 2005 meeting and approved by the FSB.
- Proposal to codify the federal subsistence windows schedule in regulation to start on May 15 was tabled by the Western Interior RAC and rejected by the FSB.
- Proposal to limit all gillnets with greater than 6-inch stretch mesh to a depth of 35-meshes in the Yukon River drainage was opposed by the Western Interior RAC and rejected by the FSB. Net size and effect on fish size continues to be controversial and will require further study, analysis, and consideration.

Waterfowl Harvest and Hunting Regulations (Subsistence)

Though not governed as subsistence under ANILCA, spring harvest of migratory birds has been a long-standing tradition in rural Alaska and requires significant attention by refuges. The 1916 Migratory Bird Treaties with Canada and Mexico failed to recognize Alaska's traditional spring/summer subsistence harvest. After years of negotiations, the treaties were amended in 1997 to recognize this customary and traditional harvest. Under the amendment terms, the Alaska Migratory Bird Co-Management Council (AMBCC) was formed, which includes representatives from the Alaska Native community, the Alaska Department of Fish and Game, and the U.S. Fish and Wildlife Service acting as equal partners. The AMBCC's specific purpose was to develop "recommendations related to the spring/summer subsistence harvest of migratory birds," and under this authority issued the first harvest regulations in 2003.

Eleven regional management bodies were created to provide crucial local input to the Council in developing the bird harvest list, regional season dates, methods and means, and other annual regulatory recommendations. The AMBCC contracts with Tanana Chiefs Conference (TCC) as the regional management body for the interior Alaska region, which includes the Kanuti Refuge villages. However, Interior villages have reported that TCC has failed to adequately represent them by not holding regional meetings to get local input for the process. This situation continued through 2006; however, the TCC representative did attend the AMBCC meetings. To facilitate accomplishing its directives, the AMBCC established several standing committees. Committee members are appointed by the AMBCC, each group recommending members from its organization. Subsistence Coordinator Brown serves on both the AMBCC's Communication Outreach Committee and the Harvest Survey Technical Committee.

Issues discussed at the AMBCC meetings included: a) whether or not Federal and State duck stamps and State hunting licenses are required for spring subsistence harvest; b) how to exclude certain communities from eligibility for spring subsistence harvest; c) approval process for releasing data back to the individual communities participating in harvest surveys; d) whether spring subsistence harvest should/should not be included in the Supplemental EIS on migratory bird hunting being prepared by the Service (nation-wide migratory bird hunting review), and e) avian influenza and participation by subsistence hunters in collecting samples for analysis. The AMBCC voted to support the following proposals which are germane to hunting on the Refuge or bird populations using the Refuge:

- make it illegal to take birds in the spring using bait; amended language from statute “to place bait in aid of hunting;”
- exclude an area from subsistence regulations; the boundary would include Delta Junction, Big Delta, Fort Greely in the exclusion, but does not include Healy Lake and Dot Lake and the communities on down the road toward Tok.

In July, the Service Regulations Committee adopted these proposals forwarded by the AMBCC for consideration.

Waterfowl Subsistence Survey

A waterfowl subsistence harvest survey was conducted for 2006. P.J. Simon, originally from Allakaket but currently living in Fairbanks, was contracted to conduct the survey. Allakaket was the only village that reported harvesting birds (Table 2). Residents of Alatna either did not hunt or did not choose to participate in the survey. Residents of Evansville and Bettles did not indicate any waterfowl hunting activity. Allakaket residents harvested 227 birds in 2006, most of which were taken in spring (Table 7).

Table 7. Results of 2006 subsistence waterfowl harvest survey.

Season	Bird species	Birds Harvested	
		Allakaket	Grand Total
Spring (April 1-June 30)	American wigeon	39	39
	Greater white-fronted goose	32	32
	Canada goose	77	77
	Snow goose	1	1
	Long-tailed duck	10	10
	Mallard	16	16
	Northern pintail	33	33
	Northern shoveler	2	2
	Surf scoter	2	2
Spring (April 1-June 30) Total		212	212
Summer (July 1-Aug 31)	Canada goose	1	1
	Northern pintail	1	1
	Sandhill crane	9	9
Summer (July 1-Aug 31) Total		11	11
Fall (Sept 1-Oct 31)	Canada goose	1	1
	Mallard	2	2
	Northern pintail	1	1
Fall (Sept 1-Oct 31) Total		4	4
Grand Total		227	227



The harvest of Trumpeter Swans is **not** permitted under sport hunting (fall/winter) or subsistence hunting (spring/summer) regulations. (S. Hillebrand photo)

Arctic Interagency Visitor Center

Overview

Open from May 27 through September 7 in 2006, the Arctic Interagency Visitor Center hosted 8,378 visitors in 2006. Overall visitation in 2006 (independent and guided visitors combined) increased 4% from 2005. Since opening the new facility in 2003, visitation at the AIVC has increased markedly. This trend is likely a result of several factors: highway upgrades that have increased safety and reduced the driving time to Coldfoot from 7-8 hours to 5-6 hours; worldwide increased publicity in magazines, newspapers and websites; an increase in the number of backcountry travelers accessing Gates of the Arctic National Park and Arctic National Wildlife Refuge; and an increase in commercially available guided tours up the Dalton Highway.

Regional Director's visit

On August 29 Regional Director Tom Melius flew to Coldfoot where he was met by Refuge Manager (RM) Spindler, NCTC photographer Steve Hillebrand, Deputy RM Barry Whitehill (Yukon Flats NWR), and Fish and Wildlife Biologist Jim Zelenak (Fairbanks Fish and Wildlife Field Office). They toured the Coldfoot Arctic Interagency Visitor Center, Marion Creek Campground, and Wiseman. Most in the party stayed the night at Kanuti Refuge's other administrative cabin at nearby Marion Creek, and then continued on to Deadhorse to meet with Secretary of Interior Kempthorne and USFWS Director Hall.



A visit to the Arctic Interagency Visitor Center in Coldfoot was a stop on Regional Director Melius' (left) trip up the Dalton Highway. (S. Hillebrand photo)



A visit with Wiseman resident Jack Reakoff was part of Regional Director Melius' itinerary in Coldfoot. Here Reakoff addresses a bus tour group, as well as the FWS contingent. (S. Hillebrand photo)

Wildlife Dependent Recreation and Education



The Refuge offers excellent recreational opportunities of considerable solitude; however, access to such opportunities can be challenging and/or possibly expensive.

(S. Hillebrand photo)

Sport Hunting

Harvest

Estimating big game sport harvest (moose, caribou, and bear) on the Refuge is difficult because of the remote nature of the hunts. Hunters are required to submit mail-in harvest report cards for moose and caribou to Alaska Department of Fish and Game (ADF&G) within 15 days of fulfilling a bag limit or within 15 days following the close of the season. The hunter harvest reports do not accurately represent the Refuge because many of the ADF&G reporting units intersect the Refuge boundary making it impossible to determine if the animal was actually taken on the Refuge. These harvest data are not yet available for 2006. The most timely harvest information is from reports of air taxi operators who are required to obtain a special use permit to operate on the Refuge. In 2006, the one permitted air taxi operator reported transporting from the Refuge two harvested moose with a party of three hunters.

The ADF&G subdivided GMU 24 into four subunits in 2006 to facilitate management (Fig. 10). Most of the refuge is in Unit 24B, although small sections along the eastern boundary lie in Unit 24A

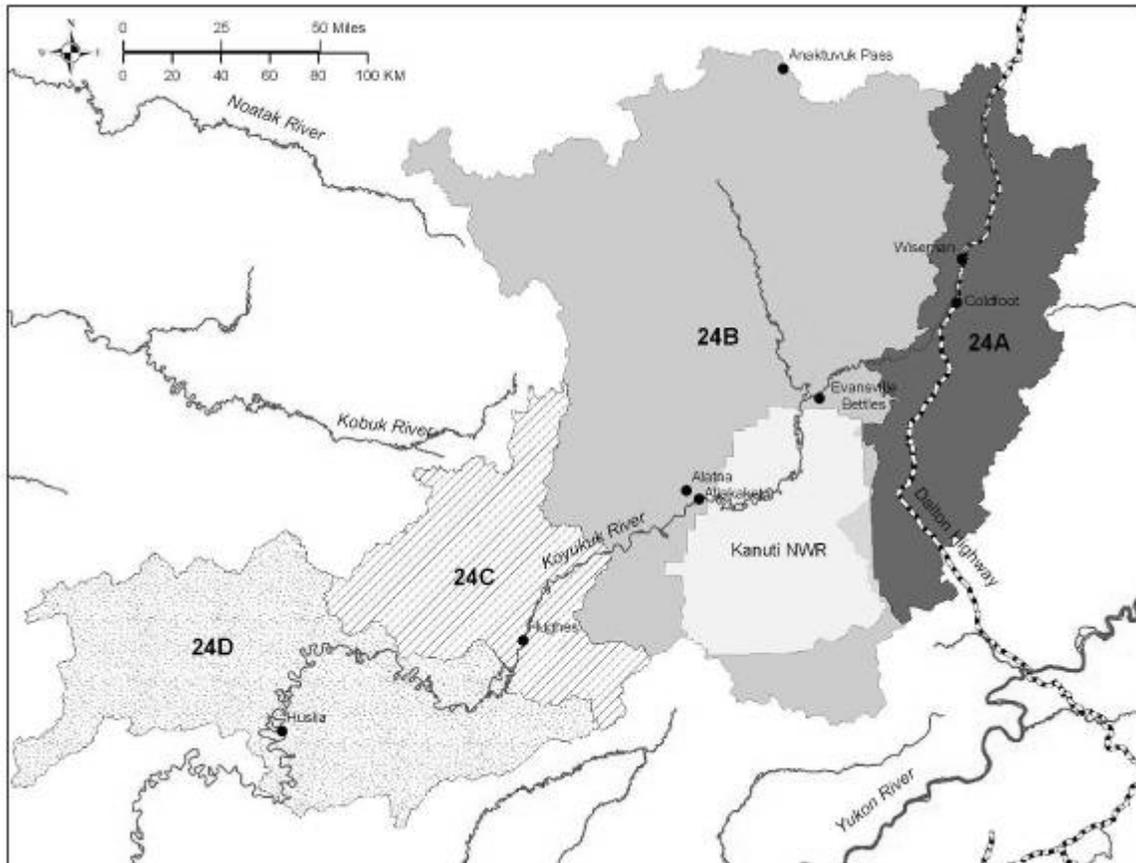


Figure 10. New subdivisions in State Game Management Unit 24. Most of Kanuti NWR lies in GMU 24B.

Sport Fishing

The Refuge does not have a mechanism in place to monitor subsistence or sport fishing activity on the Refuge. Much of the sport fishing is likely associated with fall hunting trips, but people occasionally visit the Refuge solely to fish. Northern pike and arctic grayling are probably the two most sought-after species for sport fishermen.

Wildlife Observation and Photography

The Refuge does not have a facility where visitors can check in or out of the Refuge. Therefore, tracking actual numbers of recreational visitors is difficult. Records of trips to Kanuti Refuge do not pinpoint locations or provide details on use patterns. Visitor numbers are so small that no systematic effort has been made to quantify them. It is assumed that most wildlife viewing and photography occurs incidentally when those already on Refuge lands are hunting, fishing, or floating rivers.



Before entering the Refuge after intersecting the Dalton Highway, the Kanuti River includes a “boulder field.” Visitors wishing to float this section should be aware of seasonally-changing water levels. (S. Hillebrand photo)

Environmental Interpretation

Bettles Nature Trail

The Refuge continued to pursue establishing a nature trail along the shore of VOR Lake near Bettles. The trail would be within the external boundary of the Refuge but in an Evansville, Inc. Native Corporation inholding and on State of Alaska airport lands. To date, the village, city, and Evansville want to cooperate to make the trail a reality, but there are significant access issues yet to be resolved on the VOR Lake airport lands. The USFWS Realty Division and Friends of Alaska Refuges are assisting the negotiations.

Environmental Education

Annual Report

The Calendar Year 2005 Kanuti Annual Report was submitted on April 7 and made available over the Internet. This 2005 annual narrative was the first to be completed on time in over a decade, as well as the first to be readily available to the public (i.e., via the Web).

Creamers Field 5th Grade Bird Watch

Refuge Manager Spindler, Biological Technician Knight, and Wildlife Biologist Harwood assisted Alaska Department of Fish and Game staff at the 40th annual “5th Grade Bird Watch” at Creamer’s Field State Waterfowl Refuge the week of April 24.

Fifth graders from local schools spent the day learning how to use binoculars and scopes to see birds in the wild, methods used to identify birds, and what different bird behaviors mean.

Outdoor Days

Refuge Manager Spindler and Wildlife Biologists Saperstein and Harwood represented the Refuge at “Outdoor Days” on May 9-10 at the University of Alaska Fairbanks campus. All three gave presentations to local 6th graders about the use of radio telemetry in monitoring fish and wildlife. Students particularly enjoyed locating hidden radio collars on their own with the receiver and hand-held antenna.

Photographer’s visit

Beginning August 26, Refuge Manager Spindler gave USFWS photographer Steve Hillebrand a 3.5-day aerial tour of the Refuge and the Coldfoot/Marion Creek area near the Arctic Interagency Visitor Center. They photographed villages, aerial scenery, rivers, lakes, wetlands, wildlife, employees, subsistence users, and facilities. Spindler and Hillebrand landed at dozens of spots to take surface photos of scenery and refuge resources. It was a whirlwind trip that yielded over 5,000 high-quality images, many of which are found in this document. We expect the collection of images will enhance our outreach materials for years to come.

Film Festival

Nearly 400 people in Fairbanks, Alaska celebrated National Wildlife Refuge Week by attending the Far North Conservation Film Festival on November 10-11, hosted by Arctic, Kanuti and Yukon Flats Refuges, in conjunction with six other organizations. For two days at the Pioneer Park Centennial Center for the Arts, hosts presented an engaging and diverse group of films about the conservation and sustainability of wildlife, wild places, and cultures around the world. On Friday night, Anne Mosness, a guest speaker from Bellingham, WA, introduced our feature film, *Farming the Seas*, which was followed by an enticing line-up of films. Saturday was packed with events! In the afternoon, conservation groups from around Alaska displayed booths and hosted children’s activities. *Good Dog*, a musical duo from Seward, Alaska played an energizing set of children’s songs, which was followed by educational children’s films. We concluded the festival in the evening with a compelling line-up of films for an adult audience. With music, children’s activities, and films for all ages, the third annual Far North Conservation Film Festival was a big hit with kids and adults alike!



“Friends of Alaska Refuges” vice-president, Carla Stanley, and Refuge Manager Spindler helped host the Far North Conservation Film Festival. (USFWS photo)

Web Site

With the departure of interpretive Park Ranger DeMeyere in April, the Refuge lost its point person for maintaining and enhancing the refuge Web site. Before she left, DeMeyere ensured that the 2005 Annual Report was made available via the Web site.

Law Enforcement

Patrols were conducted mainly during the fall 2006 moose hunt. Because the Refuge has no permanently assigned Law Enforcement staff, we relied on the assistance from Refuge Officers at other stations. With this assistance, Refuge Manager Spindler conducted two patrols, one in early September with Refuge Officer H. Knudsen (Arctic NWR), and one in mid-September with Refuge Officer D. Beyer (Kenai NWR). A patrol planned for late September had to be cancelled due to poor weather. During the first patrol, we did not observe any moose taken, but all hunters which we checked for compliance had all of the correct permits, harvest tickets, and licenses. This was mainly the result of work done by a highly effective and long-time State license vendor in Allakaket. This first patrol resulted in one citation to a boat operator for driving under the influence. At year’s end, the case still had not gone to trial.

Compliance during the mid-September patrol suggested that earlier education and enforcement efforts had been successful in spreading the word that hunters were being checked. Again, everyone we checked was in compliance with permit, harvest ticket, and license requirements. We fielded one inquiry from a non-local resident who owns a trapping cabin 1.2 miles inside the Kanuti Controlled Use Area (KCUA). The resident

believed he could hunt moose using an airplane inside the KCUA because he “lived” within the KCUA. After checking with State enforcement officials in their regional headquarters, we informed the individual that he could not use his airplane to hunt within the KCUA, even if he lived year-round at his trapping cabin. The individual traps out of the cabin during several winter months but does not live there.

A final check along the Kanuti River at Kanuti Lake on September 21 turned up a group of successful moose hunters that had floated down from the Dalton Highway. Officer Beyer cited one hunter under 16 USC 668dd 50 CFR 32.2 (d) (Hunting in violation of state law: failure to leave rib meat on bones), which incurred a \$250 fine. A significant amount of this rib meat was spoiled. This hunter asked if he could leave the spoiled meat at Kanuti Lake, but he was told all meat had to be transported out of the field. This hunting party was met by Officer Knudsen when they arrived in Fairbanks. Most of one entire moose was spoiled. The hunter was again cited under 16 USC 668dd 50 CFR 32.2 (d) (hunting in violation of state law: failure to salvage meat for human consumption), which incurred a \$1000 fine plus the \$25 processing fee.

On or about April 6, Refuge Officer D. Carlson (Arctic NWR) received information regarding Larry Bartlett of Pristine Ventures producing and selling hunting videos that took place on Arctic NWR, as well as on Kanuti NWR. Carlson determined that Mr. Bartlett did not have a permit to do so. On August 29, he interviewed Mr. Bartlett who admitted to not having a permit and not being aware that a permit was required. Mr. Bartlett was willing to comply with permit requirements forthwith and was issued a “Notice of violation” with two counts of conducting a commercial enterprise without a permit (one count each for Arctic and Kanuti NWRs). Each count was a \$1,000 fine, which were paid promptly.



This ridge (bottom right), known among staff as “The Thumb,” is one of the first distinct features of the Kanuti River within the Refuge boundary which hunters will notice floating in from the Dalton Highway. (S. Hillebrand photo)

Facilities and Equipment

Bettles Bunkhouse and Office

In May 2006, the Refuge received legal title to the three-bedroom residence in Bettles that serves as our bunkhouse and field office. Routine maintenance of the furnace, water pump, and water softener during the year were performed by a contractor and Maintenance Worker Doug Holton, respectively.

Refuge Manager Spindler participated in discussions with NPS and FWS engineers on preliminary designs of a Bettles Office/Visitor Center and Bettles Bunkhouse. These two buildings would replace the single large building that burned down in January 2004. Spindler worked with NPS to revise the Joint Facilities Operations Plan for Bettles. At year's end, conceptual designs were taking shape for both buildings.

Kanuti Lake Administrative Cabin

Considerable rehabilitation work was accomplished at the Kanuti Lake Administrative Cabin during 2006. A crew in June, led by Biological Technician (BT) Knight and including Administrative Support Assistant Maloney, Maintenance Worker (MW) Holton, Refuge Manager Spindler, Biological Aid Kokx, and Volunteer David Spindler, completed the tool shed /power shed construction begun in 2005. This included installing the boat shed accessories, such as an outboard engine lift and gasoline storage boxes with tank lifts. (These were the last field maintenance projects to be completed by BT Curtis Knight before he resigned to accept a permanent position with Alaska DNR.... Our loss, their gain). Per code requirements, the aviation gas pump was moved to an outdoor location and rewired. Underground electrical conduit was run between the main cabin and the power shed, and to a large 1KW photovoltaic array. A 2,500-watt sine-wave inverter, 6,500-watt generator, and power distribution center were wired into an integrated off-grid power system. The solar project was completed by Remote Power, Inc. of Fairbanks.

The last project to be completed in 2006 was the jacking and re-leveling of the foundation to the main cabin. This major project was completed by MW Holton with the able assistance of Wildlife Biologist Jim Akaran (Yukon Flats NWR) in August. Doug and Jim jacked up each beam, removed the post, and replaced it with 6 x 6 treated timber cribbing. Worn or rotted pad lumber was replaced with treated 3 ft x 3 ft 2" x 12" lumber pads. The doors and windows of the cabin operate smoothly now. While under the cabin they noticed animals had removed much of the insulation, so plans were made to replace the insulation next summer.



Completion of work to the Kanuti Lake administrative cabin, power shed, fuel shed (background; L to R) and solar panel array (foreground) required a considerable investment in staff, materials, and time in 2006. (S. Hillebrand photo)



Maintenance Worker Holton (rear) and Wildlife Biologist Akaran (Yukon Flats NWR) overhauled the Kanuti Cabin's foundational structure. The cabin is now level for the first time in many years. (S. Hillebrand photo)

Project: Burned Area Emergency Response (Hydrological assessment of Kanuti Lake)

Kanuti Lake offers floatplane access to the refuge administrative cabin. Concerns about increasing periods of protracted low-water levels in the lake have increased in recent years. When the Old Dummy fire approached Kanuti Lake in 2005, smoke jumpers were deployed and a back burn was lit at the south end to protect the cabin. As part of the Burned Area Emergency Response plan for the Old Dummy burn, funding was allocated to assess the hydrology of Kanuti Lake post-fire in light of three major issues: a) low water levels may make it unsafe to land a floatplane on the lake except during periods of high water, b) access to the administrative cabin located on the lake shore may continue to be limited for extended periods when water levels are low, and c) the administrative cabin may need to be relocated to a site with better access.

On July 12, USFWS Hydrologist Alan Peck and Refuge Manager Spindler, conducted a one-day reconnaissance of Kanuti Lake and its connecting wetlands with three objectives in mind: a) assess Kanuti Lake's hydrology and the overall recent change to the lake water level, b) evaluate the current and future effects of the 2005 Old Dummy fire to the lake, and c) identify methods to monitor lake levels or otherwise determine lake trends. Observations were made using aircraft and canoes to assess interconnected lake and river hydrology. Additional observations by Refuge staff were made in late July to determine burn severity, vegetation loss, and vegetation recruitment.

Hydrologist Peck offered the following conclusions in his report (Peck and Saperstein 2007):

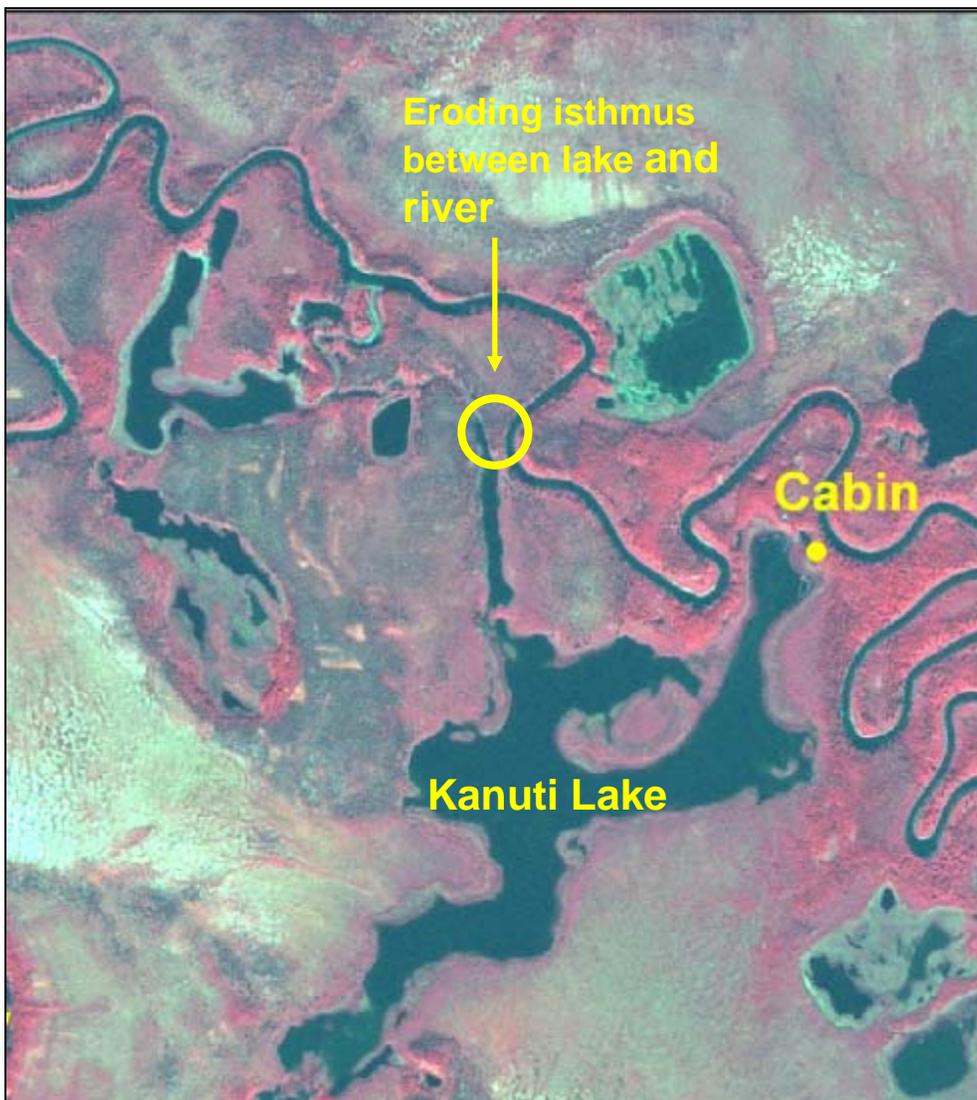
“Lake formation and disappearance is a natural occurrence in permafrost regions. Alterations of local weather patterns, thawing permafrost, or control structures at lake outlets are mechanisms that affect lake levels. The changes in lake area may result from changes in precipitation, evaporation, and increased growing season. However, these subtle trends are not readily apparent given the large annual climate variations and lack of available data for the area. Fires that lead to thawing of permafrost can initially lead to an increase in lake area as water accumulates, but lakes could dry with later formation of underlain taliks once the permafrost table deepens. Lake volume and water levels can be affected by changes to lake outlet control structures, such as actively maintained or deteriorating beaver dams.

While thawing permafrost could have an effect on lake drying in areas of moderate to high burn ratings, it is unlikely there will be a significant impact to the water levels of Kanuti Lake. As an open basin, Kanuti Lake levels are dependent on recharge from the Kanuti River, surface runoff, groundwater, and the ability of the outlet beaver dam as a control structure to retain lake volume.”

Additionally, the same report offered the following recommendations:

“The burn severity of the Old Dummy fire adjacent to Kanuti Lake was low to moderate. The impact of the fire to thawing permafrost and creating lower water levels or drying of Kanuti Lake water level is relatively small. These fire-related effects are not expected to be outside the natural range in variability for these ecosystems.

The deterioration of the outlet beaver dam on Kanuti Lake is responsible for a lower water elevation and lake volume. Water levels could be mechanically maintained by elevating the dam height, however the effort would provide only a temporary solution due to the progressive bank erosion along the isthmus between the Kanuti River and the lake [see subsequent imagery]. Access to the administrative cabin would be restricted to unpredictable periods with high and medium flows of the Kanuti River. It is recommended that alternative locations for an administrative cabin site be identified and monitored in preparation for an eventual move. A closed basin lake should be prioritized in site selection. At selected closed basin lake sites, bathymetry should be mapped and water levels monitored throughout the open water season.”



Satellite imagery illustrating erosion concern for Kanuti Lake. The isthmus separating the Kanuti River and the outlet to Kanuti Lake is growing increasingly thinner.

Airplane/Airplane Support & Facilities

In April the Refuge took delivery of a brand new American Champion Scout (8GCBC) aircraft, N178BC. This aircraft replaced the refuge's former Scout, N778AC, which was declared unairworthy in September 2005 because of severe corrosion in the fuselage. (This corrosion stemmed from several prior years service in the saltwater environment of Kodiak NWR.) The new Scout performs much better than the one it replaced because it is lighter and has a modern composite MT propeller. We used the new aircraft on several demanding missions, such as the Greater White-fronted Goose molting survey, a moose census on Yukon Flats NWR, and a Tundra Swan capture project (for avian influenza sampling) on Selawik NWR. The Scout is noted for good aerial survey visibility, observer comfort, and good long-range fuel endurance and efficiency in long-distance survey applications. We managed the six-month gap without an aircraft by borrowing planes from other stations. One of the benefits of the refuge headquarters location in Fairbanks is that we can share aircraft with other stations. At various times of the year we used a Cessna 206 and Piper Super Cub assigned to Arctic NWR and Fairbanks Office of Law Enforcement. We also used the Cessna 185 floatplane assigned to NPS at Bettles, and they in turn used our Scout on occasion. Once more Service pilots get checked out in the Scout, we anticipate that other stations may wish to borrow it when it is not in use for the Refuge.

Refuge Manager/Pilot Spindler reported flying 225 hours for the Service during FY2006. He has over 8,000 hours of flight experience to date. Spindler also serves as a mentor pilot, and gave flight training to a few individual Service pilots in 2006.



Refuge Manager/Pilot Spindler fuels the Refuge's new aircraft at the floatpond in Bettles.
(S. Hillebrand photo)

Refuge Communications

The nationally-mandated conversion to a narrow-band digital radio system was completed in 2006. New mountain-top repeaters installed in 2005 were reconfigured to communicate with a new site established in May 2006 on Wickersham Dome (north of Fairbanks). This enabled the Kanuti and Yukon Flats refuges to communicate with headquarters in Fairbanks for the first time since the antiquated single-sideband system was abandoned two decades earlier. The Service shares this radio system with Gates of the Arctic National Park and Preserve. The Fairbanks connection has improved our capability for flight-following and communications with personnel in the field during office hours.

The Refuge has also effectively used the Motorola Iridium satellite telephone system, and a commercial answering service in Fairbanks to provide 24/7 coverage for field camp status reports and emergency communications.



Refuge Manager Spindler makes use of a satellite phone. While calls made with the new narrow-band digital radio system are free (compared to the expensive satellite phone), such radio communication is not available in all areas of the Refuge. This requires that personnel carry both types of communication. (S. Hillebrand photo)

Literature Cited

- Berkbigler, B., and K. Elkin. 2006. Abundance and run timing of adult salmon in Henshaw Creek, Kanuti National Wildlife Refuge, 2005. U.S. Fish and Wildlife Service, Fairbanks Fish and Wildlife Field Office, Alaska Fisheries Data Series Number 2006-9, Fairbanks, AK.
- Busher, William H., T. Hamazaki and A. M. Marsh. (In prep. A) Subsistence and Personal Use Salmon Harvests in the Alaskan Portion of the Yukon River Drainage, 2004. Alaska Department of Fish and Game, Fishery Data Series No. 07-XX, Anchorage.
- Busher, William H., T. Hamazaki and A. M. Marsh. (In prep. B) Subsistence and Personal Use Salmon Harvests in the Alaskan Portion of the Yukon River Drainage, 2005. Alaska Department of Fish and Game, Fishery Data Series No. 07-XX, Anchorage.
- Corbett, D. G. 2006. Survey Report of Kanuti NWR BAER Project. Unpublished U. S. Fish and Wildlife Service Report. Division of Visitor Services and Fire. Anchorage, AK. 27 pp.
- Handel, C. M. 2003. Alaska Landbird Monitoring System protocol for setting up and conducting point count surveys. Unpublished report. U.S. Geological Survey. Alaska Science Center, Anchorage, AK.
- Key, C. H. and N. C. Benson. 2004. DRAFT. FIREMON landscape assessment, V. 4. Ground measure of severity: The composite burn index. 9 pp.
- Peck, A. and L. Saperstein. 2007. Hydrologic Assessment of Kanuti Lake for Floatplane Safety. Unpublished U.S. Fish and Wildlife Service report. Anchorage, AK. 13 pp.
- Roland, C., K. Oakley, E. M. Debevec, and P. Loomis. 2004. DRAFT. Monitoring vegetation structure and composition at multiple spatial scales in the Central Alaska Network. Central Alaska Inventory and Monitoring Network, Fairbanks, AK
- Saperstein, L. 2007a. Investigation of Invasive Plant Establishment in the Old Dummy Burn, Kanuti National Wildlife Refuge, Alaska, 2006. USFWS unpublished Final Report KAN-07-02, Fairbanks, AK. 28 pp.
- Saperstein, L. 2007b. Validation of a remotely sensed burn severity map, Old Dummy fire, Kanuti National Wildlife Refuge, Alaska. USFWS unpublished Final Report KAN-07-01, Fairbanks, AK. 34 pp.
- Van Hatten, G.K. 2004. Abundance and run timing of adult salmon in Henshaw Creek, Kanuti National Wildlife Refuge, Alaska, 2000-2003. USFWS Alaska Fisheries Data Series. Fairbanks, AK. 37 pp.

Section Credits

The following individuals contributed text to this document:

Brown, Randy (Fishery Biologist): Research Studies and Investigations

Brown, Wennona (Subsistence Coordinator): Subsistence

Fox, Joanna (Deputy Refuge Manager): CCP, Budget, Permits, AIVC, editing

Gaddis, Almeda (Administrative Officer): Staffing

Harwood, Chris (Wildlife Biologist): principal compiling/editing, all other sections not noted

Knight, Curtis (Biological Technician): Refuge and CCP maps,

Maloney, Louis (Administrative Support Assistant): funding

Patten, Sam (Fire Management Officer): Fire Management

Saperstein, Lisa (Lead Wildlife Biologist): Snow Markers, Wildland Fires, Natural/Cultural Resources (Overview, Biological Review, BAER, Joint Fire Science, Integrated Inventory, Moose Survey, Wolf Survey, Fire Severity, Invasives), Cultural Resources, Public Use (some Subsistence, Sport Hunting, Sport Fishing), editing

Spindler, Mike (Refuge Manager/Pilot): Management (Overview, Interagency/intertribal cooperation, Permits), Public Use (Subsistence, Law Enforcement), Facilities and Equipment, Refuge Manager's Feedback, editing

Photography Credits:

The following individuals contributed photos:

W. Brown, J. Fox, C. Harwood, S. Hillebrand, S. Holly, C. Knight, W. Knight, A. Kokx, S. Kropidowski, L. Maloney, S. Patten, L. Saperstein,

Refuge Manager's Feedback

Whenever a decision about refuge priorities is at hand, I always ask myself what the average American taxpayer would want out of a refuge staff. I usually conclude that the taxpayers want good land stewardship of their public refuge lands at reasonable cost. As I reflected on the accomplishments of 2006, I was reminded about how intently this small dedicated refuge staff has worked to provide this high-quality stewardship on over 1.6 million acres. We did this with about 1.6 million dollars in funding (including some large one-time maintenance projects). I would say that was a good value to the taxpayer.

In 2006 we wrote, edited, and reviewed the internal review draft of the Refuge's revised Comprehensive Conservation Plan, a 400-plus page document. In the same year, our biologists completed all of their normal routine field monitoring and surveys, as well as initiated some additional fire-related field work funded by the "Burned Area Emergency Response" program. We were out in the field protecting and monitoring resources, while at the same time we kept up with our office demands. This schedule would have been demanding even for a normal-sized refuge staff, but the fact that the small Kanuti staff got it all done was all the more impressive. I am ever thankful for the staff's dedication to the resources, to the pursuit of good quality scientific studies, and most of all for their good land stewardship. I hope that we can sustain these efforts into the future.