

Kanuti National Wildlife Refuge Annual Report

Fairbanks, Alaska
Calendar Year 2008



Male Hudsonian Godwit (photo by Luke Smithwick)

Refuge Manager

Date

Refuge Zone Supervisor

Date

Regional Office Approval

Date

Kanuti National Wildlife Refuge: The Year 2008 at a glance...

In Calendar Year 2008, the Refuge saw five years of persistent work finally come to fruition with the completion of the revised Comprehensive Conservation Plan. The biological staff leveraged multiple partnerships to broaden and deepen our knowledge of such diverse “critters” as moose, large shorebirds, and dragonflies. Partnerships were further fostered to bolster the Refuge’s invasive species management and environmental education programs. The contributions of volunteers was evident everywhere—from springing out at the Kanuti Lake cabin, to Dragonfly Day, to the Dalton Highway weed pull, to even the Henshaw Creek and Allakaket science camps. Between June and October, contractors largely completed construction of a brand new bunkhouse and an office/visitor center, two facilities to be shared with our National Park Service colleagues in Bettles. Finally, the hard work of paid staff, volunteers, and partners in protecting, while still promoting, this wild place was epitomized with Refuge Manager Spindler garnering regional recognition by winning the Regional Director’s “Excellence in Management” award.



A local pair of red foxes (red one shown here, but also a cross) entertained the crew springing out at Kanuti Lake cabin in 2008. (Photo by L. Smithwick)

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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.

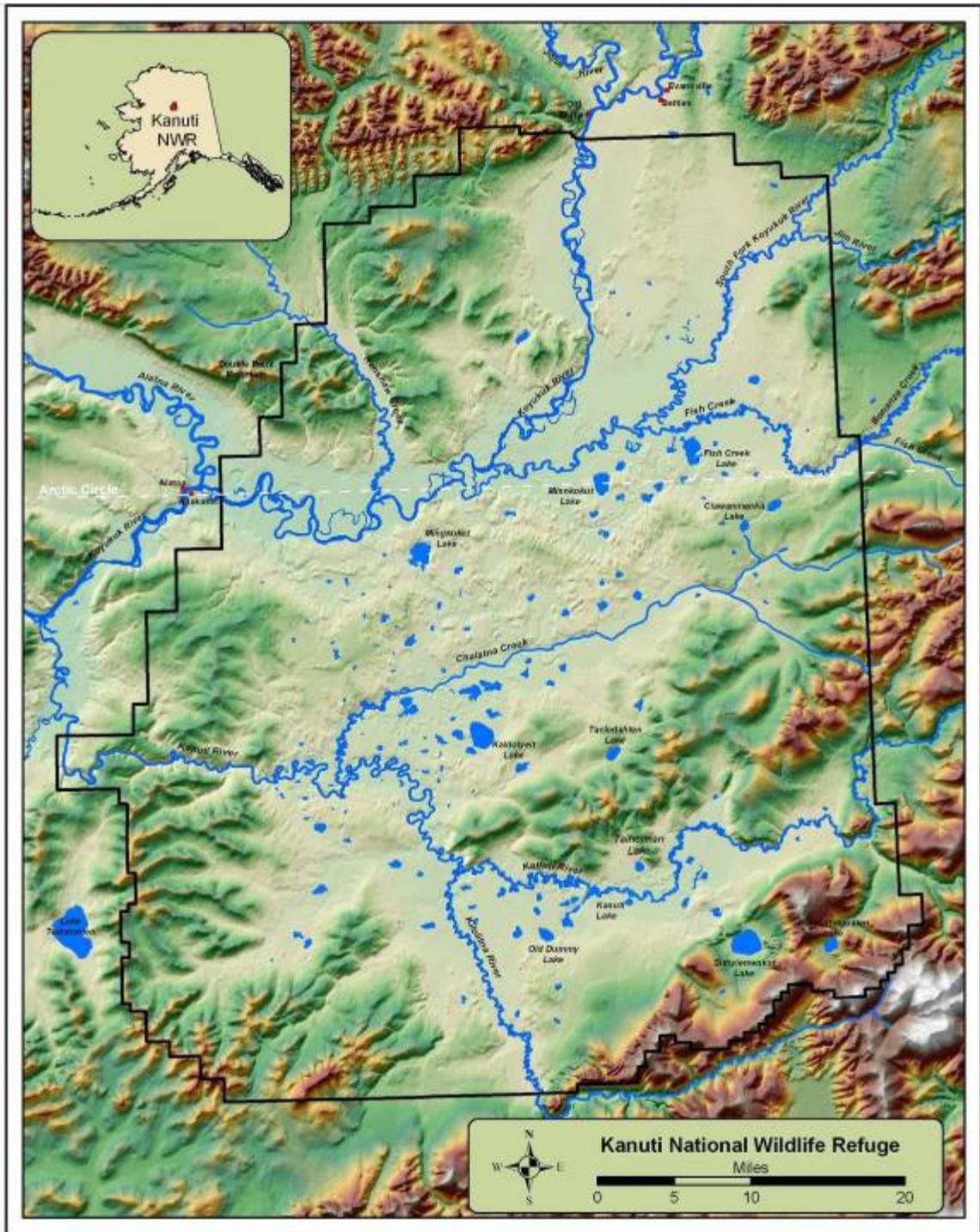


Figure 1. Map of Kanuti NWR, including major topography and hydrography.

Highlights for 2008

- For the first time in 15 years, a crew (composed of WB Harwood and three volunteers) “sprung out” at Kanuti Lake cabin to document spring phenomena including breakup and bird migration. (Pages 8 and 21)
- Hydrologists with the Water Resources Branch installed water gages on Refuge rivers and streams as a first step in the process of filing for Kanuti’s water rights. (Page 9)
- WB Saperstein developed conceptual ecosystem models, incorporating effects of climate change, in support of Refuge inventory and monitoring programs. (Page 13)
- WB Saperstein and BT Zulueta completed vegetation, fire history, and insect surveys on three inventory plots. (Page 18)
- WB Harwood documented a locally dense population of breeding Whimbrels and Hudsonian Godwits just south/southeast of Kanuti Lake, spurring plans with USGS shorebird researchers for a satellite telemetry project in 2009. (Page 22)
- WB Harwood and RM Spindler recorded the Refuge’s first detection of Yellow-bellied Flycatcher in the Kanuti Canyon during the annual Breeding Bird Survey. (Page 24)
- Migratory Bird Management biologists replicated a spring waterbird breeding pair aerial survey of the Refuge, last done in June 1997. (Page 27)
- Kanuti’s dragonfly challenge cost-share grant successfully combined biology and education in several interior Alaska locations, including “Dragonfly Day” in Fairbanks which attracted 300 visitors! (Pages 27 and 67)
- Radio-collared moose were used to develop sightability correction factors during the November moose survey, in cooperation with the Alaska Department of Fish and Game. (Page 30)
- Moose were radio-collared for the first time in the upper Koyukuk River region, thanks to a cooperative project involving Kanuti, Gates of the Arctic National Park and Preserve, Bureau of Land Management, and the Alaska Department of Fish and Game. (Page 36)
- Staff from Kanuti Refuge, Tanana Chiefs Conference, and the University of Alaska Fairbanks combined forces with volunteers from Friends of Alaska National Wildlife Refuges and the villages of Allakaket and Alatna to make the Henshaw Creek Science Camp and the Allakaket Science Day Camp big successes. (Pages 38 and 73)
- The Refuge completed its Comprehensive Conservation Plan (CCP); the final record of decision was signed by the Regional Director in August. (Page 40)
- For the third consecutive year, “Friends of Alaska Refuges” volunteers helped remove

invasive weeds from the Dalton Highway between Kanuti River and Coldfoot. (Page 43)

- RM Spindler, Deputy RM Fox, and IPR Reakoff floated the Jim River, South Fork, and Koyukuk River from the Dalton Highway to Allakaket in August to assess public access of the refuge and possible invasion of weeds. (Page 44, 48, and 70)
- WB Saperstein completed the Service’s Stepping Up to Leadership program. (Page 46)
- Effective October 1, the three administrative assistants, formerly supervised collectively by Kanuti, were reassigned to (i.e., to be supervised by) the respective refuges which each supported; ASA Maloney remained with Kanuti. (Page 50)
- RM Spindler received the prestigious Regional Director’s “Management Excellence Award” in March. (Page 56)
- Besides the general-season State hunts, RM Spindler authorized three additional moose (bulls-only) hunting opportunities available for federally qualified subsistence hunters: September 26 – October 1, and March 1–5 with an extension March 8–10. (Page 59)
- Rural Representative Bergman again conducted household surveys of waterfowl harvest, as well as a new survey for mammal (big game and furbearers) harvest, in Allakaket and Alatna on behalf of the Refuge. (Pages 63 and 65)
- An overwintered hunter cache and tent platform, discovered in the spring by refuge biologists a few miles upriver from Kanuti Lake, were later investigated; owners were contacted, and the cache was retrieved without incident. (Page 76)
- Construction of brand new bunkhouse and office-visitor information center in Bettles was begun in June and completed in October. The buildings are shared with the National Park Service and employ sustainable design and construction principles. (Page 78)



This Gray Jay image was one of many provided by volunteers. (Wild North Photography)

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.

2008 Climatological Highlights

Table 1. Monthly Temperature and Precipitation summaries (highs in red, lows in blue), Bettles Field, Alaska, 2008.

Month	Temperatures (°F)				Precipitation (inches)			
	Max.	Min.	Avg.	Depart.	Precip.	Depart.	Total Snowfall	Snow Pack (month’s end)
January	32	-47	-10	+ 1	0.90	+0.06	13	18
February	37	-50	-9	- 2	0.86	+0.25	14	23
March	31	-38	5	+ 1	0.87	+0.32	9	26
April	49	-22	20	- 2	1.81	+1.43	16	17
May	67	21	44	- 1	0.59	-0.26	2	0
June	82	34	58	- 3	2.63	+1.20	0	0
July	81	33	57	- 4	1.93	-0.07	0	0
August	70	28	51	- 3	1.27	-1.27	0	0
September	70	12	42	+ 1	0.91	-0.91	0	0
October	32	- 31	7	- 12	1.27	+0.19	19	11
November	24	-36	2	+ 3	1.33	+0.43	24	21
December	16	-46	-11	- 4	0.68	-0.19	10	19
Totals					15.05	+2.02	107	

Snow Markers

According to the refuge’s six snow markers, snow cover and depth exceeded 10 inches across most of the refuge by early November 2007, with the exception of the windblown southeastern corner where snow marker 6 is located on Taiholman Lake (Table 2). Snow persisted into May 2008, a departure from the previous year when all snow markers were snow-free by late April. According to the Natural Resources Conservation Service, the agency that monitors snow conditions throughout the state, most snowpacks statewide were at normal or above normal depths as of May 1, thanks to cool temperatures and precipitation in April (NRCS 2008). Between late November 2007 and February 1, 2008, snow depth at snow marker 2 (the Minnkokut marker) jumped from 17.5 inches to 41.5 inches, a larger increase than was seen at other markers. Deep conditions at the marker persisted until May 1, the final survey of the season. Density measurements, which require on-the-ground sampling in addition to the usual aerial observation of the marker

from an airplane, were not conducted in 2008 so depth could not be verified by direct measurement. It seems unlikely that the snow marker would have shifted significantly between late November, when depth was similar to other markers albeit a bit deeper, and February. A maintenance visit in September 2008 indicated that the marker was leaning slightly from front to back (2.5 inches difference) and from side to side (4.5 inches difference). Such differences were not noted during routine maintenance in September 2007 and may have occurred after snowmelt in 2008. The degree of leaning observed in September 2008 was not sufficient to account for differences in depth between snow marker 2 and the other markers. Other possibilities are that the marker is in an area that had been subject to isolated snow squalls or that snow had started drifting near the marker. Drifting had not been a problem in the past, but the area around the marker burned in 2004, and subsequent conditions may have exposed the area to more wind and drifting snow.



Refuge Manager Spindler performs maintenance on one of the refuge snow markers in the fall. (Photo by H. Knudsen [Arctic NWR])

Table 2. Aerial estimates of snow depth (inches) at snow markers (SM), November 2007 – December 2008. (We attempt to check markers at month’s end from October – April.)

Date	SM1 Kaldolyeit	SM2 Minnkokut	SM3 Kanuti Chalatna	SM4 Nolitna	SM5 K. Kilolitna	SM6 Taiholman
5/1/08	12.5	47.5	21	12	11.5	5
4/6/08	16.5	44.5	26	18.5	9.5	3
3/2/08	16	45.5	23	17.5	17.5	3
2/1/08	13.5	41.5	25	18	11.5	3
11/29/07	10.5	17.5	14	11	10.5	0
11/6/07	10.5	17.5	11	12	10.5	3

Hydrology Review

National Weather Service Data

Hydrological data for stretches of the upper Koyukuk River tend to be variable in completeness each year, depending on local observer participation. That said, breakup for the Koyukuk River was May 5 for Wiseman and May 10 for Bettles, Allakaket, and Hughes. The river was capable of boat traffic on May 12 and 13 at Wiseman and Allakaket, respectively. The first ice reported on the Koyukuk River at Wiseman and Allakaket was September 14 and September 30, respectively. Boating near Allakaket became unsafe on October 12, and was safe to walk on and safe for snowmachine traffic on October 14. Boating near Wiseman became unsafe on October 8, was safe to walk on October 18, and safe for snowmachine traffic on October 28. (Data from NOAA/National Weather Service)



Wide overflow on the Kanuti River as of April 19 necessitated canoe-only crossings for the crew based out of the cabin at Kanuti Lake. (Photo by Wild North Photography)

Local Kanuti Cabin area data

As of April 18, a refuge crew based out of the cabin at Kanuti Lake was still able to walk and cross the Kanuti River near the cabin. However, precipitated in part by temperatures into the 40's on April 19 (warmest to date), the crew documented considerable overflow (at least 30 ft wide and 2 inches deep) on the river, necessitating all future crossing by canoe. Increasing spring-like weather halted rather abruptly April 25–30, with below freezing temperatures and regular snowfall. These generally late spring conditions contributed in part to ski-plane access of Kanuti Lake as late as May 1. Such access, however, may not have been possible even a day later as above-freezing temperatures into the 40's and light winds promoted resumed widespread melting. Also on May 1, Refuge Manager Spindler observed considerable open water upriver of the cabin while flying moose telemetry.



Unpredictable pulses of ice-free conditions, intermittently punctuated by large ice jams from about May 3–15, precluded predictable safe motor boat travel on the Kanuti River near the cabin until May 16, 2008. (Photo by C. Harwood)

As of May 3, the Kanuti River was largely free of floating ice from the cabin downriver to the next bend; however, considerable ice, generally sheets/chunks 6–8” thick, remained jammed just upriver at the bend. Nearby ponds and lakes were still frozen enough to walk, but considerable melting was observed even from just morning to afternoon. On May 5, the crew observed the river to be ice-free from the bend just upriver to the next bend downriver (though considerable ice jams were noted only one

mile upriver). The water level in the river was observed rising slowly. Kanuti Lake was largely deemed unwalkable by this date too, as considerable melting and pooling were observed lake wide.

Crude water gages behind the cabin showed that the Kanuti River had risen $\geq 24''$ and $20''$ on May 6 and 7, respectively. Inflow of river water into connected ponds and lakes was observed just downriver. Also as of this date, Kanuti Lake was about half ice, half water. The tundra southeast of Kanuti Lake was 95% snow-free. However also on May 7, Refuge Manager Spindler and Fire Management Officer Marshall had to abort their aerial goose breeding pair survey because only 10–15 miles west and north of Kanuti Lake, lakes and ponds were still firmly within winter's grasp, thus discouraging goose staging.

Wildlife Biologist Harwood and Volunteer Smithwick launched the boat into the river on May 12 when flowing ice had seemingly ceased. However, significant continuous debris was released from upriver over the next few days, preventing safe boat travel until May 16. As of May 15, the river had risen such that it was cresting the bank just upriver of the cabin (at northwest invagination of Kanuti Lake) as well as downriver at the isthmus between river and Outlet Lake. For the remainder of their stay, direct access by jet boat from the river and over the bank to adjacent lakes was largely possible everywhere. In fact, Harwood and Smithwick were able to boat as far inland as the southernmost Mud Lake, nearly to Lake Taiholman, and all the way to Stomach Lake. Travel beyond these areas was largely restricted by lingering ice, not by water depth. Upon departure from the Kanuti Cabin on May 23, the Kanuti River was reading 4 feet above flood stage at the gage down by the boat launch. Water was still flowing over the river bank into the lake, both southeast and west of the cabin, essentially still rendering the cabin site an island.

Water Rights Process Planning

In preparation for a water resources investigation leading to a Service application for instream flow water rights, potential stream gaging sites were identified by the Region 7 (Alaska) Water Resources Branch (WRB) in October 2007 through both discussions with Kanuti Refuge and Fairbanks Fisheries staff, as well as through aerial reconnaissance. On May 15–16, WRB Hydrologist Alan Peck and Fisheries Biologist Randy Brown (Fairbanks) traveled to the Refuge and evaluated the potential stream gaging sites during high flows, just after ice breakup. From this work, eight sites were chosen for installation of stream gages, four of which will include water quality sampling. In addition, the BLM gage on the South Fork Koyukuk River at the Dalton Highway will be taken over by WRB. Although two of the sites are located on private land, permission was obtained from Evansville, Inc. and K'oyitl'ots'ina, Limited to install stream gages on the main stem Koyukuk River near Old Bettles and along Henshaw Creek, respectively. While the two gages on the South Fork Koyukuk River are on BLM land, there is no formal process with the BLM for permitting these gages. As a courtesy, however, site locations and a work summary were sent to the BLM Fairbanks District Office.

WRB Hydrologists Jasper Hardison and John Trawicki, Hydrologic Technician Wayne Stanislawski, and Kanuti Maintenance Worker Holton, installed seven of nine planned stream gages (Table 3) over September 3–10, 2008. Stream gages were installed on

South Fork Koyukuk River, Fish Creek, Kanuti River, Tokusatatquaten Lake outlet, Kanuti Kilolitna River, Holonada Creek, and Henshaw Creek. The stream gage on the Koyukuk River Main Stem at Old Bettles was not installed; installation was delayed by a need for non-standard equipment at the site. WRB will take over operation of the stream gage on South Fork Koyukuk River at the Dalton Highway from the BLM, which has operated a gage at the site for the last five years.

The installed gages are currently recording continuous stage data. Minimal field visits will be made to change batteries. Full stream flow data collection and water quality sampling will begin with water-year 2010 (October 2009). Full data collection will run for 6 years, through water-year 2015.

Table 3. Locations of stream gages, September 2008.

Well Location	Location; Decimal Minutes		Location: Decimal Degrees	
	Latitude	Longitude	Latitude	Longitude
main stem Koyokuk R.	N 66° 54.483'	W 151° 40.850'	66.90805	151.68083
South Fork Koyokuk R.	N 66° 51.091'	W 151° 05.709'	66.85152	151.09515
SF Koyokuk R. at Dalton Hwy	Not installed WY 2008 (BLM gage to be run by USFWS beginning water year 2009)			
Fish Creek	N 66° 34.079'	W 151° 12.472'	66.56798	151.20787
Kanuti River	N 66° 17.787'	W 151° 06.972'	66.29645	151.11620
Tokusatquaten Lake Outlet	N 66° 12.383'	W 151° 05.191'	66.20638	151.08652
Kanuti Kilolitna River	N 66° 59.504'	W 151° 52.109'	66.99173	151.86848
Holonada Creek ¹	N 66° 01.756	W 152° 07.910	66.02926	152.13183
Henshaw Creek	N 66° 41.481'	W 152° 16.904'	66.69135	152.28173

¹ Preliminary location



Stream gage installed on the Kanuti Kilolitna River in 2008. (Photo J. Hardison [WRB])

Wildlife Biologist (WB) Saperstein, WB Harwood, and Deputy Refuge Manager Fox assisted Hydrologist Cathleen Flanagan with a water resource assessment in December. The Water Resources Branch was responsible for completing water resource assessments for each Alaska refuge in a relatively short time frame. The initial assessment was a listing of water resources (rivers, lakes, wetlands) within the Refuge, along with an assessment of their extent, habitat, condition, and general threats. Flanagan used existing materials such as the Comprehensive Conservation Plan, gage station study plan, Biological Review, as well as staff input, to complete the assessment. The final draft was completed on January 8, 2009.

Wildland Fires Review

No wildland fires occurred on the Refuge in 2008. Figure 2 illustrates Kanuti's recent fire history (1950-2005).

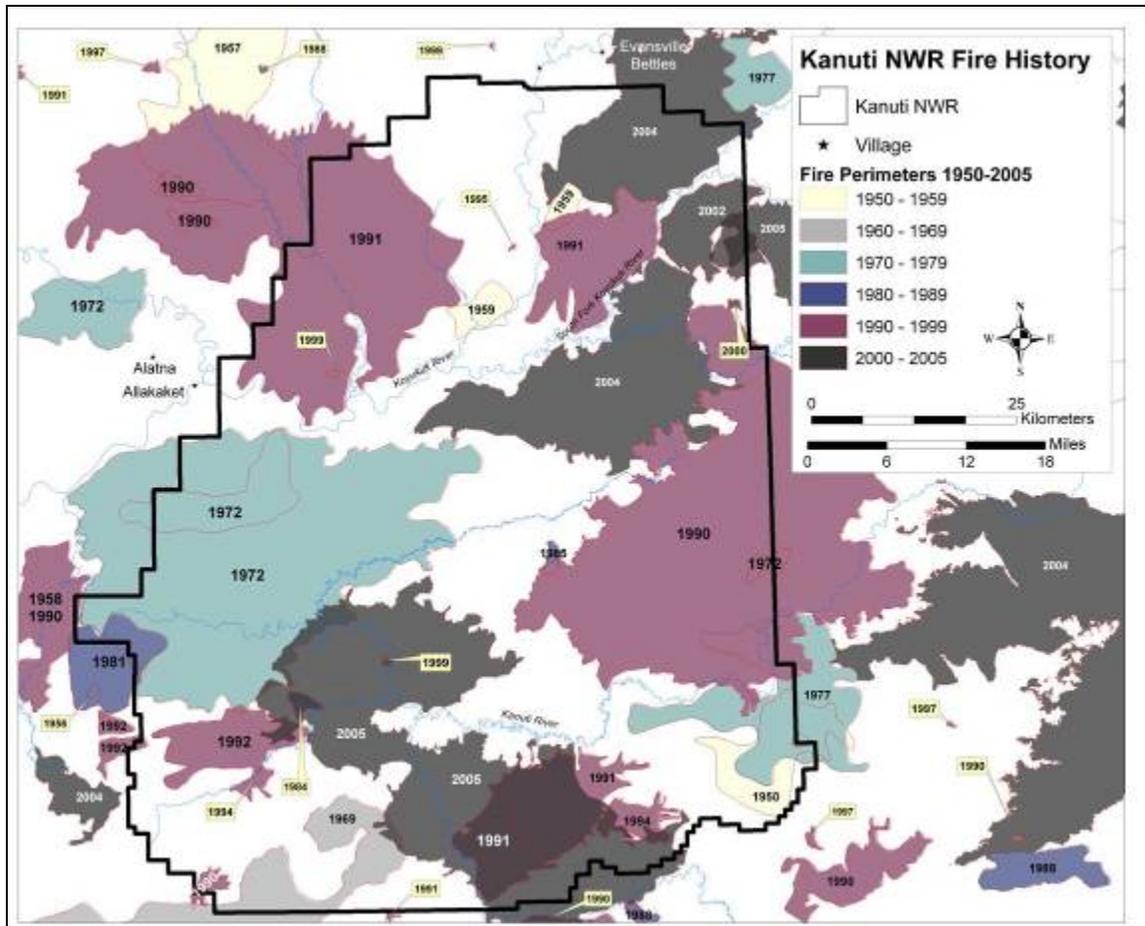


Figure 2. Fire history map of Kanuti NWR, largely current as of 2008. (There were no fires in 2006 and a small 3-acre fire in 2007 is not pictured).

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 17 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 133 species of birds, only about 20 are year-round, permanent residents. Likewise, caribou, which occasionally winter on the Refuge when the Western Arctic Caribou Herd migrates from northern calving grounds, are virtually absent from the Refuge during summer.



The first confirmed Refuge record of cattails (*Typha* [likely *latifolia*]) was documented on June 18 at the east end of “O2 Lake,” approximately 1 mile ENE of Kanuti Cabin.

The Kanuti crew springing out at the Cabin located two other likely cattail stands (senescent, however) in May on separate waterbodies SW of the cabin; identification was reserved until later, however, when more definitive field marks presented.

(Photo by R. Zulueta)

Biological Planning

Refuge Conceptual Models

Refuges were charged with developing conceptual ecosystem models to support inventory and monitoring programs; models were to incorporate the effects of climate change. USGS ecologists Erik Beever and Andrea Woodward were enlisted to assist with the effort under a previously awarded Science Support Proposal entitled “USGS technical assistance to support Region 7 initiative to design and implement a program of long term ecological inventory and monitoring for National Wildlife Refuges in Alaska.” Beever and Woodward met with Kanuti staff on June 26 to discuss conceptual models. Wildlife Biologist (WB) Saperstein provided rough drafts of conceptual models that she had developed for the Refuge. She developed a separate model for three of the Refuge’s purposes established in Alaska National Interest Lands Conservation Act (ANILCA) (i.e., biological diversity, subsistence, and water quantity and quantity). WBs Saperstein and Harwood refined the models and developed an overall model (required) for the meeting (Figs. 3–6); WB Saperstein wrote a narrative for the overall model. WB Saperstein presented the Kanuti models at an October meeting in Anchorage. Draft ecoregional models were developed during the meeting; Kanuti Refuge is in the Interior Alaska ecoregion. A follow-up meeting is planned for April 2009, during which the finalized ecoregional models will be discussed.

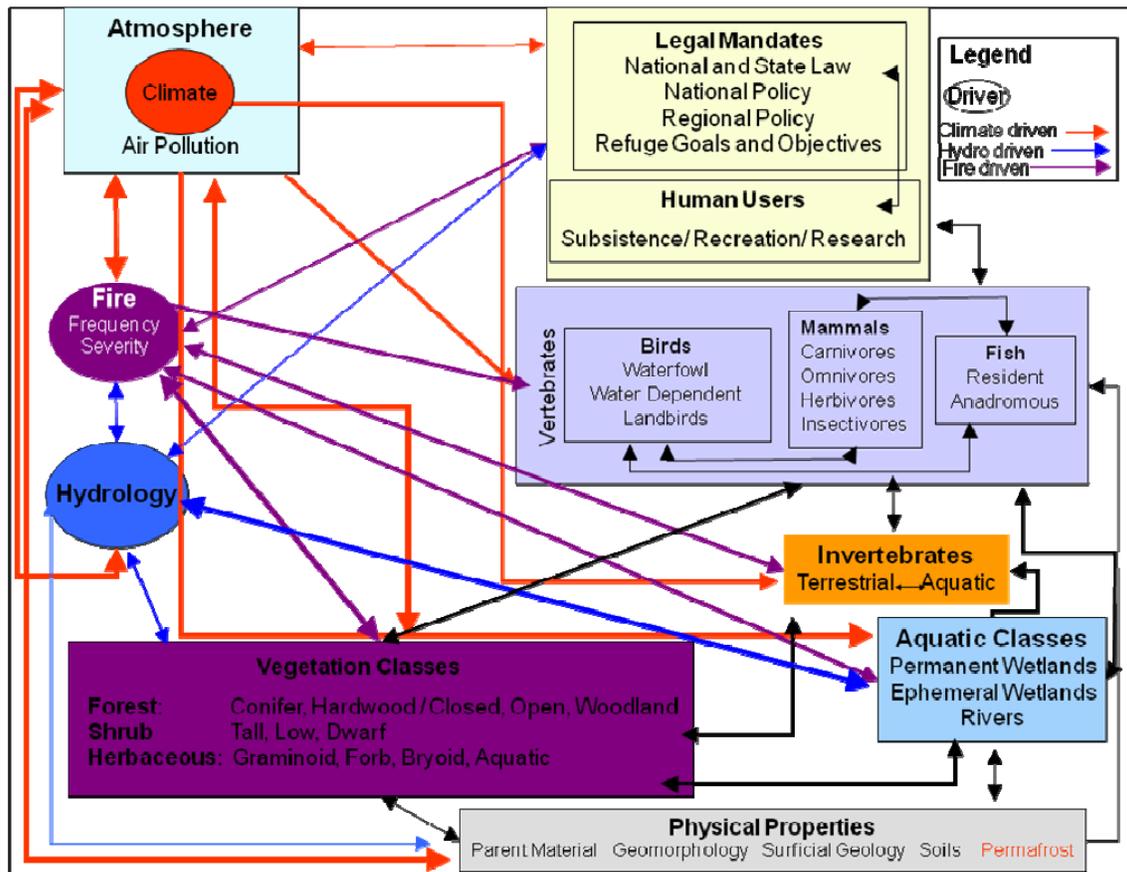


Figure 3. Draft overall conceptual ecological model of Kanuti Refuge.

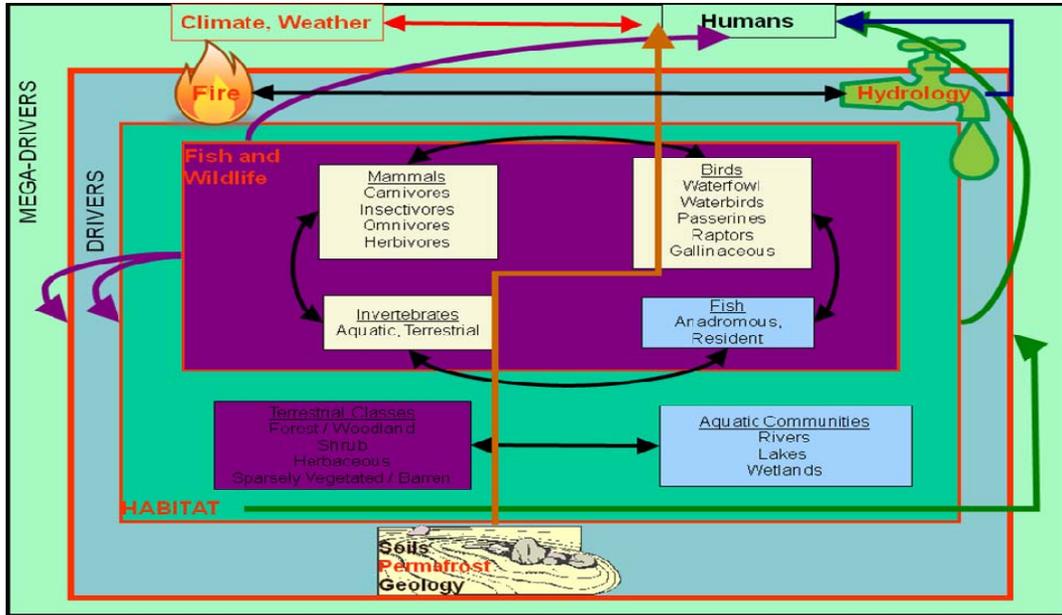


Figure 4. Draft conceptual model focusing on Kanuti Refuge’s first purpose in ANILCA: “To conserve fish and wildlife populations and habitats in their natural diversity...” Items in red are affected by climate change.

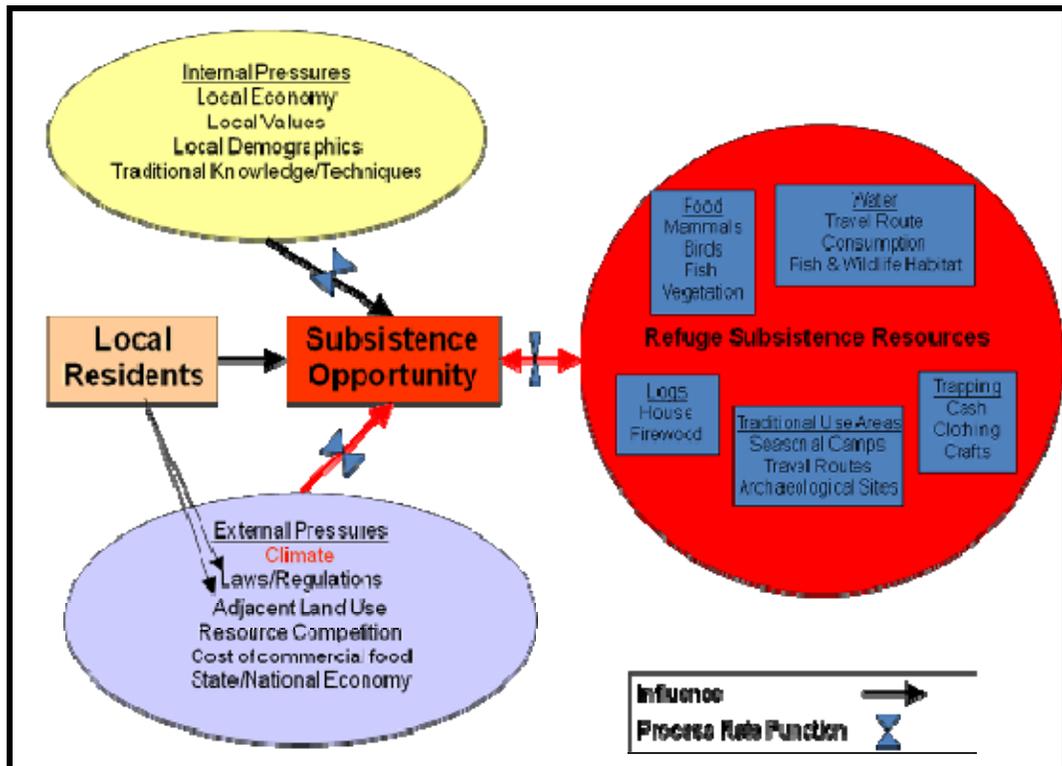


Figure 5. Draft conceptual model focusing on Kanuti Refuge’s third purpose in ANILCA: “To provide, in a manner consistent with the purposes set forth in subparagraph (i) [i.e., first purpose], the opportunity for continued subsistence by local residents.” Items in red are affected by climate change.

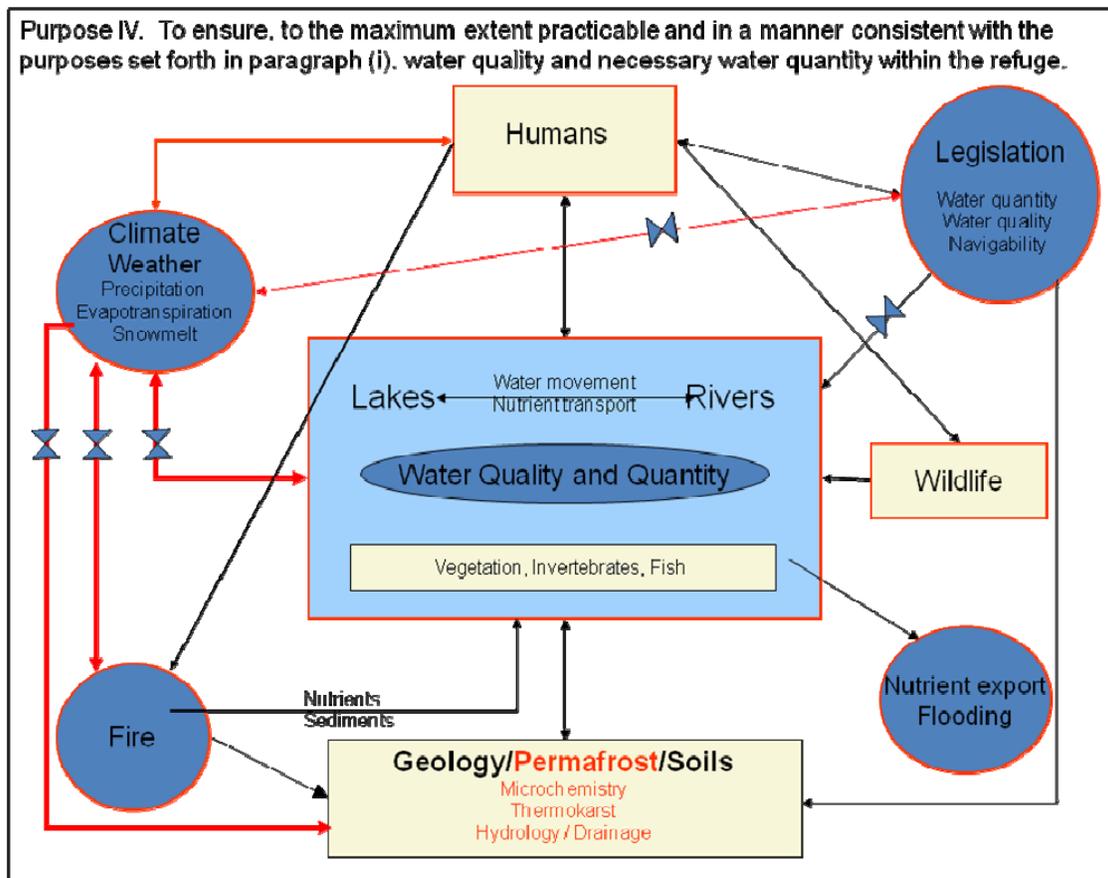


Figure 6. Draft conceptual model focusing on Kanuti Refuge’s fourth purpose in ANILCA: “To ensure, to the maximum extent practicable and in a manner consistent with the purposes set forth in paragraph (i) [i.e., first purpose], water quality and necessary water quantity within the refuge.” Items in red are affected by climate change.

Refuge Inventory and Monitoring Plan

A refuge inventory and monitoring plan (IMP) template was designed for Region 7 (R7) by a team of refuge biologists in 2006, presented to biologists at the regional biologist meeting in Homer in March 2006, and signed by R7’s Chief of Refuges in 2007. The template was designed to facilitate completion of IMPs in the region and to provide improved guidance on what to include in an IMP, given that the national I&MP policy is outdated and planned revisions have been delayed. Alaska Maritime NWR was slated to be the first refuge to complete an IMP using the new template, but biologists there encountered numerous problems and issues when trying to apply the template to a real refuge. The regional refuge biologist thought that it would be easier for a refuge that has already completed a biological review and a CCP revision to take on the IMP task. Also, it was felt that it would be easier for a smaller refuge, with a less complex biological program than Alaska Maritime, to work through the template and, with assistance from regional office staff, modify the template as needed. Kanuti agreed to move up the deadline of its IMP and provide feedback to help refine the existing template. The process has been delayed for a variety of reasons: lack of refuge staff time for writing the plan, lack of time for regional office staff to review drafts and respond to questions, and

transfer of the Regional Refuge Biologist to a different position. Despite these setbacks, the Refuge was able to provide two draft protocols (moose and Breeding Bird Surveys) to the Regional Statistician (RS) Joel Reynolds prior to the October 30 supervisory biologist meeting in Anchorage. Reynolds had been working on a revision of the protocol template based on comments about the earlier draft and new national guidance. He edited the draft moose protocol to fit the new format and provided it as an example at the supervisory biologist meeting. Comments were solicited from attendees. In the meantime, WB Saperstein continues to edit the draft.

The Project Leaders' Meeting held in Anchorage December 2–4 included a session on planning a feasible biological program. RS Reynolds gave a presentation on the status of refuge inventory and monitoring plans. On December 24, Refuge Managers received draft guidance about planning refuge biological programs. Comments were to be submitted by January 8. The draft guidance included instructions for determining “biological capacity,” or how much staff time was actually available for working on biological projects versus other activities.

National Wildlife Refuge System (NWRS) Climate Change Action Plan

Wildlife Biologist Harwood was invited by Danielle Jerry, Chief of Natural Resources and Realty, to help her represent Region 7 on a national team formed to create a strategic plan to address climate change on national wildlife refuges. Harwood attended a meeting of the team July 22–24 in Arlington, VA. While the team was originally tasked to provide a draft plan in time for the regional chiefs meeting in October, the timeline was overhauled to remain in sync with the concurrently produced U.S. Fish and Wildlife Service overall plan. An initial draft of the NWRS strategic plan was crafted largely by Washington Office team members in August, with a third draft out for comments to field station representatives of the team by mid-December.

Alaska Bird Conference

Wildlife Biologist (WB) Harwood attended the 13th Alaska Bird Conference (ABC) and associated meetings March 3–7 at the Westmark Hotel in Fairbanks. On March 3 he attended a study design refresher workshop taught by Regional Biometrician Joel Reynolds. That same afternoon he and WB Saperstein attended a meeting of Region 7 biologists and Regional Refuge Biologist Eric Taylor to discuss the future of the Alaska Landbird Monitoring Survey (ALMS) on refuges. Regional Landbird Program Coordinator Steve Matsuoka (USFWS-Migratory Bird Management) and Research Biologist Colleen Handel (USGS) submitted a proposal for a State Wildlife Grant to subsidize implementation (i.e., cover contracted crews, training, etc.) of ALMS on refuges for 2009–2013. After that, refuges would have to assume all costs of maintaining the monitoring (e.g., providing and/or contracting for crews, training, etc.). While Kanuti NWR has been on board with ALMS since 2003 (i.e., we have two plots which must be completed every two years), Alaska's refuges, which were assigned half of the program's plots, have not fully embraced the program.

On March 4, Harwood attended a workshop on using the software program DISTANCE (used to generate bird densities from point count data) taught by Matsuoka and Handel.

Harwood was able to begin analysis of the Refuge's bird data obtained through Kanuti's Integrated Biological Inventory and ALMS programs (see "Inventory and Monitoring Surveys" section following this one).

Paper and poster presentations for the actual conference were held on March 5–7. On the night of March 5, Harwood helped host a free art show, "In Celebration of Alaska's Birds," with fellow National Park Service biologist Carol McIntyre. Twenty-four artists, recruited by Harwood and McIntyre, displayed their artwork for ABC attendees and the general public, serving as a nice complement to the ABC's scientific poster session held in the adjoining room. Artists represented a wide range of media, including: pottery, oil painting, watercolor, pen and ink, fabric arts, cartooning, woodworking, sculpture, and stained glass. On March 25, Harwood attended a final meeting of all ABC organizers that closed out all conference activities.



WB Harwood (right) admires Fairbanks artist Marty Baldrige's sea duck mugs at the Alaska Bird Conference art show. (Photo courtesy of Diane Hunt)

Alaska Shorebird Group

On December 8–9, Wildlife Biologist Harwood attended the annual meeting for the Alaska Shorebird Group (ASG) where he gave a presentation on the emerging Whimbrel/Hudsonian Godwit study at Kanuti Lake (see project description in "Inventory and Monitoring Surveys" section). Also at the meeting, Harwood was one of 13 cooperators/authors recognized for producing the "Alaska Shorebird Conservation Plan (2nd Edition)," printed copies of which were made available for the first time. Finally,

Harwood was elected to the ASG executive committee.

Boreal Partners in Flight

Immediately following the Alaska Shorebird Group meeting (see immediately above), Wildlife Biologist Harwood attended the annual meeting for Boreal Partners in Flight on December 10–11. There he gave a presentation on the documenting the Refuge's first Yellow-bellied Flycatchers. Harwood also attended ad hoc meetings of the Rusty Blackbird Working Group and a group looking into creating Alaska's first state breeding bird atlas.

Challenge Cost Share proposal

Wildlife Biologist (WB) Saperstein and volunteer entomologist John Hudson successfully submitted an article based on their 2007 challenge cost-share dragonfly project. The article was published in the October 1 edition of *Argia*, the journal of the Dragonfly Society of the Americas. The citation is: Hudson, J. and L. Saperstein 2008. Prairie Bluet (*Coenagrion angulatum*): A new record for Alaska with notes on its habitat and other odonate species found near Kanuti Lake, Kanuti National Wildlife Refuge. *Argia* 20(3): 22–25.

WB Saperstein was awarded another challenge cost-share proposal involving dragonflies in March 2008. See page 27 in the Projects section for details about this effort.

Inventory and Monitoring Surveys

Project: Kanuti NWR Integrated Biological Inventory

Wildlife Biologist (WB) Harwood and Biological Technician Zulueta completed the bird and bird-habitat surveys for the Mingkoket and MingMinn inventory plots in June. WB Saperstein had conducted the vegetation surveys for these plots in 2007. Unfortunately, project conflicts, as well as a back injury to Harwood, precluded finishing up the bird and bird-habitat surveys for the South Fork plot. This is the second summer in a row that bird work for this plot has been postponed. WB Saperstein and crew completed the vegetation survey of this plot in 2006. Efficient access to this plot has proved to be elusive. Prior access to this site by inflatable raft was time-intensive.

WB Saperstein and BT Zulueta collected vegetation and fire history data and collected insects on three plots in July: Kilolitna North, Clawanmenka SE, and Kanuti Flats (Fig. 7). As more grids are completed, the number of grids accessible by floatplane decreases. Two of the grids, Kilolitna North and Clawanmenka SE, were quite shallow and difficult to access with a fully loaded Beaver aircraft. The Clawanmenka SE and Kanuti Flats grids were shallow enough that the plane could not reach the shoreline, necessitating the use of small inflatable rafts to shuttle gear to shore. At Kilolitna North, gear had to be shuttled across a precarious floating bog mat to solid ground. The Four Corners grid, south of Bettles near the Refuge's eastern boundary, was checked for access but was again deemed too shallow to land the Beaver.

A wide variety of successional stages were encountered on the grids (Fig. 8). Kilolitna

North had burned in 2005, but regrowth was advanced enough that fire severity data were not collected. Clawanmenka SE burned in 1990. The Kanuti Flats grid had not burned within the last 58 years, according to fire history maps that go back to 1950.

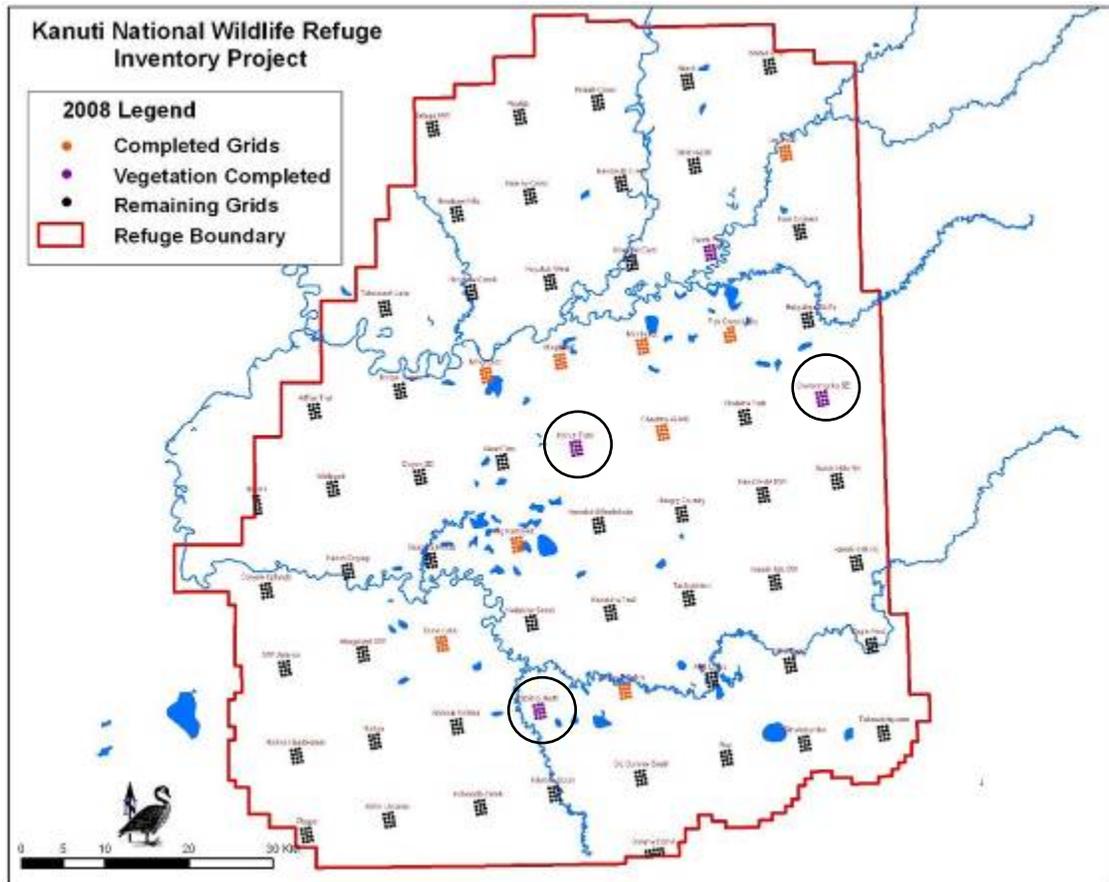


Figure 7. Location and status of inventory mini-grids by fire history as of August 2008. Plots surveyed in 2008 are circled.

A variety of weather was encountered during the sampling period. Conditions were mostly clear and warm for the first week, when the Kilolitna North grid was surveyed. It rained most of week for the Clawanmenka SE grid, and the crew returned to Bettles for a couple of days to dry out gear before going to the Kanuti Flats grid since more bad weather was in the forecast. The Kanuti Flats grid started out rainy, but it cleared up after a couple of days. The clear days were accompanied by colder temperatures, including at least two mornings with hard frosts. The rainy, cold conditions resulted in fewer insects collected than normal.



Figure 8. A variety of habitats were encountered on the three grids surveyed for vegetation in 2008: Kilolitna North grid (top left), Clawanmenka SE grid (top right), and the Kanuti Flats grid (bottom; black spruce/lichen habitat on left, white spruce/feathermoss habitat on right). (Photos by R. Zulueta)

The Refuge extended BT Zulueta's term of employment until December 19 primarily so that she could enter data from the inventory project collected since 2005. Delays in obtaining a fully functional database had led to a backlog of data to be entered, and time constraints and other duties precluded Kanuti's two biologists from working on data entry in an efficient manner. BT Zulueta managed to enter all of the data prior to her departure—a huge accomplishment!

WB Saperstein had sent all of the fire history samples (tree corings and cross-sections) from the inventory project to Diana L. Olson at the Pacific Wildland Fire Sciences Library. Olson had been ageing Alaska fire history samples and developing a database as part of a Joint Fire Science project. In October, Olson sent Saperstein a portion of the database with a request for additional information about the samples, such as general habitat/site data and information about the sampled trees (e.g., tree height, diameter where the sample was taken, diameter at breast height). Detailed tree data had been recorded since 2006. Saperstein provided as much information as possible, sending Olson initial edits on January 15, 2009 and the final edits on February 3, 2009.



Floatplane-accessible lake used as camp for Kanuti Flats grid. (Photo by L. Saperstein)

Project: Spring-out at Kanuti Lake Cabin

In Alaska, the term "spring-out" means spending spring at a remote site before the annual thaw of river and/or lake ice. For the first time in 15 years, a four-person crew composed of Wildlife Biologist (WB) Harwood and three volunteers (i.e., Luke Smithwick; Tom Collopy and Mary Frische, both of Wild North Photography) "sprung out" at the Refuge's remote administrative cabin at Kanuti Lake. Refuge staff wanted to document spring phenomena including breakup and bird migration.

Arriving at the cabin April 12, the crew weathered three weeks of freezing (often subzero [Fahrenheit]) temperatures and late April snowfall, patiently waiting for breakup to begin. The first migratory birds (geese and raptors) arrived on April 21, but the extended winter conditions seemed to delay most bird arrivals. Nevertheless, the crew's three volunteers—all photographers (two professional, one amateur)—ventured afield and obtained excellent images of winter scenery, resident birds such as Great Gray Owl and Spruce Grouse, and mammals like muskrat, beaver, and vole-hunting red foxes!

With the unplanned early departure of Volunteers Collopy and Frische on May 1, spring finally started to arrive that week with considerable changes in the lakes and rivers, as well as ever-increasing numbers (both absolute and species-wise) of migratory birds. WB Harwood and Volunteer Smithwick supplemented their general reconnaissance work with more rigorous surveys for Rusty Blackbirds (a declining bird of continental concern, though quite common locally) and tundra-breeding large shorebirds. During the latter

survey, unexpected numbers of breeding Whimbrels, as well lesser (but significant) numbers of breeding Hudsonian Godwits were found (see next project report for more details).



Musk rats were frequently observed in the spring near Kanuti Cabin.
(Photo by Wild North Photography)

The crew departed on May 23 with the Kanuti River four feet above flood level at the cabin, largely rendering the entire floodplain under water. Leaf-out occurred on May 22, with all but the latest-arriving migratory bird species accounted for. The project was a resounding success, both from a biological inventory perspective, as well as the photographic contributions of the crew, who amassed over 5,000 digital images for the Refuge’s outreach efforts.

Project: Tundra-breeding Shorebird Reconnaissance near Kanuti Lake

Situated in the heart of northern interior Alaska and the boreal forest ecosystem, the Refuge has not been known for its diversity and densities of breeding shorebirds. Motivation, timing, and locations of past field studies have been suboptimal for better clarifying the diversity, distribution, and abundance of shorebirds breeding on the Refuge.

For the first time in 15 years, Kanuti staff “sprung out” on the refuge beginning in mid-April at the administrative cabin located on Kanuti Lake (see related report above). Immediately south and southeast of Kanuti Lake and largely beyond the floodplain, a small area (<10 km²), likely contains the refuge’s most extensive, near-continuous swath of lichen-graminoid tundra. Despite its nearness to the southern part of the refuge’s base of operations since 1991 (i.e., Kanuti Lake Cabin), this tundra area has not been explored comprehensively.

Following local arrivals for Whimbrels and Hudsonian Godwits (May 6 and 8, respectively), breeding indicators (pairs, singing, flight displays) for both species began to be observed with greater regularity, particularly just south/southeast of Kanuti Lake. Although suspected breeding of Whimbrels had been documented regularly at a smaller (~ 0.5-km²) nearby tundra area 5 km east-northeast of the lake, no spring-early summer records for the Refuge existed for the godwit, let alone any suggesting local breeding.



A Hudsonian Godwit alarm calls from a black spruce in the largely treeless tundra southeast of Kanuti Lake. Alaska's likely most north-central breeding (to date) of this species was confirmed in this area in June 2008. (Photo by L. Smithwick)

With evidence mounting for a greater local presence of Whimbrels than was documented heretofore, as well as the suggestion that these Hudsonian Godwits may not necessarily be migrants heading for western and northwestern Alaska, Wildlife Biologist Harwood conducted a 20-count point (>500m between points) survey of the nearest 5-km² patch of tundra south/southeast of Kanuti Lake on May 19. Whimbrels were detected at all 20 points (includes previously detected birds) and godwits at 6 of 20. Other suspected breeding shorebird species detected included Wilson's Snipe and Least Sandpiper in the tundra, and Lesser Yellowlegs near floodplain waterbodies. Likely migrants ("fly-overs") included Pectoral Sandpiper, Long-billed Dowitcher, and American Golden-Plover. Given the unexpected local showing of Whimbrels and Hudsonian Godwits, USGS shorebird researchers at the Alaska Science Center were notified. Intrigued by the findings, they suggested that if sufficient numbers of breeders could be further substantiated, future intensive work in this area might be warranted. A post-hatch

resurveying of the area in mid-June suggested that at least 10–11 pairs of Whimbrels (excluding a transient flock of 11 birds) and 10 pairs (including 1 non-volant chick,) of Hudsonian Godwits were breeding in the local area. This likely represents north-central Alaska's first breeding record.

The Refuge and USGS are currently finalizing study plans for the 2009 season to use satellite telemetry to track the southward migration of the Kanuti population of Whimbrels and, if technologically possible, to use dataloggers in a longer term effort to study migration of the Hudsonian Godwits.

Project: Breeding Bird Surveys (BBS)

Wildlife Biologist Harwood and Refuge Manager Spindler conducted the Kanuti Canyon BBS on June 11, 2008. They recorded 569 individuals of 49 species. The run of good luck with the Yamaha jet motor came to an end with the shifter cable breaking mid-survey. Not only was reverse lost for the rest of the Canyon survey, but for the Lake route as well. The detection of Yellow-bellied Flycatchers singing in the canyon was indeed the highlight of this year's effort. Breeding of this species in Alaska was only confirmed in 2004 near Eureka (Sawtooth Mountains), only 100 miles southeast of Kanuti Canyon. The topography and vegetation of breeding habitat exhibited there is not unlike the areas where singing birds were detected in the Canyon. It is unclear how long Yellow-bellied Flycatchers have inhabited the Canyon. Harwood's predecessor as route observer, Merry Maxwell, commented at least five years ago about an odd-sounding flycatcher on the route. Harwood's unfamiliarity with this species' song likely contributed to its being overlooked. This species' detection points to the benefit of having some new (and proficient) ornithological blood (i.e., RM Spindler, a former BBS observer) along for the survey.



The Refuge's first record for Yellow-bellied Flycatcher was documented from open south-facing aspen stands in the Kanuti Canyon. (Photo by C. Harwood)

Thirty of 50 stops of the Kanuti Lake BBS were completed on June 12 before increasing drizzle forced postponement. On June 13, the survey was resumed but high winds dampened bird activity, causing another cancellation. With Spindler's return to Fairbanks, Biological Technician Zulueta took over as boat driver on June 14. Satisfactory weather finally allowed completion of the survey on that day, with 700 individuals of 44 species recorded for the entire survey.

Project: Alaska Landbird Monitoring Survey (ALMS)

Due to a back injury to Wildlife Biologist Harwood, as well as competing project schedules (e.g., shorebird reconnaissance at Kanuti Lake), the Refuge was not able to stay on schedule with its ALMS commitment. The Chalatna ALMS plot, last done in 2006, was supposed to be surveyed this year but had to be postponed until 2009.

Project: Greater White-fronted Goose monitoring

During July 2–5, 2008, Refuge Manager/Pilot Spindler and Biological Technician Zulueta conducted aerial surveys documenting numbers and distributions of primarily, molting Greater White-fronted Geese (“white-fronts”), and incidentally, Canada Geese. The crew surveyed 101 aerial line transects overlaying a majority of the goose habitat on the Refuge, as well as nearby Lake Todatonten and the terminus of the Kanuti River. Totals of 308 white-fronts (all adults) and 279 Canada Geese (116 adults and 163 young) were observed. No white-front goslings were observed during the standardized portion of the survey, though 28 (along with 12 more adults) were found during intensive resurveying efforts. Results for the last six surveys are presented in Table 4 below.

Table 4. Goose and swan observations¹ by year during aerial molting goose surveys, Kanuti NWR, Alaska, 2001–03, 2006–08. [GWFG = Greater White-fronted Goose, CAGO = Canada Goose; ad = adults, yg = young]. Surveys cancelled in 2004–05.

Year	GWFG ad	GWFG yg	CAGO ad	CAGO yg	Swan ad	Swan yg
2001	332	142	67	54	91	6
2002	117	50	101	128	103	14
2003	313	65	52	78	108	13
2006	332	71	108	95	219 ²	37 ²
2007	280	100	124	190	189 ²	70 ²
2008	308	0	116	163	211 ²	57 ²

¹ Does not include observations made outside “official” study area or during resurveying efforts

² represent minimum counts

In addition, the refuge again conducted an experimental breeding pair survey in the spring. Fourteen transects along and south of the Kanuti River and five along the South Fork Koyukuk River were selected for surveying on May 7 and 13. Late spring conditions permitted only a partial survey on May 7. Results (Table 5) of the surveys were again equivocal for both white-fronts and Canada as numbers and percentages of paired birds varied widely between surveys. There also remains the question as to what

percentage of these pairs is remaining to breed on or near the refuge, versus those birds that are merely staging before migrating further west and northwest.

Table 5. Total indicated geese and indicated paired geese (in parentheses)¹ by transect during breeding pair survey, Kanuti NWR, Alaska, May 7 and 13, 2008. Acronyms are: **GWFG** = Greater White-fronted Goose, **CAGO** = Canada Goose.

Transect	Species	Number ²	
		7 May	13 May
B1	GWFG	0	2 (2)
	CAGO	4 (4)	0
B2	GWFG	0	2 (2)
B3	GWFG	200 (0)	266 (2)
	CAGO	300 (0)	0
B4	GWFG	0	2 (2)
B5	GWFG	214 (4)	38 (16)
	CAGO	97 (14)	0
B6	GWFG	51 (0)	103 (22)
	CAGO	53 (8)	4 (4)
B7	GWFG	0	26 (4)
B13	GWFG	0	7 (4)
B14	GWFG	0	12 (4)
92	GWFG	0	4 (4)
94	GWFG	0	2 (2)
96	GWFG	0	48 (8)
	CAGO	0	9 (0)
100	GWFG	0	11 (0)
	CAGO	0	2 (2)
Total Indicated Birds¹	GWFG	465 (4)	523 (72)
	CAGO	454 (26)	15 (6)
% Indicated Paired Birds³	GWFG	0.9	13.8
	CAGO	5.7	40.0

¹ “Indicated paired birds” (in parentheses) equals the sum of twice the number of single birds plus paired birds (e.g., 1 single and 1 pair equals 4 indicated paired birds). “Total indicated birds” equals the sum of indicated paired birds plus flocked birds (e.g., 1 single, 1 pair, and a flock of 3 equals 7 indicated birds).

² Geese from different observations on same transect were combined.

³ “Indicated paired birds” divided by “total indicated birds” times 100



A lone Greater White-fronted Goose rests on the rotting ice of Kanuti Lake in May. Our breeding pair survey has so far produced equivocal results for the spring status of this species on the Refuge. (Photo by L. Smithwick)

Project: Waterbird breeding pair survey

On May 21, a Migratory Bird Management Division crew (i.e., Pilot/Wildlife Biologist [WB] Rob MacDonald and WB Dennis Marks) replicated a spring waterbird breeding pair aerial survey of the greater Kanuti NWR area last done June 1997. Results from that survey, however, were not available for inclusion in this report at the time of its completion.

Project: Connecting the public and biologists with dragonflies: An exploration of biodiversity

Wildlife Biologist Saperstein was awarded a challenge cost-share proposal involving dragonflies in March 2008. The project was entitled “Connecting the public and biologists with dragonflies: An exploration of biodiversity.” The introduction from the proposal, excerpted below, provides background information and goals of the project:

Few insects capture the public’s imagination more than dragonflies. These beautiful insects represent an outstanding, but rarely utilized, opportunity for connecting people with nature. As larvae and adults, dragonflies play an important role as both predator and prey in aquatic and terrestrial systems, making them ideal subjects for introducing the concept of ecological relationships. The goals of

this project are to increase public awareness of dragonfly diversity, biology, and ecology and to expand upon the small body of information on dragonfly species diversity and distribution in Alaska. Dragonfly expert John Hudson and naturalist/photographer Bob Armstrong, co-authors of the book "Dragonflies of Alaska," will be involved in both aspects of the project. A key educational component will be "Dragonfly Day," a public event at Creamer's Field in Fairbanks designed to introduce kids and adults to the identification and ecology of dragonflies. This event will include hands-on instruction on dragonfly collecting and identification techniques, displays about proper specimen handling and record keeping, children's activities, exhibits of live dragonflies and other aquatic insects, and nature walks focusing on dragonflies and their habitats. An evening slide-show presentation will include a photo-introduction to the dragonflies of Alaska including information on life history, biology, biodiversity, ecology, and techniques for collecting and photographing dragonflies.

Dragonfly species distribution is poorly documented in Alaska, and even the most basic surveys result in large extensions of currently known species ranges. Agency biologists, as well as interested members of the public, can greatly increase our knowledge of dragonfly diversity in Alaska by collecting specimens in association with other activities. The second component of the project will include intensive training in dragonfly identification in Fairbanks that will include staff of Kanuti, Yukon Flats, and Arctic National Wildlife Refuges (NWR), and at Tetlin NWR, the Arctic Interagency Visitor Center (AIVC) in Coldfoot, and Koyukuk NWR, based in Galena. This portion of the project will also include public demonstrations and lectures in Tok, Coldfoot, and Galena. Dragonflies will be collected at and en route to all sites to increase our knowledge of their distribution and habitat use on public lands in interior Alaska.

Partners for the project were: John Hudson, Bob Armstrong, University of Alaska Fairbanks Museum, Friends of Creamers Field, Alaska Department of Fish and Game, Fountainhead Development, Friends of Alaska Refuges, and Alaska Bird Observatory. Total project cost was \$21,708, and we requested and were awarded \$10,800 from USFWS.

The project was a huge success and resulted in discovery of a new dragonfly species for Alaska, the Kennedy's Emerald (*Somatochlora kennedyi*). Although the species occurs in other parts of the United States and in Canada, it had not been previously detected in Alaska. Over 300 people attended Dragonfly Day in Fairbanks, and events in smaller communities were also successful. A summary of the project, along with a photo, was printed in the September/October 2008 issue of "Refuge Update." A photo of a Kennedy's Emerald, taken by Armstrong near Tok, appeared on the back cover of the summer 2008 edition of "Fish and Wildlife News." The project was also written up for a Let's Go Outside award nomination on July 3; WB Saperstein later received the award. A portion of the write-up is excerpted below:

Children and adults had opportunities to learn about dragonflies in several

communities in interior Alaska June 19–26, thanks to a grant developed by Supervisory Wildlife Biologist Lisa Saperstein of Kanuti National Wildlife Refuge and the efforts of numerous partners and volunteers. John Hudson and Bob Armstrong of Juneau, Alaska, co-authors of the field guide “Dragonflies of Alaska” and the children’s book “Dragons in the Pond,” were the main attractions of the “dragonfly road show.” They were accompanied by Bob’s wife, Pauline Strong, who also has experience identifying dragonflies. The purpose of their trip to interior Alaska was threefold: to teach people about the ecology of dragonflies and foster an appreciation of these beautiful insects; to collect dragonflies to increase our limited knowledge of species distribution; and to teach biologists how to identify different species of dragonflies so they can document species occurrence at their study sites. Kanuti Refuge and the Fort Greely area currently hold the state record for the most dragonfly species, 20 in each area, but most areas have not been surveyed well, or even at all. It is hoped that, through this project, people in other parts of interior Alaska will start documenting species occurrence.

John and Bob spent two days in the Fairbanks area training biologists to collect and identify dragonflies. Seven to eight people participated each day, including biologists from Kanuti, Arctic, and Yukon Flats National Wildlife Refuges, the University of Alaska Fairbanks, the Alaska Bird Observatory, Fountainhead Development, Friends of Creamer’s Field, Friends of Alaska Refuges, and an independent naturalist. An evening talk at the University Museum was attended by around 30 people, including local residents and tourists. The crowning event of the Fairbanks visit was “Dragonfly Day,” a public event held at Creamer’s Field, a popular bird watching area in town. About 300 people attended the event, which was co-hosted by the non-profit group Friends of Creamer’s Field and featured dragonfly walks, displays about dragonflies and wetlands, children’s crafts and activities, and vendors selling dragonfly-related crafts and artwork. The three scheduled dragonfly-collecting walks were the primary attraction at the event, with each attracting 40–50 people. Nets were provided, and people were able to catch, or at least view, five species of dragonflies and one species of damselfly. Dragonflies can be caught, carefully handled, and released unharmed, giving folks a unique opportunity to hold and get a close-up view of them.

After Dragonfly Day and the other Fairbanks events, John and Bob drove three hours south to Tok to work on identification skills with staff of the Tetlin National Wildlife Refuge, lead a dragonfly walk, and give a public presentation over the course of two days. Twenty-one people attended the walk at Moon Lake, and three people attended the evening public presentation. Ten members of the Tetlin National Wildlife Refuge staff attended identification training, which was held inside using preserved specimens due to rain. En route to Tok, John, Bob, and Pauline sampled at several ponds, and during one of these stops they captured and documented a new species record for Alaska—the Kennedy’s Emerald.

After the Tok activities, the crew headed back to Fairbanks and then drove north to Coldfoot for a 3-day trip, along with Kanuti Refuge Deputy Manager Joanna Fox and

Saperstein. They were able to visit more ponds and collect additional specimens during the trip, although clouds and cool weather limited collecting activities initially and led to cancellation of an afternoon dragonfly walk at the Arctic Interagency Visitor Center in Coldfoot. Weather didn't prevent people from attending John and Bob's evening talks at the center, however. Fifteen people attended the first talk and 62 attended the second, most of whom were out of state tourists.

The final portion of the grant, a visit to Galena by John Hudson, will occur later in July.

A similar challenge cost-share proposal was submitted on December 11 and was awarded on January 29, 2009 for the requested amount of \$12,000. It proposed similar Fairbanks events, including Dragonfly Day. Instead of trips to Tok, Coldfoot, and Galena, however, in 2009 WB Saperstein, Hudson, and Armstrong will travel to Bettles for education and collecting activities followed by a collecting trip to the Refuge.



Wildlife Biologist Saperstein (center) is largely the architect behind the successful Dragonfly Day events. (Photo by J. Fox)

Project: Kanuti NWR Moose population survey

Kanuti Refuge partnered with the Alaska Department of Fish and Game (ADF&G) November 8–15 to conduct a moose population survey with a new twist: sightability trials. Using radio-collared moose, we wanted to determine how many moose are not seen during standard surveys. Biologists know that it is impossible to see every moose in a survey unit (each about 5.3 mi² in area), but they are just starting to document the actual percentage of moose missed. This can only be accurately done using radio-collared

moose. One plane radio-tracks moose during the survey and knows which units contain collared moose. Survey planes (two-person tandem aircraft such as a SuperCub or Scout) survey a unit and let the tracking plane know whether they saw any collared moose. If they did, they provide information about group size, sex, and habitat. If they missed a collared moose that had been tracked in the unit earlier that day, the tracking plane returns to make sure that the moose did not move out of the unit since being tracked.

Data from the sightability survey have not yet been fully analyzed, but it appears that surveyors missed about 20–25% of the collared moose in units, similar to what has been found by ADF&G in other parts of interior Alaska. Kanuti Refuge differed from other areas where sightability has been tested in that it is an area of low moose density; other study sites had greater numbers of moose. Habitat also differed from other study areas in that much of Kanuti Refuge has recently burned. While this leads to more open habitats where it seems that moose would be easier to see, burns contain numerous stumps and tree root wads that stick out of the snow and look like moose from a distance. Despite overall differences in habitat compared to other areas, reasons for missing moose were similar to other surveys. Sometimes the plane flew directly over a moose so that it was not visible to observers, sometimes observers were busy looking at nearby moose and missed a collared one, and sometimes the moose were in dense habitat where they could not be seen regardless of effort.

In addition to the sightability tests, a population estimate was also obtained. Eighty units were surveyed to calculate the estimate, fewer than the 150 units surveyed in 2007 due to the extra cost required for the sightability trials. In 2007, a stratification survey was flown before the population survey so that all survey units in the refuge could be roughly classified as high or low moose density based on direct observations of habitat, moose tracks, and observed moose. A stratification survey was not conducted in 2008 due to limited funding. Thus, survey units were assigned to different strata based on 1) the number of moose seen in the unit during previous surveys and 2) habitat data from satellite imagery. These two factors, a lower number of survey units and a “desktop” stratification, can lower survey precision.

Of the 80 units surveyed, 44 were in the high density stratum and 36 were considered low density. A low density unit is expected to contain three or fewer moose. A total of 175 moose were counted, with 119 in high density units and 56 in low density units. The overall estimate was 872 moose for a density of 0.32 moose per square mile (Table 6, Figure 9). This is slightly higher than in 2007 when the population estimate was 588 moose for a density of 0.22 moose per square mile.

Although there was a slight increase in the estimate between 2007 and 2008, it is not possible to say that the estimates are statistically different (Figure 9). Relatively high levels of variability associated with population surveys on the refuge make it difficult to statistically assess population trend. It is most useful to compare surveys conducted from 1999–2008 (Table 1, Figure 1) as they all employed the GeoSpatial Population Estimator (GSPE) technique (Kellie and DeLong 2006) while surveys in 1989 and 1993 used the Gasaway method (Gasaway et al. 1986). The 2007 estimate was the lowest recorded for

the Refuge and was statistically significantly lower than the 1999 GSPE estimate and both of the older Gasaway estimates (Figure 9). The only other statistically significant difference among surveys was that the 1993 Gasaway estimate was higher than estimates obtained in 1999, 2004, 2007, and 2008.

Despite the lack of a statistically significant difference between 2007 and 2008, calf and yearling bull survival suggest that this population has the capacity for growth (Table 6). Calf production was good at 58 calves per 100 cows, and a high yearling bull ratio (14 yearling bulls per 100 cows) suggested that calf survival from last year was also good. A ratio of 20–30 calves per 100 cows is considered adequate for maintaining a stable population, and ratios of over 30–40 calves per 100 cows promote population growth (ADFG and the KRMHWG 2001). Yearling bulls are identified by their antler characteristics. It is assumed that a similar proportion of female calves survived, but it is often difficult to distinguish between an adult and yearling cow from the air.

Table 6. Summary of moose population estimates for Kanuti NWR, 1999–2008.

	2008	2007	2005	2004	1999
Survey Area (sq mi) ¹	2,715	2,714	2,710	2,710	2,715
Units Surveyed	80	150	82	103	108
Population Estimate	872	588	1,025	842	1,003
Standard Error	124	76	270	146	127
Range of Estimate ²	669–1,075	463–714	581–1,470	602–1,083	794–1,211
Moose Density (moose/sq mi)	0.32	0.22	0.38	0.31	0.37
Estimated Cows	432	276	471	403	542
Estimated Bulls	199	167	331	252	320
Bulls:100 Cows	46	60	70	62	59
Yearling Bulls:100 Cows	14	13	20	9	4
Calves:100 Cows	58	53	43	46	30

¹ Survey areas vary slightly among years depending on how survey units were delineated and how units intersected the refuge boundary. Some units extending beyond the boundary were considered “in” the refuge, even if much of the unit was outside the boundary.

² 90% confidence interval

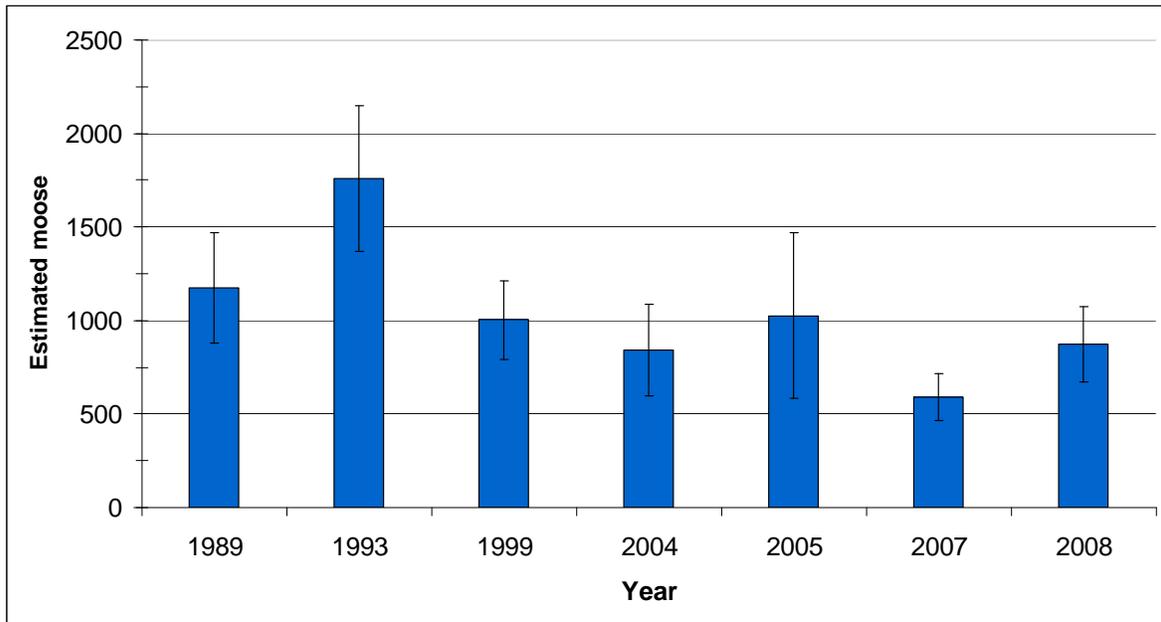


Figure 9. Moose population estimates on Kanuti National Wildlife Refuge, Alaska, 1989–2008. Error bars represent the 90% confidence interval; narrower bars indicate a higher level of precision. If error bars overlap between years, the estimates are not statistically different.

Project: Aerial Wolf Survey

A late winter aerial wolf survey was conducted March 18–22. As in 2005 and 2006, the Stephenson method (Stephenson 1978) was used and the same pilot, Harley McMahan, was contracted. A survey was planned but not conducted in 2007 due to poor snow tracking conditions. Results from this type of survey are considered a minimum count that represents a “snapshot in time” for when the survey was conducted.

The designated survey area is 3,949 mi², but 1,105 mi² (28%) were unworkable due to windy conditions, thus reducing the survey area to 2,844 mi² (Fig. 10). This is similar to conditions during previous surveys when 30% and 28% of the area was windblown in 2006 and 2005, respectively. McMahan noted that “*snow conditions for assessing wolf numbers on Kanuti Refuge in March, 2008 would have been comparable to 2005 and 2006, when I flew similar surveys, except for the incessant wind this year!*” Wind presents several problems: wolves tend to move less when winds are high, so they make fewer tracks; track systems can get blown over, especially in exposed areas; and turbulence can make flying conditions dangerous. On the positive side, wind will erase old tracks that can obscure fresher ones.

The survey took 30.37 hours, not including travel time to and from Bettles, which is consistent with the flight hours in 2006 (30.24 hours) and 2005 (30 hours). A total of 51 wolves were estimated to be within the “workable” survey area. Only 6 wolves were actually seen; the remainder was estimated from tracks (Fig. 11). This is fewer than the

78 estimated in 2006 and very similar to the 2005 survey when 48 wolves were estimated to be within the survey area.

Wolf densities are usually reported as the number of wolves per 1,000 mi². The 2008 survey resulted in a density estimate of 18 wolves/1,000 mi², which is fewer than the 28 wolves/1,000 mi² estimated in 2006 and very similar to the 2005 density estimate of 17 wolves/1,000 mi². A 2001 survey, with different pilots and slightly different methods, resulted in an estimated density of 14 wolves/1,000 mi². According to pilot McMahan, *“the Kanuti wolf population appears to be smaller this year compared to previous times I have surveyed the refuge. On the other hand, past surveys have left me thinking wolf numbers might be artificially high, considering available prey.”*

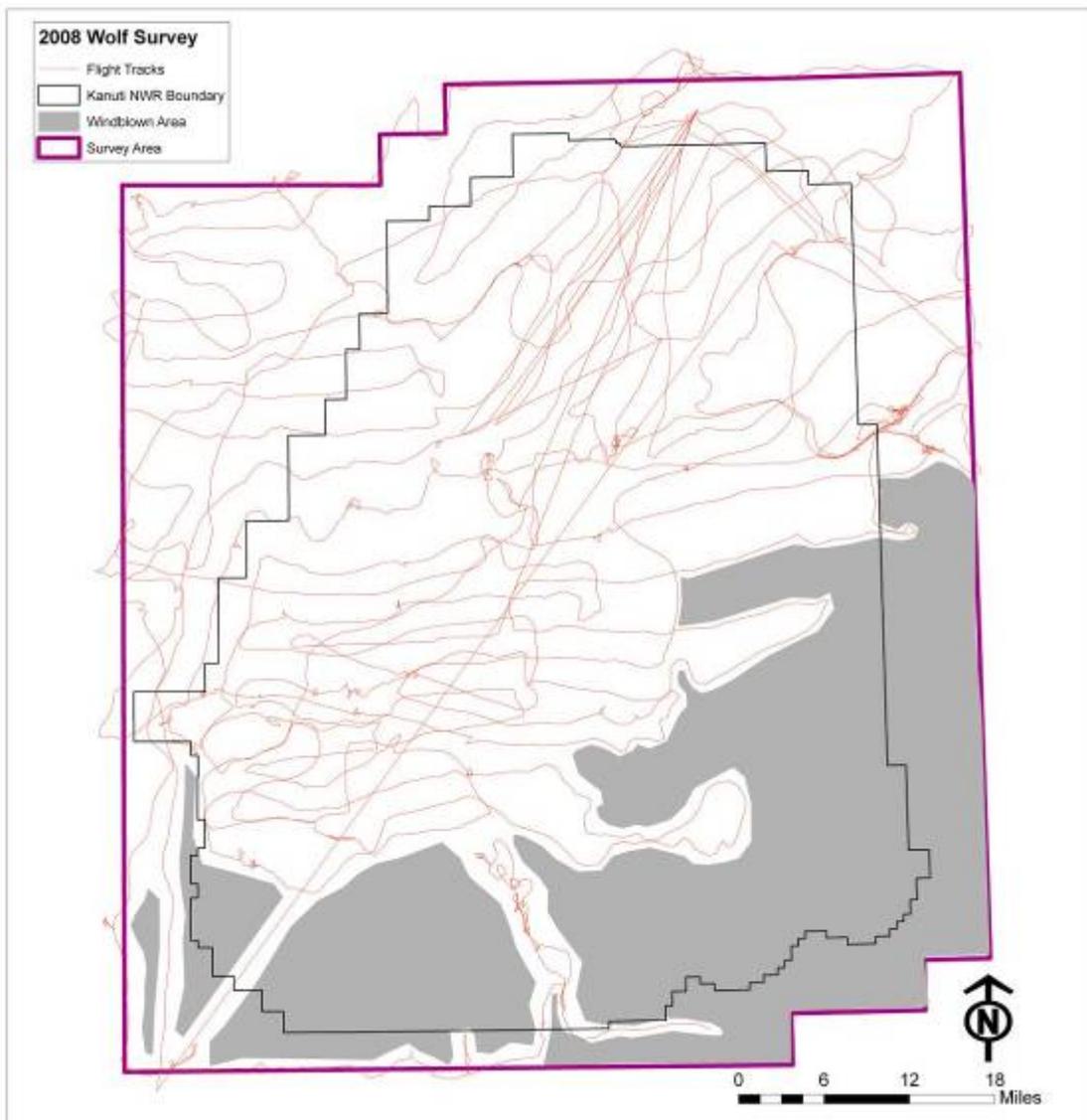


Figure 10. Survey area and flight lines for Kanuti NWR 2008 winter wolf survey. The gray area was windblown and could not be surveyed.

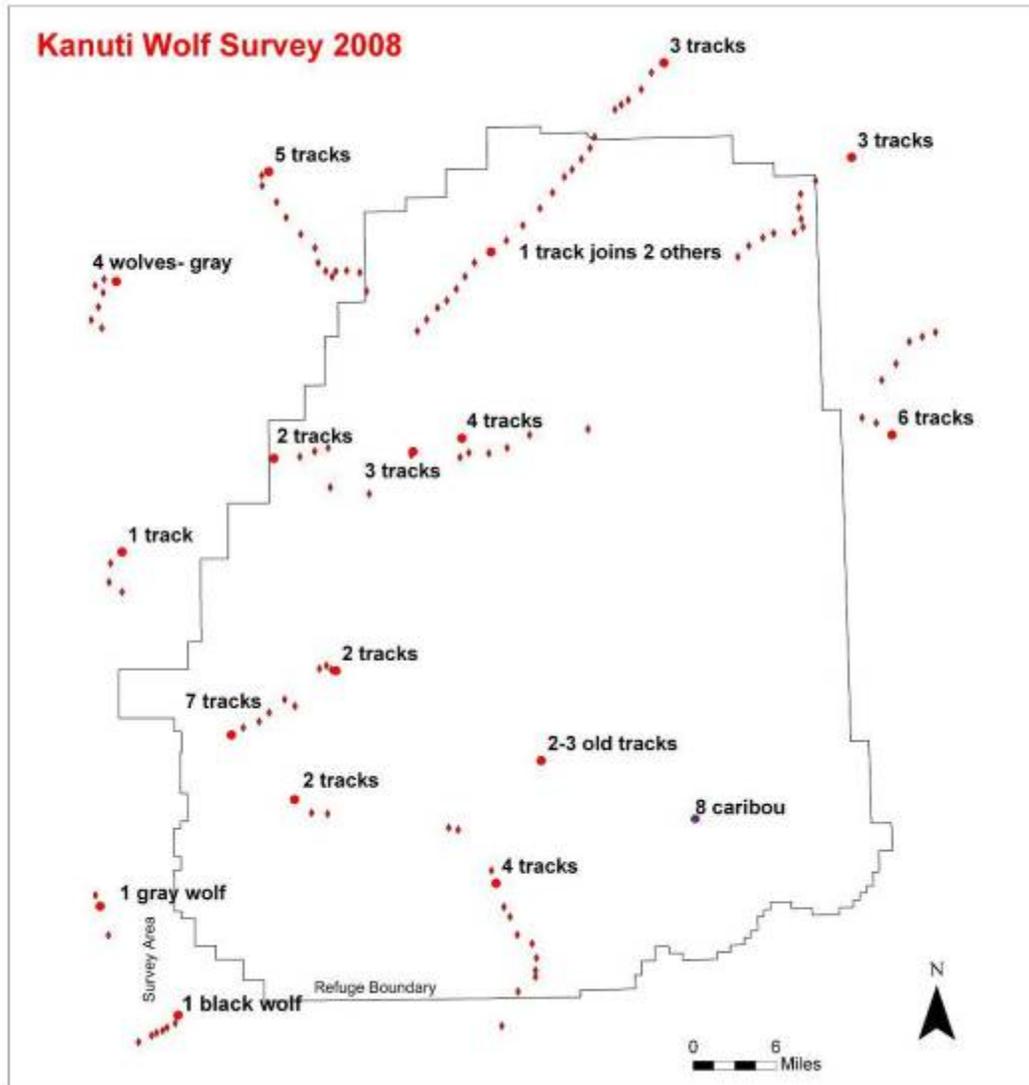


Figure 11. Location of wolves and wolf tracks observed during the late winter wolf survey on and adjacent to Kanuti NWR, 2008.

The Alaska Department of Fish and Game management goal for wolves in GMU 24, of which the survey area is only a portion, is a fall density of 13–23 wolves/1,000 mi² (Parker-McNeill 2006). Wolf density during the 2008 spring survey was within this range; a fall estimate of wolf density is not available. A rough rule of thumb is that ratios over 30 moose/wolf could result in stable to increasing moose populations *if* the habitat can support this number of moose and *if* other sources of mortality from factors such as hunting or severe weather were not excessively high (Gasaway et al. 1983). Based on the 2007 fall moose survey and the 2008 spring wolf survey, there are about 9–15 moose per wolf within the survey area (Table 7). The observed moose/wolf ratio is low, but consistent with other low moose density areas in interior Alaska.

Table 7. Summary of data used to calculate moose/wolf ratios. ¹

Wolf Survey	2008	2006	2005
Estimated spring wolf density (wolves/1,000 mi ²)	18	28	17
Estimated moose (fall surveys)	463–714 (2007 survey)	581–1,470 (2005 survey)	602–1,083 (2004 survey)
Estimated moose density (moose/1,000mi ²)	170–263	214–542	222–400
Estimated moose per wolf	9–15	8–19	13–23

¹Numbers have been rounded and may differ slightly from what has been reported in the text.

Project: Henshaw Creek fish weir

Fisheries Biologist Brandy Berkbigler of Tanana Chiefs Conference, in association with the Allakaket Tribal Council and Fairbanks Fish and Wildlife Field Office (Fisheries), again supervised operation of a resistance board weir in Henshaw Creek to record escapement information from Chinook *Oncorhynchus tshawytscha* and chum salmon *O. keta*. Historical data from the project are presented in Table 8.

Table 8. Escapement totals for chum and Chinook salmon at the Henshaw Creek weir, Kanuti National Wildlife Refuge, 2000–2008.

	2000	2001	2002	2003	2004	2005	2006 ¹	2007	2008
Chum	27,271	35,031	25,249	22,556	86,474	237,481	4	44,425	97,281
Chinook	244	1,103	649	763	1,248	1,059	0	740	779

¹Weir operation was aborted due to high water

Research Studies and Investigations

Project: Moose radio telemetry

Kanuti Refuge, Gates of the Arctic National Park and Preserve (GAAR), the Alaska Department of Fish and Game (ADF&G), and the Bureau of Land Management (BLM) cooperatively radio-collared moose in Game Management Units (GMU) 24A and 24B in March 2008 (Fig. 12). This is the first time that moose have been radio-collared in the upper Koyukuk River region. The primary objective of the study is to determine general moose movements in the area. The radio-collars will also help biologists conduct spring twinning surveys in this region where moose densities are low and it can be difficult to find enough cow moose (at least 50) for a valid survey. Twinning surveys are an important way to assess herd productivity.

Fifty-eight moose (48 cows, 10 bulls) were fitted with radio-collars during 13–17 March 2008. Of these, 29 moose (24 cows, 5 bulls) were collared within and adjacent to Kanuti refuge. The remaining moose (24 cows, 5 bulls) were collared farther north or east along the Middle Fork Koyukuk, South Fork Koyukuk, and Jim rivers, including GAAR. In addition, five of these moose were fitted with Global Positioning System (GPS) collars, which can be tracked both by satellite and from an airplane. Even though this study is just beginning, as a result we have already gathered new information from this little known population of moose. Moose are scheduled to be radio-tracked by plane once a

month, generally near the beginning of the month to coincide with snow surveys during the winter.

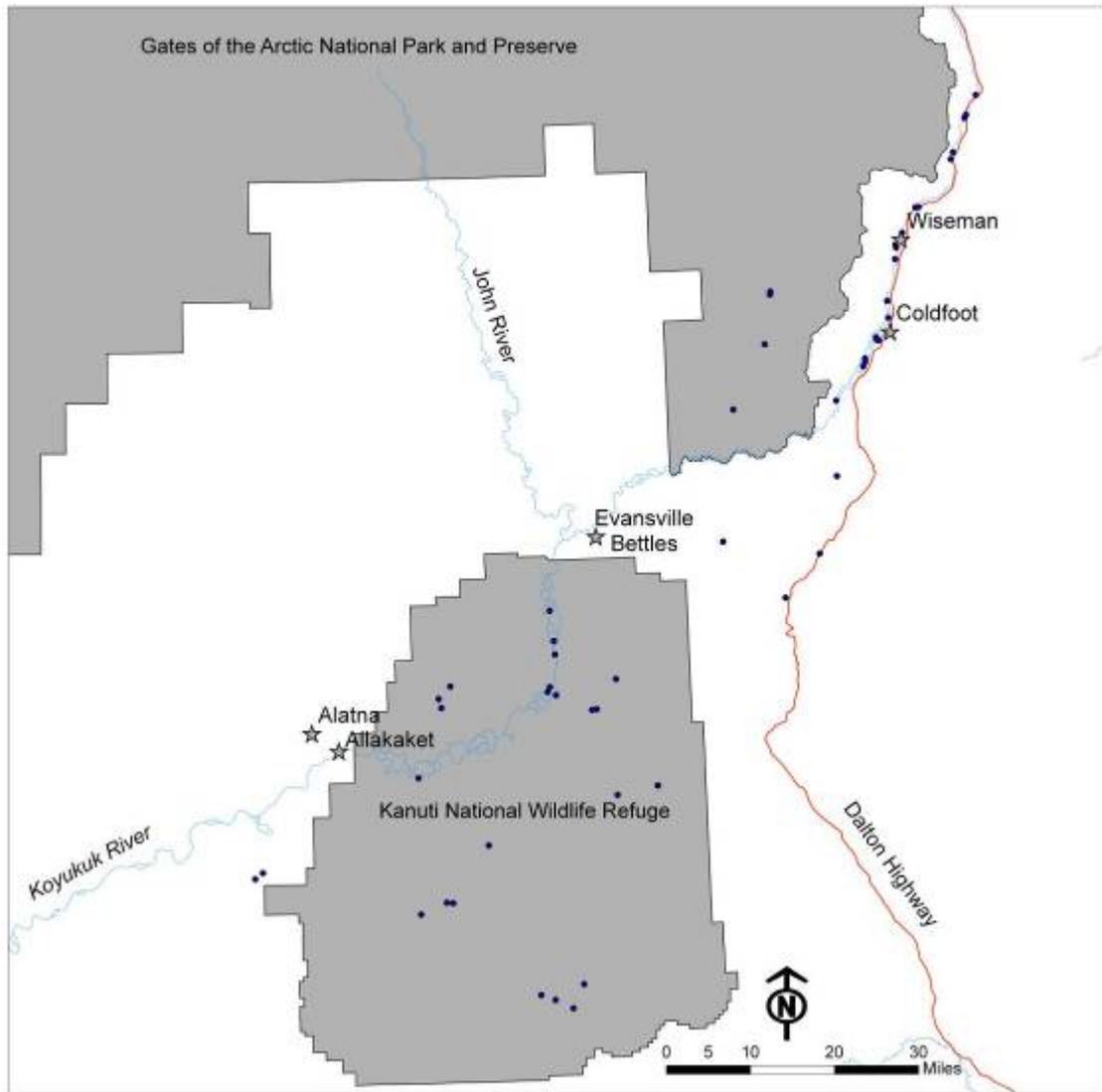


Figure 12. Capture locations of moose radio-collared in March 2008

As of December, one of the moose collared on or near Kanuti is confirmed dead and one is presumed dead, although a carcass was not located. One cow died on Kanuti NWR within 5 days of being collared. The moose was seen alive and apparently well later in the day after being collared, having moved several miles from the capture location. Only one dart was needed to drug the moose, and there were no abnormalities with the capture. Upon retrieving the radio collar, there were no signs of predation or other distress. The second moose collar was found on Kanuti NWR in a 1990 burn, with no sign of a carcass in the vicinity. The collar had been dragged from the site where it was originally detected in late August. It was dirty and somewhat battered, but still fastened, which suggests predation rather than shedding although there was no blood on the collar. These

collars, along with ones collected from confirmed or presumed mortalities in the northern part of the study area were redeployed in fall 2008 along with 9 more GPS collars. All of these collars were deployed outside of the Refuge boundaries.

Productivity and Health

Analysis of blood samples that we collected during capture indicate that moose in the study area were among the “cleanest” in the state in regards to wildlife diseases. In fact, they have not been exposed to any domestic livestock diseases, as far as we can tell.

Blood samples also indicated that pregnancy rates for moose in our study were quite high, with 96% of the captured cows carrying calves. Similarly, 35% of the cows (includes both radioed and non-radioed cows) that were located during a May survey flight had twins. These data indicate that the nutritional status and body condition of moose in our study area are very good.



The tracking of radio-collared moose should provide the Refuge with much needed data on moose movements. (Photo by L. Saperstein)

Cultural Resources

Project: Henshaw Creek Science Camp and Allakaket three-day Science Camp

Elders Kitty and David David and Elsie and Kenneth Bergman (Kanuti’s contracted Rural Representative), long-time residents of Allakaket who are knowledgeable in traditional Native techniques, spent July 20–25 at the Henshaw Creek Science Camp in July. Immediately following the science camp at the Henshaw Creek Weir, the elders also spent three days with students during the Allakaket Science Day Camp, which was

added this year to provide additional outdoor educational opportunities. The Elders instructed the students in fish cutting and smoking, building a smoke rack without nails or ropes, making fish nets out of willows, and beading. Their Native traditional stories in the evenings were a big hit with the kids. (See also Environmental Education section, page 73)

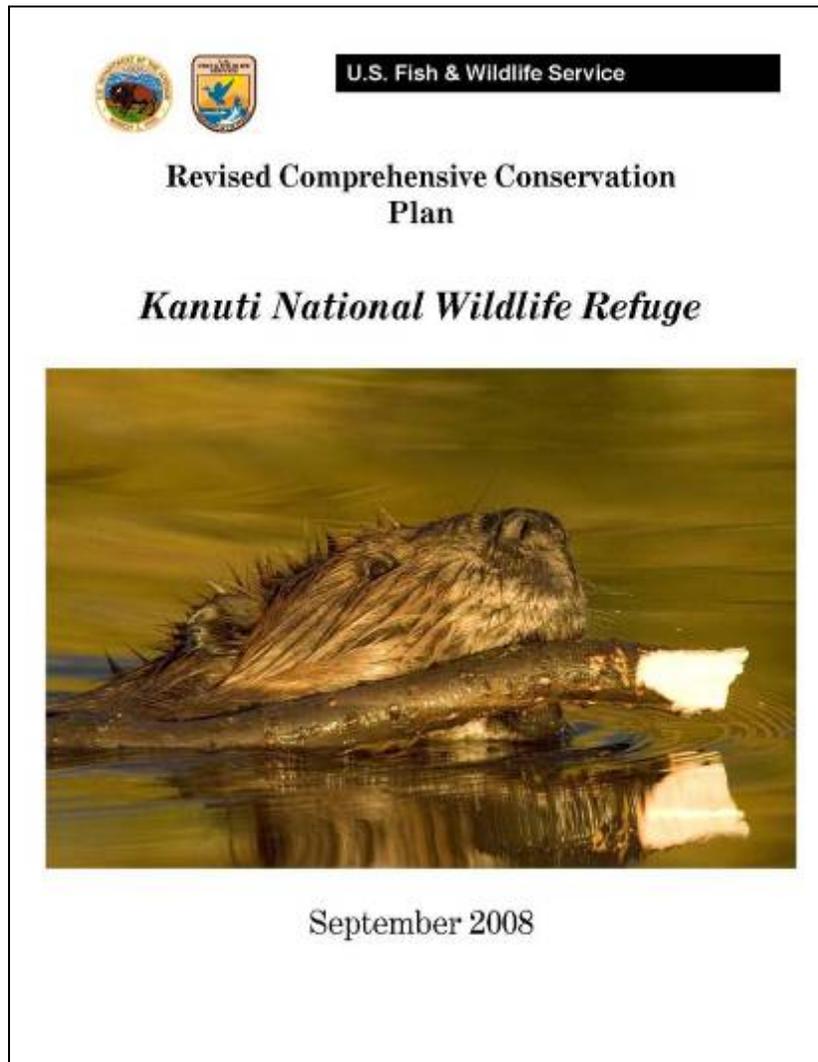


The success of the science camps would not have been possible without the traditional Native skills instruction from elders Kitty David (top), David David (below left), and Kenneth Bergman (below right).

Management

Revision of the Kanuti NWR Comprehensive Conservation Plan (CCP)

The Refuge completed its long-term management plan, also called a Comprehensive Conservation Plan (CCP). This plan will provide refuge staff with management guidance, including specific goals and objectives, for the next 15 years. The final plan represents the culmination of a four-year effort that included public involvement, consultations with stakeholders, an extensive peer-review of the biological program, writing and analysis, editing, and public review. The final record of decision to implement the plan was signed by the Service's Regional Director Tom Melius in August 2008. In late fall 2008 a summary of the plan was also published and distributed to all who participated in the process. Refuge Manager Mike Spindler said he "appreciates the involvement and participation in the planning process by both the local village public and stakeholders throughout Alaska. We view the public involvement process as a valuable 'pulse check' on the work that we are doing."



Cover for the completed Kanuti Refuge Comprehensive Conservation Plan.

Each national wildlife refuge is required to have a CCP to ensure management actions and permitted activities fulfill the mission of the National Wildlife Refuge System and the purposes for which the refuge was established. This plan provides a vision, goals and objectives for future management of the refuge. It also ensures that subsistence and fish and wildlife-oriented recreational opportunities continue to be available to the public. The CCP provides specific guidance for dealing with two major issues identified during public scoping and review of the draft plan: (1) acceptance and integration of new management policies and guidelines into the Plan, and (2) conservation of the natural, unaltered character of the refuge. New management policies and guidelines are essentially the same for all of the refuges in this region, establishing a common framework for management.

The management of the Refuge will generally continue to follow the same course of action that it has previously. It will strive to maintain the ecological integrity of the refuge with little evidence of human-caused change. Any such disturbances to resources resulting from public use, economic activities and facilities will be minimized. Finally, habitats will primarily be allowed to change and function through natural processes. The final document and summary were made available on the Internet on November 14. One may view and download the Record of Decision and the Final Plan online at: <http://alaska.fws.gov/nwr/planning/plans.htm>.

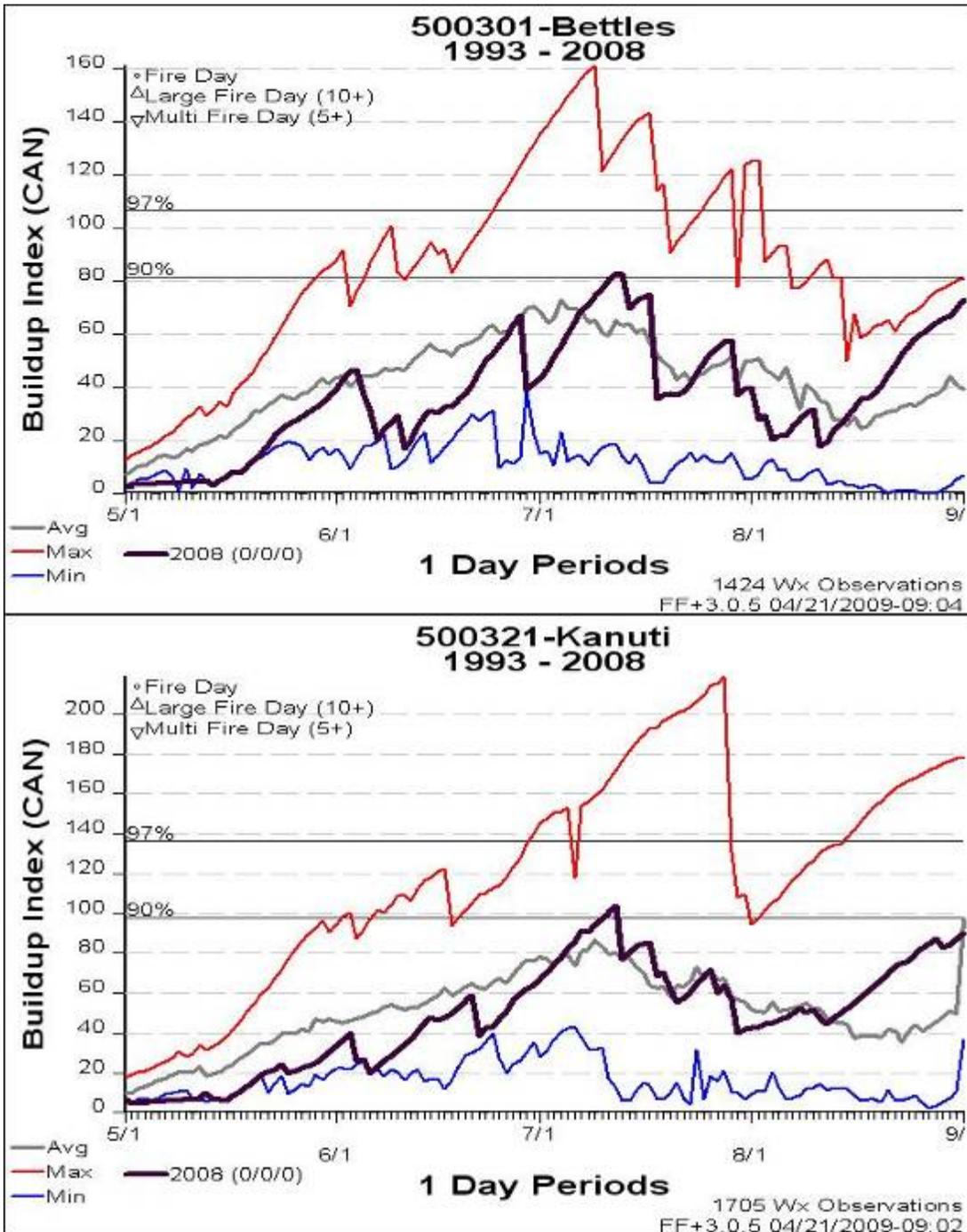
Fire Management

Kanuti was selected as a prototype in FY08 for the Wildland Fire Decision Support System (WFDSS). WFDSS will be the new national fire reporting and decision support database for all agencies which should be in full production for the FY 09 fire season. Kanuti and Browns Park NWRs were the only refuges in the nation with the opportunity to use the new database. The system was not used for Kanuti on any live fires due to the lack of fires, but staff was able to access the system and create mock fires. During FY08 the WFDSS system was incomplete but a few suggestions for the product were forwarded to the national WFDSS steering committee.

The hard copy fire reports and other various fire support documentation were all filed and organized. Fire documents dated back to the 1940s and were labeled in files and organized by year. All fire reports dating back to 1980 were entered into the Fire Management Information System (FMIS). FMIS is used for several reporting exercises and the information is used in FIREBASE which is the current funding and allocation system for fire management for the Fish and Wildlife Service.

The historical climatological data for the Kanuti Remote Weather Station (RAWS) was archived from the Kansas City Fire Access Software (KCFAS). The data were then entered into a fire behavior prediction data base named Fire Family Plus. Fires were also entered into Fire Family Plus from FMIS, and historical runs were then produced to determine trends, historic occurrence, climate influences on fire behavior, and indices. The data can be shown in a graphical form and chart form to ease the learning curve for staff not familiar with fire indices. The historical weather used for the Kanuti RAWS

was mostly incomplete but valid from 1993 to present with 1,591 weather observations. The Bettles RAWS also used data from 1993 to present with 1080 weather observations. The BUI or Buildup Index uses actual weather data to predict potential for large fire growth. Examples of BUIs for May through August 2008 for Bettles (Fig. 13) and Kanuti (Fig. 14) RAWS are shown below.



Figures 13 (top) and 14. Buildup indices for May–August, 2008, based on Bettles and Kanuti RAWS. The model indicates that 2008 (purple line) was average to slightly below average in terms of fire danger buildup.

Continued Wildland-Urban Interface (WUI) fuels reduction project in Evansville

June 2008 marked the completion of a three-year WUI fuels reduction project in Evansville. When additional WUI funds became available in July 2007 for continuing work, the existing contract with the Evansville Tribal Administration was extended to enable the thinning of 15 additional acres in and around Evansville in spring 2008. The project continuation was made possible because of the prior performance by Evansville in meeting WUI target goals and remaining within budget. In total, 58 acres were treated in accordance with national Firewise principles in Evansville and the adjoining community of Bettles during the three year project (2006–2008). This included creation of a shaded fuels break at the north end of Evansville, thinning around all public structures in Bettles and Evansville. The project included Firewise treatment around every residence in which owners requested assistance, in the two adjoining villages.

Invasive Species Management

Invasive Weed Pull on Dalton Highway

At its nearest point, the Kanuti Refuge lies just eight miles west of the Dalton Highway, the road that leads from Fairbanks north to Prudhoe Bay. At least six Koyukuk River tributaries cross the highway and later enter the Refuge. Kanuti Refuge staff and our cooperators are increasingly concerned that these waterways (Middle Fork Koyukuk, South Fork Koyukuk, and Jim rivers; Fish, Prospect, and Bonanza creeks) could become routes for dispersal of invasive white sweetclover (*Melilotus alba*) into the refuge. This non-native plant readily invades open and disturbed areas and has become established in extensive areas along many roadsides and even some river gravel bars in interior, south-central and southeast Alaska. White sweetclover has rapidly colonized the Dalton Highway corridor near the Refuge, moving 120 miles northward between 2000 and 2007.

Since 2006, The Friends of National Wildlife Refuges (Friends) have cooperated annually with Kanuti Refuge, the Bureau of Land Management (BLM), the National Park Service, Alaska Department of Transportation, Alyeska Pipeline Service Company and others to control white sweetclover at key sites where it could easily disperse into the refuge. To the best of our knowledge, the Refuge currently is free of highly invasive non-native plants. To date, control efforts have focused primarily on manual pulling. This year crews of volunteer weed warriors continued removing plants manually, but expanded the effort to include using weed trimmers, with the goal of eliminating 2008 seed production. The expanded effort required that infested areas be visited twice during the growing season in June and July. The first effort was undertaken earlier than in previous years, to better target seedlings. By late July, two crews of 13 Friends members and agency staff successfully achieved their goal— removing all outlying flowering plants at river crossings between the Kanuti River and Coldfoot.

As a result of these annual weed pulling events, white sweetclover infestations have been reduced at the target sites along the Dalton Highway. In addition, refuge staff conducted surveys along rivers downstream of the highway and within Kanuti Refuge. They report that the plant had not spread down drainages and into the Refuge. The war against invasive white sweetclover is not over; these dedicated partners plan to continue pulling

the weed at river crossings annually to prevent its spread. Knowing that their labors are paying off is providing incentive and new enthusiasm to the effort to keep sweetclover out of pristine refuge lands.

This year BLM also started developing a formal weed management plan for the Dalton Management area, holding public meetings in communities that will be affected if white sweetclover colonizes habitat in their area. It is hoped that this plan will incorporate a large-scale integrated approach that may include potential use of herbicides and other methods for controlling non-native, invasive plants.



“Friends” volunteers pull invasive weeds along the Dalton Highway. (USFWS photo)

Jim River South Fork, Koyukuk River Float Trip

As part of the Refuge’s continuing effort to monitor the possible incursion of invasive weeds onto the Refuge via its waterways intersecting the Dalton Highways, Refuge Manager (RM) Spindler, Deputy RM Fox, and Park Ranger Reakoff floated the Jim River, South Fork, and Koyukuk River from the Dalton Highway to Allakaket August 5–11, 2008, checking particularly along gravel bars and disturbed areas. No significant invasive weeds were found on the refuge proper during this trip. We found lambs-quarter (*Chenopodium alba*) to be common in a few spots on the river bank at the Jim River put-in point; however, only one small group of the species was found at the mouth of Fish Creek. Fortunately, no evidence of white sweetclover (*Melilotus alba*) was seen on the numerous gravel bars that were checked on this trip, even though it has completely infested the Dalton highway crossings of the Jim River. Other purposes of the float are detailed starting on page 48 and 70 in the Public Access and Wildlife Observation sections, respectively.

Intra- and Interagency Cooperation

Cooperative moose work

Fieldwork for a cooperative moose telemetry project involving Kanuti Refuge, Gates of the Arctic National Park and Preserve, and ADF&G was initiated in March 2008. Planning for the project got underway following cancellation of fall moose surveys due to insufficient snow in 2006. See pages 36–38 in the Research Studies and Investigations section for details about the project.

Cooperative shorebird research

The surprising discovery in May/June of locally high numbers of large shorebirds (i.e., Whimbrels and Hudsonian Godwits) breeding near the Kanuti Lake cabin led to a cooperative research project with U.S. Geological Survey (USGS) shorebird researchers. Telemetry research into the species' migrations will begin in June 2009. The proposed field crews include both USGS and Kanuti personnel. In August 2008, the Refuge facilitated the purchase and storage of fuel for the proposed helicopter work. See pages 22–24 for background details that led to this partnership.

Dragonfly challenge cost share grant

WB Saperstein was awarded a challenge cost-share grant to promote odonate (dragonflies and damselflies) outreach in interior Alaska and to conduct collecting trips to document odonate distribution. A full description of the project can be found on pages 27–30 in the inventory and monitoring section. The following agencies, organizations, and individuals were involved in the project: Kanuti, Tetlin, and Koyukuk Refuges, John Hudson, Bob Armstrong, Pauline Strong, Friends of Creamer's Field, ADF&G, University of Alaska Fairbanks, Fountainhead Development, Nancy and Jim DeWitt, Alaska Bird Observatory, Friends of Alaska National Wildlife Refuges, Fairbanks Soil and Water Conservation District, Arctic Interagency Visitor Center, and Alaska Geographic. Not all of these participants were listed as official cooperators on the grant agreement; some became involved after the agreement was developed, and other federal government entities were not listed as partners as their efforts did not contribute matching funds.

Gates of the Arctic National Park and Preserve Patrol

Biological Technician Zulueta spent a week in the Brooks Range with National Park Service rangers helping conduct backcountry patrols August 19–26.

Refuge Details

Subsistence Coordinator Brown completed a 30-day detail (November 2 – December 5) in the National Wildlife Refuge System Budget Office in Washington, D.C. During her detail opportunity, she was involved with compiling information for several data requests, including gathering data on historical construction funding that can be used to justify an increase in future year funding. She also worked on a project for infusing funding into local economies through Refuge System projects. Finally, she learned the process of researching and resolving prior year projects with outstanding balances (undelivered orders).

WB Saperstein traveled to Honolulu, HI, August 17–24 for a shadow detail required as part of her “Stepping Up to Leadership” course. She shadowed Jerry Leinecke in Refuges and Marilet Zablan in Endangered Species.

Invasive Weed Pull on Dalton Highway

The Refuge maintained its partnership with the Friends of National Wildlife Refuges, the Bureau of Land Management (BLM), the National Park Service, Alaska Department of Transportation, Alyeska Pipeline Service Company, and others to control non-native invasive plants (primarily, white sweetclover) along the Dalton Highway. A full description of the project can be found on pages 43–44 in the Invasive Species section.

Water Rights Process

Hydrologists from the Water Resources Branch in Anchorage installed seven stream gages on or near the Refuge. See pages 9–11 in the Hydrology Review section.

Tribal Cooperation

Contracted Rural Representative

2008 was the second year in which Kenneth Bergman served as a contracted liaison between the Refuge and the Allakaket Tribal Council. Kenneth helped schedule and arrange village meetings, disseminated educational and outreach materials, and conducted subsistence harvest surveys. We believe contracting for these services is a “win-win” situation for all involved because it provides a local-hire job in the village and provides rural representation for the Refuge at a reduced cost to the taxpayer. The 2-year contract will be due for renegotiation in September 2009.

Allakaket Health and Career Fair

On April 17, Park Ranger Reakoff represented the Refuge at the annual Health and Career Fair in Allakaket where she provided a host of information about career opportunities with the Fish and Wildlife Service. Allakaket residents are familiar with Refuge staff from village meetings and school visits, but parents and students alike really enjoyed the opportunity to visit in the fun and informal setting that the Fair provided. Kanuti’s participation in this event and others like it strengthens relationships between village residents and Refuge staff, providing a positive way for to interact with the community.

Subsistence harvest surveys

Contracted Rural Representative, Kenneth Bergman, again conducted household surveys of waterfowl harvest in Allakaket and Alatna on behalf of the Refuge. Bergman similarly conducted the household interviews for mammal (big game and furbearers) harvest in these villages. Survey methods and results appear in Subsistence section (pages 63–66).

Moose hunts

In addition to the general-season State hunts, Refuge Manager Spindler authorized three bulls-only moose hunting opportunities available for federally qualified subsistence hunters in 2008. (See pages 59–60, Subsistence section)

Henshaw Creek and Allakaket Science Camps

Refuge staff cooperated with the Tanana Chiefs Conference (TCC), Allakaket Tribal Council, “Friends of Alaska Refuges” group, Alaska Department of Fish and Game (ADF&G) and Fairbanks Fish and Wildlife Field Office (Fisheries) to conduct the second annual Henshaw Creek Science Camp. Due to the popularity of the science camp last year, an additional three-day science camp was held this year in Allakaket immediately following the science camp held at the Henshaw Creek weir. See further details in Environmental Education section, pages 73–74.



A “Friends” volunteer assists children attending the Allakaket Science Camp.
(Photo by K. Reakoff)

Permits

In 2008, three special use permits were issued to conduct commercial air taxi/transporter operations. The Refuge receives only 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.

Public Access

Jim River South Fork, Koyukuk River Float Trip

Refuge Manager (RM) Spindler, Deputy RM Fox, and Park Ranger Reakoff floated the Jim River, South Fork, and Koyukuk River from the Dalton Highway to Allakaket August 5–11, 2008. One of the main purposes of the float was to familiarize refuge staff with one of the most straightforward and economical ways of accessing Kanuti NWR from the Dalton Highway. This trip was made with one folding Ally pack canoe and one inflatable Aire-lynx kayak. Water levels were just about perfect for the float. Rains earlier in the week had raised water to levels slightly above the normal summer level. Through the trip levels were declining gradually and turbidity in the water was clearing up. For comparative water level data, at the time we started this trip the Koyukuk River stage at Bettles was 10.8 ft and Slate Creek at Coldfoot was 14.5 ft.

Most of the trip is benign class I water. The crew found the most challenging water to be through the Jim River canyon, where there are some Class II riffles that adept canoeists can handle at normal water level. Also the confluence of the Jim River and the South Fork was somewhat tricky due to strong cross-currents in the meeting channels. Otherwise the only hazards are sweepers. The first half of the trip through the middle South Fork is essentially a wilderness trip, with very little evidence of human use such as cabins or campsites. A few exceptions were some trash found on a north bank gravel bar just down from the Jim/South Fork confluence (where in the past airboat moose hunters have camped). We picked up a blue plastic bucket but left a large cable spool stool. Other trash picked up along the way included a blue tarp and some scattered plastic bottles and cans. There are some subsistence camps on allotments along the lower South Fork and Koyukuk River.

The Jim River, South Fork, and Koyukuk River float is perhaps one of the most economical ways for the public to visit and experience Kanuti Refuge. Assuming the recreationists already have their own folding or inflatable canoe or kayak, this trip can be done for the cost of a drive up the Dalton Highway, a week's worth of food, and the commercial airfare from Allakaket to Fairbanks.



A beautiful evening along the South Fork Koyukuk River (Photo by J. Fox)

Administration

Budget

Fiscal year 2006 saw a change in the organization of funding, making comparison with previous years problematic. Thus, 2006–2008 funding figures are given separately from the previous five years (Table 9).

	<u>Year 2006</u>	<u>Year 2007</u>	<u>Year 2008</u>
Refuge Operations (1261)	611,000	642,000	645,000
Maintenance (1262)	281,000	36,000	38,000
Visitor Services (1263)	399,000	403,000	384,000
Law Enforcement (1264)	4,000	4,000	5,000
CCP Planning (1265)	45,000	93,000	10,000
Subsistence (1332/1335)	26,000	26,000	26,000
Fire (9131/9264)	256,000	181,000	198,000
Quarters (8610)	0	0	3,000
Construction (Bettles Bunkhouse)	<u>0</u>	<u>1,267,000</u>	<u>0</u>
Total Funding	\$1,623,000	\$2,652,000	\$1,309,000

Table 9. 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

Notable staff changes in 2008 included (see also Table 10):

On April 16, Fairbanks-based refuge managers, deputies, and administrative staff met to re-evaluate our combined administrative program. Managers and administrative staff concluded that some restructuring was needed to: 1) improve efficiency; 2) increase flexibility in establishing refuge-specific priorities; 3) discontinue Kanuti Refuge’s subsidization of Arctic and Yukon Flats Refuges’ administrative operations (salary, training, supervision, administrative equipment and office supplies); and 4) reduce the amount of time the DRM Fox spends on tri-refuge administrative program supervision and coordination and increase her focus upon Kanuti-specific duties which are critically important for the small staff. It was decided that we would collectively gain efficiencies by dissolving and reprogramming the administrative team as follows:

- reassign Administrative Support Assistant (ASA) **Lorna Young** to Arctic Refuge, to be supervised by DRM Jimmy Fox;
- reassign ASA **Kimberly Robinson** to Yukon Flats Refuge, to be supervised by DRM Barry Whitehill;
- ASA **Louis Maloney** will remain assigned to Kanuti Refuge, but will be supervised by DRM Joanna Fox; and
- Administrative Officer (AO) **Almeda Gaddis** will remain assigned to Kanuti Refuge as a position shared among all three stations, with major duties in contracting, coordination of financial administration, and human resources. The PD for the Administrative Officer will be revised to reflect the new positive education requirements mandated for all warranted contracting officers, the decreased supervisory duties, and the increased coordination duties.

Seasonal Biological Technician **Rebecca Zulueta** was hired in mid-May and retained through mid-December, assisting both the biological and fire programs.



Biological Technician Zulueta helped the biological and fire management programs catch up with copious data entry. (Photo by L. Saperstein)

Fire management specialist **Sam Patten** was assigned to Kanuti Refuge (from Yukon Flats NWR) on October 1, 2008. His position still remains shared among all three Fairbanks-based refuges.

Table 10. 2008 Kanuti NWR Staff (includes permanent, intermittent, shared, and seasonal, 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 (Lead)	09/27/98	
Chris Harwood Wildlife Biologist	03/10/03	
Lou Maloney Administrative Support Assistant ¹	11/15/04	
Kristin Reakoff Interpretive Park Ranger ²	03/18/07	
Doug Holton Maintenance Worker ³	03/18/07	
Chase Marshall Fire Management Officer ⁴	07/10/07	
Sam Patten Fire Management Specialist ⁴	01/13/02	
Almeda Gaddis Administrative Officer ⁴	10/26/97	
Laurel Gale ⁴ Office Automation Clerk	05/27/08	
Wennona Brown Subsistence Coordinator ⁵	12/30/01	
Nancy Reagan Information Technology Specialist ⁶	10/05/03	
Adam Sporluck Information Technology Specialist ⁶	12/10/07	
Lorna Young Administrative Support Assistant ⁷	10/21/03	
Kimberly Robinson Administrative Support Assistant ⁷	10/21/03	
Rebecca Zulueta Biological Technician	05/19/08	12/19/08

¹ position hosted by Kanuti NWR; originally shared by 3 refuges but moved to Kanuti only on October 1, 2008

² position is local-hire, permanent, part-time

³ position is local-hire, term intermittent

⁴ position hosted by Kanuti NWR, but shared with Arctic and Yukon Flats NWRs

⁵ position hosted by Yukon Flats NWR, but shared with Arctic and Kanuti NWRs

⁶ position hosted by Arctic NWR, but shared with Kanuti and Yukon Flats NWRs

⁷ position originally hosted by Kanuti NWR and shared with Arctic and Yukon Flats NWRs; begun hosted by and only serving Arctic (Young) and Yukon Flats (Robinson) on October 1, 2008

Volunteers and Interns

In Fiscal Year 2008, 26 volunteers provided 2,936 hours of assistance to our wildlife and habitat, maintenance, environmental education, and other programs. The work of the Refuge greatly benefited from the significant efforts of these volunteers and interns in 2008:

- **Luke Smithwick** (below) volunteered 47 days with Kanuti NWR in spring 2008, amassing some 500 hours as a field assistant at our remote administrative cabin on the Kanuti River. In addition to his invaluable assistance in all of the bird-related work near the cabin, Luke's exhibited passion, aptitude, and commitment to photographically document all aspects of the crew's visual experience out there (wildlife, habitats, hydrological events, etc.). In all he donated some 4,000 (over 37 gigabytes) digital images for the Refuge to use.



- **Leonard Perkey** served as an intern with the Refuge from January 29 – May 29. Leonard, an exchange student at the University of Alaska Fairbanks, was slated to earn three credits for working eight hours per week at Kanuti. Leonard's primary project was to organize the refuge's backlog of digital photos and enter them into a digital photo library.

- **“Friends of Alaska National Wildlife Refuges”** (below) assisted in the BLM-sponsored weed pull along the Dalton Highway (8 individuals; see page 43), as well as the science camp efforts (2 individuals; see page 73).



- **“Friends” Mary Frische and Tom Collopy** (below) of Wild North Photography volunteered in April (240 hours each) as part of the crew “springing out” at the Kanuti Lake cabin. Their donation of many professional-grade images of wildlife to Kanuti’s CCP, newsletters, biological reports, and this narrative has been invaluable.



- **John Hudson** (below, top photo with orange hat), and **Bob Armstrong** and **Pauline Strong** (bottom photo) volunteered for the dragonfly challenge cost share project. John and Bob donated a total of 90 hours (50 and 40 hours, respectively) in addition to a total of 120 paid hours. Pauline volunteered for about 64 hours. Volunteer work included giving public presentations and helping with other outreach events, photography, dragonfly collecting activities, identification of specimens, dragonfly identification training, and writing reports.



- Interpretive Park Ranger **Joyce Potter** volunteered for a second season at the Arctic Interagency Visitor Center (AIVC) in 2008. Her responsibilities included: providing travel and recreation planning information to visitors; monitoring visitor use and collecting data; providing information about the natural and cultural resources of the Arctic; conducting sales and assisting with ANHA outlet inventory; and advising visitors about safety, fire prevention and proper use of public lands.

- Volunteers **Erv Nichols** and **Sandra Noll** (below) helped staff the AIVC for a three-week period in August. Erv and Sandra, both Certified Interpretive Specialists, provided interpretive programs at the AIVC; instilling in visitors an understanding appreciation and connection to the Arctic, including nearby Arctic, Kanuti and Yukon Flats NWRs, and Gates of the Arctic National Park and Preserve.



Awards/Recognition

Refuge Manager Spindler received the prestigious Regional Director's "Management Excellence Award" on March 20, 2008. In "Life Imitates Nomination," while flying a radio telemetry flight to locate recently collared moose, Mike stopped briefly in Coldfoot to call into the ceremony and find out about his award. Mike's nomination read as follows:

Despite Kanuti being known as the "quiet little refuge," Refuge Manager Mike Spindler's dedication and contributions are in no way quiet or small! With only four of Kanuti's eleven positions dedicated exclusively to the Refuge (seven positions are shared with Arctic and Yukon Flats Refuges) and a refuge

encompassing 1.6 million acres, Mike's myriad talents and tireless efforts are integral to the successes of the Refuge.

As the Refuge's only pilot and a former wildlife biologist, Mike participates in nearly all of Kanuti's biological surveys. He provides air logistical support for ground-based projects, flies most of the Refuge law enforcement patrols, and is single-handedly responsible for airplane maintenance and scheduling.

Mike is a strong advocate for local, rural residents who are the primary users of the refuge and whose subsistence lifestyles depend on the health of Refuge resources. His commitment to keeping in touch with the Refuge and people who use it shows in his actions and words. He states that "...the biggest challenge, is to keep in touch with the people who use the refuge," and to that end attempts to fly somewhere in the refuge at least monthly in the winter and weekly in the summer. He regularly attends both State and Federal subsistence meetings, and is actively engaged in improving relationships with communities near the Refuge.

*Mike leads by example, and is an exceptional role model for his staff. He ardently supports the professional development of each and every co-worker, going the extra mile to provide valuable opportunities and encouraging advice. Recent analysis of Kanuti's organization chart points out one major thing: if Mike were not the refuge manager (**and** pilot **and** biologist, and....), we would need a lot more FTE's!!! Mike keeps his eyes and feet – and ours too – on Kanuti's resources; he's no absentee manager.*

Professional Development

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

- Subsistence Coordinator Brown: Leadership Challenge Workshop, Applying Collaboration to Environmental Issues training
- Deputy Refuge Manager Fox: Leadership Challenge, Fire Management for Line Officers
- Administrative Officer Gaddis: Contracting and Warrant classes, Employees Foundations, Admin workshop, finished two degrees in Business
- Wildlife Biologist Harwood: Alaska Bird Conference, Alaska Shorebird Group meeting, Boreal Partners in Flight meeting
- Park Ranger Reakoff: Refuge Information Technician Workshop
- Wildlife Biologist Saperstein: Fire modeling workshop, Stepping Up To Leadership, Region 7 Conceptual Model Workshop.
- Refuge Manager Spindler: Leadership Challenge course, Flight Instructor Certification, Intermediate white-water canoeing

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-local peoples. 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 aligned, 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).

Concerns/Issues

- Low moose populations; high number of wolf kills
- Fish net size
- High air traffic during hunting season
- Moose harvest reports do not accurately reflect need in villages
- Illegal guiding
- Global warming affecting resources – whitefish declining possibly as a result
- High gasoline prices

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.

2) Fuel costs

High gasoline prices in the villages continued to limit hunting, fishing, and trapping opportunities for subsistence.

3) Poor salmon runs

Area residents continued to note concerns about the decline in fish size and abundance. Relatedly, they also expressed concern about the use of larger mesh size (i.e., tends to select for larger fish) by salmon fishers elsewhere.

4) Global warming affecting resources

Some residents have expressed concern that warming trends are affecting game, particularly moose, movements (i.e., making game less accessible to hunt) and are possibly causing a decline in whitefish.

Big Game Harvest and Hunting Regulations (Subsistence)

Moose is the most important subsistence wildlife species on the refuge, yet moose numbers have been low and moose hunting has become increasingly challenging. In response special moose hunting regulations have been in effect on Kanuti Refuge since the 1980s and 1990s. 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.

Besides the general-season State hunts, September 1–25 and December 1–10, there were three additional moose hunting opportunities available for federally qualified subsistence hunters in 2008: September 26 – October 1, and March 1–5 with an extension March 8–10. The Refuge contracted with the Tribal Council in Allakaket to hire Rural Representative Kenneth Bergman to issue federal fall subsistence moose hunter permits and collect harvest reports for these seasons. Seventeen federal permits were issued in

Allakaket/Alatna for the extended season, September 26 – October 1 on Kanuti Refuge. A total of 13 moose was harvested by local village hunters in the fall hunt (Table 11) and 18 were harvested by non-local hunters (resident Alaskans and non-residents). All reported moose harvest occurred during the State general hunt September 1–25, with no harvest occurring on the special federal subsistence hunts. According to Kenneth Bergman’s, telephone poll in Allakaket and Alatna five people participated in the State’s December 1–10 general season, hunting an average of 2.4 days but no moose were harvested.

Under the discretionary authority granted by the Federal Subsistence Board (FSB) in 2005, Refuge Manager (RM) Spindler, in conjunction with the Gates of the Arctic National Park/Preserve Superintendent and the Central Field Office Manager of BLM, closed the 2008 fall cow moose season, consistent with State and other federal managers’ actions. Because of low moose harvest in the fall and lack of caribou through the winter, RM Spindler, in consultation with land managers and stakeholders, opened the discretionary March 1–5 season in 2008. Extremely cold temperatures, persistent throughout the Interior in March, largely discouraged and/or hampered hunting during the week of the hunt; no hunters were successful. This precipitated an official request from Allakaket Tribal Council to extend the hunt. The Federal Subsistence Board granted an additional hunt March 8–10. Interest and effort in the March hunt declined in 2008, most likely because no one has been successful in two years. Only 9 hunters actually hunted during either or both of the hunts, with their efforts ranging from 1–5 days (average days hunted per hunter who went to the field = 2.6).

Table 11. Reported moose hunting activity by Allakaket and Alatna residents according to State harvest ticket records, Federal permits, and household surveys during the September and December general hunts).¹

Year	2006	2007	2008
Moose Harvested	12	18	13

¹Only years that include household harvest surveys are presented in order to maintain consistency.

In 2008, the Western Interior Regional Advisory Council (WIRAC) took action on two statewide and two regional proposals that would affect hunting in the Kanuti Refuge. The statewide proposals and actions are listed below:

- **WP08-01** – Proposal requests that closing dates of wolf hunting and trapping seasons statewide be extended to May 31 and the harvest limit be extended to 10/day between 4/1-5/31, and remove restrictions to disturbing/destroying wolf dens. The Council discussion centered on fur condition during proposed extension not being prime, wasteful to take animals when there’s no use for them. Motion was to support proposal. *Vote: fails unanimously (oppose proposal).*
- **WP08-05** –Proposal requests removal of all unit-specific regulations related to statewide sale of brown bear handicrafts made of skin, hide, pelt or fur, and that sale of brown bear handicrafts made of claws, bones, teeth, sinew or skull should

occur only between federally qualified subsistence users. The Council deliberations centered on fact that while they are personally opposed, they did not want to disallow opportunities that are within the cultural traditions of other regions, and if no evidence of abuse has been documented, then why limit. Motion was to support proposal. *Vote: 1 aye, 8 opposed; motion fails (oppose).*

The two related regional proposals and actions are listed below:

- **WP08-52 and 53** -- Both North Slope and Northwest Arctic requested the addition of Unit 23 to list of areas from which brown bear handicrafts can be sold. North Slope requested addition of Unit 24B and 26 to the list. Discussions centered on individual regions choosing whether to allow sale of bear handicrafts from their region, and while WIRAC doesn't feel appropriate for this region, would support other regions right to choose. Proposals voted on separately *For WP08-52 motion to adopt because it was submitted by home region. Vote – proposal passes unanimously. Proposal WP08-53 – motion was to defer to home region with modification as recommended by Gates of the Arctic SRC to exclude Unit 24B. Vote – passes unanimously.*



The annual WIRAC meeting was held in Fairbanks in late February. (Photo W. Brown)

Board of Game Proposals

The Board of Game also met in 2008 to consider proposals that would affect hunting in the Interior Alaska Region. Four proposals that could affect the Kanuti NWR area were under consideration. These proposals and actions are listed below:

- **Proposal 59** – WIRAC proposal, to hunt on Native lands within Kanuti CUA to Oct. 1; Council noted that Federally managed lands in Kanuti CUA are closed to

non-federally qualified subsistence users. Little Council discussion because follows same concept as previous proposals. Motion was to support proposal. *Vote – passes unanimously.*

- **Proposal 78 and 79** – black bear proposals – Proposal 78 would allow taking bears in dens and 79 would allow using artificial light. Council discussion centered on need to provide for customary harvest methods, which indicated need for a C&T determination, but there is no resource allocation issue that would necessitate a C&T determination. Motion to request a C&T use determination to take sows with cubs in dens and also to use artificial light in Units 21 and 24. *Motion passes unanimously.* Motion was to support Proposal 78 (bears in dens). *Vote – passes unanimously.* Motion was to support Proposal 79 (use of artificial light). *Vote – passes unanimously.*
- **Proposal 85** – lengthening sheep season this gives resident hunters in Units 24, 25, 26B, and 26C (plus others) longer season. Not a lot of discussion; some on the need to provide more opportunity for local residents. Motion was to support the proposal. *Vote: passes unanimously.*



The Refuge re-initiated its mammal harvest surveys to in part better elucidate local take of furbearers. This “cross” fox here consumes a vole. (Wild North Photography)

Subsistence mammal harvest survey

Rural Representative Kenneth Bergman of Allakaket conducted a new survey for the Refuge in 2008 looking at mammal (big game and furbearer) harvest in the nearby villages of Alatna and Allakaket. The harvest period spanned July 1, 2007 through June 30, 2008. Survey participation by village households was generally excellent. Bergman contacted, surveyed, and completed forms for all 9 of the existing occupied households in Alatna (2 houses currently unoccupied). Of the 52 houses in Allakaket, Bergman contacted and surveyed 50 households (2 houses currently unoccupied). Of these 50, harvest forms were completed for 39. Early in the survey, actual forms were unfortunately not completed for 11 participating households that reported not hunting or trapping during the 12 months; this oversight in methodology was later rectified.

In Alatna, only 3 of 9 participating households reported attempting to harvest moose; none reported success. Only 1 household reported attempting to trap; 4 beaver were harvested.

In Allakaket, 3 households reported successfully hunting moose, while 16 reported attempting without success. Only 1 household reported attempting to hunt black bear; it was not successful. Only 1 household reported attempting to hunt caribou; it harvested 2 outside the Refuge north of Hughes. Twenty households reported no attempts to hunt big game. Eight households reported some trapping success, harvesting the following furbearers: 4 wolves, 1 red fox, 3 lynx, 19 marten, and 77 beaver. All reported having trapped within the Refuge. One household reported trapping with no success, while 30 reported no attempts to trap.

Fishing Harvest and Regulations (Subsistence)

In 2008, Alatna residents harvested an estimated (i.e., actual numbers expanded for entire village harvest) 16 Chinook, 66 summer chum, 0 fall chum, and 0 coho salmon.

Allakaket residents harvested an estimated 4,784 salmon, with the following breakdown: 58 Chinook, 3,229 summer chum, 1,345 fall chum, and 152 Coho. Bettles and Evansville residents had no reported salmon harvest (D. Jallen, Commercial Fishery Management Biologist, ADF&G, Fairbanks, personal communication). Estimated harvest of fish other than salmon in Koyukuk River villages for 2005–2008 is presented in Table 12. No data were reported for Evansville.

By regulation, subsistence salmon fishing is open in the Koyukuk River drainage 24 hours per day/7 days per week. Fisheries biologists described the 2008 Chinook salmon fishing season as late in timing, and below average in run strength. The Chinook salmon fish passage was about 130,600, about equal to the 2007 run estimate. The summer chum run was estimated at 1.6 million fish, near the historical average. The fall chum run was near average in run timing, with estimated season total of about 730,000 fish. Because of the poor Chinook returns, no commercial fishery was allowed; after the mid-point of the run, some directed chum commercial fishing was allowed. To allow for escapement, subsistence fishing was restricted as the run moved upriver, with window openings cut in half to protect the run. Many subsistence fishermen stated that they had to work harder to meet their needs, and many failed to meet their needs.



Drying chum salmon at Allakaket (Photo by K. Reakoff)

The Federal Subsistence Board (FSB) again deferred action on the Yukon River proposals submitted for the 2008 fishing season; therefore, the Western Interior RAC did not have the opportunity to review and vote on them at their fall fisheries meeting.

Table 12. Non-salmon fish species harvested by the Koyukuk River villages, 2005–2008. (* = expanded to estimate village harvest; ** = reported harvest [not expanded])

Village	Whitefish *	Pike *	Sheefish *	Grayling **	Burbot **	Suckers **	Arctic Char**	Total
2005¹								
Allakaket	2,340	619	480	174	208	572	1	4,394
Alatna	100	8	0	20	0	6	0	134
Bettles	0	0	6	6	0	0	4	16
2006²								
Allakaket	7,318	480	875	23	1	0	10	8,707
Alatna	160	40	76	0	0	0	0	276
Bettles	0	4	0	23	0	0	3	30
2007²								
Allakaket	2,487	234	582	441	138	110	0	3,992
Alatna	0	0	0	1	0	0	0	1
Bettles	0	26	16	15	0	0	15	72
2008³								
Allakaket	2,237	276	547	100	0	6	0	3,166
Alatna	35	0	0	0	0	0	0	35
Bettles	0	3	6	6	0	0	20	35

¹Data from Busher et al., 2007

²Data from W. H. Busher, ADF&G, commercial fishery management biologist, Fairbanks, personal communication.

³Data from D. Jallen, ADF&G, commercial fishery mgmt., Fairbanks, pers. comm.

Waterfowl Harvest and Hunting Regulations (Subsistence)

In 1997, the Migratory Bird Treaties with Canada and Mexico were amended to officially recognize and legally sanction Alaska's traditional spring/summer subsistence waterfowl 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. Subsistence Coordinator Brown serves on both the AMBCC's Communication Outreach Committee and the Harvest Survey Technical Committee. Also under the terms of the amendment was the requirement to regularly monitor subsistence waterfowl harvest through village harvest surveys. To that end, the Refuge entered into an agreement with village of Allakaket that provides a local resident to conduct regular waterfowl harvest surveys.



“Lesser” Canada Geese. (Photo by L. Smithwick)

Waterfowl Subsistence Survey

For the second year in a row, Rural Representative Kenneth Bergman of Allakaket was tasked to interview Allakaket and Alatna households about waterfowl/waterbird harvest following the spring (April 1 – June 30) and fall (September 1 – October 31) hunting seasons. Bergman was advised not to interview residents following the summer period (July 1 – August 31) given that neither village has any tradition of summer waterfowl hunting. Bergman employed standard USFWS subsistence household survey methods and forms.

Survey participation by village households was generally excellent. Bergman formally contacted and surveyed (i.e., asked for permission and filled out forms for) 43 (of 52) Allakaket and 9 (of 11) Alatna households. No households that were asked to be interviewed declined permission. Two houses in Alatna were unoccupied. Nine households/houses in Allakaket were either unavailable to interview, not interviewed

though present (e.g., family with no hunting history), or unoccupied.

In Allakaket, 15 of 43 interviewed households reported some harvest of birds during the spring season. Residents reported take of 548 birds of 15 species. In Alatna, 2 of 9 interviewed households reported harvest of 21 birds of 4 species during the spring. No residents of either village reported any fall harvest. See Table 13 for 2006–2008 totals.

Table 13. Reported waterfowl and Sandhill Crane harvest for the communities of Allakaket and Alatna, 2006¹, 2007², and 2008³.

Season	Species	Alatna 2008	Allakaket 2008	Allakaket 2007	Allakaket 2006
Spring	Greater White-fronted Goose	7	67	37	32
	“Lesser” Snow Goose		2		1
	“Lesser” Canada Goose		76	25	77
	American Wigeon	1	60	30	39
	Mallard	5	69	38	16
	Northern Shoveler		37	12	2
	Northern Pintail	8	44	32	33
	Green-winged Teal		5	9	
	Canvasback		30	17	
	Scaup sp.		30	13	
	Surf Scoter		32	5	2
	White-winged Scoter		32		
	Black Scoter		1		
	Long-tailed Duck		56	24	10
	Sandhill Crane		7		
Subtotal		21	548	242	212
Summer	“Lesser” Canada Goose				1
	Northern Pintail				1
	Sandhill Crane				9
Subtotal					11
Fall	“Lesser” Canada Goose			10	1
	American Wigeon			1	
	Mallard			7	2
	Northern Pintail			2	1
	Canvasback			5	
	Scaup sp.			6	
	Merganser sp.			1	
Subtotal				32	4
Total		21	548	274	227

¹ In 2006, P.J. Simon (Allakaket) conducted harvest surveys for all three hunting periods in Allakaket, Alatna, Evansville, and Bettles. No harvest reported from the latter 3 communities.

² In 2007, Kenneth Bergman (Allakaket) conducted harvest surveys for all 3 hunting periods in Allakaket/Alatna only. No harvest reported from Alatna. No summer harvest done in Allakaket.

³ In 2008, Bergman conducted harvest surveys for the spring and fall hunting periods only in Allakaket and Alatna. There was no reported fall harvest from either village.

Arctic Interagency Visitor Center (AIVC)

Overview

Open May 24 through September 6 (109 days), the Arctic Interagency Visitor Center (AIVC) hosted 9657 visits in 2008. Overall visitation in 2008 (independent and guided visitors combined) increased 2.3%. While independent visitors only increased by 1%, guided visitors increased by 5%. Refuge and Park visitors together accounted for 3% of all AIVC visitors, up slightly from 2007. Attendance at evening interpretive programs increased by 8%. Also of interest; education, scientific and service group visits to the center were up by 33.5% for a total of 510 people, including University of Alaska and other college classes, Scouts, Elderhostel groups, scientists from Toolik Field Station, and others. The Ninth International Conference on Permafrost (NICOP) was held in Fairbanks this year, and a pre-conference field trip up the Dalton Highway brought 40 scientists into the center in June. Since opening the new facility in 2003, overall visitation has continued to increase annually.

New Visitor Center Coordinator Welcomed

Murray Shoemaker was selected to fill the vacant BLM Visitor Center Coordinator position. Before coming to interior Alaska, Murray spent several months working for USFWS on Midway Island starting up a new visitor services program. Before that, Murray had a long and distinguished career at Arches National Park, where he managed the visitor center for many years and also served as Acting Chief of Interpretation.

Dragonfly Day

The first annual Dragonfly Day at the AIVC (see also Challenge Cost Share proposal, pages 27–30), held just after summer solstice, was wildly popular with visitors. Dragonfly expert John Hudson and naturalist/photographer Bob Armstrong, co-authors of the book “Dragonflies of Alaska,” along with Kanuti Refuge staff, traveled to the center for the special event, collecting dragonfly specimens along the way. Activities at the center were designed to introduce kids and adults to the identification and ecology of dragonflies and included evening talks by both Hudson and Armstrong, which were attended by more than 80 people, mostly tourists. AIVC staff are looking forward to hosting the second annual Dragonfly Day in the summer of 2009. Due to the popularity of the event, plans to expand festivities are underway.

New Permanent Exhibit

A custom stand was commissioned for the locked caribou antlers that were donated to the AIVC in 2003. USFWS volunteer Sandra Noll created an interpretive program focusing on caribou and used the new exhibit all summer long during her program. The exhibit and program were both very popular with visitors. She also created a permanent information sheet about caribou that has been added as a permanent addition to the new stand for the locking antlers.



Volunteer Sandra Noll gives an educational program on the new locked antler display at the Arctic Interagency Visitor Center. (Photo K. Reakoff)

Dalton Highway Invasive Weed Pull

For the third year in a row, AIVC staff worked closely with volunteers from the “Friends of Alaska Refuges” group, BLM staff, the National Park Service, Alaska Department of Transportation, Alyeska Pipeline Service Company, Kanuti NWR staff and others to assist the weed pullers who worked tirelessly pulling invasive weeds (white sweetclover) along the Dalton Highway corridor (see Invasive Species Management section, pages 43–44). Visitor center staff helped the weed pullers with logistics, and by answering questions during two separate pulling events.

Wildlife-dependent Recreation and Education



Spring flooding offers challenging backwater conditions for canoeists on the Refuge.
(Photo by L. Smithwick)

Sport Hunting

Harvest

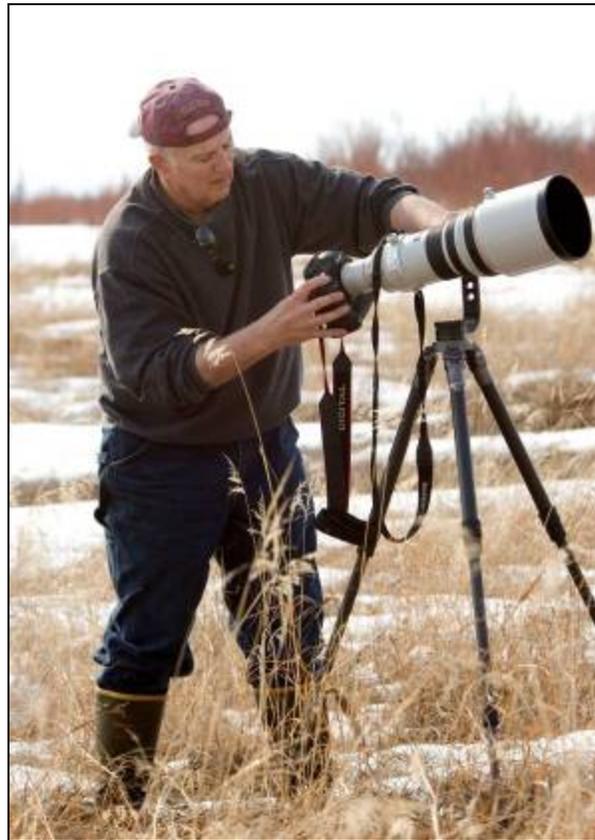
Estimating big game sport harvest (moose, caribou, and bear) on the Refuge is difficult because of the remote nature of the hunts. Hunters are required to submit mail-in harvest report cards for moose and caribou to Alaska Department of Fish and Game (ADF&G) within 15 days of fulfilling a bag limit or 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. In 2008 a total of 18 moose was reported harvested by non-local hunters (resident Alaskans and non-residents) in Unit 24B, which includes most of the refuge and some surrounding areas. 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 2008, three permitted air taxi operators reported transporting eleven clients who harvested a total of three moose in the Refuge.

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.



Wildlife photography can be a challenging, yet ultimately rewarding, pursuit on the Refuge. (Wild North Photography)

Jim River South Fork, Koyukuk River Float Trip

Refuge Manager (RM) Spindler, Deputy RM Fox, and Park Ranger Reakoff floated the Jim River, South Fork, and Koyukuk River from the Dalton Highway to Allakaket August 5–11, 2008. Although the primary purposes of the trip were to check for invasive weeds (see pg 44) and to familiarize refuge staff with refuge access via these waterways (see pages 48–49), the crew made note of the following wildlife observations:

Some of the wildlife highlights of the trip included close observation of a lynx catching a Canada goose on August 7. Large groups of Canada geese with young were seen along the middle and lower sections of the South Fork on August 7 and 8. On August 9 the last part of the South Fork had slack water and the first groups of white-fronted geese along with increasing numbers of ducks, such as mallards and wigeon. Also, several defensive red-tailed hawks were seen along the lower South

Fork. On the same date a Bald Eagle was observed perched on the river bank below the mouth of Henshaw Creek, where numerous spawned-out chum salmon were also observed. On August 10 a family of river otters was observed up close in the main Koyukuk, and another family swam by the camp in the middle of the night, investigating our canoe and kayak along the shore. Also in the main Koyukuk River we observed a few red-throated loons apparently feeding on fish in the main channel. Another major waterfowl area, named Cache Slough by Allakaket residents, is a river-connected oxbow about 5–6 miles above Allakaket. On August 10 large numbers of ducks, including mallard, shoveler, wigeon, green-winged teal, and white-fronted geese were observed, plus least sandpiper and solitary sandpiper, and a short-eared owl hunting. Shotgun shots were heard from the area the night before, and we observed our first group of subsistence hunters (from Allakaket, heading to the slough mouth in the evening). Also observed at Cache Slough were three dragonfly species: sedge darner, spread-wing, and cherry-faced meadow-hawk.



A close-up observation of uncommonly encountered wildlife, like this family of river otters, is one of the benefits of floating the refuge's many rivers. (Photo by J. Fox)

Environmental Interpretation

To date, all environmental interpretation activities have occurred at the Arctic Interagency Visitor Center. They include the following programs:

Boreal Forest Walking Tours

In 2008, Park Ranger (PR) Reakoff expanded the outdoor interpretive walking program to include a route that brings visitors to a sandy river bar near the mouth of Slate Creek. For visitors seeking a longer outdoor experience, visiting Slate Creek is a true wilderness experience and often allows visitors to view waterfowl at close range. Plans by PR Reakoff to expand the tours further to include a wetland area frequented by dragonflies and songbirds (binoculars & field guides provided for visitors) are already in the works for the 2009 season!

Discovery Boxes

Discovery Boxes continued to be enjoyed by visitors for a second year in a row. The boxes contain educational items and activities for families to borrow and use while traveling the Dalton Highway. In 2008, visitor center staff received feedback from many visitors wishing to purchase the items in the Discovery Boxes. Visitors were disappointed to learn the Discover Boxes were not for sale and that the ANHA store did not sell most of the items in the boxes. PR Reakoff hopes to work with ANHA in the summer of 2009 to create new Discovery Boxes that contain only items sold in the ANHA Coldfoot Branch store.

Binocular and Field Guide Program

The Binocular and Field Guide Program continued to be popular with visitors for a second year in a row. While some visitors enjoyed borrowing field guides, most visitors were interested in borrowing only binoculars. The goal of the program is to help visitors deepen their experience while in Interior Alaska. Visitors participating in the program receive information on wildlife viewing tips, leave-no-trace ethics and safety tips for driving on the Dalton Highway and are encouraged to get outside and enjoy the beauty of the wilderness they are visiting.

Just for Kids

A new child-size table and two child-size chairs were added to the inside of the visitor center this summer as a place “just for kids.” Children using the table and chairs were provided with wildlife and bird coloring sheets and crayons, books about the area to view on their own or with parents and board games were also available. Staff noted that children were drawn to the child size table as soon as they entered the building! During the 2009 season, PR Reakoff plans to expand the uses of the children’s area by also offering ranger-lead hands on activities.

Environmental Education

Continuing Education Assistance

Staff from the University of Alaska Osher Lifelong Learning Institute approached Kanuti staff with a request to help teach an adult education class about Alaska’s public lands. Refuge manager Mike Spindler worked with Osher’s director Barbara Landow, to identify local experts conversant about State lands, federal BLM lands, National Park lands, and of course National Wildlife Refuge lands. The month-long class reached over 50 participants who attended weekly two-hour lectures on public lands. In one of the classes Spindler spoke about the National Wildlife Refuge System, Alaska’s federal refuges, and the priority public uses. He was joined by Sue Hazlett from the organization Friends of Alaska National Wildlife Refuges, who spoke about volunteer and support opportunities with her organization. Each of the four classes was followed by a long question and answer period, and many participants lingered well after the end of each class to learn more about Alaska’s public lands one-on-one with the instructors.

Dragonfly Day

Over 300 people attended Dragonfly Day in Fairbanks..See pages 27–30 in the Inventory

and Monitoring section for complete details of events.



People try their luck at catching dragonflies during the Dragonfly Day event at Creamer's Field in Fairbanks. (Photo by Bob Armstrong)

Henshaw Creek Science Camp & the Allakaket Science Day Camp

A few days of cold weather and rain did not dampen the spirits of the 13 students from four villages near the refuge who attended the second annual Henshaw Creek Weir Science Camp on July 20-25. After the rainy start, campers were rewarded with unseasonably warm and sunny weather as they learned about fish ecology and the Refuge. Funded by the Fish and Wildlife Service and overseen by Tanana Chiefs Conference (TCC), the weir is used to monitor numbers of chum salmon making their way upstream to spawn, and is an ideal setting for science education.

Staff from Kanuti Refuge, TCC, and University of Alaska Fairbanks combined forces with a volunteer from Friends of Alaska National Wildlife Refuges (Friends) to provide a diverse array of learning experiences to the students, who were all from the remote villages of Allakaket, Alatna, Bettles and Evansville. The week-long camp included lessons about the weir, salmon life cycles, aquatic insects, fish identification and anatomy, stream ecology, stream physics, nature observation, arctic animal adaptations, fishing, art, and plant identification. Students also learned about the Refuge, which is literally the back yard for the science camp students, their friends and families, who are the primary users of resources within the refuge for their subsistence activities.



Refuge Manager Spindler assisted with instruction at the Henshaw Creek Science Camp.
(Photo by K. Reakoff)

Four long-time residents from Allakaket, elders David and Kitty David and Kenneth and Elsie Bergman, all of whom are very knowledgeable in traditional Native ways, taught traditional subsistence techniques. Participants learned to set fish nets, cut fish for drying and smoking, build a smoke rack without nails or ropes, mend fish nets with needles made out of willows, and traditional beading. The elders were able to bring about a deeper, more holistic meaning to each lesson the students tackled, and their presence was truly enjoyed by everyone. Elders also told traditional stories around the campfire in the evenings, which was wildly popular and a favorite part of the day.

Last year's science camp, the first of its kind in the area, was attended by five students. Due to its initial success, the 2008 camp was opened to more than twice the number of students. Also, a day camp was held in Allakaket for students who did not attend the camp at the weir. Staff and volunteers from Kanuti Refuge, TCC, Alaska Department of Fish and Game and the Friends group provided lessons similar to those presented at the weir camp. The three-day event included a potluck dinner for the entire community of Allakaket, which was followed by a dessert social sponsored by the Friends group.

The two science camps provided opportunity for Kanuti Refuge staff and partners to provide positive, educational experiences to students and the residents of the villages nearest the refuge while strengthening and forging new partnerships. "The magical part is that everyone wins," said one of the Friends group volunteers. Refuge staff are excited about the great success of this summer's camps and are hoping to reach even more students during next year's events.

Migratory Bird Calendar Contest

Local K–12 students from Allakaket, Bettles, Evansville, Coldfoot and Wiseman were invited for a second year in a row to participate in the Migratory Bird Calendar Contest. In November, PR Reakoff spent two days at the Allakaket School, talking with students about migratory birds and making poster entries. This year the Allakaket students were also excited to create and submit their first-ever literature entries for the contest. A similar event was planned for the Coldfoot/Wiseman area but was unable to be held, due to the unusual and long absences of the 6 eligible students and their families.

Creamers Field 5th Grade Bird Watch

Refuge Manager Spindler assisted Creamer's Field State Waterfowl Refuge (Fairbanks) staff with the annual 5th Grade Bird Watch in April.

Film Festival

Arctic, Kanuti, and Yukon Flats Refuges joined with the National Park Service, Alaska Public Lands Information Center, Fairbanks Arts Association, Fairbanks North Star Borough Parks and Recreation, University of Alaska Student Activities' Office, and the student chapter of The Wildlife Society to host the fourth annual "Far North Conservation Film Festival" on November 7-9, 2008. The film festival continues to be a cornerstone of National Wildlife Refuge Week activities for the Fairbanks-based refuges. Attendees enjoyed 19 outstanding films about conservation and sustainability of wildlife, wild places, and cultures around the world.

Outdoor Days

Wildlife Biologist Saperstein helped staff the FWS telemetry station at Outdoor Days. The two-day event provides 6th grade students hands-on lessons and games in biology, geology, archaeology, recreation, and natural resource management. At the telemetry station, students learn about the types of radio-telemetry and their uses and try their hands at tracking a radio-collar hidden in the woods.

General Outreach

New Coldfoot Brochure Rack for Winter Visitors

This winter, Kanuti staff partnered with Coldfoot Camp to install a new brochure rack at the Coldfoot Café, which is the hub of activity in the area and a place where nearly every visitor stops. Before the rack was installed, no information about public lands was available to the public in the area during the winter months. The rack provides visitors with educational brochures about nearby Kanuti, Yukon Flats and Arctic National Wildlife Refuges (NWR), as well as brochures about nearby Gates of the Arctic National Park and Preserve (NPS) lands and BLM lands. The rack also provides brochures with general information including safety tips for driving the Dalton Highway, state of Alaska maps, and tips on wildlife viewing. Staff at Coldfoot Camp estimate that around 350 commercially guided Aurora tourists visit the Café during the winter months, as well as many independent visitors (no estimate available). The brochure rack is the first of its kind in the area and will be stocked all year long, providing winter visitors with educational resources about the area and summer visitors with another option for

obtaining information besides the Arctic Interagency Visitor Center.

Newsletters

Kanuti staff were excited this year to produce and print the annual Newsletter in time for people to receive it just prior to Thanksgiving. About 400 copies of the Newsletter were mailed out to various people, including one copy to each resident of the four communities that lie on or within Kanuti's Borders (Allakaket, Alatna, Bettles and Evansville) and one copy to residents of the nearby communities of Coldfoot and Wiseman. Residents who live near Kanuti enjoy reading the many articles in the newsletter that feature events that have taken place in or near their communities and articles about the work and research being done by Refuge staff. The newsletter continues to be one of our most effective public outreach tools and will continue to be produced annually.

Law Enforcement

Our planned migratory bird enforcement trips did not occur because of unavailability of refuge officers. Our major 2008 refuge law enforcement included monitoring the March and September moose hunts, and determining the compliance with permit conditions by air taxi transporters.

Refuge Officer (RO) Heather Knudsen (Arctic NWR) conducted moose hunting patrols with RM/pilot Spindler March 2-4, September 9-12 and 17-20. RO Michael Hinkes (Yukon Flats NWR) patrolled in March. RO Don Carlson (Arctic NWR) conducted aerial moose patrols on September 1 and 2. No hunting violations were observed, but a hunter cache and tent platform a few miles upriver from Kanuti Lake were investigated in September after discovery by refuge biologists in the spring (see photo next page). Owners of the cache were contacted, and they later retrieved the cache without incident. Ownership and disposition of the tent platform needs to be further investigated. One citation of permit condition violation was made against an air taxi- transporter permittee, with a \$250 fine.

Unlike other years we did not receive reports of conflict between subsistence and sport hunters. The use areas of sport hunters along the upper Kanuti River and subsistence hunters along the lower Kanuti, South Fork, and Koyukuk Rivers are generally well segregated because of the Kanuti Controlled Use Area. Furthermore, shallow water in upper reaches of rivers outside the KCUA boundary usually limits travel of the propeller-equipped boats used mainly by local subsistence hunters. The upriver areas are mainly accessed by fly-in or float-in and fly-out sport hunting groups. Refuge staff continued to receive negative comments and animosity by some Allakaket and Alatna residents concerning our wildlife law enforcement activities in general.



Refuge Officer Knudsen investigates a hunter cache near the Kanuti River.
Owners were contacted and they subsequently retrieved their gear.
(Photo by M. Spindler)

Facilities and Equipment

New Bettles Bunkhouse and Office-Visitor Center

In October, the Refuge began moving into two brand-new buildings, a bunkhouse and an office-visitor information center, in Bettles. Construction began in June 2008 under a contract managed by the National Park Service (NPS), and was completed in October 2008. According to Brad Richie, the NPS architect who led the design team, both buildings employ sustainable design and construction principles. They were designed around the principles of the Leadership in Energy and Environmental Design (LEED) Silver rating system developed by the U.S. Green Building Council, a non-profit organization dedicated to sustainable building design and construction. The design and construction features which contribute to sustainability include:

- 1) energy efficient lighting and heating;
- 2) super-insulation (R-value 35 in the walls and R-57 in the ceiling);
- 3) extensive natural lighting;
- 4) superior thermal windows (low-e, Argon-filled);
- 5) high-recycled content materials (carpeting, insulation, etc.);
- 6) certified sustainable lumber;
- 7) photovoltaic solar panels help power the office;
- 8) masonry heater in the office and woodstove in the bunkhouse;
- 9) use of local materials such as Alaska white spruce logs and siding, Alaska birch interior trim, and river rock;
- 10) integration of natural and heat recovery mechanical ventilation to provide fresh air and eliminate carbon dioxide build up and;
- 11) specification of low water consumption restroom fixtures to reduce water consumption by 20%.

Construction of the Office-Visitor Center was funded by National Park Service Alaska Park entrance fees, and the Bunkhouse construction was funded under the national Fish and Wildlife Service construction budget. Thanks to the close cooperation between Kanuti Refuge and Gates of the Arctic National Park, both buildings are shared seamlessly by park and refuge staff stationed in Bettles and by transient employees passing through Bettles on their way to and from remote field sites.



The new combination office and visitor center in Bettles is situated on the same lot as the building that burned down in January 2004. (Photo by D. Holton)

Kanuti Lake Administrative Cabin

Maintenance Worker Holton spent a week in September performing annual maintenance and readying the facility for winter.

Airplane/Airplane Support & Facilities

RM/Pilot Spindler flew a total of 295 hours in fiscal year 2008. Most of the hours were in the Refuge's Scout, but Kanuti also borrowed other FWS and NPS aircraft including a Cessna 185 and Cessna 206.

Bettles Hangar

Maintenance Worker Holton completed repairs on sheet metal exterior and struggled with maintaining the "Clean Burn" waste-oil fired space heater in the Bettles hangar. It turns out that we do not heat the building consistently enough for the waste oil heater to be very usable. We had hoped that we could warm up the building initially by burning heating oil in the new furnace then once the hangar is warm, switch to burning waste oil in the "Clean Burn" furnace, but that has not proved to be effective. We will continue to try to get the waste oil heater to work because it will reduce heating costs and will dispose of waste oil.

Other Equipment

Hybrid car

As part of ongoing efforts to be more environmentally responsible, reduce our carbon footprint, and conserve funding by reducing fuel use, the Refuge replaced a large passenger truck with a hybrid compact sport utility vehicle in June. The hybrid will be used almost exclusively within Fairbanks, where staff believe it will average more than 30 miles per gallon and travel more than 500 miles on a single tank of gas! The green (fittingly, both paint job and environmental impact!!) vehicle even boasts eco-friendly seat covers made of post-industrial waste plastics and fibers.



Deputy Refuge Manager Fox tries out the new hybrid car. (USFWS photo)

Jetboat

The refuge jetboat maintained in Bettles was damaged during a fisheries project on the South Fork Koyukuk River. Replacement of the damaged hull was estimated at \$8,000.

Other Items of Interest

On June 5 at the Bettles field station, Refuge Manager Spindler hosted Regional Refuge Supervisor Mike Boylan and Mark Musaus, Chief, Division of Visitor Services and Communications, Washington Office. Tours were provided of the visitor center, refuge facilities, the community, and the proposed nature trail.

RM Spindler hosted Assistant Regional Director for External Affairs Larry Bell on a visit to Bettles, Allakaket, and Kanuti Lake on July 30 and 31. The theme of the visit was understanding local views about intensive management and predator control.

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Section Credits

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Maloney, Louis (Administrative Support Assistant): funding
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Spindler, Mike (Refuge Manager/Pilot): Management (Overview, Interagency/intertribal cooperation, Permits), Public Access, Public Use (Subsistence, Law Enforcement), Facilities and Equipment, editing



Fluctuating water levels (flooding followed by drying) compromised nesting of some Horned Grebes at Kanuti Lake in 2008. (Photo by B. Armstrong)