

US FISH & WILDLIFE SERVICE--ALASKA



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U.S. Department of the Interior  
Fish and Wildlife Service  
NATIONAL WILDLIFE REFUGE SYSTEM

**KOYUKUK/NOWITNA REFUGE  
COMPLEX**

Galena, Alaska

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**ANNUAL NARRATIVE REPORT**

**2001-2002**

NWR  
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2001-2002

## ANNUAL NARRATIVE REPORT

2001 - 2002

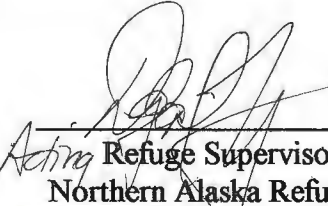
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NOWITNA NWR

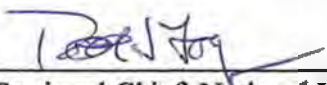
KOYUKUK/NOWITNA NATIONAL WILDLIFE REFUGE COMPLEX

Galena, Alaska

### REVIEW AND APPROVALS

  
\_\_\_\_\_  
Complex Manager      1/7/2004  
Date

  
\_\_\_\_\_  
Acting Refuge Supervisor,  
Northern Alaska Refuges'      05/26/2006  
Date

  
\_\_\_\_\_  
Regional Chief, National Wildlife  
Refuge System - Alaska      10/27/06  
Date

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## INTRODUCTION

This Annual Narrative Report is for the Koyukuk, Northern Unit of Innoko and Nowitna Refuges. These three refuges are administered collectively as the Koyukuk/Nowitna Refuge Complex. Narrative items common to all three units are discussed in the Koyukuk and Northern Unit of Innoko report. Any additional events are reported in respective sections.

The **Koyukuk National Wildlife Refuge (NWR)** is located in west central Alaska, about 270 air miles west of Fairbanks and 330 air miles northwest of Anchorage. The exterior boundaries encompass 4.6 million acres, an area slightly smaller than the state of New Jersey. This refuge lies within the roughly circular floodplain basin of the Koyukuk River. The extensive forested floodplain is surrounded by hills 1500' - 4000' on the north, east, and west, and the Yukon River to the south.

The Koyukuk NWR was established December 2, 1980 with passage of the Alaska National Interest Lands Conservation Act (ANILCA). The Refuge was established and is managed for the following purposes:

1. To conserve fish and wildlife populations and habitats in their natural diversity including, but not limited to, waterfowl and other migratory birds, moose, caribou, furbearers and salmon;
2. To fulfill international treaty obligations of the United States with respect to fish and wildlife and their habitat;
3. To provide the opportunity for continued subsistence uses by local residents;
4. To ensure water quality and necessary water quantity within the refuge.



*Koyukuk/Nowitna Refuge Complex*



*Nogahabara Sand Dunes, Koyukuk NWR*



The Refuge contains 400,000 acres of designated Wilderness surrounding the 16,000 acre Nogahabara Sand Dunes, one of only two active dune fields in Alaska. Access to the Refuge is by boat, aircraft, or snowmobile.

The **Northern Unit of the Innoko NWR** (known locally as the Kaiyuh Flats) encompasses 750,800 acres. Located south of the Yukon River, its northeastern boundary is directly across the river from the town of Galena. The Innoko Refuge was also established by ANILCA and is characterized by a wide, lowland interlaced by sloughs, creeks, and lakes. The gently rolling foothills of the Kaiyuh Mountains along the southeastern border rise to 2,000 feet. Only the first purpose for the Innoko Refuge differs from the Koyukuk Refuge.

This purpose is:

1. To conserve fish and wildlife populations and habitats in their natural diversity including, but not limited to, waterfowl, peregrine falcons, other migratory birds, black bear, moose, furbearers, and other mammals and salmon.



*Innoko National Wildlife Refuge in March.*

Vegetation types of the Koyukuk and Northern Innoko units are typical of the boreal forest or taiga of interior Alaska. The lowland boreal forest of spruce, birch, and aspen gradually merges with tundra vegetation near 3,000 feet. Black spruce bogs with poorly drained permafrost soils are a dominant feature of the area. Large pure stands of white spruce can be found along rivers where soils are better drained. Dense willow and alder are common along the rivers and sloughs. Winter ice scours sand bars which promotes a lush regrowth of vegetation each year. Over vast areas numerous fires have set back vegetative succession to earlier seral stages consisting of aspen, birch, and willow. The most prominent characteristic of these refuges is a diverse mosaic of the vegetation types.

Perhaps the greatest value of the Koyukuk Refuge is its productive breeding areas used by waterfowl from the four migratory flyways. Thousands of waterfowl, primarily wigeon, pintail, scaup, white-fronted geese and Canada geese are joined by both tundra and trumpeter swans on the Koyukuk's lush breeding grounds each spring. Refuge streams and lakes also sustain large fish populations that support subsistence, commercial and sport fisheries. King, coho, summer chum, and fall chum salmon migrate up the waters of the Yukon River and its tributaries, including the Koyukuk River. These fish are important in the region's subsistence and financial economies.

The **Nowitna National Wildlife Refuge** was created on December 2, 1980 with the passage of the Alaska National Interest Lands Conservation Act. Purposes for which the Refuge was established are:

1. To conserve fish and wildlife populations and habitats in their natural diversity including, but not limited to, trumpeter swans, white-fronted geese, canvasbacks and other waterfowl and migratory birds, moose, caribou, marten, wolverine and other furbearers, salmon, sheefish, and northern pike;



2. To fulfill international treaty obligations of the United States with respect to fish and wildlife and their habitats;
3. To provide the opportunity for continued subsistence uses by local residents;
4. To ensure water quality and necessary quantity within the Refuge.

*Nowitna National Wildlife Refuge*

The Refuge lies approximately 200 miles west of Fairbanks in the Central Yukon River Valley. It comprises 2.1 million acres of forested lowlands, hills, lakes, marshes, ponds, and streams. The Nowitna River, a nationally designated Wild River, drains the Refuge from south to north. The lowlands along this river are prime waterfowl production and migration habitat. The river and its tributaries support king and chum salmon runs, a large pike population, and one of the three known resident sheefish populations in the state. The Yukon River, which forms the northern boundary of the Refuge, has a salmon fishery of international significance and is an important transportation corridor. The Refuge's very productive marten habitat prompted specific reference in ANILCA to its outstanding furbearer value. Other species of interest common on the Nowitna are moose, wolves, black and grizzly bears, beaver, wolverine, lynx, and several species of raptors including nesting bald eagles.

Major programs of the Complex include resource inventory, management related research, subsistence management, wildfire management, and information/ education programs. Field investigations collect baseline data and quantify fish, bird, mammal, and habitat resources. An information and education program that stresses communications with the eight villages in or near the Complex is vital to the management of these natural resources.

In 2001-2001 the Complex staff had: 10 permanent, 3 temporary, and various temporary

positions. Facilities include a leased office and cold storage facility, three administrative cabins, nine government residences, and several smaller cold storage buildings.

The Koyukuk/Nowitna Refuge Complex headquarters is in Galena, a village located on the Yukon River. Galena was established about 1919 as a supply point for the mining of galena (lead sulphite ore) south of the Yukon River. Galena serves as a transportation hub for nearby villages. More like a town than a village, Galena has the advantages of direct air service to Fairbanks, modern communications, river access, two general stores, a K-12 school and health clinic. The population of Galena is approximately 700 and includes approximately equal numbers of Alaska Natives and non-Natives. Many Galena residents depend on a subsistence lifestyle of fishing and hunting. The U.S. Air Force, commercial airlines and general aviation jointly use the Galena Airport. The U.S. Air Force Base formerly supported two F-15 Eagle interceptor aircraft, but the entire base was put in "caretaker" status as of October 1, 1993.

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## **K. FEEDBACK**

## **A. HIGHLIGHTS**

### **2001**

Four Refuge staff (Spindler, Byrant, Hughes, and Lehmkuhl) attended the Alaska Refuge biologists workshop at Girdwood, AK in February. It was a great opportunity for coordinating, sharing and networking. Spindler, Bryant and Lehmkuhl also addressed the Alaska Migratory Bird Co-Management Council about the issue of declining white-fronted geese and high spring subsistence harvest of this species.

Also in February the Refuge biological and outreach staff conducted a round of white-fronted goose meetings in most area villages: Kaltag, Nulato, Koyukuk, Galena, Huslia, Hughes, Allakaket. In March, RIT Orville Huntington presented white fronted goose population trend and harvest information to the Tanana Chiefs Conference in Fairbanks. The Chiefs passed a resolution urging support for more restrictive harvest through the flyway, and voluntary harvest reductions in Alaska among interior villages.

A satellite-telemetry study of local and continental movements of white-fronted geese was funded by a Challenge Cost Share agreement with the Galena and McGrath schools. High school students helped with capture and banding, and observed surgeries. We also launched a cooperative study with the Canadian Wildlife Service to estimate fall migration stopover length of refuge-nesting white-fronted geese in Alberta and Saskatchewan, where the species receives intense hunter harvest that may be selective towards this population segment. This work formed the basis of a masters thesis for SCEP student Deborah Webb.

SWB/P Spindler traveled to Chihuahua and Durango, Mexico in January 2001 to oversee our contract with Manuel Ochoa to monitor wintering white-fronted geese in the Mexican highlands. He also traveled to Quebec City, Canada to the North American Arctic Goose Conference to present a paper on nesting and movements of white-fronted geese in northwest Alaska. Spindler presented a white fronted goose population status update to the Central Flyway Technical Committee at its spring meeting in Lethbridge, Alberta.

In July 2001 PR Karin Lehmkuhl discovered an archaeological site containing over 50 obsidian points within the Nogahabara Sand Dunes in the Koyukuk Wilderness Area. Planning for a cultural resource investigation was initiated.

We experienced considerable staff turnover in 2001. In May FMO Bob Rebarchik transferred to a zone-FMO position in the inter-agency fire office in Missoula, Montana. In June Refuge Manager Gene Williams transferred to Lake Andes NWR in South Dakota. In October Wildlife Biologist Guy Hughes transferred to Kalaupapa National Park in Hawaii. Two positions were not filled until the following year.

In March our vacant Deputy Refuge Manager position was filled by Greg McClellan, former

Subsistence Coordinator from Yukon Flats, Arctic, and Kanuti Refuges based in Fairbanks. In June Subsistence Coordinator Geoff Beyersdorf transferred to the Refuge from Togiak NWR. We hired our second Refuge Information Technician into a temporary, seasonal position. Pat Madros Jr., from the village of Nulato, complements the efforts of Orville Huntington in Huslia. In November Mike Spindler was selected as Refuge Manager, making his Supervisory Wildlife Biologist/Pilot position vacant.

A Scout aircraft was tested in comparison with the Super Cub for sightability and effectiveness in moose surveys. This builds on prior wildlife survey testing of Maule and Husky aircraft in 1999 and 2000, respectively. Based on these tests, the refuge Maule, N120G, was returned to OAS in fall 2001 so that we could have a second Super Cub in winter for ungulate and predator surveys.

Wildland fire activity was minimal in 2001, with only 12 acres burned. This was fortunate for us because we had no FMO during the fire season.

The Alaska Department of Transportation assigned a lot at the Galena Airport to the FWS as a potential aircraft parking and future aircraft hangar site. Extensive land surveys and contaminant surveys were needed before a legal lease could be finalized.

November moose population estimation surveys were conducted in standardized areas on Koyukuk, Northern Innoko, and Nowitna NWR. We had excellent weather and snow conditions for aerial surveys. Estimates for these areas were 3,400 moose on the Koyukuk (western Galena subunit), 1,800 moose on the Northern Innoko, 3,600 on the Upper Koyukuk subunit, and 1,057 moose on the lower Nowitna.

A loosely-organized group named the Koyukuk River Moose Co-Management Team ("K-River Team") began legal and legislative efforts to contract with the USFWS under PL-93-638 (the Indian Self Determination Education and Assistance Act). The group sought to gain funding to contract for operation and management of Koyukuk and Kanuti NWRs. Initial contacts with the group indicated they were mainly interested in taking over moose management and biological surveys, however, subsequent meetings suggested the K-River Team sought management control of the Refuge.

## **2002**

We started the year with no e-mail and Internet due to the Department of the Interior Indian Trust Fund lawsuit. Service was finally restored in March.

In January RM Spindler attended meetings between the City of Galena, Loudon Tribal Council, Gana-a 'Yoo Limited, and the US Air Force concerning re-use of the Galena air base facilities. It is not likely additional buildings will be made available to the Service. The Galena City School District residential vocational high school has taken over much of what is available and

desirable. The storage building we took over from USAF in 2000 is working very well.

In March, 20 caribou were collared in the Galena Mountain Herd and Wolf Mountain Herd as part of a study in cooperation with Alaska Department of Fish and Game. Unfortunately, 16 caribou died of indeterminate causes within the first few weeks. A thorough ADFG investigation was inconclusive, but all parties suspect defective immobilizing drugs were somehow involved. Similar die-offs occurred in caribou studies elsewhere in the state in March and April 2002.

In April the Refuge hosted a field visit of Deputy Regional Director Gary Edwards, Alaska NWR System Chief Todd Logan, and Northern Alaska Refuges Supervisor Jerry Stroebele. After visiting Galena facilities and village patriarch Sidney Huntington, the party overflew the Refuge. Their flight included a stop at Huslia to meet with RIT Orville Huntington, a visit to Lloyd and Amelia DeWilde's camp on the Huslia River, and to David and Romey Atchley's camp on the Nowitna River.

Levels of wildland fire activity were high, with 22,748 acres burned on Koyukuk NWR and 43,417 acres burned on the Nowitna NWR in 2002. Fortunately we had a new FMO to handle it!

For the third year in a row, Chinook and fall chum salmon runs were weak; subsistence fishing restrictions were implemented in August 2002. Refuge RITs Huntington and Madros assisted SC Geoff Beyersdorf with an in-season subsistence salmon harvest survey. Both RITs also helped complete a fifth year of waterfowl subsistence harvest surveys.

The Challenge Cost Share project to instrument white fronted geese with satellite telemetry radios was expanded to include the schools at Selawik, McGrath, and Galena as well as University of Alaska. Twenty-two geese were instrumented in 2002, plus the dozen deployed in 2001, brought the total sample to 34. Deborah Webb's master's project including the satellite telemetry and collar observations in Canada continued. Increased cooperation with the Canadian Wildlife Service resulted in a conventional VHF radio collaring effort to augment stopover duration studies in Canada and nesting studies in Alaska. Small contracts were issued for monitoring winter location and condition of satellite marked white fronted geese in the Mexico highlands and Tamaulipas coastal plain.

RM Spindler and DRM McClellan conducted moose hunting season law enforcement patrols, with a special emphasis on monitoring big game guide and transporter permits. Compliance with refuge permit conditions was disappointing in some cases. Refuge staff assisted the LE Division on a case of an illegal big game transporter at Selawik, Innoko, and Nowitna NWR's.

In October, Refuge staff learned about a large stockpile of 55 gallon fuel barrels in a remote area NW of Huslia. An aerial survey revealed that more than 100 barrels had leaked and stained surrounding vegetation. The site was too confined for floatplane landings, so plans



were made for a boat-based investigation in 2003.

In August 2002 PR Karin Lehmkuhl partnered with the Galena School to conduct a Science Camp. This was the third year in a row of a successful joint venture.

One refuge airplane, Piper Cub N83669 suffered minor vandalism from kids playing too close to the plane at the Alexander Lake float pond. A lot at the Galena Airport was formally leased from AK DOT and a gravel pad was completed by freeze-up. The area was used to park our three planes during the winter. We moved our skiplane operations from Alexander Lake to the airport for safety and security reasons, mainly avoidance of unruly snowmobile traffic and unsupervised kids playing on the lake.

Three vacant positions were filled during the year: Robert Lambrecht became our FMO, transferring in from the US Forest Service in Montana. Brad Scotton became our Supervisory Wildlife Biologist/Pilot, changing agencies from ADFG where he was an assistant area game biologist in Glenallen. Finally, Refuge Clerk Melanie Hans was selected to become our new GIS/ Habitat Biologist.

The refuge was a sponsor of the Koyukon Jamboree, an Athabascan Indian cultural festival, and hosted the Galena Breakfast Club in October. We introduced the upcoming NWR Centennial during these events.

Efforts outside the Service to privately contract major operational functions of Koyukuk and Kanuti NWR's increased. Authority to do this under the existing PL-93-638, Indian Self Determination Act, was sought to be augmented with a newly-introduced bill, HR 4734. The latter bill, brought to the House of Representatives by Rep. Don Young, would legislatively mandate annual funding contracts for major operations of Koyukuk and Kanuti NWR to the K-River Team as a demonstration project. No matching action occurred in the Senate. Refuge staff attended several exploratory meetings with the K-River Team, their attorney, and Regional Office Staff. The final meeting in mid-November ended with a cooperative working atmosphere.

## **B. CLIMATIC CONDITIONS**

The climate of western interior Alaska is subarctic/continental with warm pleasant summer weather during June, July and August, and generally cold weather from October to early April. The winters in the Galena area tend to fluctuate between periods of extreme cold and milder temperatures. Cold spells (usually -20 to -30° F, but sometimes to -40° F to -60° F or even -70° F), caused by clear skies and no wind, usually last a week or two, sometimes three, and are moderated by intervening milder weather (-20° F to +20° F), with clouds, snow, and light to moderate winds. The moderating effects of Bering Sea and Pacific storm fronts increase the farther west one proceeds across interior Alaska. By late winter, the snowpack in the valley

bottoms averages 2-3 feet. The months of April and May are transitional, with the arrival of most waterfowl late April-early May, and breakup of the Yukon River ice in mid-May. Green-up of the trees and shrubs begins in late May. Summer daytime temperatures in the western Interior generally range from 50-70°F; however, extreme highs have exceeded 90°F. Summers on the refuge Complex area are generally cooler, with more overcast skies and precipitation, compared to Fairbanks and the eastern Interior. Perhaps the most pleasant time of the year is late August to early October with cool nights, warm days, and dying vegetation to signify the end of the bug season and the start of hunting season.

**Climate 2001:** Temperatures during most of 2001 were near normal, with some exceptions (Fig. B.1). January and February were significantly warmer than normal, while May and November were cooler than normal. Spring 2001 will be remembered as having cooler, cloudier weather that delayed the spring breakup of the Yukon and Koyukuk Rivers. The Yukon River ice at Galena first moved on May 22, nine days later than the long-term mean of May 13 (Table B.1). Ice was thick, and temperatures were cool in May, so there was considerable flooding along the Yukon River near Galena, caused by an ice-jam at Bishop Rock. The Yukon River water level reached a peak of 124 ft and flooded into Alexander Lake at Galena for the second time in two years. The ice-jam let go on May 23, and waters began to recede. Ice first moved on the Koyukuk River at Hughes on May 22 and at Huslia on May 25. Huslia's breakup was also nine days later than usual. In late May and early June extensive flooding occurred along the Koyukuk River, including Three Day Slough, Dulbi Slough, and the lower Dulbi River, and at Koyukuk village. Most of the floodplain areas on the Kaiyuh Flats were also inundated. In contrast, the Nowitna River was essentially flood-free. The Nowitna ice probably moved out on the upper river during the second week of May. A May 9 flight showed most of the upper Nowitna River to be ice-free, with the ice rotting and ready to move on the middle and lower river. Precipitation in 2001 was quite different from normal (Fig. B.2). Precipitation was above normal in two months-- August and October. The May and July rainfalls were slightly above normal, while September and November were well below normal. Despite these differences, total annual precipitation was close to normal-- 12.15 inches, compared to the long term mean of 12.74 inches. Time of freeze-up was normal near Galena (Table B.2). There was greater than usual snowfall in October 2001, which provided ideal conditions for moose surveys conducted the following month.

**Climate 2002:** Temperatures during the summer months of 2002 were near normal, but during the winter months temperatures were warmer than normal from October through March (Fig. B.3). December was significantly warmer than normal, while August was the only month that was slightly cooler than normal. Spring 2002 was mostly mild with a surprisingly warm May in which 10 record breaking warm days were recorded (the hottest day was a scorching 83°F on the 25th). The Yukon River ice at Galena first moved on May 14, right about the long-term mean of May 13 (Table B.1). Ice went out quietly with no flooding along the Yukon River near Galena. The Yukon River water level did not rise enough to give alarm to the residents. Breakup water levels on the Koyukuk River were average to low, with gravel/sand bars showing in some areas. The Nowitna River was also essentially flood-free. The Nowitna

ice probably moved out on the upper river during the first week of May. In mid-May, an ice-jam on the Yukon backed water up into the Nowitna River mouth about 5 miles. As in 2001, precipitation in 2002 was quite different from normal (Fig. B.4). Precipitation was above normal in only three months-- April, July, September, and exceptionally high in January, and below normal in seven months -- February, March, May, August, November, December, and exceptionally low in June. October was the only month that was anywhere near normal. Total annual precipitation was the third lowest in 12 years of recorded data -- 11.67 inches, compared to the long term mean of 12.74 inches. Time of freeze-up was slightly later than normal near Galena (Table B.2). Snowfall during October and November was minimal, which prevented most moose trend areas from being surveyed in 2002.

Table B.1. Break-up and freeze-up dates of the Yukon River at Galena, Alaska.

	Break-up (first ice movement)	Freeze-up (ice stoppage)
1983	May 10	
1984	May 18	
1985	May 22	
1986	May 19	
1987	May 17	
1988	May 7	October 14
1989	May 7	October 25
1990	May 7	October 25/26
1991	May 7	November 1
1992	May 25	October 20
1993	May 12	November 3
1994	May 7	November 4
1995	May 2	October 30
1996	May 14	October 21
1997	May 7	October 21
1998	May 8	November 5
1999	May 14	November 4
2000	May 15	November 19
2001	May 22	October 29
2002	May 14	November 13
Mean	May 13	October 29

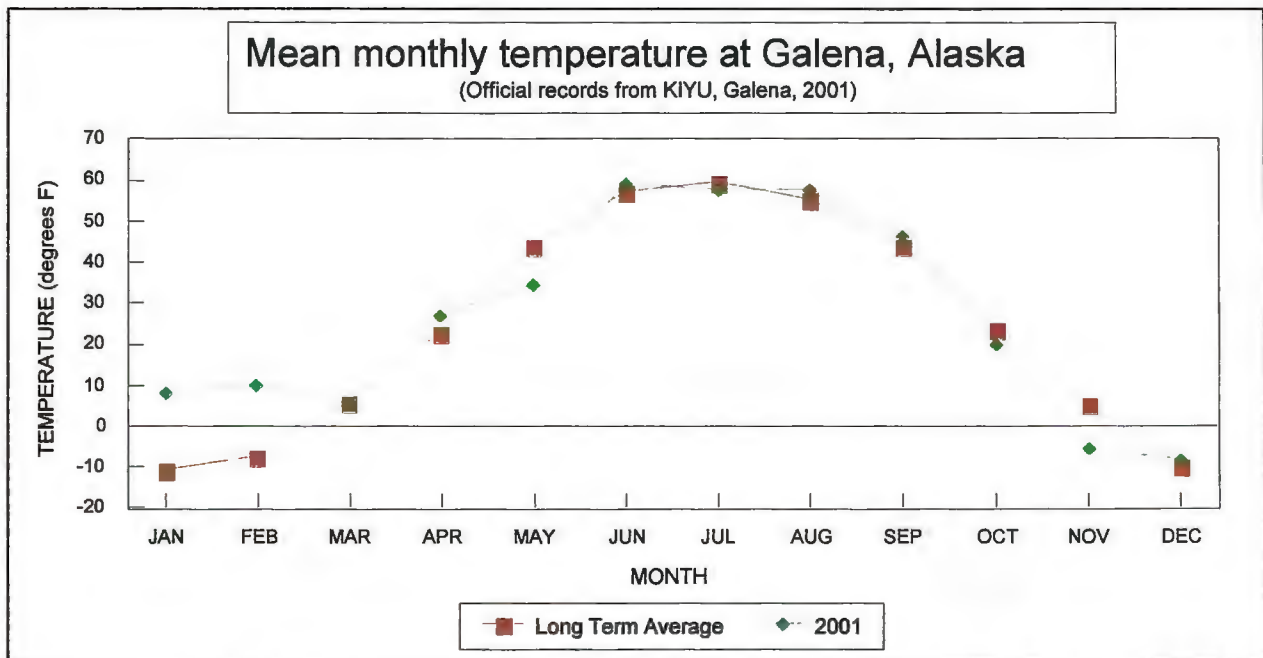


Figure B.1. Mean monthly temperature compared to long-term mean at Galena (data courtesy of KIYU and National Weather Service).

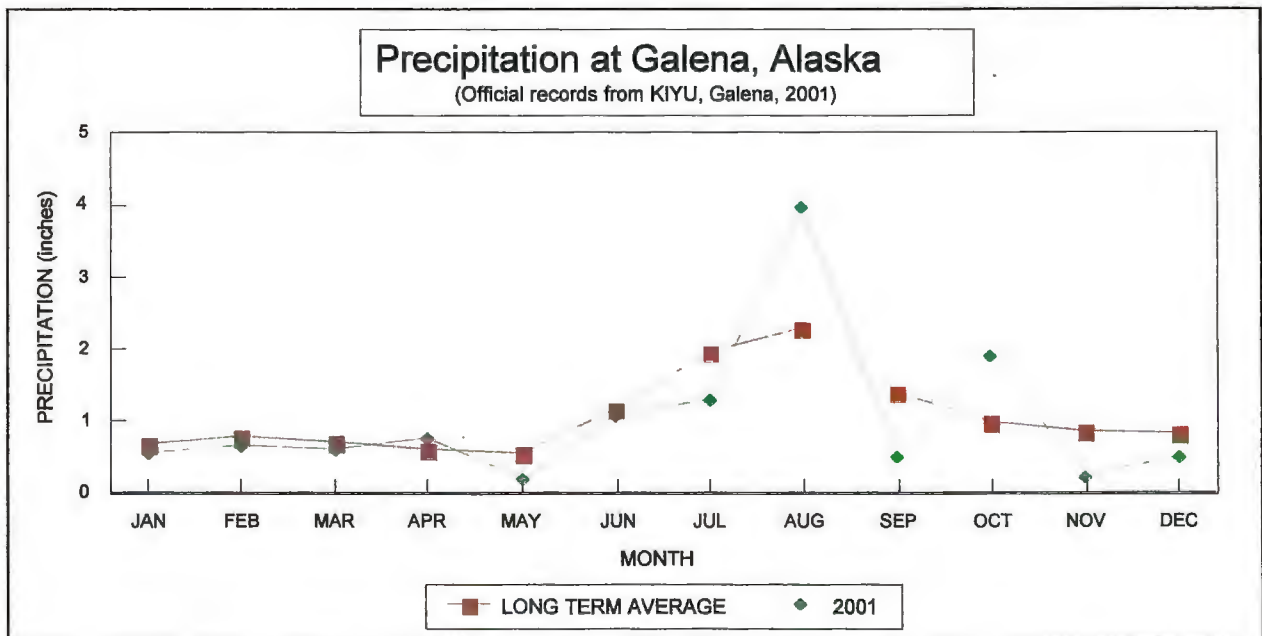


Figure B.2. Mean monthly precipitation compared to long-term mean at Galena (data courtesy of KIYU and National Weather Service).

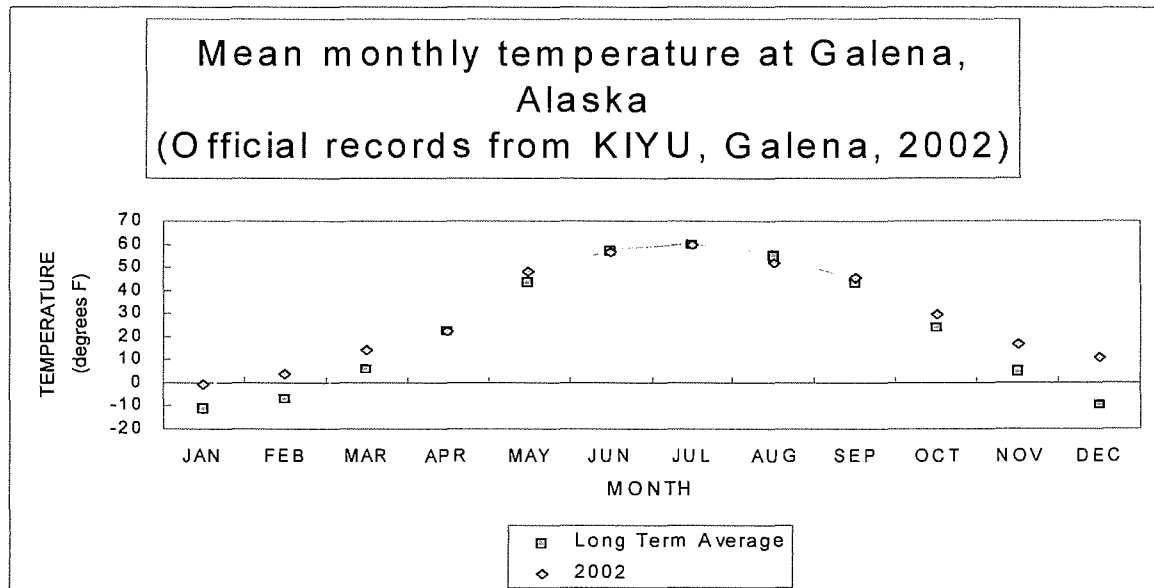


Figure B.3. Mean monthly temperature compared to long-term mean at Galena (data courtesy of KIYU and National Weather Service).

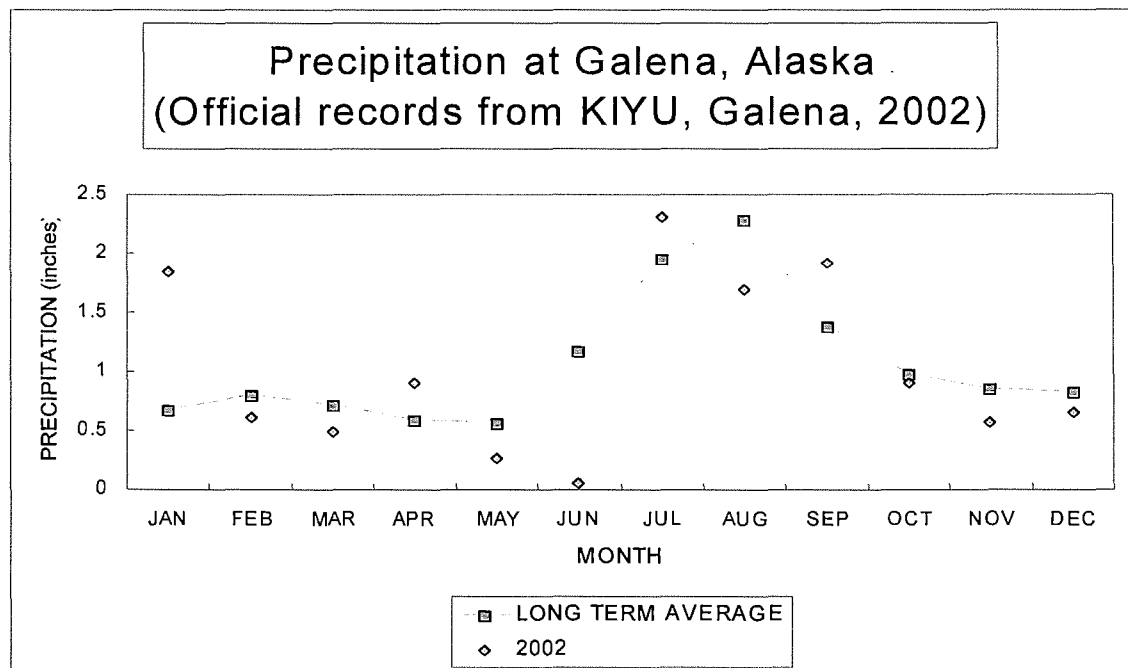


Figure B.4. Mean monthly precipitation compared to long-term mean at Galena (data courtesy of KIYU and National Weather Service).



## **C. LAND ACQUISITION**

### **C.3. Other**

In 2001, we were contacted by the Division of Realty concerning a possible land exchange. The State was interested in acquiring some refuge land (Kodiak NWR) on Sitkinak Island off the south end of Kodiak Island in exchange for relinquishing some of their selected lands on the Northern Unit of Innoko NWR. The proposal was for each entity to exchange a little over 1,600 acres. Negotiations were conducted, but the exchange was never completed.

Two new leases were initiated in 2001 and one in 2002. In July 2001, a lease was started with the Huslia City Council for office space in their city office building for RIT Huntington. Previously, RIT Huntington shared an office with the Village Public Safety Officer with no payment from the Refuge. With the lease, RIT Huntington now has his own office space. In 2002, the Refuge paid for a dedicated phone line in RIT Huntington's office. Previously, he was on the same phone line as the rest of the city offices. This greatly hampered his ability to use the internet and e-mail. In December 2001, the Refuge finally signed a lease with the Huslia City Council for a 100' X 100' piece of land adjacent to Mingogut Lake. This lake is utilized by the Refuge as a float pond at Huslia and the tank is needed for refueling float planes. On this leased land, the Refuge has a 1,000 gallon avgas fuel tank and a small storage shed. The fuel tank has been located on the site and used by the Refuge since the early 90's but the original acquisition request for a lease was never acted upon. In 2002, the Refuge started a lease with Alaska DOT for a lot at Galena's Edward G. Pitka, Sr. Airport for an aircraft storage building (see I. 1. New Construction)

## **D. PLANNING**

### **D 4. Compliance with Environmental and Cultural Resource Mandates**

On May 29, 2001, Refuge Special Use Permit #75620-01009 was issued to the Ultimate Sacrifice Memorial Foundation to retrieve a final load of previously gathered airplane parts from a crashed World War II B-17 bomber on Nowtina NWR. Most of the plane parts had been previously retrieved under a Refuge Special Use Permit in 1996. All materials of military origin dating from the World War II period and located on Refuge lands are to be managed in full compliance with the National Historic Preservation Act of 1966 as amended (15 USC 470). Regional Archeologist Chuck Diters was consulted in the issuance of the special use permit.

On June 11-12, 2001, Charles Grant, Engineering, conducted an Environmental Audit of Refuge facilities in Galena.

In July 2001, PR Lehmkuhl discovered an archeological site with more than 50 obsidian artifacts within the Nogahabara Sand Dunes. In coordination with Regional Archeologist Chuck Ditters, several of the points were collected and the site was documented.



*Chuck Ditters works at the Nogahabara Dunes Archaeology site. (KL)*

On October 3, 2002 Refuge staff were first informed of a large stockpile of 55 gallon barrels and propane tanks along Billy Hawk Creek by Eileen Jackson with the Huslia Tribal Council Environmental Department. The stockpile was first discovered by residents of Huslia on August 26. Information gathered from older residents of Huslia indicate the barrels may have been there since the 1960s. On the afternoon of October 3 DRM McClellan and P Huhndorf overflowed the site to get an exact location. There were no good landing sites near the barrel stockpile. DRM McClellan notified personnel in the Regional Office.



*Barrels found on the Koyukuk Refuge - Huslia River. (GM)*



*Barrels found on Koyukuk Refuge - Huslia River. (GM)*

A Pollution Incident Report form was filed with the National Response Center, Environmental Protection Agency, and an Oil & Hazardous Substances Spill Notification Form was filed with the Alaska Department of Environmental Conservation. Plans are to investigate the site and take samples during the summer of 2003 in preparation for future cleanup activities.

## **D 5. Research and Investigations**

The following approved refuge wildlife studies were active during 2001 and 2002. Progress reports are available from the Complex office or the Alaska Resource Library in Anchorage. A brief report from each study is included in the appropriate sections of the narrative.

*Investigations at the Nogahabara Sand Dunes, Koyukuk Wilderness Area.* (See also Section F.12) In 2001 an interdisciplinary team of biologists from the Refuge, the University of Alaska Fairbanks (UAF), and The Alaska Natural Heritage Program (ANHP), participated in an eight day investigation of the flora and fauna of the Nogahabara Sand Dunes. Rob Lipkin, from ANHP, collected and documented plant species, and Jim Kruse of UAF collected insects. PR Lehmkuhl documented bird and mammal observations. Lehmkuhl and Kruse discovered an archaeological site consisting primarily of obsidian artifacts, and collected a small portion for further research.

In 2002 FWS Regional Archaeologist Chuck Diters accompanied Refuge staff to further investigate the obsidian artifacts. Diters collected another portion of the artifacts, including pieces recovered from shallow test-pits. Refuge Volunteer Nathan Schwalen took video footage on site and at the Refuge office to make a short informational video on the artifacts and preliminary analysis.

*Spring Bird Migration adjacent to the Nowitna National Wildlife Refuge.* (See also Section G.7) In 2002 PR Lehmkuhl and several volunteers spent the spring bird migration period (late-April through late-May) in an area adjacent to the Nowitna Refuge to document migratory bird species, with emphasis on upland habitats. The effort was a preliminary attempt to complete the Nowitna bird list, for which data are lacking on upland and alpine-breeding birds. The survey was conducted along and adjacent to the Ruby-Poorman road within 25 miles of Ruby. Logistics and survey conditions limited our access to alpine areas, but migration phenology and species composition was well documented for the uplands. Songbird migration in 2002 was somewhat atypical because cold, wet weather conditions persisted across Alaska and Canada until late spring. Songbirds arrived late, and in fairly low numbers.

*Evaluation of moose browse monitoring methods for development of long-term habitat assessment procedure for the Koyukuk/Nowitna NWR Complex inventory and monitoring plan.* WB Hughes has undertaken a project to develop a long-term moose habitat monitoring plan for Refuge Complex habitats. Field work was conducted in March-April 2000-2002 and June-August 2000-2001. A progress report was in preparation, and activities are reported in Section G.8.

*Landsat Satellite Mapping Project.* Koyukuk/Nowitna NWR Complex joined forces with Ducks Unlimited, the Bureau of Land Management, the U.S. Air Force, and Spatial Solutions Inc. to form a multi-agency partnership interested in producing land cover maps from satellite imagery. The partnership plans to map over 16 million acres of land in the western interior

including our entire 7.7 million acre Refuge Complex by the summer of 2002. (See also Section F.1.).

*Frog Malformation Study:* A study to determine extent of malformations in wood frog, *Rana sylvatica*, near Galena was begun in 2001 and continued in 2002. The study was conducted RC Melanie Hans. (See Section G.10.).



*RC Melanie Hans enjoys a bright, spring day while collecting snow samples in March 2002.(JH)*

*Snow Samples.* In 2002 USGS requested that snow samples be collected at each Refuge to be analyzed for trace metals. Collections were made in February by WB Melanie Hans and P Joe Huhndorf during moose browse surveys. Results were presented in a poster by Brown Wange, (USGS) entitled "Trace Metal Concentration in snow and moss from the Yukon River Basin, Alaska and Canada." Relative to 30 regional snow samples, the Koyukuk sample was higher in Zinc (2.8 micrograms per liter) and Cadmium (0.045 micrograms per liter). The Nowitna sample ranked low on all heavy metals tested, and the Innoko had average levels of heavy metals.

*White Fronted Goose Study.* The project continued in 2001-2002 with banding and deployment of satellite telemetry transmitters. Additionally, in 2002 conventional UHF radio collars, and neck-collars were used. SCEP Deborah Webb performed field work for her

masters project in Alberta and Saskatchewan. Winter observations continued in Mexico through contracted studies. (See also Section G.3.).



## **E. ADMINISTRATION**

### **E.1. Personnel**

#### **E.1.A. Permanent**

1. Eugene Williams, Refuge Manager, GS-485-13, EOD 6/7/97, PFT. Transferred to Lake Andes NWR effective 7/01/01.

2. Michael A. Spindler, Refuge Manager/Aircraft Pilot, GS-485-13, EOD 2/11/90, PFT. Promoted from Supervisory Wildlife Biologist/Aircraft Pilot effective 11/05/01.

3. Greg McClellan, Deputy Refuge Manager, GS-485-12, EOD 3/18/01, PFT.

4. Brad Scotton, SWB/Pilot, GS-486-12, EOD 9/22/02, PFT.

5. Max (Joe) Huhndorf III, Aircraft Pilot, GS-2181-12, EOD 3/28/99, CS Local Hire.

6. Guy D. Hughes, Wildlife Biologist, GS-486-11, EOD 5/23/99, PFT. Transferred to National Park Service in Hawaii effective 10/28/01.

7. Melanie Hans, Wildlife Biologist, GS-486-5, EOD 3/11/01, PFT. Promoted from Refuge Clerk effective 12/29/02.

8. Jenny M. Bryant, Wildlife Biologist, GS-486-7, EOD 5/25/97, PFT.

9. Robert A. Rebarchik, Fire Management Officer, GS-401-11, EOD 9/3/95 PFT. Transferred to Zone FMO Missoula, Montana effective 6/03/01.

10. Robert Lambrecht, Fire Management Officer, GS-401-11, EOD 5/19/02 PFT.

11. Geoff Beyersdorf, General Biologist, GS-401-9, EOD 6/17/01 PFT.

11. Karin L. Lehmkuhl, Park Ranger (Environmental Education/Wilderness Issues), GS-025-9, EOD 5/23/99 PFT.

12. Rosie M. Cassou, Administrative Technician, GS-303-6, EOD 6/12/95 PFT Local Hire.

13. Wayne W. Strassburg, Maintenance Worker, WG-4749-8, EOD 8/16/98, CS Local Hire.

14. Orville H. Huntington, Refuge Information Technician, GS-1001-8, EOD 11/12/95 CS Local Hire.

15. Deborah Webb, graduate SCEP/Student Trainee, GS-499-7, EOD 5/21/00.



*Some of the 2001 Refuge staff pause to appreciate a spectacular breakup of Yukon River ice (pictured l to r: Jenny Bryant, Deborah Webb, Karin Lehmkuhl, Mike Spindler, Guy Hughes)*

#### **E.1.B. Temporary**

16. Patrick Madros Jr., Refuge Information Technician, GS-1001-6, 5/20/01 - 12/31/01 and 3/24/02 - 9/30/02, Local Hire Seasonal Intermittent

17. Robert Farmer, Refuge Information Technician, GS-1001-6, EOD 5/13/98, Local Hire



Intermittent.

18. Abby Kirkaldie, Biological Technician, GS-404-5, 5/19/02 - 11/02/02.

19. P.J. Simon, Biological Technician, GS-404-5, 7/15/02 - 1/06/03, Local Hire.

20. Larry Olin, 30 day Emergency Hire, WG-3502-2, 8/23/02 - 9/21/02, Local Hire.

#### **E.1.C. Volunteers**

##### **2001**

Sonia Chavira

Joanna Helmuth

Jim Kruse

Rob Lipkin

Jo Overholt

Eric Rexstad

Ross Sam

Randy Shaw

Dan Spencer

Kathy Turco

David Vent

Carol Wilson

##### **2002**

Darren Huntington

Edward George

Gared Grube

Lorrie Grube

Arvin Kangas

Tammy Koontz

Patrick Madros Jr.

Geri Orthmeyer

Tim Pavlick

Eric Rexstad

Bergman Sam

Ross Sam

Nathan Schwalen

Cheryl Scott

Sandy Scotton

Randy Shaw

Kevin Strand

Jim Torkelson

Lucy Williamson

#### **E.4. Volunteer Program**

*Sonia Chavira (2001).* For the fourth year in a row our staff was joined by a volunteer from Mexico. Sonia assisted with several summer projects: mapping of willows along rivers, waterfowl production surveys, the peregrine falcon survey, and duck banding. Sonia helped enter moose observation data and citations of Refuge reports and publications in a bibliographic database. She also gave several community and school presentations about white-fronted geese that are shared between Alaska and Mexico.

*Joanna Helmuth (2001).* Joanna primarily assisted WB Guy Hughes with the vegetation mapping project, specifically helping to prepare and identify plant specimens for the Refuge herbarium. Joanna also assisted with several field projects including telemetry implantation in white-fronted geese, duck banding, and the Nogahabara Sand Dunes trip.

*Rob Lipkin (2001).* Rob brought his botanical expertise to the Refuge during our investigation of the Nogahabara Sand Dunes. Rob works with the Alaska Natural Heritage Program in Anchorage, and has particular interest in rare and endemic species in the State. He had visited the dunes previously and his interest in returning for a more thorough investigation was one of the reasons for this year's trip.

*Jo Overholt (2001).* Jo accompanied Rob on the Nogahabara Dunes survey, and as a professional photographer, chronicled our investigation. Under an agreement with the Refuge, she has provided stunning slides and digital images for in-house use. Permission from her is needed for use of any images in publications.

*Jim Kruse (2001).* Jim joined us from the entomology section of the University of Alaska Museum, Fairbanks, to make insect collections at the Nogahabara Sand Dunes. Despite some difficulties with weather, Jim was able to collect a wide assortment of insects, including some tiger-beetles found outside their previously known range.

*Eric Rexstad (2001, 2002).* Dr. Rexstad of UAF assisted with white-fronted goose banding on the Innoko, Koyukuk, and Selawik NWR's and in the Noatak River region in 2001 and 2002. Dr. Rexstad acts as major advisor to SCEP Webb on a master's project on white-fronted geese.

*Randy Shaw (2001, 2002).* Randy is a resident of Ruby, and assisted with several projects including the peregrine falcon survey (2001, 2002), Nogahabara Sand Dunes archaeology (2002) and Ruby-Road songbird migration (2002). Randy's wife *Lucy Williamson* also helped with the songbird survey, as did *Tammy Koontz*.

Volunteers who worked on the white-fronted goose project include veterinarian *Cheryl Scott (2001, 2002)* who performed the surgical implantation of satellite transmitters and attended a conference in Maryland related to the project. Cheryl's assistant was *Geri Orthmeyer (2002)*. *Dan Spencer (2001, 2002)* assisted with goose neck-collar resighting in Saskatchewan, Canada during fall migration.

Several volunteers from local villages assisted with subsistence harvest surveys (waterfowl, salmon) including: *Edward George (Nulato; 2002)*, *Arvin Kangas (Ruby; 2002)*, *Bergman Sam (Huslia; 2002)*, *Tim Pavlick (Huslia; 2002)*, *Ross Sam (Huslia; 2002)*, and *Darren Huntington (Huslia; 2002)*.

*Carol Wilson (2001)* helped Geoff Beyersdorf with fish camp visits, and *Kathy Turco* made sound recordings at fish camps



2002 volunteers from Huslia: *Darin Huntington, Robert Farmer, and Ross Sam*, following float pond dock installation in May. (JH)

with Orville Huntington in 2001. *Gared* and *Lorrie Grube* assisted with a frog survey in 2002. *Sandy Scotton* volunteered at Ella's Cabin Moose Hunter Check Station on the Koyukuk, and *Kevin Strand* and *Jim Torkelson* spent two weeks at the Nowitna Check Station in 2002.



*Refuge staff 2002 (L to R) Mike Spindler, Geoff Beyersdorf, Wayne Strassburg, Abby Kirkaldie, Greg McClellan, Bob Lambrecht, Rosie Cassou, Jenny Bryant, Melanie Hans, Nathan Schwalen, Karin Lehmkuhl (Not pictured: Joe Huhndorf, Brad Scotton, Deborah Webb, P.J. Simon, Pat Madros, Jr., Orville Huntington)*

The Refuge lost several staff members in 2000 and 2001, then started to build back up in 2001 and finally got close to fully staffed by the end of 2002. The Refuge Clerk position became vacant on 9/30/00 and was not filled until 3/11/01 when Melanie Hans (who had volunteered for the refuge in 2000) accepted the position. Greg McClellan transferred from the Yukon Flats NWR in March 2001 to fill the Deputy Refuge Manager position that had been vacant since February 2000. FMO Rebarchik accepted a new position with the Service as a zone FMO in Missoula, Montana in June 2001. The position remained vacant despite several advertisements until May 2002, when Bob Lambrecht transferred from the U.S. Forest Service in northwestern Montana. In June 2001, Geoff Beyersdorf transferred from Togiak NWR and came onboard as our Subsistence Coordinator filling a position that had been vacant since November 2000. In July 2001, RM Gene Williams transferred to Lake Andes NWR in South Dakota. DRM McClellan was designated acting refuge manager until November 5, 2001 when SWB/AP Mike Spindler was promoted to the Refuge Manager position. WB Hughes transferred to Hawaii with the National Park Service in October 2001. This position was also advertised several times until it was filled with the selection of Melanie Hans in December 2002, but unfortunately it left the Refuge Clerk position vacant again. Finally, the Supervisory



Wildlife Biologist position remained vacant, again in spite of several advertisements, until September of 2002 when Brad Scotton who transferred to US Fish and Wildlife from ADFG in Glenallen. Brad has quite a bit of flying experience and will be converted to a dual function pilot in 2003 once he completes his training. After starting the period with multiple vacancies of permanent staff we end 2002 with only one vacancy, Refuge Clerk.



*RIT Patrick Madros Jr. and Volunteer Edward George during Kaiyuh goose production survey in 2001. (MH)*

During this two year period, WB Bryant and SCEP Webb earned promotions. In 2001 and 2002, the Refuge was able to hire Patrick Madros Jr. from Nulato as a seasonal RIT. He has been a big help working with our Yukon River villages. With all the vacancies and changes in staff, several staff members received

awards for all their extra duties. SC Beyersdorf received two awards in 2001, one for his efforts during the subsistence fishing season and the Nowitna moose hunters check station and the second award was for his efforts with the fall moose surveys. Geoff also received two awards in 2002, one from the Fairbanks Fisheries Resources Office for his efforts with the subsistence in-season salmon harvest pilot project and one from the Refuge again for the in-season harvest project and his efforts in getting subsistence fishing information out to local residents through weekly fishing reports on the local public radio station. WB Bryant received an award in 2001 for her efforts on the fall moose surveys. AT Cassou received an award in 2001 for managing the budget and fiscal year closeout with the departure of RM Williams in June. In 2002, Cassou received a quality step increase for consistent, overall excellent performance. RC Hans received awards in both 2001 and 2002 for her efforts in filling in for various vacant positions and being responsible for maintaining all computers, computer network and all GIS work. P Huhndorf received an award in 2001 for his efforts with the fall moose surveys. RIT Huntington received an award in 2002 for his efforts with the subsistence in-season salmon harvest project and leading steel shot clinics. PR Lehmkuhl received two awards in 2002: One from the Yukon Flats Refuge for her efforts with the Earth Quest Science Camp and one from the Refuge for her efforts in leading the summer biological field work in addition to her efforts with the annual science camp and investigation of the archeological site at the



*Precision timing and lightning reflexes enabled this crackerjack wood frog capture crew of volunteers Lorrie Grube, Gerad Grube, and Nathan Schwalen, to excel during the 2001 frog malformation study. (MH)*

Nogahabara Sand Dunes. In 2002, Refuge Volunteer Nathan Schwalen received an award from Yukon Flats NWR for his efforts with the Earth Quest Science Camp. In 2001, DRM McClellan received an award for his efforts as acting refuge manager for four months. In 2002, DRM McClellan received a quality step increase for his consistent, overall excellent performance. In 2002, RIT Madros received an award for his efforts with the subsistence in-season salmon harvest project and assisting with steel shot clinics. In 2001, SWB Spindler received an award for coordinating and leading the white-fronted goose banding work among three refuges and incorporating the work into a Challenge Cost Share project involving high school students from four villages. In 2001, MW Strassburg received an award for his work in refurbishing the house the Refuge acquired from the FAA in 2000. In 2001, SCEP student Webb received an award for her work documenting migration timing and stop over timing of Interior white-fronted geese in Canada. In 2001, RM Williams received an award for his excellent overall performance at the Refuge. In 2002 RM Spindler received an award for involving the Refuge in partnerships.

### **E.5. Funding**

The total station budget generally increased from FY98 to FY02, offsetting inflation and increasing operational costs (Table E.5.1). The significant drop in fire money (9251) in FY 02 was due to the vacancy of our FMO position for the first eight months of the fiscal year plus the completion of a habitat mapping project. In FY01, the Refuge received \$60K in fire money to complete a satellite mapping project of the vegetation of the Koyukuk Refuge. Subsistence funding was \$106K in FY01 and \$116K in FY02 (part of 1261 base). The increase was due to an additional \$10K received from Yukon Flats NWR when they were unable to fill a Subsistence LE position. MMS funding for FY01 was \$24K in annual equipment funding. In FY02, the annual equipment funding increased to \$35K plus \$11K in deferred maintenance money to replace a 150 HP 2-stroke outboard with a new 4-stroke 130 HP outboard motor. In FY01, an additional \$104K in MMS funding for Refuge projects was received by the Division of Engineering for two projects. One project was for \$39K to purchase three 500 gallon double-walled heating fuel tanks for three of our residences in Galena. Engineering was able to get additional funding to purchase three more tanks to replace the heating fuel tanks at all six residences in Galena. The second project was \$65K to purchase a temporary airplane storage building for Galena. In FY02, an additional \$44K in MMS funding for Refuge projects was received by the Division of Realty to design and produce plans to rehabilitate the 1940's two bedroom house that is used as a bunkhouse. The Division of Engineering was able to come through again in FY02 and get additional funding to design and produce plans to rehabilitate the three bedroom house the refuge acquired from the FAA in 2000. In FY01, the Refuge received \$25K in Challenge Cost Share funding to study timing/migration of interior NW white-fronted geese. In FY02, the Refuge received \$22K in Challenge Cost Share funding to continue the white-fronted goose work and also received \$5K in funding to archive oral history recordings of Koyukon Athabascan elders onto a web-site at the oral history collection at the UAF Rasmussen Library. (See section J.1.).



Beginning in 2000, the federal subsistence fisheries program (1937) provided additional money to base operations funds. An allocation of \$15,000 was received to cover costs associated with travel related to newly acquired fisheries responsibilities. In FY01 and FY02, Federal subsistence fisheries program funding was increased to \$45K each year and the cost code changed from 1937 to 1332. Most of the increase was to help pay a little less than half of the salary costs for our permanent RIT. In FY02, the Fairbanks Fisheries Resources Office, Yukon River Drainage Fisheries Association, and the Refuge submitted a proposal and was awarded subsistence fishery funding for a pilot project to collect in-season subsistence salmon harvest information. The Refuge directly received \$6K in additional funding for this project to help pay salary costs for our seasonal RIT, and another \$6K from the Fairbanks Fisheries Resources Office to help cover refuge costs for the in-season project. The regional office each fiscal year (01 & 02) contributed funding for up to four pay periods of SCEP student Deborah Webb's salary.

Table E.5.1. Koyukuk-Nowitna Refuge Complex Funding, 1998-2002.

<b>Program</b>	<b>FY98</b>	<b>FY99</b>	<b>FY00</b>	<b>FY01</b>	<b>FY02</b>
1231		15,000	20,000	20,000	9,000
1261	1,054,000	1,113,000	1,255,000	1,316,000	1,368,000
1262	33,000	224,000		24,000	46,000
4960	1,400	2,108	3,277	774	
8610	35,499	31,000	53,457	32,225	20,195
1937			15,000		
1332				45,000	45,000
9251	163,000	128,000	123,000	188,000	85,000
9252					
<b>Total</b>	<b>1,286,899</b>	<b>1,513,108</b>	<b>1,469,734</b>	<b>1,625,999</b>	<b>1,573,195</b>

Toward the end of FY01, the Refuge contributed \$20K back to the regional office to be used by other offices in need of funding. In FY02, the Refuge received an additional \$28K in 1261 funding to pay back funds that were contributed in previous years. In FY02, the Refuge received an additional \$15K in 1261 funding to pay for either a contaminant survey or our proposed lease site for placement of temporary airplane storage building.

## **E.6. Safety**

### **2001**

In March, AT Cassou renewed and updated her CPR instructor certification.

In March and April, Wildlife Biologist Hughes and Airplane Pilot Huhndorf inventoried the field gear safety cabinet. Based on the anticipated needs for the upcoming field season, an

order was submitted and processed for re-stocking the necessary supplies and field gear. In May, RC Hans inventoried and re-stocked the primary field medical bags. Other safety items purchased during the year included an adult manikin, adult cervical collars for CPR instruction, and escape ladders for the six government residences.

On May 21 2001, Airplane Pilot Huhndorf attended a Fuels Handling and Quality Control Seminar; this is training required by the Region 7 Aviation Policy Handbook. The seminar was one day in duration and covered fuels handling and quality control issues associated with aviation fuels. Huhndorf received technical and safety information from presenters, mainly petroleum equipment manufacturers and suppliers, on the configuration and safe operation of fuels dispensing systems. A luncheon presentation was also made by retired USFWS Region 7 Airplane Pilot Wardleigh and retired USFWS Region 7 RAM Hyatt on the importance of fueling and safety issues to aviation. They are now currently representing the Alaska Aviation Safety Foundation, a non-profit Anchorage-based organization promoting aviation safety in Alaska. As a result of what was learned at the seminar, in addition to information gleaned through discussions with OAS Fuels Specialist Mathwig, Airplane Pilot Huhndorf has begun an upgrade of the station's three aviation fuel dispensing units in order to meet current safety and performance standards. This project's anticipated completion date is the end of 2002.

Also in March and April, Airplane Pilot Huhndorf updated the listing of field personnel requiring safety training. Instructors were contacted and class dates and times were scheduled for the traditional latter two weeks in May. In 2001 the Watercraft Safety training was provided by FMO Rebarchik for all personnel requiring initial watercraft operator qualification. A new re-certification training and testing program authorized for use by Service personnel and available on the Internet was successfully used by staff being re-qualified. Administrative Technician Cassou instructed CPR and Basic First Aid. Wildlife Biologist Hughes instructed Bear Safety and Firearms Certification. Wildlife Biologist/Pilot Vivion of Yukon Flats National Wildlife Refuge was able to fly out from Fairbanks with his classroom materials, instruct the Basic Aviation Safety Course (B-3), and return the same day.

Wildlife Biologist Hughes and Airplane Pilot Huhndorf began contacting potential instructors early for the station's B-3 course due to the transfer of Law Enforcement Officer/Pilot George of Kenai NWR to another refuge outside of Alaska. Mr. George instructed B-3 for the station in the past. Despite Hughes and Huhndorf's best efforts, the commitment from a qualified instructor was not secured until approximately one week before the scheduled class time. This is because the Fish and Wildlife Service is very short-staffed on qualified B-3 instructors in Region 7 during spring/early summer. The seasonal availability of volunteers and biological technicians who make up a good portion of refuge field staff in summer months reduces our flexibility for scheduling the training week and makes any other time impractical for the station.

Koyukuk/Nowitna's safety instructor ranks were depleted in 2001 due to individual staff members transferring to new posts. FMO Rebarchik, the Water Craft Safety Instructor, and Wildlife Biologist Hughes, the Bear Safety and Firearms Instructor, both transferred to new assignments. Fortunately, these actions took place after the station's training week; however,

it appears that for 2002 the station will be faced with importing instructors for these three courses in addition to the B-3 course. The station has sought to qualify Airplane Pilot Huhndorf as an in-house B-3 instructor before the 2003 training week and will actively recruit and qualify in-house staff members to fill Watercraft Safety, Bear Safety and Firearms Qualification instructor positions.

During the last week of August 2001 DRM McClellan assisted with manning the State's check station at Ella's Cabin within the Koyukuk NWR. A local hunter from Nulato with his grandson stopped at the check station. The grandson had a deep cut on his hand. DRM McClellan used a refuge radio to phone patch a local pilot, Colin Brown, who flew out to the check station and brought the boy back to the Galena Clinic.

There were no lost-time incidents or accidents to report for 2001.

Koyukuk/Nowitna's staff was only able to conduct two official safety meetings during the year due to the retirement of the station's collateral duty Safety Officer DRM Good in February 2000. The two safety meetings were conducted by staff in conjunction with biological and logistics planning sessions for refuge field activities during the year. Current Refuge Manager Spindler and DRM McClellan observed and noted during a staff meeting that the existing staff has been exceptionally cautious during this time without an official collateral duty Safety Officer at the station. The station anticipates a new Safety Officer will be designated during 2002 and will, at that time, resume a regular quarterly schedule of staff safety meetings dedicated only to safety issues.

## **2002**

There were no lost-time incidents or accidents to report for the year. In April, AT Cassou completed EMTA instructor training which enabled her to instruct CPR/First Aid training to staff in a reduced time of 8 hours versus the previous schedule of 12 hours.

Regional Safety manager Dick Stiefken and safety specialist Charity Haring completed a safety inspection of the Refuge facilities in Galena. Several outstanding items were noted. Most of these items were fixed within a couple of weeks. The inspection noted several plans that need to be written or updated. With the recent extensive changes in staff the goal is to complete or update these plans in 2003. A couple of items, such as light placement and railing strength were highlighted concerning the leased office building and shop/storage building. These items will be negotiated with our landlord during annual renewal of the lease.

An on-site field safety training week was severely curtailed in 2002 due to lack of available instructors (anywhere in Alaska during the required time frame). Instructors were not available for Basic Aviation Safety, Bear Safety, and Boat Safety. CPR/First Aid was instructed by Koyukuk/Nowitna's Administrative Technician Rosie Cassou. Firearm safety and qualification was instructed by Instructor Barry Whitehill of Yukon Flats NWR. Individuals requiring re-qualification for Basic Aviation were able to re-qualify on the OAS

website although there were some difficulties with this due to limited internet access. Biotech Abby Kirkaldie and Volunteer David Atchley were flown by Airplane Pilot Huhndorf to Innoko NWR in McGrath to complete their initial certifications for Bear, Aviation (Atchley/Kirkaldie) and Boat Operator (Kirkaldie).

FMO Bob Lambrecht reported for duty in May, and in October was officially designated as the station's collateral duty safety officer. A safety committee composed of Lambrecht, Pilot Huhndorf, DRM McClellan, SC Beyersdorf and WB Bryant was organized and held their first quarterly meeting in October. Lambrecht surveyed the Refuge's facilities, including all cabins, and made lists of discrepancies which may affect safety if left uncorrected. Steps are being taken to correct the deficiencies as resources are available. One of the most noteworthy is the assignment and periodic maintenance of the station's fire extinguishers. FMO Lambrecht has made an exceptional effort to survey this situation and then upgrade, re-assign, or replace these units as necessary. The Refuge Complex has nearly completed this task.

Koyukuk/Nowitna's safety instructor ranks will be restored this year. Subsistence Coordinator Geoff Beyersdorf has been assigned collateral duty Watercraft Safety Instructor and completed the motorboat operator instructor certification course (MOICC) in September. Wildlife Biologist Jenny Bryant was assigned collateral duty Bear and Firearms Safety Instructor. Airplane Pilot Joe Huhndorf was assigned collateral duty Basic Aviation Safety Instructor. Both Bryant and Huhndorf will complete their instructor training in early 2003.

Airplane Pilot Huhndorf has completed an upgrade of the fueling systems at Galena's Alexander Lake Float Plane Dock (located at Quarters 3) as well as the pilot's fuel truck AVGAS dispensing tank. The AVGAS dispensing tank at Huslia's Mingogut Lake was also upgraded. A leaking fuel tank in the AVGAS truck was replaced with a more modern tank meeting state and federal highway standards. New aviation-approved American Petroleum Institute (specification 1529) arctic hose was installed on all three tanks to meet OAS safety requirements. New aviation nozzles with special in-line strainers were also installed to catch any sediment or contaminants generated by the filters, long hoses and any related hardware downstream of the filters. Bonding wires were connected to equalize static electrical potential between tank and plane. New hose reels were installed at Alexander Lake and Huslia to store the 200 feet of hose when not in use. A special shed was constructed and installed in September of 2001 by Pilot Huhndorf and Innoko NWR Maintenance man Tom Siekaniec. This shed will be for housing spill containment materials and protecting the new Huslia AVGAS dispenser from weather and potential vandalism. The shed was pre-fabricated by Huhndorf and Siekaniec in Galena and then hauled on the station's 24-foot Alweld river boat the 240 miles to Huslia and erected at the fuel tank site. USFWS's long-time friend and volunteer Steven Attla provided his assistance operating his truck to haul the large and heavy pieces of the building from the river landing to the tank site.

## **E.7. Administration, Other**

**Privatization.** Koyukuk and Kanuti National Wildlife Refuges were the object of recent efforts to privatize certain government functions, including operations of national wildlife refuges. The coincidence of Interior Department and Congressional goals to privatize, the goals of a special interest group represented by a Fairbanks lawyer, brought these two Refuges close to contracting out significant functions. Late in 2001 a loosely-organized group named the Koyukuk River Moose Co-Management Team ("K-River Team") began legal and legislative efforts to contract with the USFWS under PL-93-638 (the Indian Self Determination Education and Assistance Act, ISDEAA). This group, which originally came into existence in 1997 to represent native village interests during the Alaska Department of Fish and Game (ADFG) moose management planning process, brought suits against ADFG in 2000 and 2001 over the outcome of the moose planning process. The state ultimately prevailed in both lawsuits. In December 2001 Mike Walleri, legal counsel to the K-River Team, wrote a letter to the USFWS Regional Director in which he sought to negotiate an annual funding agreement "to conduct moose population census, habitat management, and other similar programs" for the Service under ISDEAA. Walleri also wrote "We believe that these activities, functions and programs fall within contractable items identified in the Federal Register notice published on February 24, 2001."

A pre-scoping meeting held on January 9, 2002 in the Anchorage Regional Office was attended by DRM Greg McClellan, Kanuti RM Bob Schultz, RS Jerry Stroebele, and Regional Solicitor Joe Darnell. During that pre-scoping meeting the K-River Team, represented by Mssrs. Mike Walleri, Stanley Ned and George Yaska, discussed the possible contracting of the above-mentioned moose related work, plus a broad array of additional wildlife surveys and research, and the development of wildlife regulations including those governing subsistence management. Following this meeting the Regional Director responded to the K-River Team in a letter dated May 21, 2002. Regional Director Allen stated:

"It is doubtful that any of the work listed in your December 28, 2001 letter, or discussed at the pre-scoping meeting, is contractible under Title I of ISDEAA...None of the activities that you identified are performed '*for the benefit of Indians because of their status as Indians.*' Virtually all of the work done by the Service on our National Wildlife Refuges is done for the benefit of the American public in general. At this point we are not aware of any programs, functions, services, activities, or portions thereof, or other work performed by the Service on or off the Kanuti and Koyukuk National Wildlife Refuges which would likely be available to an Indian tribe through an ISDEAA Title I contract. Notwithstanding the forgoing, we are willing to work cooperatively with you to determine what Service work could be performed by the six tribes of the Koyukuk River Basin Moose Co-management Team through other means.....Our goal would be to find mutually supportable work that could be performed under an appropriate annual funding agreement...Our interpretation of Service programs as they relate to ISDEAA does not dull our desire to work closely and cooperatively with the Native villages of Alatna, Allakaket, Evansville, Hughes, Huslia, and Koyukuk in a government-to-government manner. We earnestly desire a good relationship with these

tribes and recognize that to do a good job of conserving fish and wildlife resources within the Koyukuk River ecosystem we need to continue working together. Even if the ISDEAA is not applicable, we intend to support and pursue other avenues that will benefit both the Service and the tribes.”

In May and June of 2002 Refuge staff considered which programs might be better conducted by an outside organization such as the K-River Team. We decided that certain village outreach, environmental education efforts (especially with young adults) and village harvest surveys probably would be conducted more effectively by such an organization. However, we did not believe that resource monitoring, research, and management activities could be more effectively contracted out to an outside organization such as the K-River Team, mainly due to the highly technical nature of the work, and long-lead times required to build capacity and data continuity. While the Regional Director’s letter was being drafted, it came to be known to the Service, quite by surprise, that the K-River Team also sought to enlarge their scope of influence legislatively as well as administratively. Alaska’s Representative in the House introduced HR 4734 “The Alaska Federal Lands Management Demonstration Project Act.” This bill spoke in general of the desire to improve cooperation between the federal government and tribes, and contained specific language with regard to Koyukuk and Kanuti NWR’s:

“Notwithstanding any other provision of law, except as provided in this section, the Secretary shall enter into contracts, compacts, or funding agreements under the Indian Self-Determination and Education Assistance Act (25 USC 450) with the Koyukuk River Moose Co-Management Team, Inc. upon receipt of authorizing resolutions from its member tribal or village councils, to establish a demonstration project providing all programs functions services and activities of the Koyukuk and Kanuti National Wildlife Refuges.”

The bill specifically defined how Refuge employees would be transferred over to work for the K-River Team and remain federal employees pursuant to the Intergovernmental Personnel Act (5 USC 3371). This bill did not have a matching counterpart nor equal support in the Senate.

RS Jerry Stroebele traveled to Washington D.C. in June 2002 to assist Interior Department representative Paul Hoffman with testimony to the House Resources Committee concerning HR 4734. The official Interior Department comments to the section of the bill on Koyukuk and Kanuti NWR’s included:

“Refuges are managed as part of a national, connected network of lands and waters managed to help conserve this nation’s fish and wildlife habitats for the benefit of present and future generations of Americans. H.R. 4734 significantly conflicts with provisions of the National Wildlife Refuge Administration Act, as amended, PL-105-57.

“There are refuge management decisions and functions that cannot be made outside of the National Wildlife Refuge System, and others that would be difficult to translate into a contracting arrangement. Many functions performed on a National Wildlife Refuge

are directed at meeting public trust. We will continue to contract certain functions, and consult and collaborate with our refuge neighbors. Federal employees who have spent years training and working in the National Wildlife Refuge System are in the best position to meet the public's expectation of management with a national view. For instance, our managers must determine whether an activity is compatible with all the establishing purposes of the refuge and the mission of the national Wildlife Refuge System – a decision made more difficult if not impossible when a contractor has experience in only one location. Even within Alaska, our refuge managers must coordinate management of resource monitoring and other activities with the State of Alaska and other federal land managers. Again, we believe this would be difficult for a contractor to accomplish in a way that meets our national mission and our responsibilities to the public for operating an efficient organization.”

Mr. Hoffman's testimony also noted that the Koyukuk NWR staff of 11 full time permanent employees included five Koyukon Athabascan local-hire employees, and that the Refuge has been conducting considerable work in cooperation with local village Tribal Councils.

HR 4734 was reported out of the House Resources Committee on October 11, 2002 but a vote did not occur in 2002.

Refuge staff were invited to a K-River Team meeting in Fairbanks on November 11, 2002. DRM Greg McClellan and Kanuti NWR RM Bob Schultz and ADFG Planner Randy Rogers were the agency personnel who attended that meeting. Following are some excerpts from the meeting report prepared by McClellan and Schultz:

“Walleri stated that K-River team was started because of the concern by Allakaket people over trespass problems on their allotments. Walleri also indicated that the FWS had authority to deal with trespass problems on native allotments. I asked him under what authority and he responded under the Lacey Act and one other act that he could not remember at the time. He said that the reason FWS was not dealing with trespasses was because of the Federal prosecutors racial views.

“Walleri then reported on the status of legal cases. K-River Team versus Rue (Commissioner of ADFG) is the older case. The case was an attempt to force ADFG to make determinations on the sustained yield and the amount necessary for meeting subsistence need for the moose population in the Koyukuk River drainage. The Board of Game made those determinations outside the court case. The team lost, but the Judge ordered the State to pay the team's attorney's fee. The payment of fees is currently being litigated.

“K-River versus Board of Game, I believe Mike said the determinations that the Board made was a 5% yield in 24 and 21D and a 7.5% yield in the Koyukuk Controlled Use Area. The K-River Team is suing the State over the question if they can exceed these levels. Currently, both sides have filed briefs in the case. Oral arguments should be held sometime this winter, as early as December 2002 or as late as February 2003. A decision should be rendered sometime

in spring 2003.

“Fred Bifelt, Huslia representative to the K-River Team, indicated this is his first meeting he has attended so wasn’t up to speed on things. Fred asked Mike to confirm the Team is suing the State. Fred cautioned that they should only sue as a last resort. Better to try and work with people. When you sue, you just polarize people. It is costly. Only people who are happy are the lawyers. Fred said that he is in favor of people working together, and that he has felt that the Refuge has worked well with the Village of Huslia. He stated that villagers’ emotions against non-local hunters who compete with local hunters were running high, but that lawsuits and takeovers were not the way to solve problems. Fred commented that because their name was K-River Moose Co-management Team they should try to cooperate with the agencies, not litigate or legislate against them.

“Walleri then reported to the team that the HR 4734 bill was reported out of Committee on October 11. It hasn’t passed the full House yet. If the bill dies in this session, it will have to be re-introduced next session. Word he has received from Rep. Young’s office is that he expects to get the house to pass the bill during the lame duck session. If the bill dies, Rep. Young will re-introduce next session. According to Walleri, if Republicans have control of the Senate during the lame-duck session, there is a good chance the Senate will take up and pass the bill. However, he indicated the general feeling is that the bill will not get passed during this session. Walleri also reported that during Alaska Federation of Natives meeting in October, he met with Secretary of Interior’s Special Assistant for Alaska, Cam Toohey. (RS Stroebele also held a briefing with Toohey on November 10, the day before this K-River Team meeting).

“Walleri told the Team ‘they could ask TCC to roll the two Refuges into Tanana Chiefs Conference (TCC) compact and the Service would be required to negotiate. Also, the Service has the ability to contract out their programs now.’ Walleri then asked the Service again for a list of specific programs that the Service/Refuges was interested in contracting/compacting. He indicated they had not received that list to date. He suggested the Team draft up a letter trying to clear up some possible misconceptions and re-state what they want.

“Greg reported on the efforts the Koyukuk Refuge has made in working with local entities, and noted cooperative efforts with Loudon with GIS mapping work and science camp. This summer we worked with Fairbanks Fisheries Office, YRDFA on in-season salmon harvest monitoring, and hired Edward George from Nulato to work on the project. He noted our five permanent staff who are local residents. For seasonals we hired Patrick Madros last two summers and had P.J. Simon working with us this summer. Vincent Bergman asked what I meant by expertise? Greg replied ‘that using moose surveys as an example you need pilots (and planes) that have the expertise to fly the surveys. You need the expertise of observers who are able to fly in planes, count and identify moose and record data. You need expertise to be able to analyze the data and be able to present the information.’

“Greg and Bob gave the K-River Team a copy of the Koyukuk 2001 moose survey report, a handout developed by Jenny Bryant listing biological and educational programs we do on a



regular basis and a list developed by RM Spindler of recent cooperative projects since 1990 that the Refuge has been involved in with various entities.

“Several people on the K-River Team commented on the recent effort in Galena to form a group to encourage harvest of wolves and trying to raise money to support that. The K-River Team discussed the change of administration on State side and likelihood of seeing predator control. Randy Rogers cautioned that even if the K-River Team could get something started in State government, there is a lot of Federal land out there and they would need to get approval on the Federal side. There was discussion that this is an example of where local villages can really make a difference on their own and don't need to worry about what the State or the Federal government is doing.”

Following this November 2002 K-River Team meeting, Fred Bifelt reported results to the Huslia Tribal Council. As a result, RIT Orville Huntington wrote “this is the first time the Tribal representatives took the initiative to choose their own direction for the future of the Co-management effort. What the K-River Team would like is to start working cooperatively with the Alaska Department of Fish and Game and the federal agencies who manage along the Koyukuk River drainage, and move away from legal strategies. Bifelt reported that there were four issues the K-River Team would like to address as they move toward Co-management: 1. Predator Control, 2. No limits to guides and transporters, 3. Hunter and Trapper education, 4. Review of what has worked and not worked in the past.”

At the end of 2002 Refuge staff were relieved that this legal-legislative privatization effort seemed to diminish and move towards a cooperative working relationship with the tribes.

#### **E. 8. Technical Assistance**

In April 2002 Karen Brewster of the University of Alaska Library- Oral History Collection requested our assistance in planning a river trip along the Yukon and Kuskokwim Rivers to interview elders about their use of driftwood. We provided information on river miles, travel times and gas availability to Ms. Brewster. We referred her to the Innoko and Yukon Delta NWR staffs for information about the Kuskokwim River.

In December 2002 we received a request from Susan Paskvan, a graduate student at University of Alaska, who was planning a trip to the Kaiyuh Flats and Yukon River below Nulato to interview elders about Koyukon place names. She requested use of a Service boat in summer 2003. We tentatively decided to become a cooperator on the study and made plans for RIT Patrick Madros to drive a refuge boat to the places she will need to visit in summer 2003.

On numerous occasions in 2001 and 2002 we provided bunkhouse accommodations to Alaska State Fish and Wildlife Protection and Alaska Department of Fish and Game personnel while conducting work that was usually related to the Refuge. We also provided accommodations to Yukon River Drainage Fisheries Association personnel and visitors for the Yukon Jamboree while on site visits to Galena. In most cases these requests were filled because the limited local bed and breakfast accommodations were full or inconvenient to work locations.

## F. HABITAT MANAGEMENT

### F.1. General

The rivers in the Refuge lowlands are characterized by low gradients, meandering courses, and heavy spring flooding. Flooding during spring is common, and it is often mid-summer before most of the flood waters subside on the Koyukuk. The Yukon, Nowitna and Koyukuk rivers carry a heavy silt load at flood stage. Meandering creeks with steep banks are typically slow and shallow. River and larger creek corridors present a dynamic, shifting mosaic of habitats supporting many important species of wildlife on the Refuge. As rivers and creeks move through the flood plain, outside banks and vegetation are eroded into the river and inside banks are built up through the deposition of silt, sand, and gravel. New inside bank soil deposits along rivers and creeks are well drained and are usually free of permafrost. Deeper bodies of water are also usually underlain by non-permafrost soils. These factors create a steep willow habitat gradient away from river and creek channels. Riparian vegetation usually includes willow (*Salix* spp.) and alder (*Alnus crispa*, *A. incana*) thickets along gravel bars on the water edge; stands of cottonwood (*Populus balsamifera*) trees higher on the bank; and bands of white spruce (*Picea glauca*) on the highest banks which vary in width depending on the size of the river.



*Extensive boreal forests, interspersed with numerous wetlands, form the predominant habitat on Koyukuk, Nowitna and Northern Innoko NWR's. Here the Kokrines Hills form a backdrop to the Yukon River floodplain on the north side of Nowitna NWR. (JB)*

Further from the rivers and sloughs, white spruce stands typically grade into black spruce (*Picea mariana*), which grade into treeless bog and wet sedge habitats. On extremely winding rivers, large oxbows form; often concentric bands of the above-mentioned species in various stages of succession are intermingled with strips of grasses and sedges and open water. Stands of broadleaf deciduous forest often mix with white spruce forest along river corridors and are also typically found on south facing slopes, steep cliff faces, ridge tops, and on sandy deposits found throughout the northwestern portion of the Refuge in the Koyukuk Wilderness Area.

Treeless bogs resemble arctic tundra communities and are the predominant vegetation type in the center of the Koyukuk Refuge, and in scattered locations on the Nowitna and Kaiyuh Flats (N. Innoko). Bog vegetation on the Complex consists of various species of cotton-grass (*Eriophorum* spp.), dwarf birch (*Betula nana*, *B. glandulosa*), bog blueberry (*Vaccinium*

*uliginosum*), Labrador tea (*Ledum palustre*), leatherleaf (*Chamaedaphne calyculata*), myrtle (*Myrica gale*), sedges, and mosses, especially sphagnum moss and peat. Other species of bog habitat include bog rosemary (*Andromeda polifolia*), bog cranberry (*Oxycoccus microcarpus*), and sundew (*Drosera anglica*, *D. rotundifolia*). On drier ridges, willow, alders, resin birch (*Betula glandulosa*), black spruce and American larch (*Larix laricina*) are found.

Extent of land cover types was mapped on units of the Complex in the mid-1980's, and estimates were included in the Refuge Comprehensive Plans (1987). Technical information for part of this mapping project was reported in Talbot, S. S., and Carl J. Markon (1986). Vegetation Mapping of Nowitna NWR, Alaska Using Landsat MSS Digital Data. Photogrammetric and Remote Sensing. Vol 52, No. 6. June 1986, pp 791-799.).

Refuge staff joined forces with Ducks Unlimited, the Bureau of Land Management, the U.S. Air Force, and Spatial Solutions, Inc. to form a multi-agency partnership to produce modern land cover maps from high resolution satellite imagery. The goal of this partnership is to map vegetation on over 16 million acres of land in Alaska's Western Interior by the summer of 2002. Included in the project is our entire 7.7 million acre Refuge complex. Field work for the Northern Unit of Innoko (731,634 acres) was completed in 1998 and a draft map product was produced in 2000. The field work for a 2.2 million acre portion of western Koyukuk NWR was completed in the summer of 1999. The remaining 2.3 million acres of the Koyukuk was completed in the summer of 2001. A finished product for the Koyukuk NWR was received in August of 2002. Fieldwork to map the Nowitna NWR (and the adjacent U.S. Air Force Galena military operations area totaling 5 million acres) was completed in summer 2000. A final map product for the Nowitna NWR was received in September of 2002. Work on the remaining 2.3 million acres of the Koyukuk was completed in the summer of 2001, which resulted in finished products for the entire Koyukuk NWR in 2002.

## **F.2. Wetlands**

The floodplains of the Koyukuk, Nowitna, and Yukon Rivers form a major component of the Refuge Complex. The actions of these meandering rivers have created a high diversity of wetland habitats for fish and wildlife. Each of the main rivers in the Refuge units has distinct hydrological characteristics, which in turn create differences in floodplain and wetland characteristics. For example, the Nowitna River originates in limestone bedrock in the Kuskokwim Mountains, which contributes carbonates that buffer the acidic qualities of the river and make it more productive than many of its Interior Alaskan counterparts. The Yukon River runs through all units of the Complex, and is the fifth largest river system in North America. The Yukon is silty for most of the summer because of glacial sources in the Alaska Range and Wrangell-St. Elias Mountains. The Koyukuk River originates along the Arctic Circle in the Brooks Range, and is subject to later snowmelt runoff than the Yukon and Nowitna. In early June, at the height of waterfowl nesting, water levels of the Yukon and Nowitna may be low, while the Koyukuk River may be flooding due to mountain snowmelt in the arctic and subarctic portions of the Brooks Range. In summer any of these rivers may respond to localized heavy thunderstorms or more extensive late summer weather fronts. There are about 14,000 lakes

and ponds on the Nowitna Refuge, where wetland acreage is estimated at about 30,000. Koyukuk and Northern Unit of Innoko NWR (Kaiyuh) have an estimated 15,000 waterbodies and 5,500 miles of rivers and streams. There are an estimated 280,000 acres of wetlands on the Koyukuk and Northern Innoko.

Refuge wetlands include upland basins, ice-formed lakes on the flats, river flooded lowlands, oxbows, and bog lakes. Spring runoff, rain, and river flooding recharges lakes. Water depths and shorelines can vary from year to year. Lake depths seldom exceed 15 feet and are usually much shallower. Water temperatures in shallow lakes reach 70°F or more in mid-summer, creating ideal conditions for growth of aquatic plants and invertebrates. Among the aquatic plants, duckweed (*Lemna* sp.), horsetail (*Equisetum* spp.), water milfoil (*Myriophyllum* sp.), mare's tail (*Hippuris vulgaris*), and smartweed (*Polygonum* sp.) are abundant. One or more of 12 species of pondweed (*Potamogeton* spp.) occur in almost all lakes. Indicators of bog lakes include water lily (*Nuphar polysepalum*), pygmy water lily (*Nymphaea tetragona*), water hemlock (*Cicuta douglasii*, *C. mackenziana*), water parsnip (*Sium suave*), buckbean (*Menyanthes trifoliata*), and bladderwort (*Urtricularia macrorhiza*). Shorelines of bog lakes vary in character, but nearly always contain buckbean (*Menyanthes trifoliata*), wild calla (*Calla palustris*), various sedge species (*Carex* spp.), and burreed (*Sparganium hyperboreum*). Several species of graminoids including sedge (*Carex*), bluejoint grass (*Calamagrostis canadensis*), and foxtail (*Hordeum* sp.) provide cover on exposed shorelines. A variety of forbs grow on recently exposed soils along shorelines. Cattail (*Typha latifolia*), is an invasive species on the Refuge, and has recently appeared near Galena.

Shallow seasonally flooded basins (locally called “grass lakes”) are common along the Koyukuk, Yukon, and Nowitna rivers. Grass lakes are usually wetlands during spring breakup and flooding, and in summer become dry meadows, many of which show the beginnings of shrub and forest succession. The drier portions of grass lakes are vegetated primarily by bluejoint grass and occasionally arctic-bentgrass (*Arctagrostis latifolia*), an important food for geese. *Carex aquatilis*, *C. rostrata*, *C. capitata* and other sedges, and marsh cinquefoil (*Potentilla palustris*) dominate in the wetter portions. During flooding, sedges, and occasionally bluejoint grass will survive as emergent vegetation in water depths exceeding four feet.



A major differentiating characteristic of wetlands on the refuge is whether they are river-connected, which is a key determinant of productivity. This wetland complex, connected to the Nowitna River, receives annual flooding and nutrients from the river.



### F.3. Forest

Forests cover 88% of the Nowitna NWR and 41 % of the Koyukuk/Kaiyuh. Portions of the lower Koyukuk and Nowitna River floodplains, and some islands in the Yukon River, contain especially high quality white spruce timber measuring over 18 inches in diameter and over 100 feet high. Local residents primarily use spruce for house logs and firewood, although small commercial sawmills have operated in Tanana, Ruby and Galena. The Comprehensive Conservation Plans for Refuge units preclude commercial logging. Local interest in commercial logging operations on islands of the Yukon River has been expressed. Each year, a few permits are issued to local residents for personal harvest of house logs.

*Vegetation classes:* Many classes of forest vegetation occur on the Complex including closed needleleaf, closed mixed deciduous, open needleleaf, and needleleaf woodland. Each of these forest classes are arbitrary. While there are pure stands dominated by a single tree species, stands typically mix and grade into one another, depending on underlying soil moisture regimes. Mixtures create the opportunity to recognize other subclasses of mixed forest. The above generalized forest classes are described in more detail below:

Closed needleleaf forests occur on moist to well drained sites from the lowlands to mountain slopes and are particularly well developed on alluvial sites along the major rivers. Closed forests typically have 60% to 100% cover. The dominant tree species is white spruce (*Picea glauca*), which may grow to 80-100 feet tall, forming the largest stature forest found on the Refuge Complex. Understory species include northern toadflax (*Geocaulon lividum*), highbush cranberry (*Viburnum edule*), azalea (*Rhododendron lapponicum*), prickly rose (*Rosa acicularis*), sweetvetch (*Hedysarum alpinum*), and various species of feathermoss. This type comprises about 2% of the Refuge Complex.

Closed deciduous forests occur in well to imperfectly drained sites. White birch, aspen, and balsam poplar dominate the overstory. Other types of broadleaf deciduous forests occur in hills where strips of birch forest line hillside streams, and aspen is present on south-facing sandy hillsides. This subclass reaches its greatest extent on the Nowitna, where it covers 30% of total surface area. Only 3% of the Koyukuk was classified as this type.

Mixed forests have 25-100% cover of deciduous broadleaf trees mixed with evergreen needleleaf trees. Mixed forests are distributed mainly along the major water courses, especially on islands in the Yukon and Koyukuk Rivers, and on relatively dry, south-facing hillsides where drainage is good and permafrost is absent. The forest type consists of moderately tall (50 feet) to tall (80 feet) paper birch (*Betula papyrifera*), aspen (*Populus tremuloides*) and cottonwood, mixed with white-spruce. Common understory species found in mixed deciduous forest include highbush cranberry, currant (*Ribes triste*), bunchberry (*Cornus canadensis*), and prickly rose.

This type comprises 6% of the Koyukuk and 4% of the Nowitna Refuge.

Open needleleaf forests have 25-60% tree cover and are found on moderately to poorly-drained soils. This type is composed primarily of black spruce, but often includes larch (*Larix laricina*) and willows. This type is frequently found on north facing slopes and poorly drained lowlands usually underlain by permafrost. Ground cover species in this forest include bog blueberry, Labrador tea, sedges and mosses. In many areas a thick blanket of lichen species entirely covers the ground forming an open needleleaf-lichen association. This type dominates the Nowitna, making up 42% of the area. On the Koyukuk it occupies 7% of the area.



*The boreal forest has considerable range in tree stature, depending on slope, aspect soil quality, drainage, and presence of permafrost. Tree size ranges from quite small, such as these stunted black spruce, to large birch and spruce over 1.5 feet in diameter and 100 feet tall. Black spruce are characteristic of poorly drained sites with permafrost, while large birch and white-spruce are characteristic of well drained soils without permafrost.*

Needleleaf woodlands, which are sometimes called "muskeg," have 10% to 25% tree cover, and are found on moderately to poorly drained soils. These woodlands contain low, sparse, tree growth (mainly black spruce, but larch may be present). The ground cover resembles a treeless bog community dominated by shrub species such as Labrador tea, bog rosemary, bog blueberry, low-bush cranberry, bog cranberry, and crowberry (*Empetrum nigrum*). Various graminoid and moss species also may be common including cotton-grass, sedges, and mosses (*Sphagnum* moss and peat). This type makes up 26% of the Koyukuk and 10% of the Nowitna Refuge.

Fire regeneration: Wildland fires are primary agents of disturbance in the boreal forest, initiating successional changes which impact a variety of plant and animal species. Years of fire have produced a mosaic of seral stages within the Refuges, which provides a diversity of wildlife habitats. The general sequence of plant communities that become established after fire is as follows:

<u>Black Spruce Sites</u>		<u>White Spruce Sites</u>	
0-1 years	newly burned	0-1 years	newly burned
1-5 years	moss-herb	1-5 years	moss-herb
5-30 years	tall shrub-sapling	3-30 years	tall shrub-sapling
30-55 years	dense tree	26-45 years	dense tree
56-90 years	mixed hardwood-spruce	46-150 years	hardwood
91-200+ yr	spruce	150-300+ yr	spruce

These plant associations are described above and in section F6.

#### **F.6. Other habitats**

The Complex contains several non-forest shrub, herbaceous, and graminoid (grass-sedge) vegetation cover types. The most significant types are listed below:

Alluvial/lowland tall shrub: This type is dominated by deciduous shrubs ranging from 1.5 to 16 feet in height. It includes ‘lowland broadleaf’, ‘alluvial broadleaf’, and ‘subalpine broadleaf’ communities. Tall shrub communities are found primarily in floodplains, and are dominated by willows (*Salix alaxensis*, *Salix planifolia pulchra*, *Salix arbusculoides*, *Salix bebbiana*), and in some areas, alder (*Alnus incana*, *A. crispa*). Chief understory species include *Vaccinium vitis-idaea*, *Linnaea borealis*, *Calamagrostis canadensis*, and *Equisetum arvense*. The type makes up 4% of Nowitna and 3% of Koyukuk area.

Dwarf shrub-graminoid tussock peatland: This community contains slow-growing dwarf shrubs less than 1.5 feet tall, and frequently occurs on poorly drained organic soils. Mosses and lichens cover the surface. Dominant species include *Ledum decumbens*, *Chamaedaphne calyculata*, *Vaccinium uliginosum*, *V. vitis-idaea*, *Betula glandulosa* (or *B. nana*), *Eriophorum vaginatum*, *Carex bigelowii*, *Rubus chamaemorus*, *Sphagnum* spp., *Dicranum* spp., *Cladina* spp., and *Cetraria* spp. This is the dominant habitat type on the Koyukuk, comprising 27% of surface area, but makes up only 2% of the Nowitna Refuge.

Graminoid tussock-shrub: Plant composition is similar to above but dominated by *Eriophorum* tussocks, with lesser amounts of dwarf shrub and herbaceous cover. This type is transitional to arctic and alpine tundra in some areas. It is most common on the Koyukuk, and makes up about 14% of cover there.

Prostrate dwarf shrub tundra: characterizes relatively bare alpine communities dominated by low-growing matted dwarf shrubs. The habitat is also rich in lichens. Dominant species include *Dryas octopetala*, *Salix phlebophylla*, *Vaccinium uliginosum*, *V. vitis-idaea*, *Empetrum nigrum*, *Diapensia lapponica*, *Salix arctica*, *Arctostaphylos alpina*, *Sphaerophorus globosus*,

*Cetraria nivalis*, *C. cucullata*, *Alectoria ochroleuca*, *Thamnolia subuliformis*, and *Stereocaulon* spp. The type comprises 1% of the Koyukuk and Northern Innoko and less than 1% of the Nowitna Refuge.

The herbaceous vegetation class is dominated by herbaceous plants and includes grasses, sedges, and flowering plants. The primary subclasses are 'graminoid bog,' 'marsh,' and 'meadow.' 'Graminoid bog' has a mossy surface underlain by peat that is often saturated with water. Typical graminoids in this subclass are *Eriophorum russeolum*, *Carex limosa*, *Carex chordorrhiza*. 'Graminoid meadow' is relatively dry and dominated by *Calamagrostis canadensis* and is often associated with old river meander scars. 'Graminoid marsh' primarily occurs at the margins of lakes and ponds. The most important graminoids in this subclass are *Carex aquatilis*, and *Carex rostrata*. This class occurs along the margins of most wetlands on the Refuge. Approximately 2% of the Nowitna and 2% of the Koyukuk is comprised of this class.

Other vegetative types occur in upland areas that surround the wetland floodplain basins that make up the Koyukuk, Kaiyuh, and Nowitna. On the Koyukuk NWR, small mountain ranges occur on the east, west, and north boundaries of the Refuge. On the Northern Unit of Innoko, the Kaiyuh hills occur along the southern boundary. On the Nowitna, hills occur along all four sides of the Refuge. Mountaintops in the Refuge typically are scarcely vegetated rock scree that may extend down the mountain in fingers of unstable rock slopes. Below the scree, communities of prostrate dwarf scrub tundra, alpine meadows, and dwarf shrub tussock tundra predominate. These communities grade into subalpine broadleaf scrub communities and a treeline composed of stunted white spruce. Alpine habitats are particularly rich in lichen species such as *Cetraria nivalis*, *C. cucullata*, *Alectoria ochroleuca*, *Thamnolia subuliformis*, *Stereocaulon* spp., *Cladina* spp., and *Cladonia* spp., of which several are an important food source for wintering caribou. Subalpine broadleaf scrub communities are dominated by alder and willow (*Salix planifolia* ssp. *pulchra*), a favored forage of moose. Estimated cover of these alpine and subalpine habitats is 3% on the Koyukuk and 1% on the Nowitna.

#### **F.9. Fire Management**

Fire management goals and procedures for the Refuge Complex are delineated in several planning documents: Koyukuk National Wildlife Refuge Northern Unit of Innoko National Wildlife Refuge Comprehensive Conservation Plan, Environmental Statement and Wilderness Review Final October, 1987; the Nowitna National Wildlife Refuge Comprehensive Conservation Plan, Wild River Plan, Wilderness Review and Environmental Impact Statement 1987; and the Alaska Interagency Wildland Fire Management Plan Amended October 1998 (AIWFMP). The Koyukuk Fire Management Plan is in the process of being updated. The Nowitna NWR does not have a fire management plan, but is scheduled to have one written by



the end of fiscal year 2004.

No prescribed fires were implemented on the Refuge Complex during 2001 or 2002. The focus of the Refuge Complex's fire management program has been the management of wildland fires.

The majority of fires in Interior Alaska are started by lightning strikes. Over 500 lightning strikes have been recorded on the average June or July day in the Galena area. More than 5000 strikes occur annually in the Alaska Fire Service (AFS) Galena Zone. In Alaska, an average of 655 fires burn nearly 1.6 million acres during the typical Alaska fire season.

Statewide fire activity during 2001 was relatively low with 351 wildland fires that burned 218,113 acres. There were 15 fires occurring on National Wildlife Refuge land. They burned 1,607 acres. The Koyukuk, and Northern Unit of Innoko NWR, and the Nowitna NWR each had one fire. A total of 12 acres burned on the Refuge Complex.

The 2002 Alaska fire season was one of the busiest in years, with 543 fires burning a total of 2,202,688 acres. This season ranks as the fifth most active since reliable records began to be compiled in the mid-1950s. The worst fire season occurred in 1957 when five million acres burned. During 2002 there were five fires on the Koyukuk NWR. They ranged in size from one to 22,502 acres in size. A total of 22,748 acres burned. There were no fires on the Northern Innoko NWR during the summer of 2002. There were two fires on the Nowitna NWR in 2002 that burned a total of 43,417 acres.

Details for the individual 2001 fires on the Koyukuk and Northern Innoko NWR and Nowitna NWR are found respectively in Table F.9.1 and 9.2. Specific 2002 fire information is listed in Table F.9.3 for the Koyukuk NWR and in Table F.9.4 for the Nowitna NWR.

Table F.9.1 Wildfire Occurrence on the Koyukuk and Northern Innoko NWR during 2001.

Fire Number	Acres Burned	Cause	Protection Level	Discovery Date	Declared Out
B198	2	Lightning	Limited	06/06/01	06/07/01

Table F.9.2 Wildfire Occurrence on the Nowitna NWR during 2001.

<b>Fire Number</b>	<b>Acres Burned</b>	<b>Cause</b>	<b>Protection Level</b>	<b>Discovery Date</b>	<b>Declared Out</b>
B316	8	Lightning	Limited	07/02/01	08/01/01
B377	2+	Human	Full	09/27/01	10/15/01

Table F. 9.3 Wildfire Occurrence on the Koyukuk National Wildlife Refuge during 2002.

<b>Fire Number</b>	<b>Acres Burned</b>	<b>Cause</b>	<b>Protection Level</b>	<b>Discovery Date</b>	<b>Declared Out</b>
A411	22,502	Lightning	Modified	07/17/02	08/25/02
A412	100	Lightning	Modified	07/17/02	07/18/02
A414	1	Lightning	Limited	07/17/02	07/20/02
A429	2	Lightning	Limited	07/17/02	07/20/02
A469	143	Lightning	Limited	07/19/02	07/24/02

Table F. 9.4 Wildfire Occurrence on the Nowitna Refuge during 2002.

<b>Fire Number</b>	<b>Acres Burned</b>	<b>Cause</b>	<b>Protection Level</b>	<b>Discovery Date</b>	<b>Declared Out</b>
A284	39,641	Lightning	Limited	06/08/02	09/17/02
A438	3,776	Lightning	Limited	07/18/02	09/17/02

The information kiosk located in front of the Refuge office was used to provide current fire information during the summer of 2002. Daily situation reports and a refuge map with fire locations were placed in the kiosk.

The Fire Management Officer (FMO) position became vacant in June 2001. The Regional Fire Management Coordinator and the Deputy Refuge Manager filled in while the FMO position was vacant during the summer of 2001. The Fire Management Officer position was filled on May 18, 2002. The FMO reported to work in Galena on June 4.

Items accomplished during the summer of 2002 include the following: The Koyukuk/Nowitna fire cache was inventoried and equipment was maintained. A good working relationship was established with staff of the BLM-AFS Galena Zone. During the active fire season several fire detection/reconnaissance flights were flown with AFS and a weekly fire update was aired on the local radio station. The FMO spent one month on fire assignments in south-central Oregon. A hazardous fuels assessment was completed for the Refuge Complex quarters and administrative buildings. Support provided to other refuges included: a. relaying pertinent fire information to refuge managers; b. a fuels assessment of the Innoko Field Station; c. Innoko Field Station fire cache inventory and maintenance; and d. met with Innoko Refuge staff (the meeting with the Selawik Refuge staff did not occur because of bad flying weather; it has been rescheduled for the spring of 2003).

## **F.12. Wilderness and Special Areas**

Inside the Koyukuk Wilderness, on the shore of a large lake ("Gas Can Lake"). East of the Nogahabara Dunes, a large number of Chevron 80/87 Avgas 5-gallon cans were discovered and removed. During the summers of 2001 and 2002 pilots J. Huhndorf and M. Spindler



*This pile of old 1960's gas cans was discovered in 2001 along a lakeshore in the Koyukuk Wilderness, about 8 miles east of the Nogahabara Sand Dunes. These cans, which contained av-gas, may have been left from aerial wolf control efforts by the Federal Service long before the area became a Refuge. We hauled the cans out with our C185 on several trips in 2001 and 2002 (JH)*

brought the cans to Galena on space available backhaul flights. Refuge staff suspect the cans were used and discarded by Federal aerial wolf hunters in 1950's or 60's.

*Nogahabara Sand Dunes, Koyukuk Wilderness Area. (See also Section D.5) In 2001 Refuge staff and cooperators conducted an eight day investigation of the flora and fauna of the Nogahabara Sand Dunes. Participants were: PR Karin Lehmkuhl, GB Guy Hughes, Volunteer Joanna Helmuth, BT Deborah Webb, and BT Derek Milsaps, USFWS; Rob Lipkin, Alaska Natural Heritage Program, Anchorage; Jo Overholt, Photographer,*

Anchorage; Jim Kruse, Entomologist, UAF Museum, Fairbanks. A report including a description of dune vegetation is on file in the biological files. In 2002 FWS Regional Archaeologist Chuck Ditters accompanied Refuge staff to investigate an archaeological site discovered in 2001. Participants were: PR Karin Lehmkuhl, BT Abby Kirkaldie, Vol. Randy

Shaw, Vol. Nathan Schwalen, Danielle Jerry USFWS Anchorage, and Chuck Deters USFWS Anchorage. Most of the materials found were worked pieces of obsidian. Further research is expected in 2003, possibly in cooperation with UAF.



*In 2001 an interdisciplinary team of biologists investigated the Nogahabara Sand Dunes. Here Rob Lipkin, a botanist with The Alaska Natural Heritage Program shows a sample of Corispermum to PR Karin Lehmkuhl and RC Melanie Hans. One of several rare plants found there, this species of Corispermum may be endemic to the dunes.*



*Golden sands of the Nogahabara dunes glow against a stormy backdrop. This unique geological feature is a central part of the Koyukuk Wilderness Area.(DW)*

## **G. WILDLIFE**

### **G.1. Wildlife Diversity**

The Koyukuk/Nowitna National Wildlife Refuge Complex has a high diversity of habitat types resulting from riverine erosion, deposition, and flooding, the actions of wildfire, and topographical variation. Baseline data continue to be collected to determine the status and distribution of bird, fish, and mammal species. Over 140 bird species, 30 mammal species, and 14 fish species occur on Koyukuk and Northern Innoko NWRs. A Koyukuk NWR bird list was published in 1992 following a decade of active field surveys and local observations by staff living in Galena.

Thirty-seven species of mammals, 147 birds, 20 fishes, and 1 amphibian are known to occur on or near Nowitna NWR. A draft bird list for the Refuge was completed in 1992. It will not be published until adequate field and literature review can be accomplished. Particularly lacking are observations and documentation of upland and alpine-breeding species. In Spring 2001, PR Lehmkuhl updated and revised the fish, mammal, and plant lists for both the Koyukuk and Nowitna published in the Refuge Comprehensive Conservation Plans in 1987 and 1988. These lists were posted on the Refuge website in 2002.

Included among the biodiversity monitoring efforts on the Complex in 2001 and 2002 were surveys of spring bird migration phenology (collection of arrival dates), the North American Migration Count, breeding birds (Standard Breeding Bird Survey and Off Road Point Counts), inventory of plant species in habitat mapping efforts, inventories of wintering birds (Christmas Bird Count), small mammals, wood frogs and invertebrates.

### **G.2. Endangered and/or Threatened Species**

The only endangered, or formerly endangered species, to occur on the Complex are the arctic peregrine falcon and American peregrine falcon. The arctic peregrine falcon migrates across the region to its arctic nesting areas. The American peregrine falcon nests on all units of the Complex. The American peregrine falcon was removed from the endangered species list in June 1999. It will be monitored for a five year period and re-evaluated for permanent removal. The threatened arctic peregrine falcon was de-listed in 1994, and its monitoring period is over.

### **G.3. Waterfowl**

Wetlands within the Koyukuk NWR, Northern Unit of the Innoko NWR (Kaiyuh Flats), and Nowitna NWR support large waterfowl populations. The main breeding duck species include American wigeon, northern pintail, mallard, green-winged teal, northern shoveler, surf scoter, white-winged scoter, common and Barrow's goldeneye, bufflehead, and lesser scaup. Less abundant breeding ducks include red-breasted merganser, greater scaup, canvasback, ring-necked duck, redhead, black scoter, and long-tailed duck (oldsquaw). Arctic, red-throated,

and common loons also nest on the Complex, as do horned and red-necked grebes. Canada geese, white-fronted geese, trumpeter swans, and tundra swans occur in moderate numbers. The greatest concentrations of waterfowl occur during spring and fall migrations on large, shallow floodplain waterbodies.

#### Weather Conditions and Waterfowl Migration Chronology

It is important to monitor arrival chronology and spring breakup conditions because these factors greatly influence waterfowl productivity. In 2001 white-fronted geese arrived in Galena on April 24, right on the mean arrival date; Canada geese arrived on April 29, three days later than average; mallards arrived on April 26, right on the average date; and pintails arrived on April 29, four days later than the long-term mean. In 2002 white-fronted geese arrived in Galena on May 2, nine days later than the long-term mean; Canada geese arrived on April 28, two days later than average; mallards arrived on April 25, right on the mean arrival date; and pintails arrived May 5, ten days later than average.

*Koyukuk/Kaiyuh.* On April 26, 2001, most of the the Koyukuk NWR had 90-100% snow cover. Only the smaller creeks, like Cottonwood and Holtnakatna Creek, were open and flowing. Small river tributaries, like the Dulbi, had open moats on the sides, but ice was still in place. There were enough open patches of bare ground for geese to start nesting on the southern Koyukuk, but the open patches disappeared to less than 1% in the northern half of the refuge. By May 17, much of the snow cover had melted to 10-30%; the lakes were still 80-90% frozen. Only the smallest ponds had open water; medium and large lakes were 100% frozen. The lower Dulbi River was frozen solid with 50-60% snow cover. The southern end of Treat Island had 70% snow cover and very little open water. The Koyukuk River ice was complete with no open water. Cloverleaf Lake near 3-Day Slough had 90-95% snow cover and no open water. On May 22, the Yukon River ice in front of Galena went out. On May 29, the Kaiyuh flats experienced extensive flooding. Some areas that did not receive flood water from the Yukon River and Kaiyuh Slough still had high water from extensive localized snowmelt and run off. Goose nesting meadows out of the floodplain seemed to be dry enough to support nests. The southern Koyukuk NWR was 75% snow and ice free. Only the largest lakes still had ice. Further north, the Dulbi River was ice free with moderately high water and no flooding. The Koyukuk River ice was flowing past Dulbi River Mouth with medium water level and some sand bars were still exposed. Most medium sized wetlands were 75% ice free. Dulbi Slough was open and flowing with 5% snow cover and all large and medium lakes still had 70-80% ice. Only small ponds were open. On June 1, the Koyukuk River flooded up over the willow bars and grasses. It appeared that goose nesting and moose calving habitat was marginal and all low land habitat was under water. Koyukuk River tributaries were also flooded, including the lower Dulbi River, Dulbi Slough, and Willow Lake. On June 14, Koyukuk flooding was still evident, but waters were receding.

On May 10, 2002, snow cover on the southern Koyukuk was 30% in the open habitat and 50-80% in tree covered areas. Bear Creek to the north of Galena was open and flowing. On May

14, 2002, snow cover on the southern Koyukuk was 5% and the Dulbi River ice was broken up and moving out. Flooding was minimal though water was high and connecting oxbow lakes with the river but not extending up into the trees. Gravel bars in the upper Dulbi above Cottonwood Creek were visible while water levels in the lower sections were high enough to cover all gravel bars. Smaller lakes were partially open while larger lakes still had 100% ice cover. On May 16, 2002, the Yukon River ice was jammed at Bishop Rock and at Jungle Island, below Galena. Snow cover north of Galena was at 5% and all small ponds were open. Large lakes had 75-90% ice cover, though the ice was green and rotting. The Koyukuk River at Dulbi River mouth was open with no flooding. The water was low enough that sand bars were still showing, though there were small ice jams at Dubin Point and Dulbi Slough mouth. There was no flooding visible on Dulbi River. Snow cover on the southern Koyukuk was 10% in open areas and 50-60% in covered spruce woods. Water at Dulbi Slough was flowing into the Koyukuk River. Goose nesting meadows near Willow Lake were open with only 5-10% snow cover and no flooding. Willow Lake still had 50% ice cover. On May 18, 2002, Dulbi River was clear of ice and there was no significant flooding. Snow cover on the southern Koyukuk was only 1-2% though the some large lakes still had 100% ice cover.

*Nowitna.* On May 9, 2001, the lower Nowitna River valley was 20-80% snow-free, and the river ice was gray and rotting with water flowing on both sides. Near the canyon there was 20-30% snow cover with up to 95% snow cover in the hills. The river ice was rotten, but still firm. Most meadows were open. The upper Nowitna River ice was broken in some places, small ponds were open and snow cover was 5-10%. On May 17, the Yuki River was open with no flooding. The Sulatna River on the west Nowitna Refuge boundary was open and ice free with no flooding. Snow cover was 0% in the valley and 10-20% in the hills. Most lakes were open except the large ones and the Nowitna River was open and ice-free with high water, but no flooding.

On May 8, 2002, snow cover on the upper Nowitna River was 80-100%. Higher elevation creeks were still frozen to the bottom, although a high volume of water was flowing over the ice from snow melt and rain run-off causing minor flooding in these creek beds. On May 13, 2002, the Nowitna River was open to within 5 miles of the mouth. The ice was jammed on the Yukon forcing water to back up into the Nowitna River mouth about 5 miles. Snow cover near the mouth was still 100% in the trees and 75% in open areas. Many small ponds and lakes were open and larger lakes still had 75% ice cover.

## **Ducks**

### **Koyukuk Ducks**

*Production.* Annual duck production surveys were conducted on the Koyukuk NWR and the Northern Unit of Innoko NWR from 1983 to 1993. The estimated number of ducklings produced on both refuges ranged between a minimum of 62,050 in 1989 to a maximum of 199,155 in 1990 (Saperstein, L.B. 1997. *A summary of ten years of duck production surveys*,



*Koyukuk NWR, AK, 1983-93).* The estimated number of adults occurring on both refuge units between 1990-93 ranged from 61,664 in 1993 to 117,449 in 1992.

*Breeding population.* Duck brood surveys were discontinued in 1993. Since that time, duck abundance on the Refuge has been monitored using the aerial duck breeding pair survey conducted by the Service's Division of Migratory Birds in Juneau (DMB). Weather conditions in 2001 and 2002 were very similar and the DMB expected only average production in both years, due to a late spring and substantial flooding in the Koyukuk stratum. Indices of abundance of most duck species/groups in 2001 were above the long-term mean, with the exception of pintail, scaup, and scoters, which were at or just below the long-term average. In 2002 indices for dabblers and divers were down while the miscellaneous category increased. It should be noted that the estimates apply to the entire Koyukuk stratum, of which Koyukuk NWR is only a part. A comparison of the breeding pair estimates for the Koyukuk stratum with estimates of adults summering on the Refuge (based on 1990-93 brood survey extrapolations) suggested that, depending on the year, the Koyukuk NWR represented approximately 36-65% of the ducks estimated for the entire Koyukuk stratum. The May 1984-2001 mean estimated breeding duck population in the Koyukuk Stratum was 245,000 ducks. Using the percentages given above, the calculated mean estimated population for Koyukuk NWR was 88,200-159,250. The mean estimated breeding duck population in May 1984-2002 was 166,000 ducks with the mean estimated population for the Koyukuk NWR of 59,760-107,900, (using the percentages above). These figures corresponded well with and appear to be increasing in 2001 above the July post-breeding estimates of 62,000-117,000 presented by Saperstein (1997). The DMB recommends caution when viewing the 2002 estimates. Survey timing was normal, however the migration of waterfowl from southern wintering areas was delayed initially and unusual concentrations and sightings of some species were noted. In addition, there may have been some overflight from other areas further south.

*Expanded breeding population survey.* In 1996 and 1997 the Division of Migratory Birds conducted an expanded breeding population survey in the Koyukuk stratum, including Koyukuk and Kanuti NWR's, and the Hog River/Pah River Flats. This intensive transect survey, which had parallel flight lines spaced every nautical mile over all wetland habitats in the Stratum, resulted in the best quality estimates of duck numbers available for the region. The 1997 expanded breeding population survey estimated 211,600 ducks in the Koyukuk stratum, while the standard breeding population survey estimated 199,000 ducks the same year.

*Incidental Observations.* Incidental duck observations are recorded during early July annual goose production float surveys conducted on Dulbi River and Dulbi Slough. These observations are analyzed strictly as an index of the population and are not used to form an estimate of total population. Results from the combined Dulbi Area incidental observations in 2001 show a continued increase in adults and a large decrease in production, which may have been caused by the extensive spring/early summer flooding on the Koyukuk and the late phenology dates from the summer 2001. In 2002, Dulbi Slough was not surveyed, but data from the Dulbi River survey show adults decreased from the high number observed in 2001

and are just below the long-term average while production was poor for the second year.

### Nowitna Ducks

Duck production surveys were conducted on the refuge from 1983 to 1992, and were analyzed by Saperstein (1996) in a report entitled *A summary of ten years of duck production surveys, Nowitna National Wildlife Refuge, Alaska, 1983-1992*. Refuge-wide production estimates reported between 1987-1992 ranged between 4,209 ducklings (90% CI=14.5%) in 1989 and 17,140 ducklings (90% CI=15.9%) in 1988. Confidence intervals around production estimates were much wider following standardization of techniques and refinement of statistical procedures in 1990. Production estimates between 1990-1992 ranged from 4,855 (90% CI=63.4%) in 1991 to 14,270 (90% CI=57.4%) in 1990. The 1990 implementation of standardization and stratification methods that worked for other Alaska refuges to improve precision of estimates did not improve the quality of estimates for Nowitna. Any future duck production surveys on the Nowitna would likely benefit from a serious review of the earlier methods documented by Andy Loranger that were so successful.

The only other indication of trends in duck numbers available for the Refuge is the aerial duck breeding pair survey conducted by the Service's Division of Migratory Birds in Juneau. A summary of key duck species estimates for the Tanana-Kuskokwim stratum is presented in their unpublished report entitled "*Alaska-Yukon waterfowl breeding pair survey...*" for year 2001. The Nowitna NWR comprises <10% of the Tanana-Kuskokwim Stratum, and therefore, these data will not be presented here.



*Geoff Beyersdorf on an annual waterfowl production survey of the Nowitna River. (MS)*

#### *Incidental Observations.*

Incidental duck observations are recorded during an early July annual goose production float survey conducted on the Nowitna River. These observations are analyzed strictly as an index of the population and are not used to form an estimate of total population. Results for all species combined in 2001 Nowitna River show a decrease in adults seen from the all time high observed in 2000, though the numbers are still above the 50

long-term average. Production decreased slightly and was just above the long-term average. In 2002, the number of adults observed decreased slightly from 2001, although observations are still above the long-term average. Production increased and was above the long-term average.

## Geese

Abundance and productivity of white-fronted and Canada geese in Northwest and Interior Alaska were monitored by aerial and float surveys. In 2001, a late spring breakup combined with extensive flooding in several western interior Alaska areas probably caused a significant drop in production. Reduced abundance of adult and young white-fronted geese was observed on both aerial and float surveys. Canada geese fared better in 2001. The intensive aerial molting survey provided adult white-fronted goose abundance data without excessive variability, which should be useful for continued monitoring and evaluation of management actions. The intensive survey did not work as well for Canada geese on the Koyukuk. Totals of 1162 white-fronted geese and 87 Canada geese were banded in three areas: Innoko, Koyukuk and Selawik. Satellite telemetry transmitters were implanted in 12 white-fronted geese. A website is available to provide real-time updates on the most recent position of each goose. Over 130 white-fronts were sampled for prevalence of avian cholera.

In 2002, spring breakup was mild to normal following an unusual cold spell that delayed spring migrations. Brooks Range snow melt flooding occurred along the Koyukuk and Kanuti Rivers, but elsewhere flooding was minimal. Despite the late cold spell and flooding, production was about average, with estimates of 52% young for white-fronts and 55% young for Canada geese. Decreased abundance of white-fronts was observed on June and July aerial surveys in the Koyukuk Stratum, while float surveys showed an increase in adult numbers over 2001 levels. Again, the intensive survey did not work as well for Canada geese on the Koyukuk. Totals of 933 white-fronted geese and 78 Canada geese were banded in three areas: Innoko, Koyukuk and Selawik. Satellite telemetry transmitters were implanted in 22 white-fronted geese and VHF radio transmitters were placed on another 20 white-fronted geese. A website is available to provide real-time updates on the most recent position of each goose. As in 2001, blood was drawn in 2002 from white-fronts to determine prevalence of avian cholera.



*White-fronted goose banding involves many tasks: shown busy at work here are Deborah Webb (Koyukuk/Nowitna), Bill Larned (FWS Migratory Birds, Anchorage), Larry Lysne (Migratory Birds, Fairbanks), Mike Spindler (Koyukuk/Nowitna)*

### Abundance Surveys

*May-June Breeding Population Surveys.* A regional perspective was obtained by extracting goose abundance data from the interior and northwest Alaska strata of the statewide waterfowl production aerial survey (Figs. G.3.1-2, data from Conant and Groves, USFWS Division of Migratory Bird Management, pers. comm. July 2001 and 2002). In the Koyukuk Stratum,

abundance of white-fronts was lower in the 1990's compared to the 1980's. Some increase was observed in 2000 and 2001, but a decline occurred again 2002 (Fig. G.3.3). No trend in abundance of Canada geese in the same strata was detectable using linear regression detected (Fig. G.3.4). We believe these May-June surveys can provide a good general picture of long-term abundance trends, but the survey was not designed for geese, which results in considerable short-term variability. This occurs because of variability in survey timing relative to chronology of nesting, which in turn relates to goose sightability (Bromley et al. 1995).

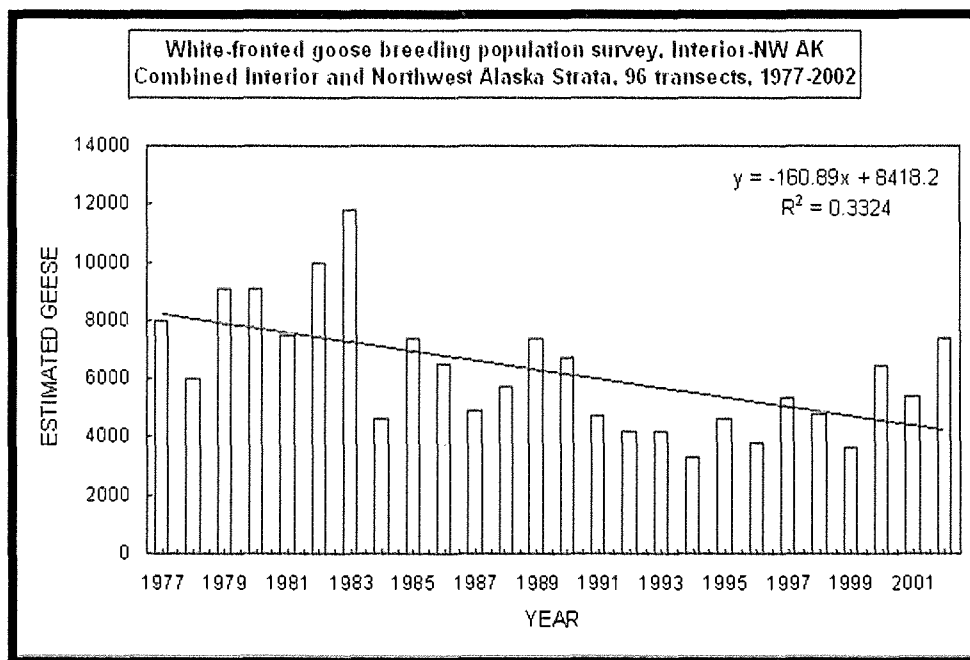


Figure G.3.1. Abundance of single and paired white-fronted geese during spring waterfowl breeding population aerial surveys, Northwest & Interior Alaska combined (96 transects, 384 mi<sup>2</sup> expanded to 32,950 mi<sup>2</sup>).

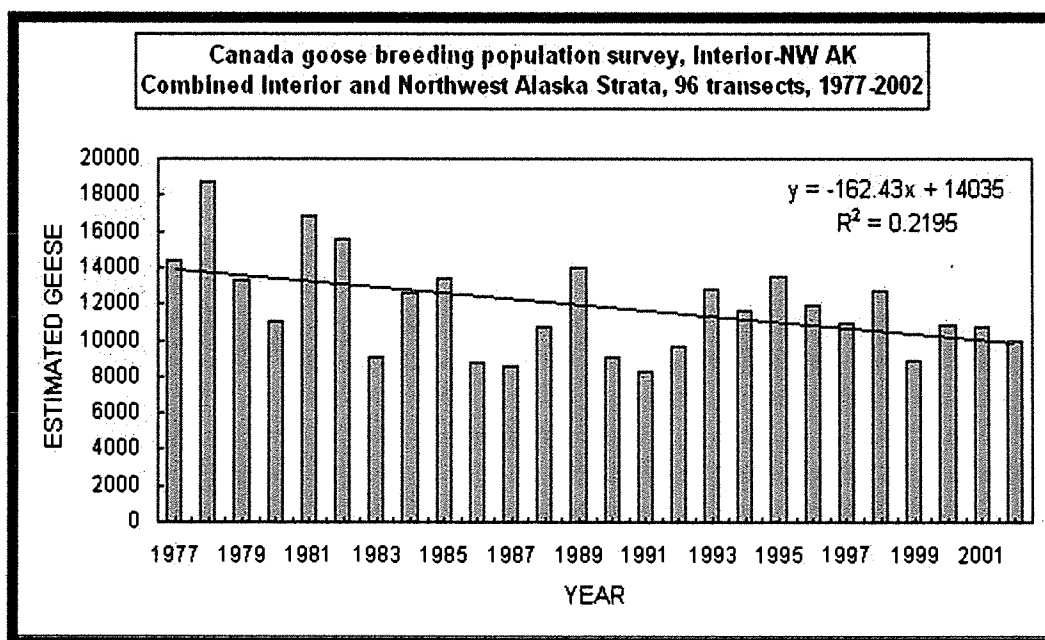


Figure G.3.2. Abundance of single and paired Canada geese during spring waterfowl breeding population aerial surveys, Northwest & Interior Alaska combined (96 transects, 384 mi<sup>2</sup> expanded to 32,950 mi<sup>2</sup>).

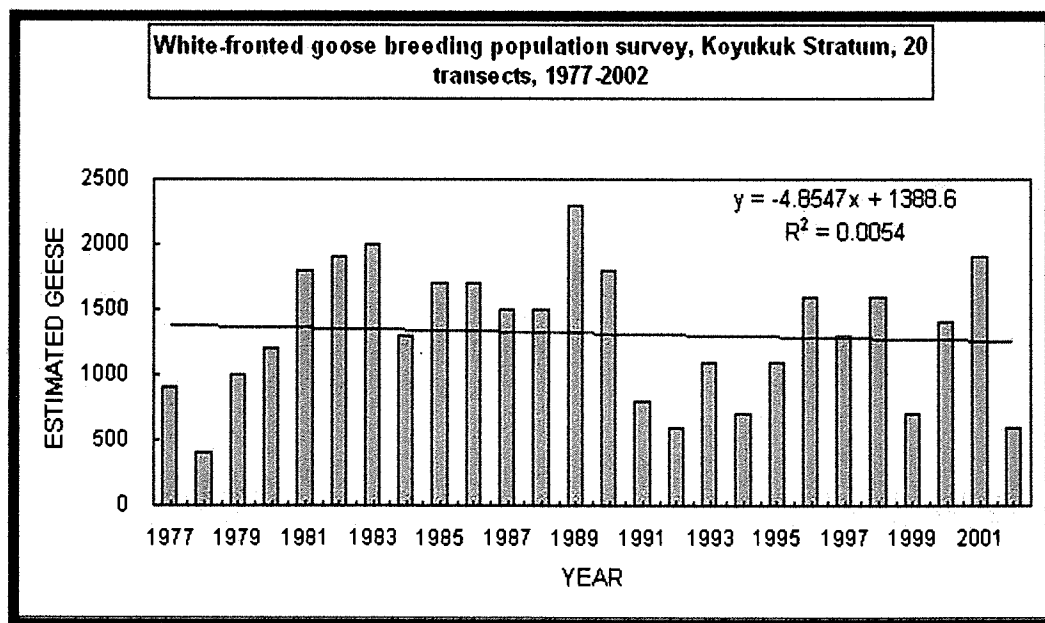


Figure G.3.3. Abundance of single and paired white-fronted geese during spring waterfowl breeding population aerial surveys, Koyukuk stratum only (20 transects, expanded to 4100 mi<sup>2</sup>).

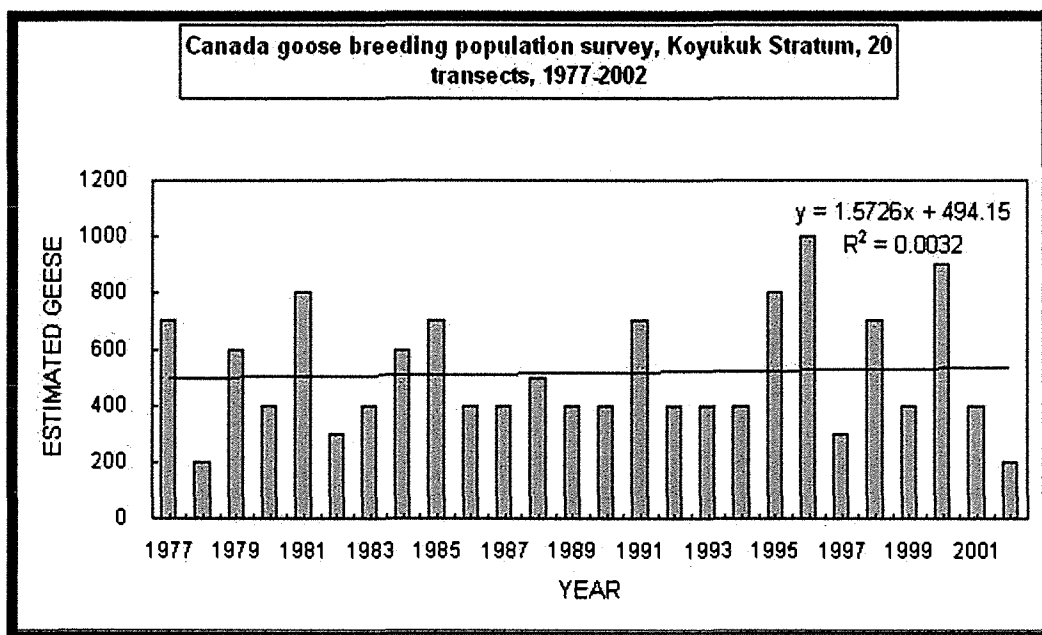


Figure G.3.4. Abundance of single and paired Canada geese during spring waterfowl breeding population aerial surveys, Koyukuk stratum only (20 transects, expanded to 4100 mi<sup>2</sup>).

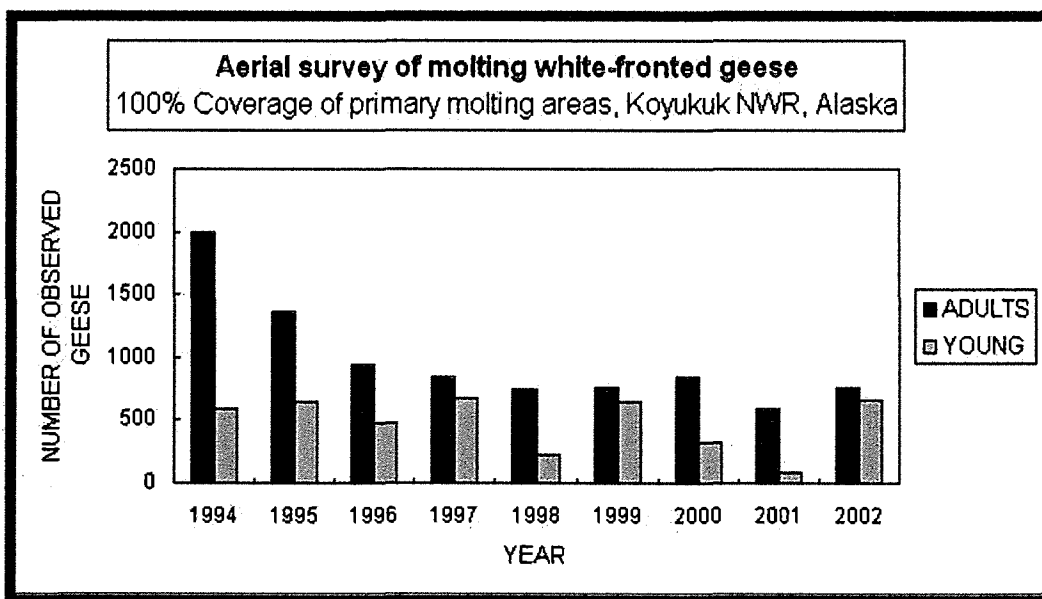


Figure G.3.5. Results of intensive aerial molting survey covering main habitats of white-fronted geese on the Koyukuk NWR, Alaska, July 1994-2002.



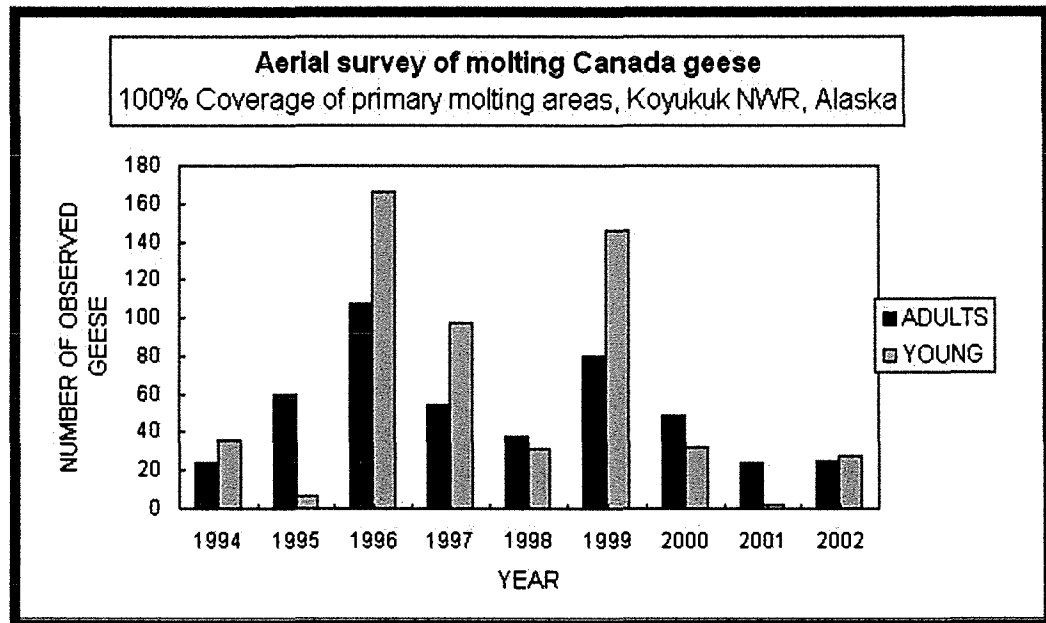


Figure G.3.6. Results of intensive aerial molting survey covering main habitats of Canada geese on the Koyukuk NWR, Alaska, July 1994-2002.

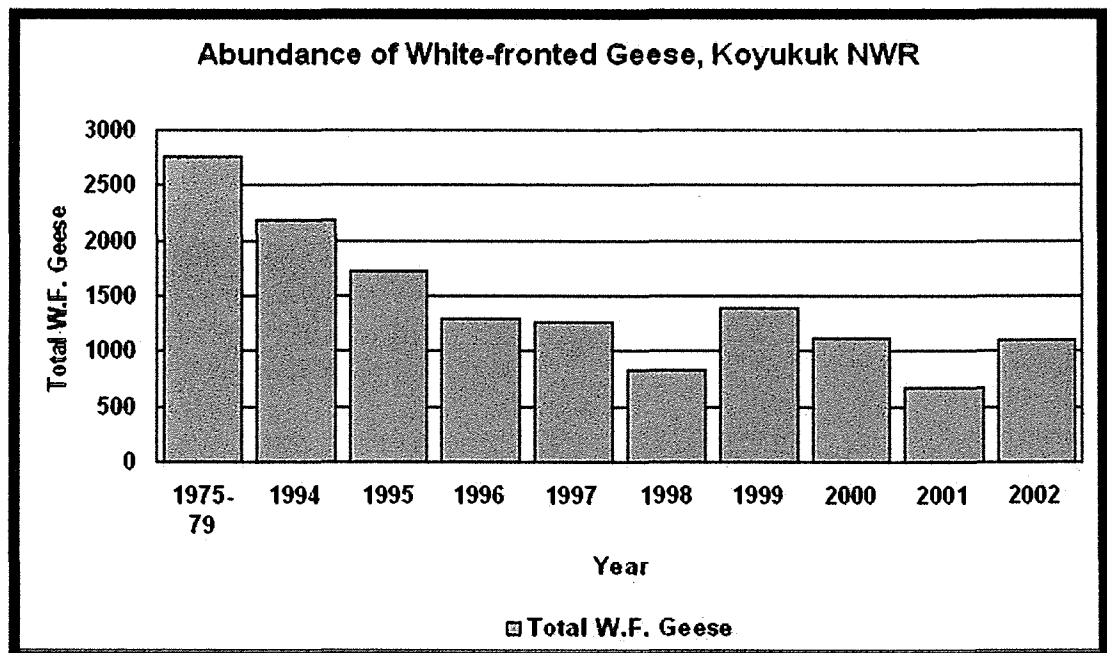


Figure G.3.7. Abundance of total white-fronted geese in main molting and brood-rearing aeriels of the Koyukuk NWR, 1975-2002 (1975-1979 data based on mean of pre-banding reconnaissance flights in the same areas of 1994-2002 intensive aerial transect surveys).

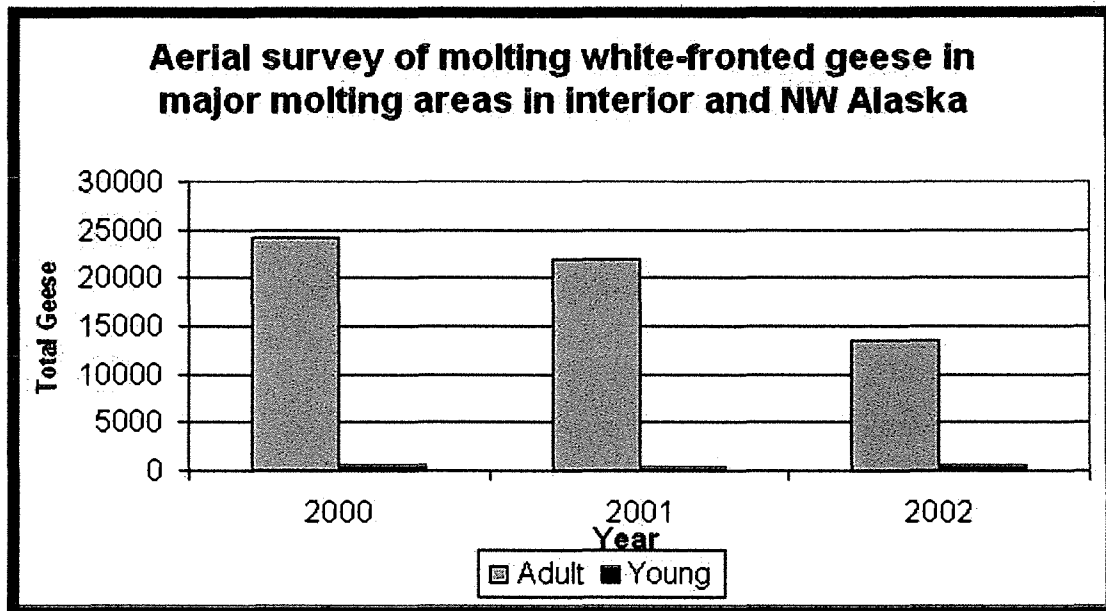


Figure G.3.8. Results of aerial molting survey covering main habitats of white-fronted geese on the Innoko, Selawik, Koyukuk, and Kanuti Refuges, 2000-2002.

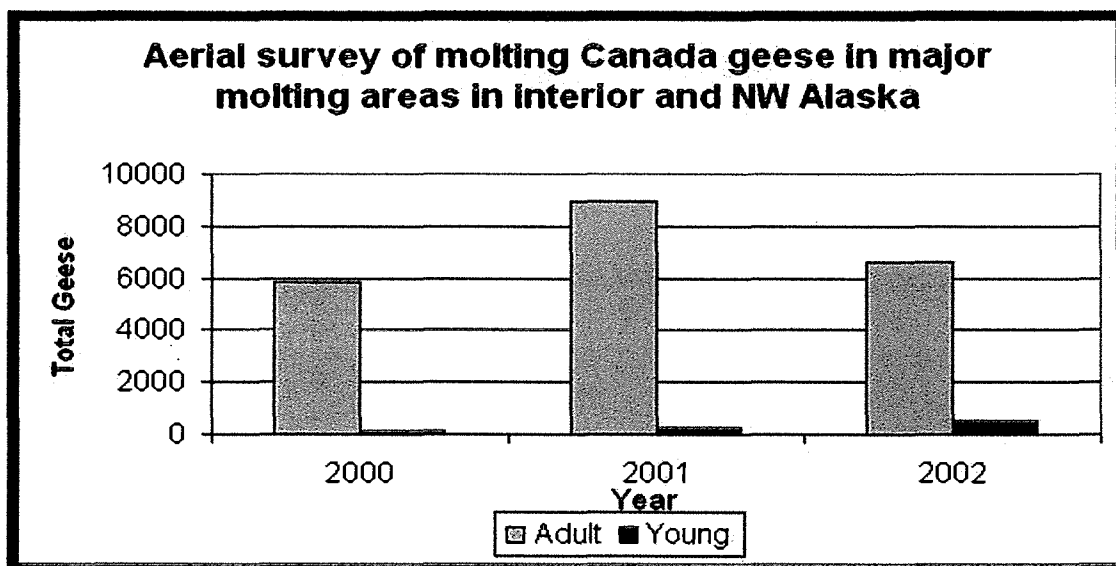


Figure G.3.9. Results of aerial molting survey covering main habitats of Canada geese on the Innoko, Selawik, Koyukuk, and Kanuti Refuges, 2000-2002.

*Estimates of population size.* During the years 1979-83, Lensink (1987) estimated a mean indexed estimate of 113,000 white-fronts in the Interior-Northwest Alaska region. This figure can be updated by using May-June aerial breeding population survey based on the Connant and Groves mean index of 24,752 in the last decade. Application of Lensink's (1987) 3.6 sightability correction factor resulted in a mean population index of 89,104 white-fronts for Interior-Northwest Alaska in the last decade. This recent estimate is 21% less than Lensink's 1979-83 estimate of 113,000. Similar application of this correction factor to the results of the July aerial molting survey yielded white-front indices of 89,719 in 2000, 80,251 in 2001, and 50,980 in 2002.

The May-June aerial breeding population survey indicated a mean of 20,050 Canada geese. This provided a sightability-corrected index of 72,180 Canada geese in the same region. The molting survey provided estimates of 5,987 and 9,187 in 2000 and 2001, and 7060 in 2002. Koyukuk NWR staff have documented poor representation of Canada geese in their molting survey, therefore no sightability-corrected estimates were attempted using these values.

*July aerial molting survey.* Abundance of white-fronted geese is best monitored with an intensive aerial survey which is timed specifically adjusted to occur during the molt in early-mid July, when sightability is highest. July surveys were conducted in four areas: Selawik, Innoko, Koyukuk and Kanuti NWR's. In 2001 and 2002 these areas were surveyed in cooperation with the involved Refuges and the USFWS Division of Migratory Bird Management. This survey covers the most important white-front habitat in the Northwest/Interior Alaska region and is the most comprehensive aerial survey of geese in the region to date (Tables G.3.1 and G.3.2). The July molting survey has indicated a steady decline in abundance of white-fronted geese on Koyukuk NWR from 1994-2002 (Fig. G.3.5). Abundance of Canada geese has varied considerably in the July molting survey (Fig G.3.6). The decline of total white-fronted geese in the Koyukuk area is more pronounced when earlier minimum abundance estimates made during pre-banding reconnaissance flights in the 1970's are included (Fig G.3.3, and *see* Lobb 1980). Collectively, the molting surveys of all four areas also suggest a regional decline of total white-fronted geese in the Western Interior and Northwest Alaska (Fig. G.3.8-G.3.9). Water levels on the Innoko in 2002 were extremely low, which may have affected bird distribution and sightability.

Table G.3.1. Total white-fronted geese observed during intensive aerial survey of major molting areas in northwest and interior Alaska, July 2001-2002.

Area	Ad. 2001	Yng. 2001	Total 2001	Ad. 2002	Yng. 2002	Tot. 2002
Innoko	18246	137	18383	11273	19	11292
Selawik	2844	45	2889	1518	73	1591
Koyukuk	447	99	546	630	471	1101
Kanuti	332	142	474	121	56	177
Total	21869	423	22292	13542	619	14161

Table G.3.2. Total Canada geese observed during intensive aerial survey of major molting areas in northwest and interior Alaska, July 2001-2002.

Area	Ad. 2001	Yng. 2001	Total 2001	Ad. 2002	Yng. 2002	Tot. 2002
Innoko	4777	40	4817	3903	114	4017
Selawik	4077	138	4215	2576	224	2800
Koyukuk	24	2	26	51	58	109
Kanuti	67	54	121	87	122	209
Total	8945	234	9179	6617	518	7135

### Productivity

Float surveys to monitor productivity trends are conducted annually on two rivers on Koyukuk NWR, one on Northern Innoko NWR, one on Nowitna NWR, and one on Kanuti NWR. We surveyed Dulbi River, but not Dulbi Slough in 2002 because of concerns about disturbance of molting geese in that part of the Refuge. The overall sample for historical comparisons has dropped from 539 miles to 470 miles.

*White-fronted geese.* Four of the five survey areas had a near production failure in 2001. Production was below average because of a late break up and flooding in the western interior and northwest Alaska. The only area in which good production was observed in 2001 was the Nowitna, which had normal breakup timing and no flooding. Productivity of white-fronted geese on all five areas in 2001 was estimated at 37% young, which was below the long term-mean of 52% (Fig. G.3.10). For all areas, the adult count of 443 white-fronted geese was well below the long term mean of 764, while the gosling count of 249 was about a third of the long term mean of 769. At Koyukuk NWR the 2001 drop in adult and young white-fronted geese was more pronounced (Fig G.3.12). Counts of adults, goslings, and percent young were up in July 2002. Productivity of white-fronts in 2002 was estimated at 52% young, an increase from 2001 and corresponding to the long-term mean (Fig. G.3.10). With all four float routes combined, the sums of 622 adult and 662 young white-fronted geese were above the mean of 479 adults and 521 young.

*Canada geese.* Productivity of Canada geese was better than white-fronted geese in 2001. On all five areas the productivity was estimated at 51% young in 2001 and 55% young in 2002, slightly down from the average of 58% young (Fig G.3.11). For all areas, the count of Canada goose adults was 190 in 2001 and 173 in 2002, which were both above the average of 154. Likewise, the gosling count was 275 in 2001 and 211 in 2002, which was above and comparable to the average of 211. On all five survey areas Canada goose adult numbers have been relatively stable from 1996-2002 (Fig. G.3.11).

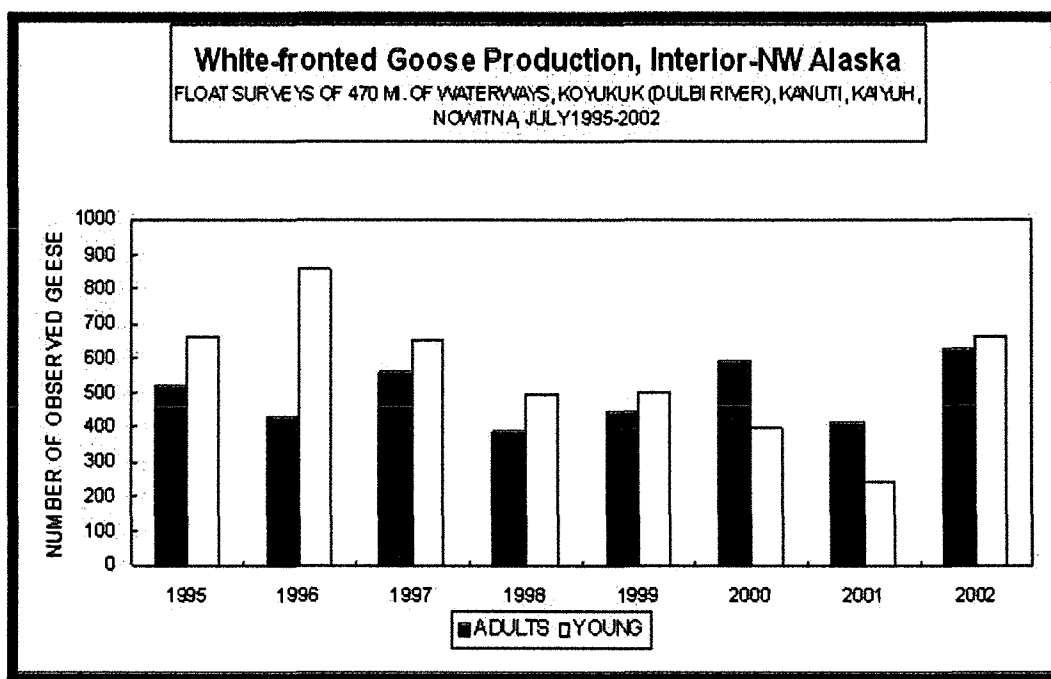


Figure G.3.10. Recent productivity of boreal forest-nesting white-fronted geese as determined by float surveys (totaling 470 miles) on the Kanuti, Koyukuk, Nowitna, and Northern Innoko NWRs, Alaska, 1995-2002. Mean age composition was 52% young.

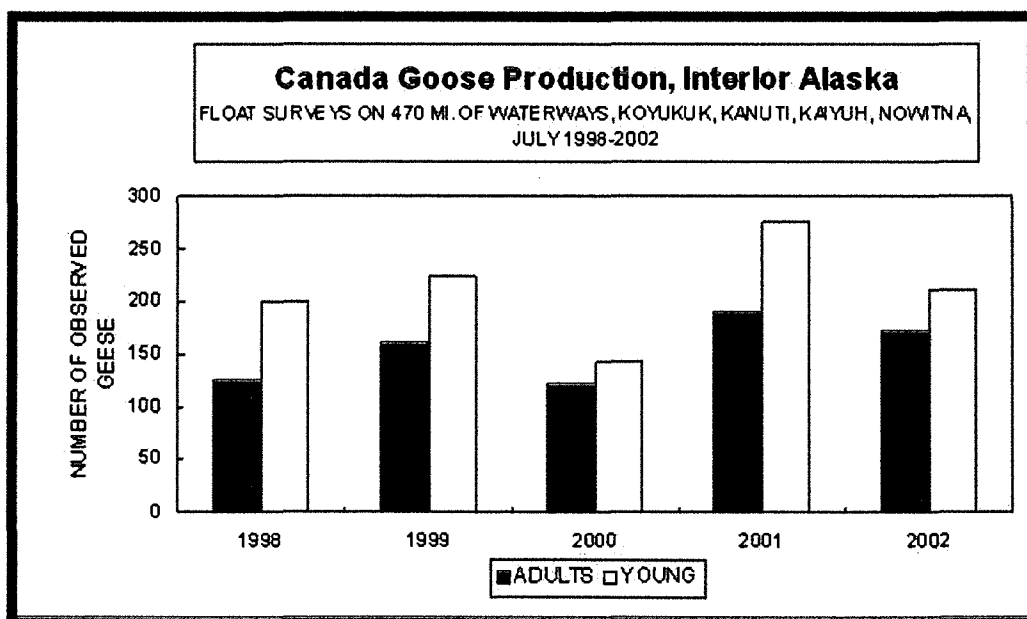


Figure G.3.11. Recent productivity of boreal forest-nesting Canada geese as determined by float surveys (totaling 470 miles) on Kanuti, Koyukuk, Nowitna, and Northern Innoko NWRs, Alaska, 1998-2002. Mean age composition was 58% young.

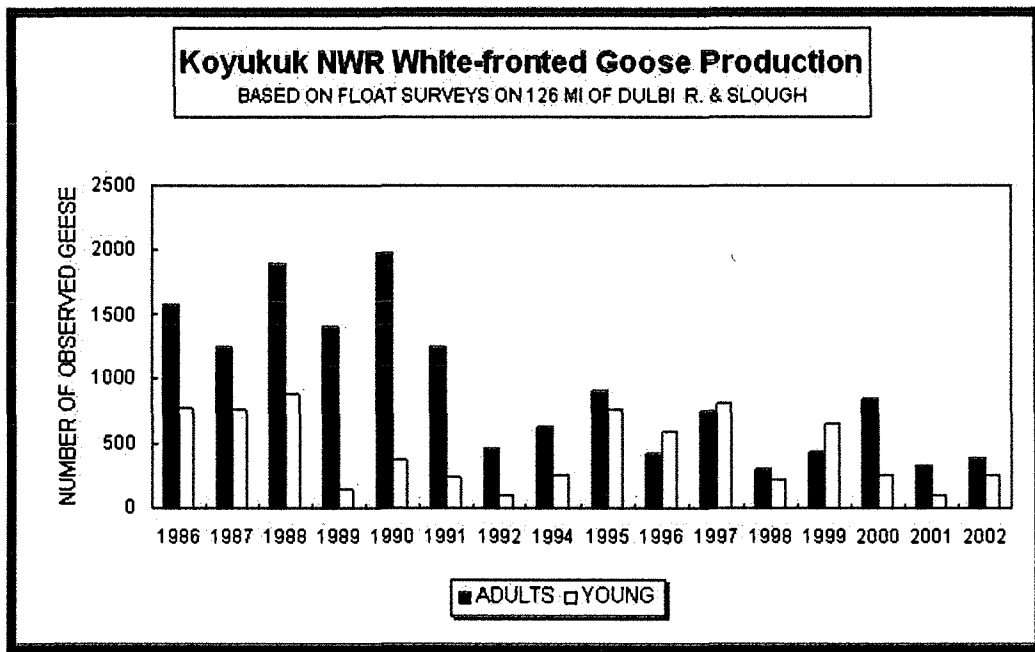


Figure G.3.12. White-fronted goose adults and young observed on two float surveys (Dulbi Slough and Dulbi River, totaling 126 miles) on Koyukuk NWR, Alaska, 1986 and 2002. \*\*only Dulbi River was surveyed.

**Banding.** Between July 9 and 14, 2001, a joint Division of Migratory Bird Management/Refuges team banded 1162 white-fronted geese and 87 Canada geese. Total white-fronts banded at each site varied in approximate proportion to total geese available: Innoko, 846; Selawik, 182; Koyukuk, 124. We were unable to band at Kanuti due to time and aircraft limitations. There were 43 white-fronted goose recaptures, 29 with bands only and 16 with collars. There were no Canada goose recaptures. Banding in 2002 took place between July 8-14, with a total of 933 adult and 65 young white-fronted geese and 78 Canada geese banded. Neckbands were fitted on 213 banded geese. We were unable to band at Kanuti due to lack of Super Cub availability and banding site access. There were 40 white-front recaptures and no Canada goose recaptures in 2002.

**Cholera study.** During banding, blood and throat swab samples were taken from more than 130 white-fronted goose adults in 2001 and 189 in 2002 to determine prevalence of avian cholera. Blood serology from 2001 showed that 5% of the sampled birds had cholera antibodies, suggesting exposure in the 3-4 months prior to molt. That exposure was probably occurring from late-winter to breeding. Swab samples analyzed from 2001 showed no presence of cholera. This study is being conducted by Dr. Mike Samuel and his student, Ms. Jennifer Grannick, of the USGS-GRD National Wildlife Health Center in Madison, WI. From 2001 data, Dr. Samuel made a preliminary conclusion that these birds were probably not carriers, but were likely infected by other individuals or species elsewhere.



*VHF telemetry study.* The purpose of this study was to investigate potential spatial and temporal differences between white-fronted geese from Interior and NW Alaska and white-fronted geese from the Central Canadian Arctic during their staging in the Canadian Prairies. In July 2002, 20 female white-fronted geese with brood patches were captured during banding on the Innoko Refuge and fitted with VHF radio collars. Another 20 females were captured and fitted with radio collars by Ray Alisauskas (CWS Saskatoon) and his crew on Queen Maude Gulf in the Central Canadian Arctic. Radio-tracking by small airplane was conducted (Keith Warner, CWS Saskatoon) in the Canadian Prairies starting with the arrival of the geese in August and ending with their departure in November. All the main staging areas were covered weekly (initially 2 days Saskatchewan, 1 day SE Alberta, 1 day Peace River). Of 40 radioed geese, 37 could be located in the Prairies. The results showed temporal as well as spatial difference in staging between the geese from Alaska and from Canada (Fig. G.3.13 and Fig.G.3.14). White-fronted geese from interior and NW Alaska arrived in the Canadian Prairies approximately two weeks earlier than geese from Queen Maude Gulf (Fig. G.3.13) and used areas in the Peace River and in EC Alberta that were not used by geese from Queen Maude Gulf (Fig. G.3.14).

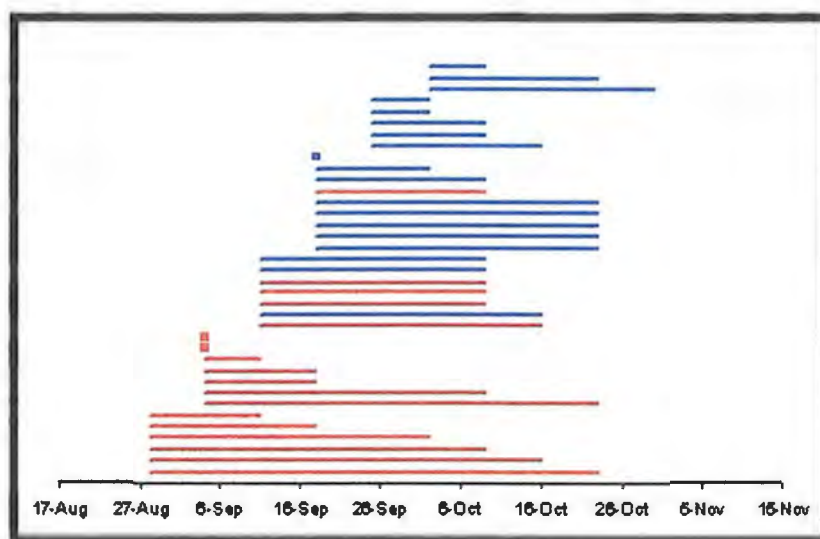


Figure G.3.13. VHF telemetry of white-fronted geese in Alberta and Saskatchewan in 2002. Duration of stay of white-fronted geese from Interior and NW Alaska (red) and white-fronted geese from Queen Maude Gulf, Canada (blue).

*Satellite telemetry study.* Satellite telemetry transmitters were surgically implanted in 12 brood-patch female white-fronted geese in 2001 and 22 in 2002. Allocation of the sample corresponded roughly to the pattern of regional abundance: Innoko, 16; Noatak 5; Selawik, 7; Koyukuk, 6. This telemetry effort is part of a broader University of Alaska study conducted by Dr. Eric Rexstad and his student, Ms. Deborah Webb. Their study, *"Measuring stopover length of mid-continent greater white-fronted geese in Alberta and Saskatchewan, Canada,"* utilized collar resightings from the existing CWS database (1990-2000), plus additional observations from late August through late October 2001 and 2002. Deborah's field work in 2001 and 2002 was augmented significantly by assistance from the Canada Wildlife Service. When field work is complete they will estimate stopover time using reverse capture history modeling and compare these results with stopover data obtained from satellite telemetry. In 2001, all 12 satellite-implanted interior Alaska white-fronts remained in Canada for the entire six week staging period. A University of Alaska website contains more details about the satellite telemetry and stopover studies: [http://mercury.bio.uaf.edu/~eric\\_rexstad/satellitegeese/](http://mercury.bio.uaf.edu/~eric_rexstad/satellitegeese/)

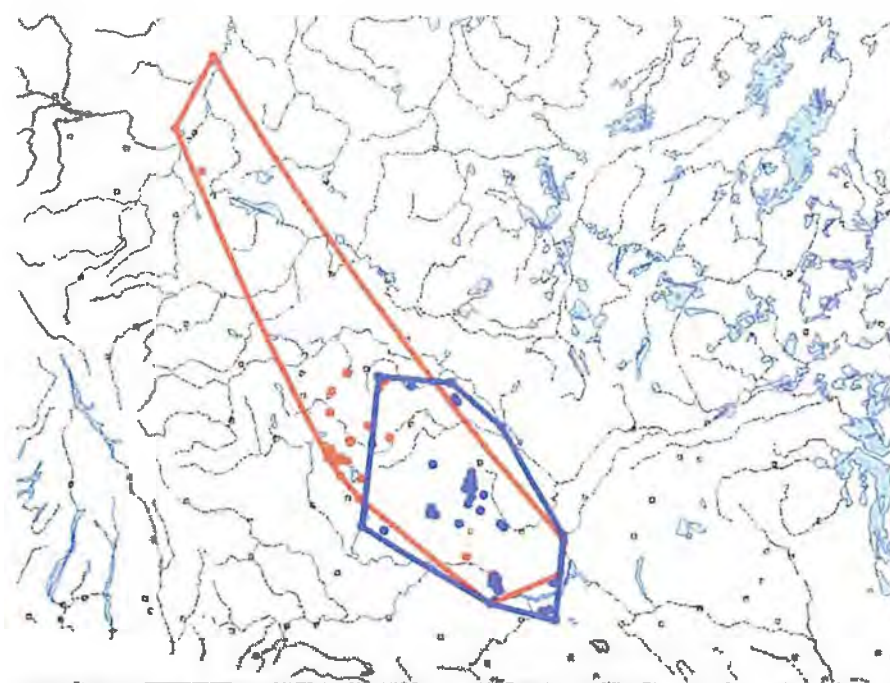


Figure G.3.14. VHF telemetry of white-fronted geese in Alberta and Saskatchewan in 2002: Spatial distribution of white-fronted geese during their staging between August and November. Red: White-fronted geese from Interior and NW Alaska, blue: White-fronted geese from Queen Maude Gulf, Canada.

## Swans

Swans are considered a key indicator species because their production trends tend to correlate well with that of other waterfowl species, their sensitivity to nest disturbance, and their sightability is high during aerial surveys. For these reasons, swan surveys have been conducted on the Complex. Both trumpeter and tundra swans nest on the Refuges, but cannot be separately identified during aerial surveys.

In 1989 the staff selected twelve 1:63,360 trend maps (four on the Koyukuk, two on the Kaiyuh, and seven on the Nowitna) to monitor swan population and production according to the Refuge Wildlife Inventory Plan. Aerial surveys are conducted to monitor trends in swan population and production on an annual basis and a state-wide census is conducted to estimate overall population every five years. The most recent state-wide census was conducted in 2000. Detailed 2001 and 2002 trend survey reports are available in the Refuge biological files. A brief summary follows:

### Koyukuk:

Results from the 2001 survey show a slight increase in the number of adults and were comparable to the long-term average. The number of young observed declined sharply and was the second lowest ever observed during the survey. Although, breeding effort (% pairs with broods) was fairly high, production (# young/brood) was very low. In 2002, both the number of adults and young increased sharply to the second highest number observed for each. Breeding effort did not increase notably but production increased from the low observed in 2001 to just below the long-term average.

### Northern Unit of Innoko (Kaiyuh):

Results from the 2001 survey showed a slight decline in the number of adults from the all-time high seen in 2000. The number of young declined more than adults but was still comparable to the long-term average. Breeding effort was high, but production was very low. In 2002, the number of adults continued a gradual decline from the extreme high observed in 2000 and was still well above the long-term average. The number of young increased from a low seen in 2001 and was above average. Breeding effort increased to a new high and production increased to just above average.

### Nowitna:

The number of adult swans observed in 2001 was the highest ever recorded. The number of young increased slightly and was comparable to the long-term mean. Breeding effort and production were both average. In 2002, results showed a decrease in the number of adults from the high seen in 2001, although numbers are still well above the mean. The number of young decreased slightly but was still comparable to the mean. Composition data showed excellent breeding effort and good production.

A report entitled *Effect of aircraft type and survey timing on aerial surveys of trumpeter swans near Galena, Alaska- a preliminary evaluation* (Report FY-2001-1) was completed in 2001 by Spindler, Hans, Hughes, and Roberts. An abstract to that report follows:

The effects of aircraft type and timing of aerial surveys to determine abundance and productivity of Trumpeter Swans (*Cygnus buccinator*) were evaluated in western interior Alaska, near Galena. Three aircraft types were evaluated, Husky (A1B), Super Cub (PA18), and Scout (8GCBC), using the same pilot and consistent observers on one medium density and two high density sample units. In medium density habitat all three aircraft produced similar counts. In high density habitat, the Super Cub and Scout produced similar counts, while the Husky detected fewer young swans. The number of young swans detected in the Husky may have been lower because the observer's seat is low in relation to window height. This design feature may be compensated for by use of a thick seat cushion. Because of aircraft type effects, similar aircraft types should be used, whenever possible, in surveys where the main goal is to make swan abundance comparisons. Survey timing also appeared to have influenced our aerial swan counts. Territoriality diminished during the month of August, especially as non-breeders regained flight and they began to flock up for pre-migratory staging. This study suggested that it is important to schedule aerial swan surveys in early August if possible, and if not, it is important to survey all adjacent sample units in succession before moving on to other areas. If surveys must be done in late August, it is important to compare them only with other late August surveys.

#### **G.4. Marsh and Water Birds**

A number of marsh and water birds are commonly observed on the Refuge, including: common, Pacific, and red-throated loons; red-necked and horned grebes; and Sandhill cranes. Yellow-billed loons are occasionally observed. Past duck production surveys indicated that red-necked grebes, common loons, and sandhill cranes were the most common marsh and water bird species. Incidental observations of water birds are recorded during annual waterfowl production float surveys.

#### **G.5. Shorebirds, Gulls, Terns, and Allied Species**

The following shorebird species are commonly observed on the Refuge Complex: lesser and greater yellowlegs; Arctic tern; glaucous, Bonaparte's, mew, and herring gulls; long-tailed jaeger; semipalmated plover; common snipe; spotted, least, pectoral, and solitary sandpipers; northern phalarope; Hudsonian godwit; and whimbrel.

#### **G.6. Raptors**

The Refuge complex supports a diversity of raptor species, including rough-legged hawks,



merlin, sharp-shinned hawks, northern harriers, red-tailed hawks, goshawks, great horned owls, great grey owls, boreal owls, northern hawk owls, American peregrine falcons, bald and golden eagles. Raptors are generally sensitive to disturbance and, therefore, act as important indicator species.

*Peregrine falcons.* Peregrine falcon surveys have been conducted periodically on the Yukon River between Ruby and Kaltag, and on the Koyukuk River above Koyukuk Village. The USFWS Endangered Species Office conducted the survey (as part of a larger survey of the Yukon River) between 1979 and 1991. Refuge staff conducted partial surveys from 1992-1994. With Refuge funding in 2000, Peter Bente (currently with ADFG, but previously with USFWS Endangered Species) conducted a thorough peregrine survey along the Yukon River. The area surveyed was between Ruby and Tabernacle (downriver from Holy Cross) with the assistance of Volunteer Shaw and PR Lehmkuhl. In 2001 and 2002 Shaw led the annual surveys between Ruby and Galena.

Past efforts to monitor peregrines have included early and late season surveys to assess nest site occupancy, reproduction, and fledge success as well as banding. Current survey methods primarily document nest occupancy and reproduction whenever possible. In 2001



*Volunteer Randy Shaw and BioTech Abby Kirkaldie set up a spotting scope to look for peregrine falcons. The cliffs on the north bank of the Yukon River provide nesting habitat for peregrines. An annual survey of the river between Ruby and Galena continues work started in the 1970's by the Endangered Species office. Peregrine numbers increased sufficiently to allow delisting from the Endangered Species list in 1999. (MH)*

Shaw was assisted by Volunteer Sonia Chavira and BT Derek Milsaps. They located peregrines at 9 of 11 known breeding sites, with 5 pairs and 4 singles. Only 4 young were observed, but 2 pairs were acting as though they were defending a nest. In 2002, RC Hans and BT Kirkaldie assisted Shaw, and documented nest locations using GPS. They observed 10 peregrines on the survey, 3 pairs and 4 singles. No eggs or young were detected other than one immature (heard) at LY 2.1. Peregrines at three sites gave defensive vocalizations. Of 11 known breeding sites on the route, 8 were occupied.

*Owls.* An owl survey was initiated in 2001 in Galena following a protocol developed by Boreal Partners in Flight for statewide owl monitoring (in cooperation with Alaska Bird Observatory). Our survey route included 10 stops at 1 mile intervals along the road east of Galena. Surveys were conducted by car in February, March and April. Each survey began approximately 2 hours after sunset. At each stop we listened for calling owls for 8 minutes (no tapes or calls were used to elicit a response). When an individual owl was first detected, we recorded the species, approximate direction and distance, and time elapsed from the start of the listening period.

In 2001 PR Lehmkuhl, WB Bryant, and RC Hans conducted five owl surveys between 13 March and 20 April 2001. Two stops were discontinued after the first survey due to noise (dogs, snowmobiles, autos), so most surveys had only 8 stops.

In 2002, PR Lehmkuhl, WB Bryant, RC Hans, and GB Beyersdorf conducted seven owl surveys between 13 February and 04 April. Two surveys were canceled due to high wind. Survey stop #1 was discontinued this year due to its close proximity to town. We started the survey series in February based on the hypothesis that we would detect boreal owls earlier in the season. The series of surveys ended earlier in 2001, primarily due to the early-morning start times after the daylight-savings time change. Peak owl detection occurred in late March, and boreal owls seemed to call earlier in the season, with great horned owls calling more in late March and in early April. The Alaska Bird Observatory did not coordinate a statewide survey in 2002.

Table G.6.1. 2001 owl survey observations, Galena, Alaska.

Date	Start Time	End Time	Species Observed	Number	Average Temp. (F)	Cloud Cover	Moon Phase
13 March	22:02	0:38	GHOW*	12	14	overcast	full
21 March	22:10	0:08	none	0	-10	clear	last 0.25
04 April	0:00	1:42	GHOW	3	33	overcast	first 0.25
13 April	3:58	5:36	GHOW	9	-2	clear	last 0.25
20 April	3:24	4:54 (cancelled due to high wind)			25	clear	new

\* GHOW = Great-horned Owl

Table G.6.2 . 2002 owl survey observations, Galena, Alaska.

Date	Start Time	End Time	Species Observed	Number	Average Temp. (F)	Cloud Cover	Moon Phase
13 Feb	20:12	21:50	BOOW <sup>1</sup>	1		overcast	0.53
21 Feb	20:25	cancelled due to wind			-5	80%	0.80
25 Feb	20:32	cancelled due to wind			20	60%	0.93
07 Mar	21:16	22:53	BOOW	3	5	clear	0.27
20 Mar	22:03	23:38	BOOW	10	26	30%	0.70
			GHOW <sup>2</sup>	2			
25 Mar	22:07	23:51	BOOW	1	18	overcast	0.87
			GHOW	12 (2 possible repeats)			
04 April	23:10	0:43	GHOW	2	0	clear	0.20

<sup>1</sup>BOOW = Boreal Owl

<sup>2</sup>GHOW = Great-horned Owl



Survey methods used in 2001 and 2002 were adequate for detecting species in the study area. However, our ability to detect changes in abundance using these techniques is questionable. The results of two seasons of effort have been favorable in that owls were detected in almost all surveys. (In other parts of the State many surveys resulted in few or no owl detections in 2001). Our study area provides an opportunity to further develop regional owl survey techniques by exploring seasonality of singing behavior, nightly singing patterns, effects of cloud cover, moon phase, wind, and other environmental variables on singing, etc. at little logistical cost. A station report on the 2002 owl survey includes recommendations for future surveys (Lehnkuhl, K, 2002: Alaska Owl Survey-Koyukuk/Nowitna NWR Complex, 2002).

#### **G.7. Other Migratory Birds**

Monitoring efforts for passerines in the Galena area during 2001 and 2002 included surveys of spring bird migration phenology (collection of arrival dates and North American Migration Count), breeding birds (Standard Breeding Bird Survey - BBS, Off Road Point Count-ORPC) and wintering birds (Christmas Bird Count). Migrant songbirds commonly seen in the summer include alder flycatcher, olive-sided flycatcher, tree swallow, bank swallow, ruby-crowned kinglet, American robin, Swainson's thrush, gray-cheeked thrush, varied thrush, northern waterthrush, yellow warbler, blackpoll warbler, orange-crowned warbler, yellow-rumped warbler, rusty blackbird, savannah sparrow, dark-eyed junco, American tree sparrow, white-crowned sparrow, fox sparrow, and Lincoln's sparrow. Common winter residents are common redpolls, common raven, gray jays, black-capped and boreal chickadees, and pine grosbeaks.

*Phenology.* These analyses are used to relate annual differences in temperature, precipitation, timing and duration of flooding, etc., with observed patterns in wildlife populations and productivity. Records of annual spring arrival dates for common and conspicuous birds were summarized to compare spring migration phenology among years (in Refuge files). In 2001 four species for which we have long-term data arrived earlier than their long-term mean arrival date, seven species arrived later than the long-term mean, and two species arrived right on the average date. In 2002 one species for which we have long-term data arrived right on the average date and all other species arrived later than their long-term mean arrival dates.

*Migration Counts.* The North American Migration Count was begun in 1992 to provide a "snapshot" of spring migration across the continent. Always held on the second Saturday in May, the count coincides with International Migratory Bird Day and provides a good opportunity for public involvement. In 2001 totals of 5,989 individuals of 43 species were recorded in the Galena area, breaking the previous year's record by over 1000 birds for the most individuals counted. The greatest number of species observed was during the Galena NAMC in 2000, when 51 species were recorded. Particularly high counts in 2001 were observed for several waterfowl and shorebird species. Another highlight in 2001 was the

inclusion of 4,915 sandhill cranes. A majority of these were migrating along the Yukon River headed west across the Bering Strait to nest in eastern Siberia. For the second year, we have been lucky enough to have the NAMC coincide with this spectacular migration, which usually lasts only 2-4 days each spring and fall. Other high counts of sandhill cranes occurred in 1999 (118) and 1997 (165). The count was not organized in 2002.

*Breeding Bird Survey.* The Refuge assists with national monitoring of songbirds, many of which are neotropical migrants, by conducting standardized Breeding Bird Survey (BBS) routes in taiga habitats near Galena. Three BBS routes were conducted on the refuge Complex: two at or near Koyukuk NWR and one at or near Nowitna NWR.

*Off-road Point Counts (ORPC).* Boreal Partners in Flight has developed survey methods for Off-road Breeding Bird Surveys to assist in monitoring landbird populations in Alaska. The survey is similar to BBS in that singing birds are counted at a series of listening stations. However, the route is established in areas without roads. In 2001 PR Lehmkuhl assisted Merry Maxwell and Harvey Williams with several ORPC surveys on Kanuti Refuge to become familiar with the methods. In 2002 three ORPC routes were established, two on the Koyukuk Refuge (Two-lakes burn) and one adjacent to the Nowitna Refuge (Hub Hill).

#### Koyukuk NWR.

The Galena road BBS route has been run continuously since 1985. It is the longest-running route on/near Koyukuk NWR. It covers 12.5 miles on much of the available road system. This route is considered by USGS-BRD as an unconventional *half-route* (25 stops instead of 50 stops) and is therefore not analyzed nationwide with other full BBS routes. The Galena route is useful for monitoring local birds even though its diversity is lower than the other Koyukuk NWR route- Nikolai Slough. The Nikolai Slough survey route is 4-10 miles northwest of Galena and is run by boat, which makes it especially challenging to complete within the allotted time limits. However, the route encompasses some excellent songbird habitat and is one of the most productive in terms of species diversity and abundance. Both ADFG and USFWS Division of Migratory Birds have been particularly interested in the counts of long-distance neotropical migrants (particularly flycatchers) from this route.

*Galena road BBS.* This survey was conducted on June 13, 2001 by SWB/Pilot Mike Spindler. Totals of 254 individuals of 30 species were recorded (Table G.7.1). Total individuals decreased and is just below average while the number of species observed is comparable to the average. Notable increases in the 2001 counts compared to the mean or last year's observations were observed for two species: herring gull and common raven. Three species decreased from the mean: ruby-crowned kinglet, Swainson's thrush, and American robin.

The survey was conducted on June 12, 2002 by RM/Pilot Mike Spindler. Totals of 249 individuals of 32 species was recorded (Table G.7.1). Total individuals decreased to a level just below average while the number of species observed increased to slightly above average. The

range in number of species observed has been 28-36 in the last four years. Notable increases in the 2002 counts compared to the mean or last year's observations were observed for four species: gray jay, ruby-crowned kinglet, fox sparrow, and Lincoln's sparrow. Two species decreased from the mean: alder flycatcher and yellow warbler.

Table G.7.1. Number of birds observed during Galena Breeding Bird Survey, 1995-2002 (mean taken from long-term survey 1985-2002).

Species	1995	1996	1997	1998	1999	2000	2001	2002	Mean	SD
Common Loon				1		1	1		1.00	0.0
Red-necked Grebe				1	1	4		2	2.11	1.3
Trumpeter Swan			1						1.00	
White-fronted goose					2				2.00	
Canada Goose					3				2.50	0.7
Green-winged Teal						1			1.33	0.6
Mallard	1								1.60	0.5
Northern Shoveler	1								1.50	0.7
American Wigeon		1			3		1		1.57	1.0
Lesser Scaup						2			2.00	
Greater Scaup									2.00	
Sandhill Crane	2			1	4	1		2	1.93	1.0
Semipalmated Plover							1		1.50	0.7
Greater Yellowlegs									1.00	
Lesser Yellowlegs			1		4		2	1	4.21	3.2
Solitary Sandpiper	1	1	7	3	3	2			2.92	2.0
Spotted Sandpiper	1								4.00	5.2
Whimbrel									1.00	
Common Snipe	7	1	5	14	8	15	10	7	9.69	4.0
Mew Gull			9	3	3			1	3.90	2.7
Herring Gull		1				1	8		2.80	3.0
Boreal Owl	2							1	1.33	0.6
Northern hawk-owl						1			1.00	
Great Horned Owl		1				1			1.25	0.5
Short-eared Owl									1.00	0.0
Belted Kingfisher		1					1		1.14	0.4
Hairy Woodpecker									1.00	
Northern Flicker									1.00	0.0
Olive-sided Flycatcher	6	1	1	4	1	3	1		2.88	2.0
Alder Flycatcher	16	16	17	17	30	40	36	7	32.50	13.2
Tree Swallow	4		25	6	14	5	8	10	7.88	5.8
Violet-green Swallow	6		2	6	2	6		1	3.33	2.3
Bank Swallow			1					2	3.33	3.4
Cliff Swallow					1	1			6.33	8.2
Gray Jay	2	2	2	3	5	5	4	10	3.42	2.6
Common Raven			1	2	14	15	33	4	7.31	9.5
Black-capped Chickadee	1	1	1	1				1	1.00	0.0
Boreal Chickadee				1					1.00	
Ruby-crowned Kinglet	5	5	8	10	9	6	3	11	6.92	3.4
Gray-cheeked Thrush	6	3	4	7	1	1	1	5	4.35	3.2
Swainson's Thrush	52	31	29	41	38	24	11	31	29.89	13.2
American Robin	16	13	18	21	19	25	7	18	18.17	7.0
Varied Thrush	2	1	1	5	5			5	4.67	2.4
American Pipit									1.00	
Orange-crowned Warbler	35	16	13	31	12	23	14	19	13.78	8.8
Yellow Warbler	35	31	30	22	23	15	22	12	21.53	11.4
Myrtle Warbler	14	10	9	17	22	17	13	11	10.00	5.8
Blackpoll Warbler	4	2	3	6	9	3	4	4	4.00	2.5
Wilson's Warbler				2		2	1		1.67	0.6
Northern Waterthrush	30	20	23	22	26	23	19	24	17.19	9.5
American Tree Sparrow									2.00	
Savannah Sparrow	8	7	3	10	7	7	7	7	7.11	2.1
Fox Sparrow	4	3	8		3	1	3	7	3.71	2.3
Lincoln's Sparrow	4	10	8	10	8	5	6	12	6.23	3.4

Golden-crowned Sparrow									1.00	
White-crowned Sparrow	14	25	8	16	18	9	11	13	18.50	6.8
Slate-colored Junco	20	15	14	22	21	20	21	17	16.89	4.8
Rusty Blackbird	2			1	7	1	3		2.08	1.7
Pine Grosbeak		1				2	1	1	1.20	0.4
White-winged Crossbill	1			4	3	7			6.83	7.7
Common Redpoll	4	6	5	5	3	11	1	1	7.28	5.8
Least Sandpiper								1	1.00	
Ruffed Grouse								1	1.00	
TOTAL INDIVIDUALS	306	225	256	316	332	306	254	249	263	46.4
SPECIES	31	27	28	33	35	37	30	32	29.61	3.5

*Nikolai Slough BBS.* This survey was conducted on June 12, 2001 by SWB/Pilot Mike Spindler and SCEP Deborah Webb. A total of 474 individuals of 44 species was observed in 2001 (Table G.7.2). Total individuals decreased from the long term average, but the number of species was average. Counts above the long-term average were observed for two species, common snipe and ruby-crowned kinglet. Counts that were below previous years or below the long-term average were recorded for four species: American wigeon, belted kingfisher, yellow warbler, and northern waterthrush.

The survey was conducted on June 6, 2002 by RM/Pilot Mike Spindler, BT Abby Kirkaldie and PR Karin Lehmkuhl. A total of 510 individuals of 53 species was observed in 2002 (Table G.7.2). Total individuals increased from 2001 and is comparable to the mean; number of species observed was above average. Counts above the mean were observed for six species: trumpeter swan, mallard, American wigeon, gray jay, Swainson's thrush, and northern waterthrush. Counts that were below previous years or below the mean were recorded for three species: white-crowned sparrow, rusty blackbird, and slate-colored junco.

Table G.7.2. Number of birds observed during Nikolai Slough Breeding Bird Survey, 1995-2002 (mean taken from long-term survey 1986-2002).

Species	1995	1996	1997	1998	1999	2000	2001	2002	2003	Mean	SD
Pacific Loon										0.1	0.0
Red-throated Loon		1				1	1			0.2	0.0
Red-necked Grebe	5	6			0	3	5	1	0	2.0	1.7
Trumpeter Swan		2		1	2	1	1	4		0.6	1.1
Greater white-fronted Goose	2	5	9	43	3		4	1	6	4.6	11.1
Canada Goose		1		2	5		2			0.9	1.7
Green-winged Teal		2	2				3			1.4	2.3
Mallard				4	3	1	7	17	17	5.4	8.6
Norther Pintail	1				13	1		2		2.1	3.5
Northern Shoveler	2				14	2	1	6		4.3	7.2
American Wigeon	3	36	18	33	34	13	5	40	9	17.1	11.6
Scaup		1	1							0.2	0.5
Canvasback			1					1		0.1	0.0
Black Scoter			3							0.4	1.0
Common Goldeneye	1	1	4	6	8	1	3	2	1	4.1	3.4
Bufflehead	1	1	2	5		2	1	3	12	2.7	3.1
Red-breasted Merganser	2				2					0.4	0.0
Bald Eagle					2					0.3	0.5
Red-tailed Hawk	1		3	1	1			1		1.3	1.2
Rough-legged Hawk										0.1	0.5

American Kestrel										0.1	0.9
Ruffed Grouse	1			1		2	1		1	0.9	1.1
Sandhill Crane	10	3	3	12	10	10	9	8	3	5.6	3.4
Semipalmated Plover		2						3		0.3	0.5
Lesser Yellowlegs	12	7	11	13	6	4	8	4	4	9.1	4.6
Solitary Sandpiper	5	5	3	5	2	4	2	5	9	4.3	2.6
Spotted Sandpiper	18	23	22	21	22	10	14	18	11	13.4	8.0
Whimbrel										0.1	0.0
Common Snipe	25	47	57	61	46	40	53	46	39	37.6	12.2
Bonaparte's Gull	1			1	3			1		1.1	2.2
Mew Gull	1	1	14			2	1	2	1	4.1	5.8
Herring Gull			1	1	5	1	1	1	2	1.3	1.3
Arctic Tern						2		2		0.5	0.5
Great Horned Owl	2							1	1	1.6	1.8
Northern Hawk Owl						1				0.1	0.0
Belted Kingfisher	4	6	3	1	7	1		4	1	3.2	
Three-toed Woodpecker			1			1				0.2	0.0
Hairy Woodpecker									1	0.1	0.0
Downy Woodpecker										0.1	0.4
Northern Flicker			1			2				0.7	0.9
Olive-sided Flycatcher	12	12	11	16	14	15	13	10	18	12	4.4
Western wood-pewee						1				0.1	0.0
Alder Flycatcher	20	17	28	27	19	30	31	1	12	18.5	7.9
Hammond's Flycatcher		2				0				0.2	0.7
Tree Swallow	3	7	1	12	9	7	4	4	3	4.2	3.2
Violet-green Swallow					6				1	0.4	2.5
Bank Swallow	2	5	14	10	6	43	17	14	33	37.4	34.5
Gray Jay	20	18	21	25	6	9	8	21	16	13	6.2
Common Raven	4	3	5	4	4	4	5	2	3	4.2	2.3
Black-capped Chickadee						2		1	3	0.9	0.9
Boreal Chickadee	5	4	2	3	2		2	2		1.8	1.3
Ruby-crowned Kinglet	7	7	7	11	6	4	16	4	14	6.2	4.1
Gray-checked Thrush	4	2		6	6	5	3	2	10	5.7	3.9
Swainson's Thrush	46	44	74	49	88	61	58	68	54	55.7	20.2
American Robin	9	11	22	13	16	21	14	20	26	24.3	17.5
Varied Thrush	7	10	21	25	15	9	8	10	11	17.8	11.1
Bohemian Waxwing		1				1		2	1	1.2	1.7
Orange-crowned Warbler	13	21	29	42	18	27	18	25	29	16.6	11.0
Yellow Warbler	13	12	15	8	9	4	3	2	5	10.6	6.5
Myrtle Warbler	29	35	29	43	37	38	30	25	32	24.8	9.9
Blackpoll Warbler	2	5	4	3	2	2	4	0	5	2.4	2.6
Northern Waterthrush	43	63	61	60	63	64	41	67	58	44.8	16.8
Wilson's Warbler	1		1	4	2			0	2	0.8	1.2
Savannah Sparrow							1	0		0.6	1.4
Fox Sparrow	8	17	6	12	16	4	5	7	19	10.1	7.8
Lincoln's Sparrow			1	2	2	2	4	4	2	1.1	1.4
White-crowned Sparrow	6	6	3	3	4	3	9	0	5	7.8	5.3
Golden-crowned Sparrow								0		0.1	0.4
Slate-colored Junco	33	41	40	40	50	40	34	31	34	36.9	6.6
Rusty Blackbird	8	6	10	10	8	6	6	3	3	8.3	3.5
Pine Grosbeak			3	1		3	2	3		1.2	1.0
White-winged crossbill	1		12		3	3		0		2.9	5.4
Common Redpoll	9	2	44	9	7	10	16	9	13	13	11.4
TOTAL INDIVIDUALS	402	501	623	649	606	523	474	510	530	517.9	70.0
SPECIES	43	42	46	42	45	51	44	53	44	45.6	4.3

Two Lakes ORPC. Two Off-road Point Counts were established adjacent to a lake on the Koyukuk NWR in 2001. Our goal is to monitor songbird populations in habitat types not covered by existing survey efforts at the Refuge complex, and to document changes in bird populations during post-fire succession on one of the routes. The study area is located south of Hozatka Lake ("Three Lakes") adjacent to a pair of lakes (known to local pilots as "Two Lakes") near the Huslia-Galena winter trail. Primary access to the survey sites is from "East Two-Lakes" where the winter trail shelter cabin is located. PR Karin Lehmkuhl and BT Abby Kirkaldie established and conducted the breeding-bird survey and documented vegetation at listening stations from 18-20 June 2002.

Two Lakes Burn ORPC. This route is located within the Natlaratlen River fire (A292) which burned in late summer 2000. The route is adjacent to three vegetation monitoring transects established in 2001 to document successional changes in flora (see Section 8 Caribou). The area is primarily burned black spruce woodland (with 60-100% tree mortality) interspersed with lakes, wetlands, and sphagnum bogs. The ORPC survey was conducted on June 19, with 145 individuals of 23 bird species detected (Table G.7.3). Birds observed on the burn transect but not on the caribou woodland survey include long-tailed jaeger, olive-sided flycatcher, American robin, and fox sparrow.

Caribou Woodland ORPC. This survey route lies mainly within black spruce woodland with an understory of sphagnum, lichen and low shrubs. There are several extensive lakes and bogs adjacent to the route. On June 20 we detected 125 individuals of 25 species. (Table G.7.3) Species observed only on this route include boreal chickadee, ruby-crowned kinglet, gray-checked thrush, and white-winged crossbill.

Table G.7.3 Birds encountered during Two Lakes Burn and Two Lakes Caribou Woodland ORPC surveys, Koyukuk NWR, AK 2002. A "p" indicates species was present but not detected during count periods.

Species	Burn	Woodland
Common Loon	2	6
Red-necked Grebe	1	2
Canada Goose	1	0
White-Fronted Goose	0	p
Northern Shoveler	0	p
American Widgeon	1	1
Lesser Scaup	0	p
Greater Yellowlegs	0	1
Lesser Yellowlegs	13	4
Solitary Sandpiper	0	1
Sandhill Crane	p	2
Common Snipe	9	9
Long-tailed Jaeger	p	0
Bonaparte's Gull	0	p
Mew Gull	0	4
Arctic Tern	3	3
Olive-sided Flycatcher	5	0
Alder Flycatcher	5	5
Tree Swallow	1	1
Bank Swallow	p	0
Gray Jay	4	5
Common Raven	5	p
Boreal Chickadee	0	2
Ruby-crowned Kinglet	0	3



Gray-cheeked Thrush	0	1
American Robin	11	0
Bohemian Waxwing	2	0
Myrtle Warbler	1	5
American Tree Sparrow	11	7
Savannah Sparrow	6	7
Fox Sparrow	3	0
Song Sparrow	<i>p</i>	0
Lincoln Sparrow	1	1
White-crowned Sparrow	30	23
Slate-colored Junco	20	20
Rusty Blackbird	3	10
White-winged Crossbill	0	2
Common Redpoll	7	3
Total	145	128

*Wintering birds.* Resident songbirds were monitored with the standardized Christmas Bird Count conducted by Refuge staff and local volunteers on December 21, 2001. The 2001 count had 311 individuals of 8 species, which was similar to the previous year. Participation was average, with 8 people spending 18 person-hours and traveling 56 miles. Weather conditions were mild for mid-December, a minimum temperature of -10° F (average is -8.5° F). The 2002 count showed 395 individuals of 14 species, an increase over 2001.

Participation was slightly above average with 11 people spending 30 hours and traveling 95 miles. Weather conditions were mild for the second year with a minimum of -10°F. The count procedure is usually sensitive to amount of effort expended in terms of participants, party-hours, and miles traveled, as demonstrated by the 2001 and 2002 results.



*Hub Hill, on the road south of Ruby, was an excellent site to watch birds migrating through the uplands in spring of 2002. Here Volunteer Randy Shaw watches birds with our canine companions, Nayuka and Budger. (KL)*

#### Nowitna NWR

Just west of the Refuge boundary is a 40-mile state-maintained gravel road that connects the village of Ruby with a major gold mining district. Since 1994 Refuge staff have conducted a standard

Breeding Bird Survey along this road, which represents the only significant length of

roadway in western and northern interior Alaska. This affords an opportunity to have a standard BBS route in an area of the state that is poorly represented.

*Ruby Road Spring Bird Migration.* In spring 2002 bird migration was observed in an area adjacent to the Nowitna NWR to contribute information to the bird checklist for that region. Upland and alpine regions on the Refuge are difficult to access, so we chose to survey the area along the Ruby-Poorman Road where we could stay in a privately owned cabin and hike to upland areas. We stayed in Clara Honea's cabin at 7 mile and traveled the road and adjacent areas between Ruby and 23.5 mile. We were able to spend a fair amount of time on Hub Hill (~1200 ft. elev.), and twice climbed Boston Dome (~1450 ft. elev.), to observe birds in open habitats near treeline.

Spring weather conditions were particularly cold into mid-May, both locally and across much of Canada and the northern US. Bird migration was delayed, and many migrants did not begin to appear until May 15. Neotropical migrants began to arrive around May 20. Bird arrival dates were similar in Galena and on the Ruby Road, with some birds arriving a day or two earlier to the Ruby area.

Forty-eight bird species were observed, including seven winter residents (Table G.7.4). Two species were observed for which no records are listed on the draft Nowitna Bird Checklist. An arctic warbler was seen near Ruby on May 21. This species was also captured at the Galena MAPS station in August of 1996. Arctic warblers likely migrate through the Refuge, but it is unclear whether the species nests anywhere within Refuge boundaries. A western wood-pewee was heard on May 22 on Hub Hill. )The species was also heard on the Ruby Road (at approx. 35 mile) on June 13, 2003.) Western wood-pewees have been heard singing on the Nowitna River during the waterfowl production survey (late June). This species likely breeds on the Refuge.

The support we received from Ruby residents was excellent, and our presence in the area provided a unique opportunity for "outreach." When we came into Ruby on occasion, people asked us about the survey, and told us about birds they had observed recently. The survey was worthwhile if only to have opportunities to discuss wildlife with locals! We spoke to the City Council at the end of the survey to report on what we had seen and done. Folks who helped with the project include: Clara Honea (cabin), Jay deLima (transportation, hauling firewood), Jr. Gurtler (firewood), Roger McCarty, Willy McCarty (transportation on Ruby Road), and observers: Tamara Koontz (April 30-May 12), Randy Shaw (May 13-17), Lucy Williamson (May 18-20), Abby Kirkaldie (May 21-23).

Upland habitats similar to those on the Nowitna refuge are well represented in the Ruby Road region. However, the unusual spring conditions in 2002 make a similar survey in a different year seem worthwhile. Also a survey of birds during migration and breeding season in one of the higher (~2000 ft. elev.) ridge systems on the Refuge is recommended before completion of the bird checklist.

Table G.7.4. Spring 2002 arrival dates of migratory birds, Ruby Road and Galena, AK.

Species	First Detected Ruby Road	First Detected Galena	Mean arrival date Galena (1982-2001)	Winter range
Comon raven	04/30			Resident
Common redpoll	04/30			Resident
Pine grosbeak	04/30			Resident
Spruce grouse	04/30			Resident
Black-capped chickadee	04/30			Resident
Gray jay	05/01			Resident
White-winged crossbill	05/01			Resident
Boreal chickadee	05/02			Resident
Snow bunting <sup>1</sup>	05/31	04/22	03/18	N. America <sup>2</sup>
Canada goose	05/04	04/28		N. America
Swan (Trumpeter or Tundra)	05/05	05/15		N. America
Ruby-crowned kinglet	05/06	05/15	04/29	N. and S. America
Sandhill crane	05/06	05/09		N. America
White-fronted goose	05/08	05/02	04/24	N. America
Lapland longspur	05/09	05/14		N. America
Varied thrush	05/09			N. America
Slate-colored junco	05/10	05/09	04/25	N. America
Peregrine falcon	05/10			N. and S. America
American robin	05/10	05/08	04/28	N. America
Tree swallow	05/11	05/15	05/08	N. and S. America
Common snipe	05/13	05/13	05/06	N. and S. America
Northern harrier	05/14			N. and S. America
Glaucous gull	05/14	04/25		N. America
White-crowned sparrow	05/15	05/15		N. America
Three-toed woodpecker	05/15			N. America
Merlin	05/15			N. and S. America
American tree-sparrow	05/15	05/16	05/02	N. America
Horned lark	05/15			N. America
Myrtle warbler	05/15	05/16		N. and S. America
Fox sparrow	05/15	05/16		N. America
Bohemian waxwing	05/15			N. America
Northern goshawk	05/15			N. America
Spotted sandpiper	05/20			N. and S. America
Northern waterthrush	05/20	05/19		S. America
Savannah sparrow	05/20	05/16		N. and S. America
Lincoln's sparrow	05/20	05/20		N. and S. America
Arctic warbler	05/21			Tropical Asia
Orange-crowned warbler	05/21	05/20		N. and S. America
Swainson's thrush	05/21	05/19		Central and S. America
Gray-cheeked thrush	05/22	05/23		S. America
Wilson's warbler	05/22	05/21		Central and S. America
Western wood-pewee	05/22			Central and S. America
Blackpoll warbler	05/22			S. America
Golden-crowned sparrow	05/23			N. America
Upland sandpiper	05/23			S. America
Belted kingfisher	05/23			N. and S. America
Yellow warbler	05/23	05/22		Central and S. America
Barn swallow	05/23			S. America

<sup>1</sup> Snow buntings and resident birds were likely present prior to date observed

*Ruby Road BBS.* The 2001 survey was conducted on June 12 by WB Jenny Bryant, PR Karin Lehmkuhl, and RC Melanie Hans. A total of 522 individuals of 29 species was recorded, an increase over the long-term mean of 364 individuals. Notable increases in the 2001 count compared to the long-term mean were observed for five species: gray jay, gray-cheeked thrush, slate-colored junco, common redpoll, and white-winged crossbill. Six new species were observed this year; two solitary sandpipers, two pine siskin, one great-horned owl, two boreal chickadees, one pine grosbeak, and one red-tailed hawk. No species in 2001 declined significantly, although yellow-warbler observations are still well below the long-term mean.

The 2002 survey was conducted on June 13 by PR Karin Lehmkuhl and BT Abby Kirkaldie. A total of 418 individuals of 25 species was recorded, an increase over the long-term mean of 370 individuals. Notable increases in the 2002 counts compared to the long-term means were observed for five species: gray jay, myrtle warbler, Wilson's warbler, and slate colored junco. Two new species were observed this year; two American tree swallows and nine Canada geese were recorded. Varied thrush was the only species to decline significantly in 2002, although yellow warbler observations are still well below the long-term average. Weather conditions were good with partly cloudy skies, light wind, and no rain. Temperatures were cool, yet comfortable in the morning, registering 42°F at start time. The temperature was 50°F at the end of the survey.

*Hub Hill Off-Road Point Count.* Hub Hill is located on the Ruby-Poorman road approximately 18 miles south of Ruby. It was chosen for establishment of an ORPC survey because it consists mainly of upland/subalpine habitat, is easy to reach from Ruby, and can be surveyed in conjunction with the annual Ruby Road Breeding Bird Survey (BBS). The route was established on June 12 and 13, 2002. Survey conditions were good on the morning of 14 June 2002, with mostly clear skies, no wind, and a start temperature of 38°F. The survey began at 04:15 hrs and was completed at 07:43 hrs. Totals of 112 individuals of 15 species were observed during the survey (Table G.7.5.). All of the species seen during our time at the site (establishing route, describing vegetation, etc.) were detected during the survey. Most frequently observed were orange-crowned warblers (25), white-crowned sparrows (16), savannah sparrows (12), and slate-colored juncos (11). All passerine species observed at Hub Hill have also been recorded during the Ruby Road BBS. Savannah sparrows were more common on Hub Hill than the BBS route, which is not surprising given the open habitat of the former. Orange-crowned warblers, blackpoll warblers, and white-crowned sparrows also appear to be well represented in the Hub Hill ORPC relative to the Ruby Road BBS.



Table G.7.5. Numbers of songbirds observed during Hub Hill ORPC, 14 June 2002.

Species	Stop #												total
	1	2	3	4	5	6	7	8	9	10	11	12	
alder flycatcher	3	2	2						2				9
blackpoll warbler	1	2	1					2					6
Bohemian waxwing		1				p		1					2
common redpoll		2			1 p		1			1			5
fox sparrow			2	1		1				1	1		6
gray-ckeed thrush	1												1
gray jay								p		1	1		2
Myrtle warbler			1										1
orange-crowned warbler	2		4	3	1	2	1	2	2	3	3	2	25
ruby-crowned kinglet									1				1
savannah sparrow				1	3	4			1	2	1		12
slate-colored junco		1	2	2		2	1		1		1	1	11
Swainson's thrush	1	1	1	1	1			1	2		1		9
varied thrush					1			2	2	1			6
white-crowned sparrow	1	1		3	2	1			2	1	3	2	16
												Total	112

p=species present but not detected during survey period at that stop



*BT Abby Kirkaldie walks along a trail near the Village of Ruby after completing the Breeding Bird Survey and Off-Road Point Counts in June 2002 (KL).*

## G.8. Game Mammals

### **Moose**

*Trend Count Areas.* In the most important moose hunting areas, trends in density, age and sex composition are monitored annually by aerial surveys of Trend Count Areas (TCA's) along river drainages where moose concentrate in late fall and early winter. Moose abundance is generally highest in riparian habitats and lowest away from riparian habitats. Within the river corridors, moose abundance is lowest in northern Koyukuk NWR and the Upper Nowitna River, and highest in the Koyukuk part, near Dulbi River Mouth and Three Day Slough.

Since the mid-1980's, aerial surveys of the moose TCA's have emphasized consistent application of methods and standardized survey areas that are aimed at sampling identical units each year to simplify comparisons. These surveys, which focus intensively on the more popular hunting areas, are not able to produce estimates of overall population. Previous large-scale population estimation surveys estimated the Koyukuk/Kaiyuh moose population at 11,000 in the late-1980's and 8,500 in 1997. On the Nowitna, a 1995 population estimate for the northern half of the Refuge indicated about 1,000 moose. The southern half of Nowitna has not been censused since 1990.

In fall 2001, aerial moose trend count area (TCA) surveys and large-scale population estimates were conducted jointly by the Service and ADFG on the Nowitna, Koyukuk and Northern Unit of Innoko NWRs. Snow cover was complete and much better in 2001 than the previous two surveys in November 1999 and 2000. In fall 2002, we flew a limited amount of the aerial moose TCA surveys (one on the Nowitna, two on the Koyukuk, and three on the Kaiyuh) but poor snow conditions forced us to curtail any further surveys for the year.

We thank ADFG for their contribution to the moose surveys on Nowitna and Koyukuk NWRs. Following is a brief summary of moose trend survey and population estimate data on the Refuge, from north to south, and west to east.

### Koyukuk NWR

The moose population in the Koyukuk NWR and Northern Unit of Innoko NWR portions of GMU21D was estimated at 11,000 in 1987-89 (Bodkin, J.L., W.N. Johnson, T.O. Osborne, and G. Rost. 1990. *Abundance, distribution, and population structure of moose on the Koyukuk/Nowitna National Wildlife Refuge, 1987-89*. Unpubl. Report, Unpubl. Report, U.S. Fish and Wildlife Service, Galena, AK. 20pp). Census work in 1997 combined with trend count surveys, provided a population estimate of 8,500 in the same area (Koyukuk NWR 1998). The refuge moose population formerly included some of the highest densities in the state at Three Day Slough (up to 13 moose/mi<sup>2</sup>). The overall Refuge, however, appears to have stabilized at a lower level as harvest and predation have increased in the 1990's.

*Trend Counts (2001).* In November 2001, moose trend count surveys were conducted in



combination with a large-scale population estimate. Prior to 2000, population estimation surveys and trend count area surveys were conducted using the Gasaway method (ADFG 1988). In 2000, we began using a new method called the Geo-Statistical Population Estimator (GSPE, Ver Hoef, J.M. 2001. *Predicting finite populations from spatially correlated data*. 2000 Proceedings of the Section on Statistics and the Environment of the American Statistical Association, pp. 93-98). Trend count area surveys were completed in six areas of the Koyukuk NWR; Huslia River Flats, Treat Island, Dulbi River Mouth, Dulbi Slough, Three-Day Slough, and Koyukuk River Mouth. These areas total 440.9 mi<sup>2</sup>. Moose numbers observed in 2001 on the Koyukuk TCAs suggest that adult moose numbers have been stable, calf production declined to low/poor levels, and recruitment also declined to low or normal levels.

*Population Estimation Surveys (2001).* The large-scale population estimate for 2001 was completed for the southern portion of GMU 21D and was analyzed in three sections (West Galena Subunit, Kaiyuh Subunit, and the upper Koyukuk Subunit) for comparison with the 1997 population estimate. The 2001 surveys produced a population estimate of 8,925 in the same area (West Galena and Kaiyuh Subunits combined) as the 1997 estimate (8,500) and the 1987-89 estimate (11,000). The overall sex ratio in 2001 was 33 bulls/100 cows, which is considered in the normal range (20-39 bulls/100 cows) and has been average for most values reported in these areas in previous years. Recruitment in 2001 was 7 yearling bulls/100 cows and is considered on the low side of normal. Calf productivity from the 2001 surveys was low, at 18 calves/100 cows. The Koyukuk River Moose Management Plan indicates a guideline range of 20-30 calves/100 cows to maintain population stability, therefore the refuge and ADFG staff are concerned about these levels and will be monitoring productivity closely.

*Trend Counts (2002).* Trend count area surveys were completed in two areas of the Koyukuk NWR in 2002; Dulbi River Mouth and Koyukuk River Mouth. Snow conditions were considered poor on the Dulbi, and adequate though marginal at the Koyukuk River Mouth. Results from the Koyukuk and Kaiyuh surveys must be interpreted with caution. The overall moose observations from the limited 2002 TCA surveys showed an increase in calves observed and slight decreases in adults observed. The number of calves observed is considered a minimum count for the TCAs and is promising considering the trend in poor calf production for the prior 3-4 years. Although considered encouraging, we would like to see several consecutive years of good calf production and recruitment with improved survey conditions.

#### Northern Innoko (Kaiyuh Flats)

The total moose population on the Northern Unit of Innoko NWR was estimated at about 1,500 in 1997 (Huntington, O.H. 1999. *Koyukuk/Nowitna National Wildlife Refuge Complex, Lower Koyukuk River and Kaiyuh Flats, 1997 Moose Census, Game Management Unit 21D, Alaska*. Final Report FY98-08. Unpubl. Report, U.S. Fish and

Wildlife Service, Galena, AK. 49pp.). In November 2001, trend count area surveys were conducted in combination with a large-scale population estimate of the Kaiyuh Flats. Trend count areas included in the survey were; Kaiyuh Slough, Squirrel Creek, and Pilot Mountain Slough. These three areas total 161.3 mi<sup>2</sup>. Moose observations in the Northern Unit Innoko NWR (Kaiyuh) TCAs suggest that adult numbers have been stable and calf production and recruitment fluctuating but considered normal, with the exception of the Kaiyuh Slough TCA in 2001, which showed large declines in both calf production and recruitment, and a large increase in the bull:cow ratio. The large-scale population estimation survey produced an estimate of 1,800 in 2001 for the Kaiyuh Flats. Overall composition data in 2001 suggest that the sex ratio is good at 44 bulls/100 cows. Recruitment and calf production were good at 9 yearling bulls/100 cows and 22 calves/100 cows, respectively, but has steadily declined between large-scale population estimation surveys from highs seen in 1987 (15 yearling bulls/100 cows, 46 calves/100 cows) and that seen in 1997 (11 yearling bulls/100 cows, 28 calves/100 cows). As with the Koyukuk NWR, Refuge and ADFG staff have concerns over the trend of declining recruitment and production.

Trend count area surveys were completed in three areas of the Northern Unit of Innoko NWR in 2002; Pilot Mountain Slough, Squirrel Creek, and Kaiyuh Slough TCAs, with the best snow conditions occurring on the Kaiyuh Slough TCA and adequate though marginal on the other two. As seen on the Koyukuk NWR TCA surveys, the overall moose observations showed an increase in calves observed and slight decreases in adults observed, especially cows on the Kaiyuh Slough TCA. We are concerned about an apparent trend in decreasing cow survival on Kaiyuh Slough.

#### Nowitna NWR



*Adult moose numbers have been relatively stable, but productivity and recruitment have declined in 2001-2002 on both Koyukuk and Nowitna NWRs.(KL)*

In 1995, an estimate of 908-1,052 total moose was obtained in the lower Nowitna portion of GMU21B, where most of the moose hunting activity takes place (Huntington, O.H., and M.R. Bertram. 1996. *1995 moose census, lower Nowitna River and Sulatna River drainages*. Progress Report FY96-04. Unpubl. Report, U.S. Fish and Wildlife Service, Galena, AK. 37pp.). In 2001 trend area surveys were conducted in combination with a large-scale population

estimate. Trend count areas surveyed were; Deep Creek, Nowitna River Mouth, Nowitna/Sulatna River Confluence, and Our Creek (though not included in the 2001 analysis). These four areas totaled 239.2 mi<sup>2</sup>. Historical trends suggest that adult moose numbers in the lower Nowitna Trend Count Areas (TCAs) have been stable, calf production declined to low/poor numbers, and recruitment increased to normal levels. Results from the upper Nowitna suggest that all segments (adults, calves, yearling bulls) of moose seen in the historical TCA declined dramatically since 1980, and have remained low from 1996-2001. The 2001 large-scale population estimation survey produced an estimate for the lower Nowitna portion of the Nowitna NWR at 610-908 moose. Overall composition data in 2001 suggested the sex ratio was normal at 26 bulls/100 cows. Recruitment in 2001 was normal at 7 yearling bulls/100 cows. Production in 2001 was poor at 19 calves/100 cows. Range guidelines suggest calf production of 20-30 calves/100 cows to maintain a stable population. Refuge and ADFG staff remain concerned about productivity and high predation on the population.

In 2002, trend count area surveys were completed on one TCA on the Nowitna NWR; Nowitna/Sulatna River Confluence, although it had the poorest snow conditions of the 2002 surveys and therefore these results will not be considered.

*Moose Browse Study.* High moose densities in the late 1980s and early 1990s have resulted in obvious browse pressure on willows in certain areas of Koyukuk NWR. Past studies, however, suggested that the moose range was not yet overbrowsed (Kielland and Osborne. 1998. *Moose browsing on feltleaf willow: optimal foraging in relation to plant morphology and chemistry.* Alces 34). Their study found that the high quality of browse in the study area may help explain the sustained high density of moose in Three-Day Slough. Kielland and Osborne believed that browse was not overexploited at the time of the study because moose bite diameter utilization was below the threshold level of decreased digestibility. Moose browse surveys were conducted in 2000 by WB Guy Hughes and Volunteer Tim Osborne and in 2001 by WB Guy Hughes and Volunteer Hector Hernandez. In February and March 2002, RC Melanie Hans and P Joe Huhndorf collected the third and final year of moose browse data on the Koyukuk, Nowitna and Innoko Refuges via plane and snowmachine. In all years, data on diameter at point of bite, current annual growth and end stem diameter of unbrowsed branches were collected from *Salix* spp.

## **Caribou**

Two caribou herds normally occur on the Koyukuk and Northern Unit of Innoko NWR refuges: the Galena Mountain Herd (GMH) and the Western Arctic Herd (WAH). The GMH is a small resident herd of approximately 300 animals that winter north of Galena and calve east of the Koyukuk NWR in the western Kokrines Hills. The WAH is currently estimated at about 500,000 caribou. Portions of the WAH winter on northern and western sections of the Koyukuk NWR, but in the winters of 1989-1990, 1990-1991, 1992-1993, and 1998-99 WAH caribou wintered southeast of the Koyukuk River from the mouth of the



*Aerial photo of 516 caribou in the Wolf Mt. herd, July 17, 2002. This photo may represent a majority of the herd. (MH)*

Koyukuk, northeast to the village of Hughes. Normally, caribou hunting is closed in Game Management Unit 21D in winter to protect the GMH, which is not large enough to sustain a significant harvest. When the WAH enters the Unit in sufficient numbers (so that GMH numbers are only 10% of total caribou), ADFG may open a hunting season by emergency order.

A refuge-wide caribou distribution survey was conducted on April 12, 2001 and January 22, 2002. In 2001, we found two areas of cratering for the Galena Mountain Herd (perhaps 20-30 animals) south of Dulbatna Mountain on the Dulbi River, and just south of

Hozatka Lakes, where six caribou were observed. Evidence suggested that segments of the Western Arctic Caribou Herd had wintered in the open tundra expanses south of Hughes. Numerous tracks (several hundred) were observed traveling west to east from south of Solismunket Lake toward Hog River. More WAH cratering and trails were observed at the base of Purcell Mountain near Billy Hawk Creek. There was not much sign of caribou near Huslia. It appears that Western Arctic Herd use of the Refuge during winter 2000-2001 was minimal, with small numbers in some of the usual places, near Hughes, the Dakli River, and the south side of Purcell Mountains. In 2002, one area of cratering was observed for the Galena Mountain Herd near Bucket Lake. Evidence of the Western Arctic Herd was observed near the North Fork of the Huslia River and use of the Koyukuk NWR appears to have been minimal for the third year in a row.

Recent distribution and calving surveys (1999-2001) of the GMH indicate a decline in herd size and production (G. Stout, ADFG, pers. comm.). Inadequate information concerning herd status prompted the initiation of a cooperative study with ADFG in 2002 to monitor the movements and size of the Galena Mountain Herd (GMH), including range overlap effects with the Western Arctic Caribou Herd and the Wolf Mountain Caribou Herd (WMH), on the Koyukuk NWR and adjacent lands. Radio telemetry collars were deployed on 10 GMH caribou and 10 WMH caribou on April 10-11, 2002. Unfortunately, four GMH caribou and seven WMH caribou died immediately, and though



*Recent low recruitment has made sightings of yearling caribou, like the one seen here, a rare occurrence in the Galena Mt. Herd in 2001 and 2002. (BS)*



we suspect renarcotization, the cause was never fully understood. Similar die-offs from March 2002 collaring efforts occurred elsewhere in the state. Subsequent natural mortality decreased our sample size down to one surviving WMH caribou and three GMH caribou by the end of 2002. Monthly telemetry tracking of the surviving caribou has so far shown no mixing of the GMH with either the WMH or the WAH, but because the sample size is so small, conclusions about herd mixing cannot be made. Herd movements, to date, appear to coincide with the findings from earlier studies reported by Saperstein (1997).

*Caribou Habitat.* In 1994, Lisa Saperstien established four permanent vegetation transects near Hozatka Lake (a.k.a Three Lakes) to estimate vegetative cover and biomass of forage available to the Galena Mountain Caribou Herd (GMH) in their wintering habitat. Each transect is 100 meters long containing 10 plots per transect. The methods and results are described and reported in Saperstein's Progress Report: Distribution, movement, and population status of the Galena Mountain Caribou Herd, Alaska, April 1992-November 1996, and is filed in the Refuge biological files.

In July 2000, approximately 8,541 acres burned ½ mile southwest of Three Lakes, presenting a unique and convenient opportunity to monitor and record post fire re-vegetation and subsequent caribou use of burned habitat in the core winter range of the GMH. In August 2001, PR Karin Lehmkuhl, WB Jenny Bryant, and RM Mike Spindler expanded the existing four permanent vegetation transects to include three more transects in the new burn. These new transects were re-visited in August 2002 by PR Lehmkuhl and FMO Bob Lambrecht. Methods and results for 2001 and 2002 are reported in annual summaries and are also filed in the Refuge biological files.

## **Bear**

Black and interior Alaska grizzly bear inhabit the Koyukuk, Northern Unit of Innoko, and the Nowitna NWRs. Grizzly bear are regulated according to the Northwest Alaska management plan implemented by ADFG. Most black bear harvest is for subsistence purposes, but a few are taken by recreational hunters visiting the area. Grizzly bears are required to be sealed, but only black bears taken out of the State are required to be sealed. There are many bears on the Complex, but no inventory has been conducted due to the high expense (mark-recapture), and perceived abundance. ADFG and Refuge staff are working on estimating the subsistence harvest of bears through a household harvest survey. Koyukon Athabascans in the



*During the summer of 2000 a portion of the caribou winter range on the Koyukuk NWR burned. WB Jenny Bryant and PR Karin Lehmkuhl established vegetation transects in the burn to monitor plant regeneration and succession. (MS)*

local villages have many beliefs relating to the bears in their area. Sometimes in the fall, the Koyukuk River Natives hold a 'Bear Party' where all the men go to hunt, cook, eat fresh bear meat, play games and tell stories.

#### **G.10. Other Resident Wildlife**

##### **Wolves**

Wolves are common to abundant on the Refuge and are sought after by local hunters and trappers. Wolf furs are prized for parka ruffs and a wolf pelt is a distinguished gift in local Koyukon Athabascan memorial potlatch ceremonies. Wolves are one of the most significant predators of the Refuge's major subsistence resources, moose and caribou; therefore population and predation rate information is important to Refuge ungulate management decisions. Wolf populations on the Koyukuk NWR have increased. Estimates of wolf density on the portion of Koyukuk NWR within GMU 21D were estimated at 8.7 wolves/1000 km<sup>2</sup> in March 1994, and most recently at 13.7/1,000 km<sup>2</sup> in March 2000. Wolf populations on the northern Nowitna NWR were estimated at 8.4 wolves/1,000 km<sup>2</sup> in 1991 and most recently at 9.1 wolves/1,000 km<sup>2</sup> in 1996 and appear to be stable or increasing. The southern Nowitna has not been censused since 1980. A wolf population estimation survey was scheduled for the Nowitna in spring 2001, but due to poor snow conditions, was canceled and rescheduled for 2002. Survey crews from ADFG were able to fly a wolf reconnaissance flight (although conditions were very marginal) on April 13-14, 2001. In his 2001 report ADFG area biologist Glenn Stout states, "The reconnaissance survey appears to be very similar to the wolf pack and track locations plotted during the 1996 population estimation survey, and may be an indication that the population is relatively unchanged since 1996."

The wolf population estimate survey scheduled for the Nowitna in 2002 was also cancelled due to a combination of inadequate conditions, time conflicts with other projects, and aircraft/pilot availability.

##### **Beaver**

Beaver populations in much of Interior Alaska were high in the early 1990s. In the mid to late 1990s fur prices declined and trapping effort has decreased significantly throughout the Interior. As a result, many local people have reported an increase in beaver populations. Beaver are an important resource to the local people, supplying food, clothing, and income.

When time and money permit, beaver cache surveys are flown in October to determine trends in relative abundance. Surveys were conducted on the Nowitna NWR on October 12-19, 2001. The survey results showed that 59% of the beaver caches observed in 16 townships were active in 2001, a decrease from 72% active observed in 1993. The total number of caches observed in 2001 was 450, a decrease from 480 observed in 1993. The density of active caches has decreased from 0.60 active caches/mi<sup>2</sup> in 1993 to 0.46 active caches/mi<sup>2</sup> in 2001.



No beaver cache surveys were conducted in 2002. Future plans are to survey the Kaiyuh in 2003, Koyukuk in 2004, and the Nowitna in 2005.

### **Small Mammals**

Small mammal research on the Refuge Complex was limited to a two-day effort at the Nogahabara Sand Dunes, 22-24 June 2002. PR Karin Lehmkuhl and BT Derek Milsaps conducted the trapping. Sherman live-traps (20) and cone pitfall traps (20) were used in several vegetated portions of the active dune-field. No small mammals were captured. Squirrel sign (runways and cone caches) was evident in one of the spruce stringers where traps were placed.

Snowshoe hares in the Galena area appeared to peak during the winter of 1999-2000 (based on casual observation). In the spring of 2000 some areas around Galena (Campion Road area) were littered with hare feet, indicating significant overwinter predation. Hare numbers were still high during the winter of 2000-2001, and impacts of heavy browse were noted that winter and in the spring, both in Galena and in areas on the Koyukuk Refuge. Since that time, local hare sign has declined dramatically.

### **Frogs**



*This tiny froglet was captured on the Northern Innoko during the 2002 frog malformation survey. (MH)*

In 2001, a pilot study was begun to monitor wood frogs for malformations at three sites near Galena, Alaska. The ponds were monitored for egg masses beginning in May, with follow-up monitoring of tadpole development in June and July. Upon returning to one of the ponds in July, biologists found only dead or sickly tadpoles. Several tadpoles were sent to a Wildlife Disease Specialist at the USGS National Wildlife Health Center in Madison, WI. A virus of the genus *Ranavirus* was isolated from one of the tadpoles, suggesting this virus had caused the die-off. It was previously theorized that ranaviruses that kill one species of larval amphibian are carried by adult amphibians of another species, but there is

only one species of amphibian present in the study area. Suggestions for followup research were made by the Disease Specialist.

In August of 2001, 50 young frogs were captured at Duck Lake (with the help of Galena Science Camp students). Of these, 5 showed malformities, mainly permanently curled digits on one or more hind limb. The 10% deformity rate is much higher than normal rate of <3% reported in other areas.

Wood frog monitoring was expanded in 2002 to include lakes on the Northern Unit of the Innoko NWR (Kaiyuh). A total of 82 froglets were captured at a pond near Nine-mile camp (on Kaiyuh), and 50 frogs (17 froglets) were captured at Duck Lake. None had

malformations. Some invertebrate sampling was conducted at frog monitoring sites in 2002. Collected invertebrates were preserved but have yet to be identified and quantified.

## **G.11 Fisheries Resources**

Of the 20 fish species with published ranges that include Refuge Complex waters, 15 have been documented by field investigations in the last two decades. Major fish resources on the Complex include anadromous species such as salmon, dolly varden and sheefish, and resident species such as pike, burbot, whitefish, blackfish, and suckers. Salmon are of particular importance to subsistence and commercial fisheries. For example, from the early 1980's to the mid-1990's, the Yukon River had a peak reported annual salmon catch of 1.2 million, of which an estimated 200,000 were from sections of the Yukon adjacent to or within the Refuge Complex (Koyukuk and Nowitna NWRs Fisheries Management Plans). In the late 1990's strength of both the chum and chinook runs declined dramatically (see Salmon, below and Section H.9.).

After the mid-1990's Yukon River salmon harvests declined significantly. In the period 2000-2002 Chinook salmon dropped from a previous 10-year average of 160,000 to less than 80,000; summer chum salmon dropped from a previous 10-year average of 700,000 to less than 70,000; fall chum salmon dropped from a previous 10-year average of 105,000 to less than 32,000; and coho salmon dropped from a previous 10-year average of 70,000 to 20,000. US Fish and Wildlife Service and ADFG salmon fisheries biologists indicated that overall run sizes had declined because of poor production for all species since 1998 and poor returns for chum species. The lower estimated run sizes meant that fishing would have to be curtailed to meet escapement goals and reverse this trend (see Section H.9). There has been considerable speculation and a paucity of solid information that explains definitively reasons for the reduced run sizes; tentative explanations included warm water el-nino effects, poor ocean survival, interception fisheries, prior years of over fishing in the Yukon, and a combination of these reasons. In an effort to understand reasons for this decline, several agencies increased funding and staffing of Yukon River salmon studies.

### **Salmon**

The Fisheries Resource Monitoring Program funds studies to gather, analyze, and report information needed to manage and conserve subsistence fisheries resources, address fisheries issues and priorities identified by the Regional Advisory Councils, minimize fisheries conflicts, and address regulatory actions before the Federal Subsistence Board. The Board has adopted a unified approach where Federal agencies work together with State, Tribal, and local organizations. The Monitoring Program is multi-disciplinary, blending together the biological and social sciences with traditional ecological knowledge to manage and conserve fisheries resources and ensure priority is given to subsistence users on Federal Conservation Units in Alaska.

Regional Advisory Councils for the Yukon River region have identified many issues and

information needs. Much of this interest is centered on the salmon resources, including in-season run assessment in mainstem rivers, distribution and abundance of spawning escapements, and causes for stock declines. Improved documentation is desired regarding changes in subsistence harvest patterns, and improved use of traditional knowledge is recommended.



*Salmon hang to dry at a fish camp on the Yukon River. In 2001 Refuge staff visited villages and fish camps to determine how well subsistence needs were being met. (JB)*

In 2001 refuge staff worked in conjunction with the Yukon River Drainage Fisheries Association (YRDFA), ADFG, and the Fairbanks Fisheries Office on the following salmon projects: 1) Assess run timing, stock status, and trends using weirs on the Nulato, Gisasa, and Kateel rivers; and 2) Monitor subsistence harvest and prevalence of *Ichthyophonus* through field visits and

participation in weekly YRDFA teleconferences.

In 2002 refuge staff expanded their involvement in the fisheries programs. Staff worked with the Nulato Tribal Council, ADFG, Bering Sea Fishermen's Association, and the Fairbanks Fisheries Office to determine run timing, abundance, and trends through weirs placed on the Nulato, Gisasa, and Kateel rivers. The National Marine Fisheries Service, ADFG, and FRO were assisted by staff in conducting a tagging/radio telemetry project to determine distribution and abundance of chinook salmon. An in-season salmon harvest assessment program was begun this year. Working with the Huslia Tribal Council, Nulato Tribal Council, YRDFA, and the FRO, Refuge staff were able to share subsistence users harvest information and *Ichthyophonus* prevalence to assist federal/state managers with management decisions. Staff assisted ADFG in collecting chinook age, sex, and length information in local villages. Staff were able to assist YRDFA with a traditional ecological knowledge project on salmon in Nulato.

## **Pike**

### **N. Unit Innoko NWR**

A small controversy arose in 1991 when a commercial fishing guide began operating on Native lands on the Kaiyuh Flats. Complaints of dead pike were received from local

subsistence users; however, the guide insisted that his trophy catch and release fishing practices were low-impact and that fish were being handled carefully. The Complex in cooperation with the Fairbanks FRO felt that because very little was known about the local pike biology it would be difficult to determine actual impacts and sustainable harvest. The ADFG Division of Sport Fisheries was interested in pursuing a pike study in the area, so a cooperative project was proposed. From 1994 to 1996 the Service and ADFG conducted a pike telemetry study on the Kaiyuh Flats, which resulted in a final ADFG report (number 96-64) entitled *Seasonal migrations of the northern pike in the Kaiyuh flats, Innoko National Wildlife Refuge, Alaska* by T.T. Taube and B.R. Lubinski. The abstract to the report follows:

From July 1994 through July 1996, the Department of Fish and Game, Division of Sport Fisheries, and the US Fish and Wildlife Service (USFWS), conducted a joint study to identify overwintering areas and estimate length and age compositions for the Kaiyuh Flats northern pike population. During July 9-29, 1994, 50 large (>750mm FL) northern pike were implanted with radiotelemetry transmitters and 962 northern pike were sampled for length and age. From June 12-22, 1995, the USFWS sampled an additional 840 northern pike for length and age. Northern pike were captured using trap nets, hook and line, and gill nets. Mean length of northern pike sampled in 1994 was 666 mm. Ages of the northern pike sampled in 1995 ranged from 1-17 years. Mean length of all northern pike sampled in 1995 was 618 mm. During winter 1994-95, 45 (90%) of the 50 radio-tagged fish were found to have survived and retained their transmitters and were located within three distinct overwintering areas (2 lake channel habitats and 1 channel habitat). Sixteen (52%) of 31 fish tracked through winter of 1995-96 were found to have survived and retained their transmitter into summer 1996, with an additional 6 fish perishing or expelling their tags within their overwintering area. Of the 232 fish confirmed to have survived and retained their transmitters during winter 1995-96, 16 (73%) returned to their 1994-95 overwintering area, suggesting a strong fidelity to winter areas for those fish. Northern pike left the overwintering areas for spawning areas beginning in early May and did not concentrate in any specific spawning areas.

*Nowitna River.* In response to increased guided sport fishing on the Nowitna, in 1997 the Alaska Department of Fish and Game, Sport Fisheries Division (Fairbanks), conducted a baseline study on pike abundance and age structure along the lower Nowitna River. According to John Burr, the Principal Investigator, preliminary findings of the study showed that pike were abundant and that age structure had probably not yet been affected by the sport harvest. He said that the Division would return to the Nowitna in about five years to assess any changes if sport fishing continues to increase. Titles and abstracts of two reports resulting from this study are provided:

*Burr, J. 1998. Effects of post-capture handling on mortality in northern pike. Alaska Department of Fish and Game, Fishery Data Series No. 98-34, Anchorage.*

Northern pike captured with hook and line gear were subjected to one of two handling regimes to assess the effect of varied catch and release practices on the short term (48 h) mortality of this species. Handling regimes were selected to reflect known angler practices. Northern pike were captured in hoop nets to provide a control for the experiment. After 48 h the only observed mortality was for fish caught in hoop net gear (0.04, SE=0.04).

*Burr, J. and S.M. Roach. 2000. Abundances, compositions, and CPUE of Northern Pike within selected sloughs of the Nowitna River, 1997. Alaska Department of Fish and Game, Fishery Data Series, Anchorage.*

Abundances, compositions, and catch per unit effort (CPUE) of northern pike *Esox lucius* within Johnson, Titus, and Pat Moore sloughs of the Nowitna River were described using mark-recapture techniques. Variability in abundance and composition of northern pike among these small areas were examined to determine if future population assessment could be simplified by sampling small areas with a minimum of effort as an index of the larger area. Estimated abundances ranged from 20 fish (SE=5) in Pat Moore Slough in August to 1,247 fish (SE = 375) in Titus Slough in August. Estimated densities ranged from 1.6 fish per hectare (SE = 0.4) in Pat Moore Slough in August to 39.9 fish per hectare (SE = 15.1) in Johnson Slough in June. Density of northern pike varied by slough and month. The average length of northern pike sampled ranged from 606 mm FL (S.D. = 140) in July from Johnson Slough to 744 mm FL (S.D. = 148) in June from Pat Moore Slough. The minimum age sampled was age-2 and the maximum age-15. There were significant differences between length distributions of northern pike sampled by slough ( $T_{akn}=4.85$ ;  $P<0.01$ ), month ( $T_{akn}=4.55$ ;  $P<0.01$ ), and gear ( $T_{akn}=2.09$ ;  $P<0.04$ ). CPUE with gill nets ranged from, 2.51 northern pike per hour in June from Titus Slough to 0.09 per hour in July from Pat Moore Slough. CPUE with hoop traps ranged from 0.28 northern pike per hour in June from Titus Slough to 0.02 per hour in July from Titus Slough. CPUE with hook and line ranged from 2.30 northern pike per hour in June from Johnson Slough to 0.00 per hour in August from Titus Slough. There was no obvious correlation between CPUE and abundance. This study does not support the hypothesis that investigators can take a quick look at a small area within the lower Nowitna River to assess the health of the northern pike population in general.

## Contaminants

A technical report entitled *Contaminant baseline data for water, sediments, and fish of the Nowitna National Wildlife Refuge, 1985-1988* was completed in August 1992 by Northern Alaska Ecological Services (NAES) in Fairbanks, with cooperation of Refuge staff. Further study based on sampling in 1991 was analyzed in a 1996 report by K. Mueller, E. Snyder-

Conn, and M. Bertram entitled *Water quality and metal and metalloid contaminants in sediments and fish of Koyukuk, Nowitna, and the Northern Unit of Innoko National Wildlife Refuges, Alaska, 1991*. They found that concentrations of beryllium, cadmium, copper, lead, manganese, and nickel were lowest in sediment samples from the Nowitna. Copper concentrations exceeded 25 mg/kg at all Northern Innoko and Koyukuk sites, and at two of four sites on Nowitna. Nickel concentrations exceeded 31 mg/kg at all sites except Sulukna River and Sulukna adjacent pond, which exceeded 28 mg/kg. Mercury was detected in each fish regardless of location, except for the one Alaska blackfish collected. Mean concentrations of mercury in muscle samples were from 3.3 to 8.6 times greater than the mean background concentrations reported by other investigators. The report demonstrated that considerably more baseline work needs to be done to identify the sources of contamination and to have a solid baseline should any threats occur in waters upstream from the Refuges.

Some pike sampled on the Kaiyuh Flats in 1993 by Paul Headlee of TCC had elevated tissue mercury levels. The observed levels were below the human consumption guidelines set by the Minnesota Department of Health (no Alaska or national standards exist); however, Headlee recommended caution for consumption of large amounts of larger sized fish. There was a statistically significant relation between fish size and mercury level. According to Headlee, if the average size of a pike eaten is 32 inches long, the estimated mercury concentration would be 0.73 ppm (wet tissue weight). The Minnesota guidelines recommended that the amount of fish muscle tissue from fish of that size class "that could be consumed over a year long period without any adverse effect" would be approximately 23 pounds. ADFG estimated annual per capita pike consumption in Galena and Huslia at 5.2 and 28.8 lbs., respectively. Details can be obtained in Headlee's final report entitled: *Mercury and selenium concentrations on fish tissue and surface waters of the northern unit of the Innoko National Wildlife Refuge (Kaiyuh Flats), west-central Alaska, 1993*.

#### **G.16. Marking and Banding**

Total banding activities are summarized in Table G.16.1. Banding was divided into three main efforts: geese, ducks, and songbirds (MAPS project).

Table G.16.1. Summary of bird banding at Koyukuk/Nowitna NWR during 2001 and 2002.

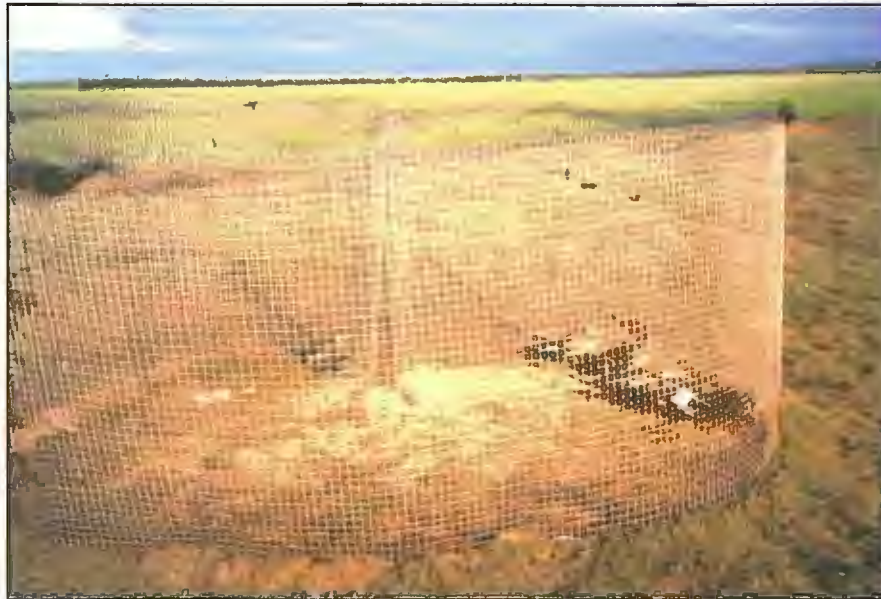
Species	2001	2002
Greater White-fronted	124	89
Canada Goose	0	0
Ducks	252	no banding
Total	376	89



*Geese.* In 2001 and 2002, white-fronted geese and Canada geese were banded by Refuges and Migratory Birds staff on Selawik, Innoko and Koyukuk/Nowitna NWRs as part of the regional goose study. The total birds banded on these three Refuges was 1,162 white-fronted geese and 88 Canada geese in 2001. And 933 white-fronted geese and 78 Canada geese in 2002.

*Ducks.* A total of 252 ducks (175 northern pintail, 56 American green-winged teal, 20 mallards, and one American wigeon) ducks was banded at Willow Lake on the Koyukuk NWR in 2001. No ducks were banded in 2002.

*Songbirds.* No songbirds were banded on the Complex in 2001 or 2002.



*Simple cloverleaf walk-in traps are used to capture ducks during the annual duck banding project, August, 2001. (MH)*



## H. Public Use

### H.1. General

All three complex units, Koyukuk, Nowitna and Northern Unit of the Innoko Refuges, receive subsistence and recreational public use. Subsistence dominates use with activities ranging from harvesting meat, fish and berries to cutting house logs. Recreational activities include sport fishing for pike (particularly on the Nowitna and Kaiyuh Flats) and grayling, and hunting for moose, bear and wolves. Some recreational canoeing and kayaking takes place on the Koyukuk and Nowitna rivers.

Commercial use permits are issued each year (Table H.1.). Virgil Umphenour continued big game guide/outfitting operations in his designated guide use areas KOY-04, 05 & 06. Gilbert Huntington continued his big game/guide outfitting operation in KOY-02 and Fred Bifelt continued his big game/guide outfitting operation in KOY-03. Alex Tarnai continued his big game guide/outfitting operation in NOW-01, 02 & 03.

A total of seven different air-taxi operations were permitted among the three complex units in 2001 and five in 2002. Sportsman's Air Service, Wrights and Yukon Eagle Air had permits to operate on all three units both years. Willow Air and Ptarmigan air had permits to operate on both the Koyukuk and Nowitna Refuges. Alaska Air Taxi and Susitna Air had permits to operate only on the Nowitna Refuge. Action Aviation and Mavrik Aire had permits to operate only on the Koyukuk Refuge. The year 2001 was the first year Special Use Permits had been issued to Mavrik Aire and Susitna Air for air-taxi operations on the Complex.

A total of three fishing guide operations were permitted among the three complex units. Green Fishing and Transporting was permitted on all three units. Alfred Attla, a local person from Hughes, initially had a permit for the Koyukuk Refuge in 2001, but did not have any clients and did not renew his permit for 2002. North Country River Charters out of Fairbanks had a permit for the Nowitna Refuge in 2002.

Table H.1. Commercial Use Permits issued in 2001 and 2002 for Koyukuk/Nowitna/Northern Innoko NWR.

Permittee	Year	Use	Fee Collected	Clients	Species Taken
Virgil Umphenour, 01 Hunt Alaska		Guide/Outfitter	\$2,355.80 user fee	KOY-6: 0	
				KOY-5: 15	14 moose, 2 wolves 1 black bear
				KOY-4: 12	5 moose, 1 black bear
Virgil Umphenour, 02		Guide/Outfitter	\$2,437.00 user fee	KOY-6: 0	
				KOY-5: 23	20 moose, 1 black bear
				KOY-4: 3	3 moose
Gilbert Huntington, 01		Guide/Outfitter	\$0.00 user fee	KOY-2: 0	

# Koyukuk Guide Service

Gilbert Huntington, 02	Guide/Outfitter	\$267.60 user fee	KOY-2: 4	None
Fred Bifelt, 01	Guide/Outfitter	\$0.00 user fee	KOY-3: 0	
Koyukuk River Guide Service				
Fred Bifelt, 02	Guide/Outfitter	\$256.45 user fee	KOY-3: 7	2 moose
Alex Tarnai, 01	Guide/Outfitter	\$234.15 user fee	NOW-3: 3	3 moose
Timberwolf Guiding Service			NOW-2: 0	
			NOW-1: 0	
Alex Tarnai, 02	Guide/Outfitter	\$323.35 user fee	NOW-3: 5	5 moose
			NOW-2: 0	
			NOW-1: 0	
Steve Williams, 01	Air Taxi	\$100.00 admin fee	0	
Ptarmigan Air				
Joe Schuster, 01	Air Taxi	\$100.00 admin fee	Now - 6	2 moose
Sportsman's Air Service		\$27.00 user fee		
Joe Schuster, 02	Air Taxi	\$100.00 admin fee	Now - 2	1 moose
		\$27.00 user fee	Koy - 4	1 moose
Bob Bursiel, 01	Air Taxi	\$100 admin fee	Now- 21	1 moose
Wright's Air Service		\$45.00 user fee		
Bob Bursiel, 02	Air Taxi	\$100.00 admin fee	Now - 11	4 moose
		\$24.75		
Colin Brown, 01	Air Taxi	\$100.00 admin fee	Koy - 3	2 moose, 1 black bear
Yukon Eagle Air		\$29.25 user fee	Now - 5	1 moose
Colin Brown, 02	Air Taxi	\$100.00 admin fee	Koy - 2	0
		\$54.00 user fee	Now - 8	4 moose
			Kaiyuh - 2	2 moose
Steve White, 01	Air Taxi	\$100 admin fee	0	
Willow Air				
Steve White, 02	Air Taxi	\$100.00 admin fee	Now - 2	1 moose
		\$4.50 user fee		
Kurt Lepping, 01	Air Taxi	\$100.00 admin fee	Koy - 5	1 moose
Action Aviation		\$11.25		
Jack Barber, 01	Air Taxi	\$100.00 admin fee	0	
Alaska Air Taxi				

Jack Barber, 02	Air Taxi	\$100.00 admin fee \$9.00 user fee	Now - 2	0
Paul England, 01 Susitna Air	Air Taxi	\$100.00 admin fee \$6.75 user fee	Now - 3	0
Craig Schweitzer, 01 Mavrik Aire	Air Taxi	\$100.00 admin fee \$9.00 user fee	Koy - 2	1 moose
Craig Schweitzer, 02	Air Taxi	\$100.00 admin fee	0	
Charlie Green, 01 Green Fishing & Transporting	Fish/Guide	\$100.00 admin fee \$45.00 user fee	Kaiyu - 4	Northern Pike
Charlie Green, 02	Fish/Guide	\$100.00 admin fee \$18.00 user fee	Kaiyu - 4	Northern Pike
Alfred Attla, 01	Fish/Guide	\$100.00 admin fee	0	
Bill O'Halloran, 02 North Country River Charters	Fish/Guide	\$100.00 admin fee \$81.00 user fee	Now - 6	Northern Pike

In addition to the commercial permits noted above, the following non-commercial special use permits were issued. For 2001, five individuals were issued permits to mark corners of proposed Vietnam veterans Native allotments. A permit was issued to TCC and one to BLM to conduct boundary surveys of Native allotments. One subsistence cabin permit was renewed. Two permits were issued for harvest of house logs. A permit was renewed for use of a tent platform on the Nowitna NWR. Finally, a permit was issued to the USAF to continue a cleanup of old 55 gallon barrels downstream of Galena along the Yukon River and tributaries. Refuge lands affected included lands on Koyukuk NWR and the Northern Unit of Innoko NWR. For 2002, six individuals were issued permits to mark corners of proposed Vietnam veterans Native allotments. Five subsistence cabin permits were renewed. Four permits were issued for harvest of house logs. A total of 97 white spruce trees was reported harvested. Trees were harvested on two islands near the mouth of the Nowitna River and along Bering Slough and Bering Creek. A permit was renewed for use of a tent platform on the Nowitna NWR. A permit was renewed to the USAF to continue a cleanup of old 55 gallon barrels. A permit was issued to Dr. Mann with the Institute of Arctic Biology to harvest up to 1000 black spruce trees along the Nowitna River in support of a research project entitled, "Development of a computer model for management of fuels, human-fire interactions and wildland fires in the boreal forest of Alaska." Finally, a permit was issued to DOT to mark traditional snowmachine trails between Koyukuk and Galena and between Koyukuk and Huslia. Significant time was spent in 2002 drafting Refuge area descriptions and guide use offerings for the Koyukuk and Nowitna Refuges in preparation for the competitive selection of big game guides on Alaska Refuges in 2003.

## H.2. Outdoor Classroom - Students

*Classroom visits.* A wide variety of classroom presentations was made by Refuge staff in 2001 and 2002. Galena elementary, middle school, high school, and Project Education Residential School (PERS) were all visited, as well as schools in four area villages. Below is a list of some programs given (all by PR Karin Lehmkuhl unless noted; GM is DRM Greg McClellan, and NS is volunteer Nathan Schwalen). Among the topics presented to students were current Refuge projects involving the local white-fronted goose population decline, and radio-collaring of Galena Mountain and Wolf Mountain Caribou herds.

<u>Date</u>	<u>Location, Grade</u>	<u>Presentation/Theme</u>
Jan. 26, 2001	Ruby, K-12	Boreal Forest Animals, adaptations to winter
Feb. 13, 2001	Galena, 8	Boreal Forest Biome
April 2, 2001	Ruby, 3-5	Winter: animal tracks and snow science
Oct. 31, 2001	Galena PERS 9-12	Local plant identification, traditional uses
Nov. 26, 2001	Galena, 3	"Virtual Bog" wetlands visit
Dec. 7, 2001	Ruby, 3-5	White-fronted goose populations
Dec. 10-11, 2001	Hughes, K-8	White-fronted goose populations
Feb. 15, 2002	Kaltag, K-12	White-fronted goose populations
Feb. 18, 2002	Galena, 9-12	Career Fair
Feb. 19, 2002	Galena, 9-12	Backyard bird count
March 27-28, 2002	Hughes, K-8	Caribou biology and migration (collaring)
April 1, 2002	Ruby, 3-5	Caribou biology and migration (collaring)
April 9-11, 2002	Nulato, K-12	Solzits'eey Days, water pollution, goose popn's
April 25, 2002	Galena, 9	Refuge land use and regulations (GM)
Sept. 2002	Galena HS	White-fronted goose satellite telemetry project (NS)
Nov. 13, 2002	Galena, 3	"Virtual Bog" wetlands visit

*Summer camps.* PR Lehmkuhl and Volunteer Schwalen also participated in several science camps in 2001-02. Galena Science Camp is a cooperative effort between the Refuge Complex, Galena City Schools, and Galena's Loudon Tribal Council. The day-camp was directed by PR Lehmkuhl in 2001 and Volunteer Schwalen in 2002. Both staff members also participated in EarthQuest Science Camp, a residential camp for rural high school students held biennially at Twin Bears Camp near Fairbanks. In 2002, Lehmkuhl and Schwalen were camp "counselors" and Lehmkuhl led the students in a 5 day small-mammal live-trapping study.

<u>Date</u>	<u>Location/Program</u>	<u>Presentation/Theme</u>
June 15, 2001	Galena ANSWER Camp, 9-12	Local plant identification, trad. uses
Aug 6-10, 2001	Galena Science Camp, K-3	Wetlands
Aug 13-17, 2001	Galena Science Camp, 4-6	Watersheds
June 15, 2002	Galena ANSWER Camp, 9-12	Rodents
July 2001, 2002	Innoko, Koyukuk, Selawik Refuges, HS students	White-fronted goose banding and satellite telemetry
July 30-Aug 8, 2002	EarthQuest Science Camp, Fbks.	Small Mammal Trapping
July 15-19, 2002	Galena Science Camp	Local wildlife
Aug 12-15, 2002	Galena Science Camp	Local wildlife

*White-fronted goose collaring and satellite telemetry.* The white-fronted goose satellite telemetry project was conducted in cooperation with local schools. In 2001 and 2002 several students from Galena, McGrath, and outlying villages joined biologists in the field to assist with capturing and banding white-fronted geese(See Section G.3.).

### **H.3. Outdoor Classroom - Teachers**

PR Karin Lehmkuhl attended several teacher in-service meetings in Galena to update teachers on resources available at the Refuge complex and Refuge projects. This has been a good way to contact the teachers and find out more about their needs and interests without taking too much time from their busy schedules.

### **H.6. Interpretive Exhibits/Demonstrations**



*The theme of the 2003 Alaska Waterfowl Calendar was "Waterfowl Yesterday, Today, Forever." Students from across the State submitted artwork, such as this, and poetry related to the theme. Winners' work will appear in the 2003 calendar. (KL)*

In 2002 the Refuge began participation in the Alaska Waterfowl Calendar (formerly Goose Calendar). The calendar was initiated as an outreach tool to educate people about goose population declines in the Yukon-Kuskokwim Delta region. Production of the calendar involves many partners including USFWS, Ducks Unlimited, National Fish and Wildlife Foundation, and Alaska Department of Fish and Game. Students submit artwork and poetry related to the theme chosen for each year. In 2002 we had entries from Galena and several villages, and one student's poem was chosen for the calendar (Matthew Wicks, Galena).



### **H.7. Other Interpretive Programs**

Ranger-led community bird walks continue to be fairly popular, and add to our collection of data during national bird-count events. These include the Christmas Bird Count in December, Great Backyard Bird Count in February, and North American Migration Count in May.

On June 2, 2002 PR Lehmkuhl initiated the first in what was hoped to be a series of nature walks and art workshops. The event was well attended and enjoyable, and has good potential as a community outreach program.



*An annual highlight of the Galena Science Camp program is the trip to Duck Lake. The 2002 campers and leaders show their enthusiasm for hands-on learning about wetlands!*

Several proposals were submitted for funding to acquire the old Galena City Hall building for use as an environmental education center. Proposals include potential cooperation with Loudon Tribal Council, the University of Alaska, and the City of Galena. No funding has been received so far.

### **H.8. Hunting**

#### **Koyukuk/Nowitna/Northern Innoko NWR**

**Waterfowl.** On October 23, 1997 the U.S. Senate approved subsistence hunting amendments to the migratory bird treaties with Canada and Mexico. These amendments provide a basis for legal spring and summer waterfowl harvest for rural Alaska residents. However, regulations must first be established. The Alaska Migratory Bird Co-management Council, established in 2000, currently consists of one Federal, one State and 11 Native members. This council will make recommendations for statewide regulations for spring and summer subsistence harvest beginning in spring of 2003. SWB/Pilot Spindler, WB Bryant and RIT Huntington attended the February 2001 meeting to present the white-fronted goose issue to the Council. RIT Huntington attended the November 2001 and May 2002 meetings, and WB Bryant attended



*This Kaltag student gets a little help on her homework from a Canada Goose puppet. Students learned about local goose populations and methods biologists use to track their movements. (KL)*



the April/November 2001 and March/October 2002 meetings to provide Refuge input to this decision making process. In order to develop reasonable and sustainable waterfowl seasons and bag limits, estimates of regional and total harvest by species, and estimates of average consumption per household and village are needed. In addition, the Central Flyway Technical Committee has expressed a need for more accurate estimates of spring harvest of white-fronted geese in response to the Service's concern over a regional decline of that species. Therefore, in 1998 the Refuge initiated a study to estimate subsistence waterfowl on and near the Complex.

In 2001 and 2002, household interviews were conducted in Kaltag, Nulato, Koyukuk, Huslia, Hughes (except fall 2001), Galena, and Ruby. Interviews were completed in May and early June to estimate spring harvest, and in October to estimate summer and fall harvest. Harvest estimates varied considerably between years and seasons. In 2001, the overall annual subsistence waterfowl harvest was estimated at 2,251 birds; 88% of these birds were taken in the spring. In 2002, the overall annual subsistence waterfowl harvest was estimated at 1,674 birds, and 47% of these birds were taken in the spring. In 2001, more geese (64%) were harvested than ducks (36%). In 2002, more ducks (63%) were harvested than geese (37%). Species most commonly harvested were Canada goose, Greater white-fronted goose, mallard, American wigeon, and Northern pintail. Detailed information by species and village are available in Refuge files.

Harvest estimates in this study are much lower than estimates from surveys conducted in the Koyukon region in the early 1990's. The reported decline in harvest is likely due to changing socio-economic conditions in the region, which have changed as the availability of jobs, freezers, and moose have increased in the past 20 years. In addition, the spring of 2002 had poor snow conditions which limited access to waterfowl via snowmachines.

*Steel Shot Clinics.* RIT Huntington attended the Steel Shot Instructor Clinic held in Anchorage in April, 2001. In April 2002, Refuge staff along with Volunteer (and retired Alaska Assistant Regional Director) John Rogers conducted steel shot clinics in Huslia and Nulato. In May 2002 RIT Madros assisted Yukon Flats staff with a clinic held in Stevens Village. With the help of RIT's Huntington and Madros, and Clyde Ramoth (Selawik NWR) a clinic was held August 2002 in Selawik. The goals of the clinics were to familiarize residents with how steel ammunition shoots differently from lead, help them become more efficient hunters, reduce wounding loss, and provide an opportunity for outreach on the decline of greater white-fronted geese. In all villages, the clinics entailed an evening classroom session followed the next day with an outdoor shooting session. About 15 people in each village participated in the evening classroom session. At the outdoor shooting session, about 25 people in each village participated. The clinics were well received.

*Moose.* Since 1983, ADFG has conducted a hunter check station at Ella's Cabin, which is just south of the Refuge boundary on the Koyukuk River. The entire Koyukuk River within the Koyukuk NWR boundary is part of the Koyukuk Controlled Use Area (CUA), where aircraft access for moose hunting is prohibited. Therefore, the Ella's Cabin check station provides a

consistent source of harvest information for the majority of Refuge hunters who gain access to the Refuge via the Koyukuk River. This includes most residents on the Yukon and virtually all non-resident hunters, except for those who float down river from above the Controlled Use Area boundary. The check station has been a mandatory stop since 1990.

#### 2001

Temperatures during the September 2001 moose harvest season were warm much of the season. In addition to the ever popular Three-Day Slough, hunting effort was concentrated in other localized areas of the drainage. Meat was checked thoroughly by staff at the check station in 2001. Although some poorly cared for meat was encountered, the majority came out in game bags and in good condition.

Traditionally, Refuge staff have not been involved in operations at Ella's Cabin. Due to good relations between ADFG Biologist Glenn Stout and the Refuge, GB Geoff Beyersdorf, and DRM Greg McClellan spent four days each working at the check station, and PR Karin Lehmkuhl helped with the last ten days of the season in 2001. In 2002 new Supervisory WB Scotton spent several days at Ella's Cabin. The Refuge gained considerable insight into hunting conditions on the Koyukuk, and will strongly support future requests for assistance.

A total of 546 permits was issued for the combined subsistence and general drawing hunts in the Koyukuk Controlled Use Area in 2001 (477 at Ella's, 60 in Huslia, and 9 in Hughes). Numbers of registered hunters in 2001 increased by 36 hunters or 7% compared to 2000 numbers (510). This is still a reduction from the 731 hunters in 2000 which prompted regulation changes proposed by the Koyukuk Moose Hunters Working Group and approved by the Board of Game at its Spring 2000 meeting. The working group used the number of hunters and moose harvested in 1998 in the lower Koyukuk River area as a baseline for the maximum number of hunters and moose harvested in future years. The biggest change in regulation was instituting a drawing hunt to replace the RM830 general registration hunt. In 2001, a total of 403 RM832 subsistence permits (AK resident) was issued while only 258 drawing permits (DM827-830; AK resident and non-resident) were made available. Of the 258 hunters who drew permits, 118 hunters hunted with them and 127 hunters did not hunt or use their permits.

Hunters harvested 187 moose (three cows, 183 bulls, and one unknown) in the lower Koyukuk drainage during the 2001 registration/drawing hunts. The 2001 harvest was a significant decrease from the 2000 record harvest and was 27% below the twelve year average (1990-2001) of 256 (Tables H.8.1 & H.8.2). ADFG and Refuge staff are concerned about the number of cows being harvested in the lower Koyukuk and are supportive of actions to reduce or cease all cow harvest in the unit until productivity and recruitment increase.

#### 2002

A total of 483 permits was issued for the combined subsistence and general drawing hunts in the Koyukuk Controlled Use Area in 2002 (394 at Ella's, 86 in Huslia, and 3 in Hughes). Numbers of registered hunters in 2002 decreased by 63 hunters or 12% compared to 2001

numbers (546). This decrease may have been a result of the new State regulation designed to reduce the number of trophy hunters by requiring forfeiture of part of the antler palm. In 2002, 359 RM832 subsistence permits (AK resident) were issued while only 198 drawing permits (DM827-830; AK resident and Non-resident) were made available. Of the 198 hunters who drew permits, 104 hunters hunted with them and 90 hunters did not hunt or use their permits.

Hunters harvested 218 moose (217 bulls, 0 cows, and 1 unknown) in the lower Koyukuk drainage during the 2002 registration/drawing hunts. The 2002 harvest was a significant decrease from the 2000 record harvest and was 14% below the thirteen year average (1990-2002) of 253 (Tables H.8.1 & H.8.2).

ADFG and Refuge staff were concerned about the number of cows being harvested in the Lower Koyukuk and were in support of actions to reduce or cease all cow harvest in the unit until productivity and recruitment increased. ADFG and Refuge surveys had shown four consecutive years of poor recruitment (less than 20 calves/100 cows) for the moose herds in these areas. The low moose calf to cow ratio (7:100) observed over the 5,526-square mile area in Unit 21(D) and southern third of Unit 24 during the fall 2001 surveys concerned wildlife managers. In 2002, the Koyukuk/Nowitna National Wildlife Refuge (NWR) and the Federal Subsistence Board announced the closure of the Federal subsistence fall cow moose hunting season starting August 27, within Unit 21(D) and portions of Unit 24. The August 27 – 31 fall cow season within the Koyukuk Controlled Use Area and the September 21 – 25 fall cow season outside the Controlled Use Area were subsequently closed. This closure was necessary to protect the continuing health of the moose population in these areas and to align Federal regulations with an emergency order issued by the ADFG closing lands under state jurisdiction to cow moose hunting in these areas. This action did not affect the winter moose seasons. In 2000, ADFG and the Koyukuk River Moose Hunters Working Group prepared a five-year management plan providing guidelines for managing harvest when conservation measures are necessary. The Board and the Western Interior Federal Subsistence Regional Advisory Council endorsed the five-year plan and this closure follows the plan's approach for reducing antlerless moose hunting opportunities.

On the Northern Unit of Innoko NWR, most hunting on the Kaiyuh Flats and Bishop Creek drainage is done by residents of Kaltag, Nulato, Koyukuk and Galena. The majority of hunting there is for subsistence purposes by local residents. Some non-locals do hunt in the area, but harvest is thought to be minimal. With low water levels in 2001, hunting pressure in the Kaiyuh Flats may have been below normal. Hunting pressure in the Kaiyuh Flats was estimated at about average in 2002 with good water conditions allowing for easy access throughout the area.

Table H.8.1. Number of moose hunters by residency class checked through the Koyukuk River Check Station.<sup>1</sup> Data courtesy ADFG, Galena.

Regulatory Year	Non-local AK.Residents	Non-Residents	Local Rural Residents	Total Hunters
1989-90	125	23	154	302
1990-91	133	36	137	306
1991-92	189	55	136	380
1992-93	173	39	145	357
1993-94	132	34	115	281
1994-95	194	56	106	356
1995-96	260	63	124	446
1996-97	306	89	213	608
1997-98	278	89	157	524
1998-99	341	126	159	626
1999-00	365	173	193	731
2000-01	246	44	220	510
2001-02	288 <sup>2</sup>	35	223 <sup>3</sup>	546
2002-03	227 <sup>2</sup>	24	232 <sup>3</sup>	483
Mean	233	63	165	461

<sup>1</sup> Checking in and out of Ella's Cabin was not mandatory until 1990, and compliance was lower during the initial years 1983-89.

<sup>2</sup> This number may include up to nine drawing permits in 2001 and eight drawing permits in 2002.

<sup>3</sup> This number does not include up to nine drawing permits in 2001 and eight drawing permits in 2002.

Table H.8.2. Harvest by moose hunters and harvest rate by residency class checked through the Koyukuk River Check Station<sup>1</sup>. Data courtesy of ADFG, Galena.

Regulatory Year	Non-Local AK.Residents <sup>2</sup>	Non-Residents <sup>2</sup>	Local Rural Residents <sup>2</sup>	Total Moose Harvest <sup>2</sup>
1989-90	89 (71%)	14 (61%)	55 (36%)	158 (52%)
1990-91	105 (79%)	30 (83%)	48 (35%)	183 (60%)
1991-92	121 (64%)	38 (69%)	49 (36%)	209 (55%)
1992-93	103 (60%)	19 (49%)	45 (31%)	167 (47%)
1993-94	109 (83%)	28 (82%)	48 (42%)	185 (66%)
1994-95	127 (65%)	41 (73%)	34 (32%)	202 (57%)
1995-96	188 (72%)	50 (79%)	49 (40%)	287 (64%)
1996-97	198 (65%)	66 (74%)	90 (42%)	353 (58%)
1997-98	185 (67%)	55 (62%)	66 (42%)	306 (58%)
1998-99	203 (60%)	73 (58%)	69 (43%)	345 (55%)
1999-00	204 (56%)	91 (53%)	71 (37%)	366 (50%)
2000-01	180 (73%)	26 (59%)	72 (33%)	278 (54%)
2001-02	124 (70%)	14 (07%)	49(26%)	187(34%)
2002-03	133 (61%)	18 (08%)	67 (31%)	218(45%)

<sup>1</sup> Checking in and out of Ella's Cabin was not mandatory until 1990.

<sup>2</sup> Moose harvest is followed by estimated percent hunter success in parentheses.

## Nowitna NWR

The single largest public use of Nowitna NWR is the fall moose hunt. Most of the moose hunting pressure observed on the northern portion of the Nowitna NWR occurs on the Nowitna River from the canyon area downstream to the river's mouth. The majority of moose hunters using the Refuge are from Fairbanks, the "railbelt" (Mat-Su Valley, Palmer, Wasilla, Anchorage), Kenai, and other non-local Alaska locations. Most of the local hunters using the lower Nowitna River drainage are residents of Ruby and Tanana.

The Refuge staff and ADFG have operated a hunter check station at the Nowitna River mouth on the northern border of the Refuge since 1988. The majority of the Nowitna River is within the Refuge boundary, and the check station provides a consistent source of harvest information for the majority of Refuge hunters who gain access to the Refuge from the Yukon River. The check station is a voluntary stop, except in 1997 when it was a mandatory stop for a registration hunt. The check station opened for business August 31 and remained open until September 26 in 2001, and from September 3 through September 26 in 2002. In addition to Refuge staff, Area Biologist Glenn Stout from ADFG assisted at the check station in 2001, and Volunteers Nathan Schwalen, Jim Torkelson, and Kevin Strand were of great assistance in 2002.

## 2001

In September 2001, 160 hunters checked in 34 moose at the check station (Table H.8.4). Twenty-seven hunters were from local villages, 62 from Fairbanks, 48 from other areas in Alaska, and 23 were non-residents (Table H.8.3). The number of hunters increased by 16% from the 14 year average. Most of the increase in hunters were non-local residents from other parts of the state, primarily Anchorage and Wasilla, and also from non-residents. Some of this increase was spill-over from the Koyukuk River; a number of these hunters reported they usually hunt the Koyukuk, but had elected to try their luck on the Nowitna this year to avoid crowding and the subsistence registration hunt requirement of destroying the trophy value of bull racks.



*A view from the Nowitna Moose Hunter Check Station near the confluence of the Yukon River. (MH)*

The weather was also unseasonably warm on the Nowitna throughout the majority of the 2001 hunting season and may have had a negative impact on overall hunter success. The harvest of 34 bulls was the lowest on record and was 26% below the 14 year average of 46 (Table H.8.4). Hunters observed many cows and calves throughout the season, but heard and saw few bulls until the end of the month, when the weather became cooler.

## Additional observations

Check station staff also asked hunters to report bear observations and harvest this year. One black bear was harvested, and hunters observed six bears and/or their tracks. Three wolves were harvested, and hunters observed nine wolves and/or their tracks. Most hunters reported that both bear and wolf tracks were abundant throughout the Nowitna drainage.

## 2002

In September 2002, 134 hunters checked in at the check station and 51 bull moose were harvested (Table H.8.4). Eighteen hunters were from local villages, 56 from Fairbanks, 45 from other areas in Alaska, and 15 were non-residents (Table H.8.3). The number of hunters decreased 4% from the 15 year average of 139. Fewer non-local residents from Anchorage and Wasilla, and fewer local residents checked through the station this year. Similar to last year a number of the hunters reported they usually hunt the Koyukuk, but had elected to try their luck on the Nowitna.



The weather in 2002 was average and the harvest rate was 10% above the 15 year average of 46 (Table H.8.4). Due to concerns expressed by local residents and Regional Advisory Council members, meat care was checked and documented thoroughly by staff at the check station in 2002. Evaluations documented if the meat was clean, dry, and the overall care. Meat care was ranked on a scale of 1-5 with one as the lowest value and five as the highest. Hunter meat care this year was very good. In terms of overall care, 24 of the thirty-eight hunters evaluated rated a four and 13 hunters rated as five.

In conjunction with ADFG, to determine if recreational activities other than hunting were being utilized on the Refuge, hunters were asked the following questions on a 2002 Nowitna River Wildlife Viewing Form. 1) Number of days in the drainage area, number of days spent viewing wildlife 2) Visiting the Nowitna to hunt, view wildlife or both? 3) Did you observe wildlife you were not hunting? 4) What species were viewed and how many? 5) Rank which animals were most important to you: moose, caribou, bears, wolves, songbirds, waterfowl, furbearers, small mammals, and others. 6) Is wildlife an important part of the reason you visit the Nowitna? 7) Rank how important viewing wildlife is. 8) Is observing wildlife "sign" as rewarding as observing animals? 9) Where did you receive information about the Nowitna?

The survey was answered by 21% of the hunters going through the checkstation. The twenty-eight respondents averaged 6.4 days on the Nowitna. Sixteen respondents came specifically to hunt, two came to view wildlife, and nine visited to do both hunting and viewing. Most respondents did observe wildlife they were not hunting and included such species as beaver, ducks, eagles, bears, swans, and wolverines. Respondents ranked species in terms of importance as follows: moose, bears, wolves, waterfowl, songbirds, furbearers, caribou, and small mammals. Eighteen respondents said that viewing wildlife was an important reason for visiting the Nowitna. Those that said viewing wildlife was important ranked it a 3.5 on a one to five scale (five=very important). Fifteen respondents said viewing wildlife "sign" was as important as seeing the actual animal, while twelve said it was not. Lastly, most people said they received their information about the Nowitna from friends (11), family (4), personal knowledge (3), ADFG (2), and REI (1).

Table H.8.3. Number of moose hunters by residency class checked through the Nowitna River Check Station.<sup>1</sup>

Regulatory Year	Non-local AK Residents	Non-Residents	Local Rural Residents	Total Hunter
1988	137	8	33	170
1989	123	12	31	166
1990	93	14	23	130
1991	116	17	21	155
1992	91	10	24	125
1993	93	21	19	133
1994	104	13	16	134
1995	107	9	16	132
1996	90	20	19	129
1997	78	7	16	101
1998	84	22	17	113
1999	117	14	24	155
2000	115	28	11	154
2001	110	23	27	160
2002	101	15	18	134
Mean	104	16	21	139

<sup>1</sup> Checking in at the Nowitna River check station was only mandatory in 1997.

Table H.8.4. Harvest by moose hunters and harvest rate by residency class checked through the Nowitna River Mouth Check Station<sup>1</sup>.

Regulatory Year	Non-Local AK Residents <sup>2</sup>	Non-Residents <sup>2</sup>	Local Rural Residents <sup>2</sup>	Total Moose Harvest <sup>2</sup>
1988	42 (31%)	5 (63%)	9 (27%)	56 (33%)
1989	38 (31%)	6 (50%)	6 (19%)	50 (30%)
1990	44 (47%)	4 (29%)	7 (30%)	54 (42%)
1991	35 (30%)	2 (12%)	9 (43%)	46 (30%)
1992	29 (32%)	2 (20%)	3 (13%)	34 (27%)
1993	45 (48%)	1 (5%)	7 (37%)	53 (40%)
1994	43 (41%)	5 (38%)	6 (38%)	54 (40%)
1995	33 (31%)	5 (38%)	3 (19%)	38 (29%)
1996	33 (37%)	2 (10%)	2 (11%)	36 (28%)
1997	37 (47%)	3 (43%)	1 (6%)	41 (41%)
1998	43 (51%)	3 (14%)	4 (24%)	50 (44%)
1999	38 (32%)	4 (29%)	3 (13%)	45 (29%)
2000	39 (34%)	6 (21%)	2 (18%)	47 (31%)
2001	29 (26%)	5 (22%)	0 (0%)	34 (21%)
2002	45 (45%)	3(20%)	3(17%)	51(38%)

<sup>1</sup> Checking in and out of Nowitna River check station was not mandatory, except in 1997.

<sup>2</sup> Moose harvest is followed by estimated percent hunter success in parentheses.

## H.9. Fishing

Most fishing within the boundaries of the Refuge units is for local subsistence. Most fish are harvested using gill nets either as a set net or a drift net in traditional fishing spots respected and recognized by local residents. The most favorable fishing spots are passed down through family ties, and generally remain in the immediate or extended family.

### 2001

Going into the 2001 fishing season, the pre-season salmon outlook for chinook, summer chum, and fall chum salmon was anticipated to be below average to poor, in large part due to the low productivity trends experienced in recent years. At the State Board of Fisheries (BOF) January 2001 meeting Yukon River chinook and chum salmon were identified as stocks of concern, and for the first time, the Board implemented a “windowed” subsistence salmon fishing schedule. The goal of this schedule was to increase the quality of escapement, spread the harvest throughout the run, and spread subsistence opportunity among users. The schedule for the local District 4 began June 13, with two 48 hour periods from 6 pm Sunday to 6 pm Tuesday and from 6 pm Wednesday to 6 pm Friday. However, subsistence fishing for whitefish and other non-salmon species with gillnets of 4 inches or less stretch mesh continued to be

allowed 7 days a week throughout the Yukon River drainage including the Koyukuk River.

In addition to using the BOF subsistence salmon fishing schedule, the ADFG indicated that any commercial fishing periods were highly unlikely for the Yukon River and that they would close the sport fishery for chinook salmon if the runs were weak. The USFWS and ADFG biologists conducted pre-season public meetings, produced informational posters, and published news articles to inform local users about concerns for the expected low salmon returns and explain to fishermen the reasons for the new subsistence salmon fishing schedule in 2001.



*Traditional fish camps such as this are still a common sight on the Yukon and Koyukuk Rivers. Subsistence fish harvest continues to contribute significantly to the local diet.*

On May 10 the Federal Subsistence Board, after hearing public testimony and expressing their concern for the poor salmon outlook for 2001, adopted a Special Action closing the chinook and summer chum subsistence salmon fishery on all Federal waters in the Yukon River drainage for 60 days to all users except Federally-qualified subsistence users (FSA01-02).

As the run began, both the chinook and summer chum salmon runs were assessed to be low in abundance. Restrictions in fishing time were first implemented in District 1 and moved upriver sequentially to conserve both chinook and summer chum salmon. When it was determined that the summer chum salmon return would not meet a threshold size of 600,000 fish, gear restrictions were implemented in District 1 on July 5, and also implemented sequentially upriver, to prohibit directed summer chum salmon harvest. The 2001 summer chum salmon return appears to have been near 400,000 fish. The subsistence harvest was approximately 68,600, which is 40% below the recent 10 year average. Subsistence summer chum salmon needs were likely not met due to the restrictions in fishing time and gear.

The estimated total run of Canadian origin chinook salmon in 2001 was approximately 80,000 fish. This was twice as good as in 2000, but still well below the 1982-1999 average of 124,000 fish. The subsistence harvest was approximately 57,000 which is 12% above the recent 10 year average. The increase in subsistence harvest for chinook was likely due to the public's anticipation of a poor fall chum run. The Federal in-season manager rescinded the federally qualified user restriction for chinook salmon in late July upon establishing that there was a harvestable surplus of fish available in excess of the number needed for escapement, subsistence, and for Canada border passage. Subsistence catch reports were variable with

success rates ranging from very good to poor, but it appears that most individuals who tried were able to meet their chinook salmon subsistence needs.

Due to the poor performance of the 2001 summer chum salmon run, and the realization that the trend of poor salmon production would likely continue for the fall season, there was great concern that Yukon River fall chum salmon would not return in sufficient numbers to attain minimum escapement goals. Based on the high probability that the overall return of this population would be less than 350,000 fish, both the ADFG and Federal in-season managers decided to close all fall chum salmon fishing in the Lower Yukon Area beginning July 16. It was the second year in a row that such a closure was required; prior to 2000, such closures had been rare. The fishery remained closed until early August, when the early half of the fall chum salmon run showed unexpected strength and it was projected that there would be enough salmon to meet drainage wide escapement needs and provide for limited subsistence fishing. Based on this projection, the Federal in-season manager issued a Special Action effective August 4 which limited the subsistence harvest of fall chum salmon to those persons who were Federally qualified subsistence users. This restriction was rescinded on August 10, with the projection that there would be enough fall chum salmon to provide for escapement needs and subsistence harvest by all users. The fall chum run was estimated at 385,000, well below the 1974-99 average of 761,000. The subsistence harvest was approximately 31,600 which is 68% below the 10 year average. The harvest was greatly reduced due to early season closure, windowed fishing schedules, and because many fishermen were waiting to harvest fish later in the season which ended up being the portion of the run that was relatively weak. Although it appears most of the escapement goals for Alaska were met, the escapement into Canada was less than anticipated with a Canadian projection of 53,000 fish, as contrasted to our border Treaty obligation of 80,000 fish. One bright spot was the unusually strong return of coho salmon which provided some late season subsistence fishing opportunity.

In mid-July GB Beyersdorf, RIT Madros, WB Bryant and Volunteers Milsap and Wilson traveled the Yukon from Nulato to Ruby and conducted interviews in fish camps and villages. The following questions were asked of subsistence users: 1) Are their subsistence fish needs being met? 2) What percentage of their harvest have they conducted to date? 3) What is the chum:king ratio of their catch? 4) How does fishing compare to previous years? 5) How does the size and quality of this year's fish compare to previous years? 6) Have they been finding many fish infected with *Ichthyophonus*? 7) Has their fishing effort changed compared to previous years? and 8) Can the information provided by them be used in the Yukon River Drainage Fisherman's Association (YRDFA) teleconference?

Twenty people were interviewed between July 16 and 19, 2001, in the three villages and three fish camps. Overall, people reported they were able to meet 80-100% of their subsistence fish needs. The percent harvest to date was approximately 90% as most people had stopped fishing by July 10. The chum:king ratio could not really be gathered as most people were using king gear. There was some by-catch of chum, generally two to three per 100 kings. Compared to previous years, people felt that fishing in 2001 was good, and many people felt that it was much better than in 2000. People also stated that the size and quality of the fish

was much better and the presence of *Ichthyophonus* was reduced compared to previous years. Generally people had one to three infected fish for their entire catch (catches ranged from 120-185 fish). There was no change in fishing effort compared to previous years.

## 2002

Going into the 2002 fishing season, a joint information sheet from the USFWS and ADFG was developed and mailed to all Yukon River commercial and subsistence fishing households. The information sheet was also provided as a handout at pre-season fishermen's meetings informing them of the outlooks, subsistence salmon fishing schedule, and management strategies for the 2002 season. The pre-season salmon outlook for chinook, summer chum, and fall chum was anticipated to be below average to poor in strength due to the low productivity trends of recent years. This was the second fishing season in which subsistence users fished the regulatory "windowed" subsistence salmon fishing schedule. The District 4 schedule used the same two 48-hour periods initiated in 2001. The handout also presented the management strategy for this season to wait until near the quarter-point of each salmon run to implement a reduction of the subsistence salmon fishing schedule if necessary, while also agreeing to wait until near the mid-point or later of the chinook salmon run to determine if the run size was sufficient to allow commercial fishing.

## Chinook

As the chinook and summer chum salmon runs developed, they were assessed to be average in run timing but below average in abundance. However, enough fish were available to allow subsistence fishing to continue at the maximum allowed by the regulatory schedule. Near the mid-point of the summer season managers assessed that the run abundance of both species appeared adequate to provide for escapement, continued subsistence fishing, and a small commercial chinook salmon harvest. ADFG provided small commercial fishing opportunities in nearly all fishing Districts, although lack of buyer participation or limited sales opportunities resulted in no fish being commercially sold in some areas.

The estimated total run of Canadian origin chinook salmon in 2002 was approximately 63,000 fish. This was twice as good as 2000, but still well below the 1982-1999 average of 124,000 fish. The Alaskan subsistence harvest was approximately 43,900 which is 13% below the recent 10 year average. Preliminary escapement and subsistence information indicate that the chinook salmon run appeared consistent with the mid-season assessment. Although the 2002 chinook salmon run was below average, most of the escapement objectives were met, subsistence users generally reported meeting their needs, and there were enough fish to have a small commercial fishery.

## Summer chum

Even though the 2002 summer chum salmon run was a little more than one million fish, it was determined to be a below average return. Nevertheless, it was encouraging to see the 2002 return more than double the run size experienced in 2001. The subsistence harvest was approximately 87,200, which was 6% below the 10 year average. The 2002 summer chum salmon run appeared sufficient to meet most escapement objectives, allow scheduled



subsistence fishing, and provide for a small commercial harvest.

#### Fall chum

Entering the fall season, a projected run size of 500,000 to 600,000 fall chum salmon was based on the pre-season projection and on the strong performance relationship of fall chum to summer chum salmon returns. Unfortunately, near the midpoint of the fall chum salmon run it became apparent that the trend of poor production was continuing as indicated from the Emmonak, Mountain Village, and Kaltag drift gill net test fisheries, Pilot Station Sonar, and subsistence fishing reports. At that time, the overall run of fall chum salmon was projected to be less than 350,000 fish. Together, ADFG and Federal managers announced subsistence salmon fishing closures for the Lower Yukon Area on August 9 and closures for the Upper Yukon Area on August 11. Subsistence fishing with limited gear types for non-salmon species remained open. This was the third year in a row that such a closure was implemented. The salmon fishery remained closed until late August, when the subsistence fishery was progressively reopened once it was determined that the majority of migrating fall chum salmon were beyond a fishing district. The 2002 fall chum run was estimated at 413,000, well below the 1974-99 average of 761,000. The subsistence harvest was approximately 19,700, more than 80% below the 10 year average. Subsistence fishermen in most areas did not have adequate opportunities to fish for fall chum salmon and fishermen did not get enough fall chum salmon to meet their subsistence needs. Preliminary information indicated that escapement objectives were met for the Tanana River, Chandalar River, and Canadian Border but the Sheenjek and Fishing Branch River systems did not meet goals for escapement.

#### Coho

The coho salmon run was assessed to be near average in run strength and timing in 2002. Unfortunately, the overlapping run timing of coho salmon with fall chum salmon resulted in missed coho salmon harvest opportunity due to the closures to protect fall chum salmon. Where possible, managers tried to provide opportunities to harvest coho salmon.

#### In-season Harvest Assessment

A new project was begun in 2002 to help fisheries managers assess in-season salmon run strength. In years with low salmon returns, it is difficult to assess run strength. Two factors compound the difficulty: 1) In years of low return no commercial fishery occurs; therefore managers lose a comparable data tool; and 2) The newly established Board of Fish subsistence fishing schedule (2001) effect on harvest is unknown. When there are in-season fishing restrictions in place there is no method currently employed to evaluate how this affects the ability of subsistence users to meet their subsistence needs. Subsistence surveys have traditionally only provided post-harvest information.

The objectives of this project were to: 1) Collect qualitative in-season subsistence salmon harvest data in a standardized format from active fishing households in Middle Yukon villages associated with the Refuge; 2) Determine subsistence fishermen's progress toward meeting their subsistence salmon needs via weekly household surveys; 3) Summarize weekly survey data and provide it to State and Federal managers prior to the weekly Yukon River Drainage

Fisheries Association (YRDFA) teleconferences so it could be used when making management decisions; 4) Present weekly survey summaries by local hire surveyors on the YRDFA teleconferences; 5) Broadcast weekly YRDFA teleconference summaries via the local public radio station to keep resource users informed of management decisions; and 6) Collect age, sex, and length samples from chinook and chum salmon in coordination with and support of ADFG.

The project used local hire RIT's and Refuge staff in Emmonak, Holy Cross, Nulato, Galena, and Huslia to survey fishermen about their harvest of chinook and summer chum salmon. Subsistence fishermen were able to contribute traditional knowledge about salmon harvest, abundance and run timing, and provide information on whether their subsistence needs were being met. Present year abundance and harvest were compared to knowledge from previous years' fishing experiences and rated on the basis of the harvest being very good, normal, or poor. Survey data indicated that most households in all areas surveyed met or nearly met their subsistence salmon needs. In addition to this year's survey providing useful information to fisheries managers, the Refuge received several comments from local people who appreciated the weekly YRDFA teleconference summaries.

#### **H.10. Trapping**

Trapping on the Koyukuk, Northern Unit of Innoko and Nowitna NWR's provides a source of supplemental income for some residents in the villages of Ruby, Tanana, Galena, Huslia, Kaltag, Nulato, Koyukuk and Hughes. Also important to village residents is the opportunity to trap and teach their trapping techniques to youth as part of their customary and traditional practice. Recently, trapping activity on the Refuges has decreased, but there are still a few families that rely mostly on trapping for their livelihood.

Trapline territories are not registered, but are generally passed down through families from generation to generation. Thus, claims to certain areas for trapping are usually recognized and respected by local residents. The traplines are usually associated with a cabin or camp of some sort. Occasionally traplines and accompanying cabins and equipment are sold to newcomers. Beaver trapping, however, is not always done within strictly controlled trapping territories. Areas are often shared by several people, perhaps because of the importance of beaver as a survival food.

Snowmobiles are the primary means of transportation for trapping. Some individuals travel up to 200 miles round-trip on the trapline. Some trappers use airplanes for access, and a few simply walk their traplines. Marten are the most frequently harvested species and are generally taken using pole sets and/or cubby sets. Beaver are taken with traps or snares through the ice, and most wolves are shot, trapped or snared around moose kill sites.

#### **Snaring clinics**

In conjunction with ADFG, trapping and snaring clinics were held in three area villages in 2001. The Hughes clinic was held December 10, with 16 attending; Kaltag on December 11-

12, with 17 attending; and Ruby on December 13 with 9 attending. Glenn Stout (ADFG) and Brett Gibbens (FWP) gave lectures on different methods to use, followed by input from local trappers on successful techniques. The lecture was followed by a classroom portion where local people were shown how to construct wolf snares and then allowed to practice on materials provided by ADFG.

In November, 2002, prompted by local concerns about declining moose recruitment and the desire to promote youth interest in their customary and traditional practice of trapping, the "Friends of Moose" was formed by Galena residents. On December 18-19 SWB/P Scotton and GB Beyersdorf along with members of Friends of Moose gave presentations on trapping and furbearer management to the Galena high school (six students) and Project Education Rural School (twelve students). On December 20, 2002 nine people attended a joint ADFG/USFWS presentation on trapping and snaring that was held in Galena.

#### **H.17. Law Enforcement**

The Refuge Complex had only one collateral duty law enforcement officer for most of 2001 and all of 2002. The Refuge had two law enforcement officers in 2001 from late March through June with the arrival of DRM McClellan, but with the departure of RM Williams on July 1, the Refuge was down to one officer again.

From July 5 - 12, 2001 two special agents on a detail from the Lower 48 patrolled the Yukon River via boat from Tanana to Kaltag during the subsistence fishing season. No fishing related violations were noted. On the Nowitna NWR, the two agents came upon a commercial photographic enterprise operating on the Refuge without a permit. A citation was issued by a Fairbanks based agent.

From August 2 - 9, 2001, one Fairbanks based special agent and one agent detailed from the Lower 48 patrolled, via boat, the Yukon River between Tanana and Kaltag. No fishing related violations were noted. They did come across a fresh moose carcass on one of the islands in the Upper Innoko NWR. Information was turned over to the local State Fish and Wildlife Protection Officer, but it was determined that the moose carcass was from a potlatch moose.

From August 28 to September 1, 2001, RO McClellan assisted at Ella's cabin during the subsistence moose season. No violations were noted.

During six days in September 2001 RO McClellan conducted aerial law enforcement patrols with Refuge pilots. Guide camps were checked on the Koyukuk Refuge. The Northern Unit of Innoko NWR was overflowed twice. Guide camps and several hunting camps were checked on the Nowitna NWR. No violations were noted. A large number of drop-off hunters rafting the upper portion of the Nowitna River was noted. Hunters with a couple of different rafts were checked. Information was gathered on possible non-permitted air-taxi/transporter operators. Special agents from Fairbanks were out in the area patrolling throughout the month.

Fairbanks special agents made a case against Kurt Lepping and his son on a Lacey Act misdemeanor. Lepping had an air-taxi/transporting permit with the Koyukuk Refuge.

During September 2001 Refuge staff and volunteers manned the volunteer moose hunter check station at the mouth of the Nowitna River. Information was gathered from several hunting groups on possible violations including non-permitted air-taxi/transporters and using airplanes to spot moose.

During the 2002 subsistence fishing season, RO McClellan conducted two different patrols of the Yukon River from Galena to Kaltag.

During the 2002 subsistence fishing season, special agents conducted boat patrols between Tanana and Kaltag as part of a river wide effort to check fishermen during subsistence seasons and closures on the Yukon River.

From July 1 - 8 RO McClellan was detailed to assist the National Park Service in national security efforts at the Arch in St. Louis.

On August 13 RO McClellan and RM Spindler investigated an incidence of vandalism on a Refuge Supercub parked at the Refuge float dock at Alexander Lake. They noted a punched small hole in the fabric of the airplane along the tail; and the entire airplane was splattered with mud and vegetation. Several young children were in the area and it was determined that a group of them were playing on the Refuge float dock and did the vandalism. It could not be determined which individual punched the small hole in the fabric. Over the next several days, RM Spindler or RO McClellan along with other local staff met with the parents of all the suspected children and discussed the incident and danger to human safety if the plane had been flown without the damage being discovered.

On September 3 RO McClellan received a call from a complainant concerning 17 wasted northern pike on the ground at a big game guide camp on the Koyukuk Refuge. P Huhndorf flew RO McClellan to the site that afternoon. The fish were originally discovered by the permitted guide and his crew on August 31. There was a small wall tent, gill net and other items when they arrived at the site. Information was gathered at the site. Followup information was gathered on a visit to Huslia on September 10 by RO McClellan and on September 13 on a visit to Huslia by RO McClellan and RM/P Spindler. On September 13, RO McClellan interviewed a suspect who admitted leaving/wasting the fish. Discussions were held with the Solicitor's Office and Senior Resident Agent (SRA) Corky Roberts concerning the best way to proceed. SRA Roberts and Refuge staff discussed going through the Huslia Tribal Court. SRA Roberts wrote a letter to the Huslia Tribal Council expressing the Service's interest in going through tribal court. A tribal court hearing was held in April 2003.

On September 9-10 RO McClellan and RV Schwalen set up a spike camp within the Koyukuk Controlled Use Area to gather information on reported use of airplanes during moose hunting activities within the Koyukuk Controlled Use Area.

On September 11, RO McClellan and P Huhndorf conducted a patrol flight of the Nowitna Refuge. Big game guide permittee Tarnai's Mud River camp was checked and other camps along the Nowitna River were checked. Before heading back to Galena, P Huhndorf received a search and rescue alert for a downed plane in the upper Nowitna River. F&WP Officer Gibbens from McGrath had landed at the site by the time we arrived. The pilot and two passengers of the crashed plane were okay. We stayed on the scene until F&WP Officer Gibbens was sure he could take off from the site with the pilot.

During the week of September 9 RM/P Spindler investigated the operation of outfitter Mark Confer, an outfitter based out of Galena during September. Confer was bringing a large number of clients into Galena then flying them out to a mud bank along Bear Creek just a couple miles north of Galena. From Bear Creek, Confer was flying the clients out to spots all over the area. RM Spindler determined that currently Confer had at least two clients out on the Nowitna NWR, four on the Innoko Refuge and eight on the Selawik Refuge. Confer did not have a special use permit with any of the three Refuges. The plane crash noted in the paragraph above was the only pilot and plane Confer had in his employ. On September 12, RM Spindler and RO McClellan met with Confer and notified him that he was not authorized to conduct any air-transporting/outfitting activities on any of the three Refuges and that any clients he had remaining on the Refuges must be picked up by air taxis currently permitted with the respective Refuges. For the Nowitna Refuge, Confer claimed that he had contacted several of our permitted air-taxis/transporters, but none were willing to help him. The Refuge worked with Confer on permitting an air-taxi service he was able to hire out of Fairbanks. SRA Roberts came out in late September and interviewed several of Confer's clients and his pilot. During the winter, SRA Roberts and SA Wade out of the Nome office brought a case against Confer. A plea bargain was reached.

On September 13 RO McClellan and RM/P Spindler patrolled the Kaiyuh Flats via airplane and then patrolled the Koyukuk Refuge. Stops were made at Virgil Umphenour's base camps in KOY-05 and Gilbert Huntington's base camp for his KOY-02 operation.



*RO Barry Whitehill, Yukon Flats NWR, assisted with a law enforcement patrol of the upper Nowitna Refuge during the September 2002 moose season. The patrol was conducted in one person inflatable rubber kayaks provided by Yukon Flats NWR.*

On September 16 - 20 RO Whitehill from Yukon Flats NWR assisted RO McClellan in patrolling the upper Nowitna River via rubber kayaks. The patrol started just inside the boundary of the southern tip of the Nowitna NWR and floated down the Nowitna River to above the canyon. This effort was designed in part to investigate the increase of floating hunters in the upper Nowitna observed last year. About 10 parties of hunters were checked with about half successful in harvesting a moose. Most groups were flown in by Wright's Air with one group flown in by

Alaska Air Taxi. No violations were observed although one group was ticketed the day before by an F&WP protection officer patrolling via airplane. The effort was very successful, surprising quite a few hunters when we came floating up. Many thanks to Barry Whitehill for his assistance and to Yukon Flats NWR for the loan of the rubber kayaks.

On September 30 RO McClellan and RM/P Spindler checked Virgil Umphenour's two base camps in KOY-05 and tried to locate Fred Lee Bifelt's base camp in KOY-03. Umphenour's camp on the Huslia River was in terrible shape with trash strewn extensively about. The outhouse was not filled in and there was quite a bit of toilet paper strewn about. A river boat was found beached on a bank about two miles below the camp. The boat belonged to Mr. Umphenour's operation. Mr. Umphenour's base camp on the Koyukuk River was also checked. The Koyukuk camp area was cleaned up but the condition of the outhouse area was similar to the Huslia River Camp. RO McClellan and P Huhndorf flew back to Umphenour's base camp on the Huslia River on October 3. The camp was completely cleaned up except the outhouse hole was not filled in. No violation was issued to Umphenour for littering, but a letter was written to him documenting the condition of the camp and highlighting changes that would be made to the special conditions on future permits.

On September 13 an official letter of warning was hand delivered to Umphenour concerning violating his plans of operation by using an airplane in his big game guiding operation. Use of a plane was not part of his approved plans of operation. In addition, the plane Umphenour was using did not have 12 inch identification numbers which is a standard special condition on all big game guide permits. Umphenour was informed that he would need to submit a revised plan of operations if he wanted to continue use of the airplane next year and the revision would need to be approved by the Refuge Manager. Umphenour submitted a revised plan of operations including airplane use. Refuge Manager Spindler responded to Umphenour that he intended to deny his revision. The denial was based on the fact that airplane use in support of moose hunting operations within the Koyukuk Controlled Use area would be illegal according to state law. Umphenour countered that he only use the plane outside the Controlled Use area. After further discussions, Umphenour was granted tentative approval to use an airplane provided there would be no use of the airplane within the boundary of the Koyukuk Controlled Use area during the moose season and that any camps where the plane would be used must be located at least three air miles from the exterior boundary of the Controlled Use area.

After the hunting season, information was passed on to special agents in Fairbanks on a couple of potential violations. The agents conducted followup interviews, but there was not enough evidence to pursue the cases further.

#### **H.18. Cooperating Associations**

Refuge staff continued to operate the Middle Yukon Branch of the Alaska Natural History Association (ANHA) in 2001-2002. Sales from the small book outlet were up from previous years. No new items were developed, but many of our standard items remained popular. Our outlet continues to enhance the image of the Refuge in the local area by bringing books and



products to people, and providing opportunities for resource managers to contribute to community events through donations (for raffles, volunteers, etc.) Donated items usually are Refuge mugs, t-shirts, and tote bags, centennial patches, and Sidney Huntington's book Shadows on the Koyukuk. These are also some of our top selling items. In April of 2002 funds generated from ANHA were used to purchase materials for caribou tufting (native craft) used at a caribou education workshop in Hughes. PR Lehmkuhl and AT Cassou spent several days at the Hughes school, teaching students about local caribou populations and conducting an evening tufting workshop.

## **H.20. Subsistence management**

In 1989 the State of Alaska's subsistence law was found unconstitutional by the state supreme court, which eliminated the state's subsistence preferences. The lack of a state subsistence preference was inconsistent with the Federal subsistence provisions in the Alaska National Interest Lands Conservation Act (ANILCA). As a result the Federal government in July, 1990, assumed responsibility for implementing Title VIII of ANILCA on federal public lands in Alaska. In October of 2000, the Federal government also assumed responsibility for subsistence fisheries management for waters in and adjacent to Refuge boundaries. The affected public lands in the Yukon River drainage are collectively referred to as Federal Conservation Units and are comprised of the Yukon River Delta National Wildlife Refuge (NWR), Innoko NWR, Koyukuk NWR, Nowitna NWR, Kanuti NWR, Yukon Flats NWR, Arctic NWR, Gates of the Arctic National Park and Preserve, Yukon-Charley Rivers National Preserve, Denali National Park and Preserve, White Mountain National Recreation area, and the Steese National Conservation Area.

The Federal Subsistence Board was established to implement a subsistence priority for rural residents on Federal lands and waters consistent with ANILCA . In the spring of 2000 an Interim Memorandum of Agreement (MOA), signed by management authorities representing the State of Alaska and Federal agencies, established the guidelines for coordinating fish and wildlife subsistence management of Federal public lands in Alaska. This platform provides guidance for using state management plans and regulations to implement management actions, so long as they provide for subsistence priorities under state and Federal law.

The Koyukuk/Nowitna Complex supports many uses which occur on a checkerboard of Federal, State, native corporation, and privately owned lands within Refuge boundaries. In terms of use-days, the most significant public use of Federal lands within the Complex is subsistence by rural residents. *Wildlife* subsistence activities occurring on Federal lands and waters and subsistence *fishing* activities occurring on navigable waters within or adjacent to Federal lands are administered by the Service. On State and native corporation lands, navigable waters, and certified native allotments within the Complex, subsistence and other recreation/consumptive use of *wildlife* are managed by ADFG. ADFG also manages sport and commercial fisheries on these same lands and waters. Since 1990, the arrangement of dual Federal-State subsistence management has presented residents of the area and the Service with many new challenges stemming from a complex set of legal mandates.

In June of 2001 GB Beyersdorf began to serve as the Subsistence Coordinator for the Complex. In FY 2001 and 2002 the Complex received approximately \$20,000 and \$30,000 in dedicated subsistence funds, respectively. These funds were used for subsistence harvest surveys, subsistence wildlife surveys, and for travel to meetings, seminars and villages in support of the subsistence regulatory process.

### Federal Advisory Council

The Western Interior Regional Advisory Council (WIRAC) consists of nine members, appointed by the Secretary of the Interior, to represent the residents of the western interior Alaska region. The function of the Council is to convey the needs and opinions of its constituency to the Federal Subsistence Board and to submit fish and wildlife regulation proposals and comments.

### 2001

Council members in 2001 were Chairman Ronald Sam, Allakaket; Vice-Chair Ray Collins, McGrath; Secretary Jack Reakoff, Wiseman; Carl Morgan, Aniak; Angela Demientieff, Holy Cross; Benedict Jones, Koyukuk; Henry Deacon, Grayling; Michael Stickman, Nulato; and Samson Henry, Allakaket. The Council held two regular meetings in 2001. The spring meeting was held in Fairbanks on March 9-10, and was attended by RM Williams and RIT Huntington. The joint fall meeting with the Eastern Interior and Yukon-Delta RAC's was held in Anchorage on October 9-11, and was attended by RIT Huntington, DRM McClellan, and GB Beyersdorf.

The primary issues expressed at the spring 2001 meeting were proposals to limit moose hunting pressure in the Koyukuk drainage. Council members' concerns particular to the Refuge included monitoring the level of air taxi/guiding operations on Refuge lands, and sport fishing on Kaiyuh Flats.

The following proposals concerning the Koyukuk/Nowitna Complex were discussed:

Proposal 25: Align Federal regulations with existing State regulations to have the brown bear season in Unit 21D and 24 from September 1 to June 15 instead of September 1 to May 31. The Council recommended approval.

Proposal 27: Remove the ½ mile restriction along the Yukon River for winter moose hunting in Unit 21(D). The Council did not recommend approval.

Proposals 28/31: Limit the number of non-Federally qualified moose hunters in Units 21(D)/24. The Council did not recommend approval.

Proposal 29: Establish an Innoko Controlled Use Area in Units 21(A)/(E). The Council recommended approval.

Proposal 30: Establish a Huslia/Dakli Controlled Use Area. The Council did not recommend approval.

Proposal 32: Expand the Kanuti controlled Use Area and close Federal lands to non-Federally

qualified users. The Council did not recommend approval.

The primary issues expressed at the fall 2001 meeting were the commercial over-harvesting of ocean salmon stocks and the potential impacts of oil spills on subsistence uses of fish and wildlife resources. Council members again requested that the Refuge monitor the level of air taxi/guiding operations throughout the Complex, and sport fishing on Kaiyuh Flats. The Council also requested that the Federal Subsistence Board, Federal, and State agencies work cooperatively to conduct studies immediately on the effect of predators on the moose populations of the Koyukuk River area (Units 21(D) and 24).

As is usual for the fall meetings, subsistence fisheries was the primary focus with five fishery proposals addressed by the tri-councils. Only one proposal affected Refuge areas.

Proposal 9: Prohibit the use of Chinook salmon as dog food except for fish that are unhealthy for human consumption, fish scraps, fish under 16 inches or fish caught incidentally during chum salmon directed fishing. The Council supported with the modification to adopt the existing State regulatory provisions with the exclusion of the reference to the Tanana drainage.

## 2002

Council members in 2002 were Chairman Ronald Sam, Allakaket; Vice-Chair Ray Collins, McGrath; Secretary Jack Reakoff, Wiseman; Carl Morgan, Aniak; Angela Demientieff, Holy Cross; Benedict Jones, Koyukuk; Robert Walker, Anvik; Michael Stickman, Nulato; and Emmitt Peters, Ruby. The Council held two meetings in 2002. The spring meeting was held in McGrath on March 19-20, and was attended by RIT Huntington, RM Spindler, DRM McClellan, and GB Beyersdorf. The fall meeting was held in Fairbanks on October 8-9, and was attended by RIT's Huntington and Madros, and GB Beyersdorf.

The primary concerns expressed at the spring 2002 meeting were the continuing urban/rural subsistence divide, managing for healthy moose populations, balancing customary trade with the need to protect fisheries resources, public input to the Refuge guide selection process, increased sport hunting, predator control, and displeasure with the windowed fishing schedule. The following proposals concerning the Koyukuk/Nowitna Complex were discussed:

Proposal 30: Establish an open harvest opportunity for funerary or memorial potlatches for all species in Unit 21 and 24. The Council approved support with the modification to remove the word "Native ."

Proposal 32: Establish a new Controlled Use Area for moose in Unit 24. The Council did not recommend approval.

## Customary Trade

Prior to this meeting the WIRAC received a briefing on the issue of customary trade of subsistence-caught fish. Agencies and some fishermen sought more stringent definitions in

order to permit more effective law enforcement. In March 2002 the Council formed a subcommittee to review the proposed rule and other Regional Advisory council recommendations, and develop language for the full Regional Council review. The Council approved to adopt the subcommittee's customary trade language as amended. The following recommendation along with the nine other Council recommendations was submitted to the Federal Subsistence Board to develop a statewide recommendation on customary trade.

WIRAC recommendation #27 Subsistence taking of fish.

(c)\*\*\*

(11) Transactions Between Rural Residents- The exchange between rural residents in customary trade of subsistence-harvested fish, their parts (except eggs), legally taken under the regulations in this part, unprocessed or processed using customary and traditional methods, is permitted.

For the Yukon and Kuskokwim Areas Only

(12) Transactions Between a Rural Resident and Others-Customary trade for fish, their parts (except eggs), legally taken under the regulation in this part from a rural resident to individuals other than rural residents is permitted, as long as it is used for personal or family consumption of the individual who purchases the fish and cannot be resold.

At least 50% of each fish species taken under Federal subsistence regulations must be used for personal and family consumption. If in-season subsistence restrictions have been imposed on a salmon species or escapement goal thresholds have not been met on the majority of the Yukon and Kuskokwim River drainage, sale to others shall be eliminated for that species.

If a rural resident engages in customary trade of subsistence harvested fish they shall maintain a subsistence harvest record to track the harvest level as a record keeping system. Anyone selling subsistence harvested salmon must have their harvest record in their possession when engaged in sales with others.

If a person sells more than a total of 100 pounds of processed salmon, it would constitute a significant commercial enterprise, which should then be looked at more closely.

(13) No Purchase by Fisheries Businesses-If you are required to be licensed as a fisheries business under Alaska Statute, AS 43.75.011, you may not purchase or receive for commercial purposes or barter or solicit to barter for, subsistence-taken fish, their parts, or their eggs.

The primary issues expressed at the fall 2002 meeting were to allow a salmon drift-net fishery in Sub-District 4B/4C, the lack of law enforcement especially on State and BLM lands, BLM's lack of a guide policy, adequate salmon escapement, the increasing number of sport hunters, and guides. The following proposals concerning the Koyukuk/Nowitna Complex were discussed:

Proposal 27: Provide for the harvest of fish for use in traditional religious ceremonies. Passed as amended to include tribal governments as a designee to contact the Federal fisheries manager and to remove the restriction of 25 salmon.

Proposal 28: Streamline the Federal Special Actions process. This proposal reads that statewide Federal subsistence fishing schedules, openings, closings, and fishing methods are the

same as those issued for the subsistence taking of fish under Alaska Emergency Orders, unless superseded by a Federal Special Action. Passed with staff modification that it only apply to the Yukon and Kuskokwim drainage.

Proposal 2: Allow the use of rod & reel to subsistence fish for salmon in Yukon River tributaries. Passed with staff modification to include the Yukon river drainage 24 hours per day seven days per week unless specifically restricted.

### Customary Trade

During its May 2002 meeting, the Federal Subsistence Board deferred action on the proposed rule for customary trade until January 2003. The public comment period was extended until November 1, 2002. Current Federal Subsistence Management Regulations authorize customary trade as long as it does not become an illegal "significant commercial enterprise." The Board has found that the term "significant commercial enterprise" is unclear, hampering effective law enforcement to prevent abuses. The Board wants to preserve traditional customary trade practices and recognize regional differences while preventing abuse. Public comments will help the Board decide: the definitions of the limits of a "significant commercial enterprise;" what limitations should be placed on the exchange for cash between rural and non-rural residents; if there should be a limit on an exchange for cash between rural residents; how any limitations set on customary trade will affect subsistence needs, traditions, and the values of the subsistence way of life. Several people testified before the RAC as to the lack of contact with elders, little public notice, and the swiftness of this proposed rule potentially becoming law. The Western Interior Regional Advisory Council (WIRAC) submitted a letter of support for Alternative 1 to the Board. This alternative maintains the status quo, which permits customary trade unless it results in a "significant commercial enterprise." The Council felt this would give them more time and also allow them to talk to village elders and elicit feedback on customary trade from rural to rural and rural to urban users.

### Federal Advisory Committee Act

As part of a national review of all Department of Interior advisory committees, Region 7 conducted a review of RAC composition for compliance with the Federal Advisory Committee Act (FACA). With this review the Board proposes to increase membership on most councils, with the WIRAC going from nine to ten members. It will also change the composition so that 70% of the council seats represent subsistence interests, while 30% represent commercial and recreational hunting and fishing interests. All council members will continue to be residents of their council region as required by Title VIII of the Alaska National Interest Lands Conservation Act (ANILCA). All members must be knowledgeable about subsistence uses of fish and wildlife, resources within the area, and other resource uses within the region. In addition, they must demonstrate leadership and communication abilities. These changes of representation and membership will be phased in over a three-year period starting in 2003.

## Koyukuk River Moose Management Plan

The Koyukuk River Moose Management Plan (KRMMP) was developed through the cooperative efforts of the Koyukuk River Moose Hunters' Working Group (KMWG), ADFG, and other agencies. A citizen-based group, the KMWG is composed of representatives of local and non-local State Fish and Game Advisory Committees, representatives from the Western Interior Regional Advisory Council, and commercial guides. In addition, numerous Federal land management agencies including Koyukuk/Nowitna NWR have participated in the planning process as technical advisors by providing harvest and population survey data and other biological information. The recommendations of the KMWG were developed through a consensus decision-making process.

ADFG's Division of Wildlife Conservation initiated the planning process in response to concerns about increasing numbers of hunters and harvest levels and potential effects on moose populations, primarily in the lower section of the Koyukuk River. In 2000, 731 hunters were checked at the Ella's Cabin check station and reported a harvest of 367 moose. This compares to 299 hunters harvesting 181 moose 11 years earlier in 1988. In addition to human harvest pressures, it appears that predators are having a significant influence. A survey conducted in spring 2000 indicated an approximate 17% increase in wolf populations over the 1994 estimate.

As a result of the planning effort, moose hunting regulations in the lower river within the Koyukuk CUA have changed significantly. The general registration hunt on the lower Koyukuk River has been changed to a drawing hunt with separate resident and nonresident drawing pools. Separate resident and nonresident drawing hunts help to retain opportunity for nonresidents and commercial guides, but at a much lower level than has occurred in recent years. Additionally, those hunting under the subsistence permit must devalue the antler trophy by sawing through the palm of one of the antlers. This regulation is designed to reduce the number of trophy hunters to the area.

Members of the KMWG met in December 2000 and agreed that the fall 2000 season was greatly improved and that both local and nonlocal hunters enjoyed a much higher quality hunt than in the past several years. The group did not make any significant recommendations to the draft plan. The draft plan was presented to the Board of Game and Federal Subsistence Board. Both boards endorsed the planning process, and in March of 2001 a finalized plan through 2005 was formally adopted by both boards.





*The Koyukuk River Fish and Game Advisory Committee meeting was held at Huslia on February 7. The Committee includes representatives from the villages of Huslia, Hughes, Allakaket-Alatna, and Bettles-Evansville. Refuge staff try to attend these meetings as much as possible to foster coordination and communications concerning fish and game monitoring and regulatory issues. The Refuge Complex included four Committees: Koyukuk, Middle Yukon, Ruby, and Tanana. The state has been funding travel for representatives to attend only one meeting per year. Other meetings are by teleconference. (MS)*

DRM McClellan attended a Koyukuk River Moose Hunters working group meeting on January 4, 2002 held in Fairbanks. The KMWG endorsed ADFG Area Biologist Glenn Stout's recommendation to issue only 198 drawing permits this fall, a drop of 60 from this past year. The KMWG also expressed frustration with a declining moose population leading to fewer hunting opportunities, and the lack of predator management.

#### State Fish and Game Local Advisory Committees

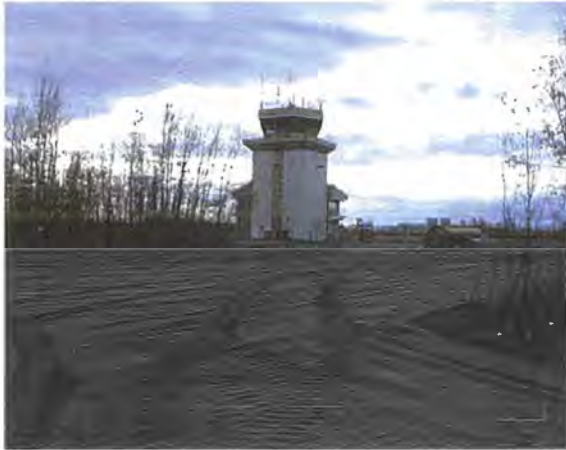
The Middle Yukon, Koyukuk River, and Ruby local Fish and Game Advisory Committees encompass the area covered by the Refuge Complex. Refuge staff continued to work with the

Committees and attempted to attend meetings whenever possible. RM Spindler and DRM McClellan attended the Middle Yukon Committee meeting held in Kaltag on February 5, and the Koyukuk River Committee meeting held in Huslia on February 7, 2002. Concerns expressed by members and public at these AC meetings included: (1) Desire to maintain opportunity to harvest a cow as a last resort at the end of the hunting season; (2) Support for a regulation to keep meat on the bone for all four quarters and ribs; (3) Increasing predation on moose by bears and wolves; (4) There is a burden on local people to hunt wolves and bears; urban hunters reap the benefit but don't share the burden; (5) And a big increase in non-local hunters, including independent parties and those supported by transporters and guides. Finally, AC members were frustrated that this state has provided funding for only one meeting per year.

## **I. EQUIPMENT AND FACILITIES**

### **I.1. New Construction**

In FY01, \$130K in Refuge MMS funding was allocated to the Division of Engineering to purchase two “weatherport” type temporary airplane storage buildings, one for Galena and one for McGrath. The “weatherport” items were barged out to Galena during the summer of 2002.



*After a land survey and a contaminant survey in 2001 and 2002, a lot at the Galena Airport was finally leased from Alaska DOT in September 2002. A gravel surface to create an aircraft parking area was completed before freezeup. (GM).*

In November 2000, the Refuge originally submitted a request to the Division of Realty to Lease Lot 5 within Block 12 at Galena Airport for location of a weatherport style building to house aircraft. In 2001, extensive staff time was spent in discussions with Nancy Walsh, Division of Realty, who was negotiating with Colette Foster of the State Department of Transportation on the lease. Lot 5 was originally targeted for the lease although there was some discussion of Lot 3 (the adjacent lot to the west). Lot 5 is approximately 100' X 200' in size. In June, concerns were raised about the potential of contaminants from historic military use. There is also concern of potential contaminant migration to the site below the surface via the water table.

In August, delivery orders were submitted to Phukan Consulting Engineers & Associates, Inc. for a Level I contaminant survey and also for a survey of the lot to establish the corners and boundaries. Results of the Level I contaminant survey determined that a Level III survey would be needed. Existing within the lot was a concrete foundation approximately 50' X 30' in size that used to be the floor for a liquid oxygen facility. The original idea was to cover the foundation with gravel, but in August Colette Foster offered to ask the Air Force to remove the concrete slab from the site. During the first week of October, the Air Force broke up the concrete slab, removed the pieces and filled in the hole with gravel. Both the initial land survey and the Level I contaminant survey were completed in 2001.

In late winter/early spring of 2002 we purchased geotex fabric, an impermeable liner, for the base of the structure, and obligated additional monies for the overhead door. Activities on and with the airport lease site began in earnest again in June 2002. Staff met with personnel from Air Force Contractors Chugach Development Corporation to locate and mark any underground utilities in the lease area. RM McClellan and P Huhndorf met with the local gravel contractor in Galena to discuss clearing a portion of the lot and hauling gravel to fill and level the entire lot site. The local contractor won the contract for \$80,000 to complete all clearing, fill and leveling work. In June it was determined that the Refuge could lease an additional 25 feet to the west and 50 feet to the south. Another delivery order was given to



Phukan for a new land lot survey of the increased lot plus a topographic survey of the entire lot area. On July 16 Mike Miller with Phukan arrived in Galena to collect soil samples for the Level III contaminant survey. Results from the soil samples were "... that all of the constituents tested for including TCLP metals, DRO, RRO, GRO and BTEX were either not detected or are below recommended ADEC soil cleanup levels..., it is concluded no cleanup of contamination or further environmental investigation is required at the site." On July 24-25, Refuge staff met with a local electrician and an electrician from a Palmer construction company that was in Galena for the summer working on projects for the military. It is hoped both will bid on the electrical work for the hangar site. In early August acquisition requests for \$10,000 to Phukan for electrical design and \$40,000 to Weldin for electrical work were submitted. In August and September Sweetsir Construction, the local gravel contractor, cleared the airport lease site plus constructed and compacted a gravel pad large enough for the 40' by 50' weatherport and to park up to 5 airplanes. On August 23 a delivery order was submitted for a third boundary survey. In early September a delivery order with Phukan was submitted for \$7,000 for mechanical design. The actual lease for Block 5 was signed by both parties and active as of November 13, 2002. We hoped to put up the airplane storage weatherport in fall 2002, but it was not to be. On the bright side, this allowed the gravel pad to firm up and settle over the winter with anticipation of construction of the structure in summer 2003.

Pilot Huhndorf obtained the requisite permits from the FAA and is currently seeking final building permits from the Alaska DOT and State Fire Marshal (expected in early to mid FY 03). Region 7's engineers are working with the building manufacturer to design specifications for the floor surface and foundation. Engineering is also working to design and purchase an above ground AVGAS tank and pump approved by DOT and Fire Marshal. The service-owned and operated AVGAS dispensing tank will be the most cost effective and operationally efficient way for flight crews to refuel the airplanes before and after each flight mission. Arrival and installation of the tanks are anticipated for summer 2003.

## **I.2. Rehabilitation**

In FY02 the Division of Engineering received \$44K in Refuge MMS funding for design and planning to rehabilitate the Refuge's 1940 vintage single family house that is used as a bunkhouse. The Division of Engineering was able to come up with additional funding for design and planning to rehabilitate the Refuge's 1960 vintage single family house that was also used as a bunkhouse.



*The finished aircraft parking area was put into service in October 2002. We were able to obtain limited electrical power from our neighbor, BLM, to plug in the planes for winter pre-heating.(MS)*

Phukan Consulting Engineers & Associates in Anchorage was given the contract to do the design and planning work. On September 25 a representative from Phukan, an architect from USKH and an electrical and a mechanical engineer from RSA Engineering visited Galena and inspected buildings #109 and #111. Phukan produced a 15% Presentation for Design Rehabilitation of Buildings #109 and #111 in late October. On November 1 DRM McClellan met with regional architect Harland Anderson and representatives from Phukan concerning the 15% design. Refuge comments on the 15% design were forwarded to Engineering on November 7. The 35% design presentation was received early in 2003. Building #109 is planned for rehabilitation in 2004 and Building #111 in 2005.

### **I.3. Major Maintenance**

In April 2001 a new refrigerator was purchased for the east duplex. Six dryers were purchased to replace the dryers in the six residences.

In July 2001 gravel was purchased and spread out at the base of the quarters #3 driveway and the driveway to the floatpond to widen out both entries and fill in a couple of low spots to lessen the possibility of getting stuck while winter plowing both driveways.

In August 2001 Carpet World of Alaska replaced the carpet in quarters #4.

In December 2001 with temperatures down to -30° F, the boiler in the Refuge duplex kept shutting down and when it was working it was pumping out black soot. MW Strassburg was able to make some temporary repairs to keep it working. The insulation board on the back wall of the boiler had fallen into the burning chamber. A local certified boiler repairman (Kangas Burner and Heating Service) happened to be in town and he was hired to fix the boiler. He cleaned out the burn chamber and stove pipe and installed a new insulation board on the back wall. After completing the repairs, he did a complete tune-up on the boiler. He also did a complete tune-up on the boiler in the little bunkhouse.

During the winter of 2001-2002 the waterline to the little bunkhouse froze. The bunkhouse was unoccupied. In early June, MW Strassburg borrowed a welding machine from Alaska Fire Service (AFS) and thawed out the pipe. Prior to the winter of 2002-2003 water was completely drained from the little bunkhouse to preclude freezing problems.

During the winter of 2001-2002 MW Strassburg painted the interior of the second floor and the garage floor of quarters #4. Strassburg painted the storage room and garage floor in quarters #6.

In early summer 2002 MW Strassburg repaired the base and repainted the Refuge information kiosk.

In August 2002 five new refrigerators were purchased from Sears with MMS funding to replace the refrigerators in five of the six government residences. Residence #5 already had a

new refrigerator from 2000.

In August 2002 \$30,000.00 in 1261 money from salary savings due to several vacancies plus \$37,000.00 in 8610 money from the Regional Office was combined into one purchase order with Kanagiq Construction Company in Anchorage for installation of vinyl siding on two of the six government residences. The siding work will be completed in 2003.

In August 2002 the Refuge completed an emergency hire of local resident Larry Olin. Olin painted the exterior railings of residences #3 and #6 plus painted the three bedrooms and two bathrooms in residence #3.

#### **I.4. Equipment Utilization and Replacement**

In the summer of 2001 the Refuge received a new 21' Alweld river boat and 75 HP four-stroke Honda outboard motor. MW Strassburg installed the motor and controls on the boat.

In fall 2001 the Refuge received seven new 500-gallon double-walled heating fuel tanks for the six residences. Funding was provided through the Division of Engineering. In fall 2002 MW Strassburg replaced the old single-walled heating fuel tanks with the new double-walled tanks at each residence.

In the fall of 2001 the Refuge purchased a new 40 HP four-stroke Yamaha engine for the 16' MonArk boat. MW Strassburg installed the motor and controls on the boat. The boat was shipped to Huslia for use by RIT Huntington.

In the fall of 2001 the Refuge purchased a new 340CC Polaris snow-machine with MMS small equipment funding.

In April 2002 the Refuge purchased a new 130 HP four-stroke Honda outboard motor with MMS deferred maintenance money to replace the 130 HP two stroke outboard on the "Nowitna" boat.

In September 2002 a new boiler was purchased for the duplex. Mr. Rooter in Fairbanks received the bid for \$8,576.30. It was a challenge getting the old boiler out of the duplex and the new boiler inside. A front-end loader was rented from GanA-Y'oo and MW Strassburg fitted a 4" pipe on one of the claws of the bucket to get the old boiler out of the duplex and the new boiler in. The technician from Mr. Rooter did a good job hooking up the new machine with no problems to date.



*New 500 gallon double-walled heating fuel tanks were installed at each of Galena's six FWS residences. (GM)*

## **I.5. Communications Systems and Weather Stations**

2001 and 2002 were the sixth and seventh years that the Bureau of Land Management (BLM) Alaska Fire Service was contracted to maintain the U.S. Fish and Wildlife Service radio communications system in our part of Alaska. Eighteen portable hand held radios, eight mobile units (in vehicles and boats), five repeaters, four Remote Automated Weather Stations (RAWS) sites plus one site in Galena and our base station radios were given annual service or maintenance during the year. The handheld radios are mailed to AFS in Fairbanks in late winter every year for annual service and maintenance prior to the summer field season. Usually, in early June, radio techs from AFS do annual service and pre-season maintenance on the mobile radios, repeaters and base stations. The radios in the three Refuge airplanes are serviced by the airplane maintenance vendors in Fairbanks or Anchorage.

No major problems cropped up with the radio system in 2001. The RAWS station in Galena set up near the FMO residence was inoperable for most of the summer. In August it was decided that the AFS radio techs would take the station down. When the new FMO comes on board, that person in consultation with AFS will decide if the station should be put back up and where.

In spring 2001 the Refuge purchased three Iridium satellite telephones. After an initial learning phase, they proved easy to use and they were able to pick up satellites and be functional over most of the Refuge Complex. In fall 2001 the Refuge purchased over a dozen "Racal" VHF handheld radios that are both analog and digital capable. These radios will be compatible with the planned conversion to a narrowband digital system in 2003.

In January 2002 the Refuge started experiencing problems with the speaker on the downstairs base radio. In February the radio problems increased. The primary problem appeared to be with the repeater on Totson and the downstairs base radio. The VHF portion of the radio system appeared to be working but the UHF portion was not. The radio system is designed such that all the signals from the downstairs base must go through Totson via UHF link. We tried to work with regional telecommunications specialist Mike Lewis to fix the problem, but for the remainder of the winter and spring we had sporadic to no radio coverage. On one overflight of the Totson repeater, it appeared that snow coverage was extensively covering the solar panels. On May 1 AFS radio techs were finally able to come out and look at our base station and make some repairs. AFS determined the following problems with our radio system. The downstairs UHF base radio either needed a new receiver or needed to be re-tuned. There is a bad duplexer on repeater 2321. Later in May the AFS radio techs were able to fix the UHF base and replace the bad duplexer on 2321. The radio techs also remounted the mobile radio in the fuel truck from the floor to the top of the dashboard.

The Refuge is scheduled to receive funding for a new narrowband digital radio system in FY 2003. In late May, RTS Mike Lewis drafted up a narrowband digital radio implementation plan for the complex and submitted to the staff for comments. Comments were submitted back to Lewis by the end of the month.



In June 2002, the RAWs station that had been used in Galena next to the FMO's residence was shipped to Lewis for use by the National Park Service.

## **I.6. Computer and Network System**

2001

As technology advances we have tried to update the computer systems of a few staff members every year to enable region-wide compatibility. Bob Rebarchik and Guy Hughes received new Gateway E-3400 desktop computers. Mike Spindler also received a new Gateway GP7-800 desktop computer. Mike Spindler and Orville Huntington received Gateway Solo 5300 laptops.

2002

The Refuge acquired five new laptops in 2002. Four Gateway 600XL laptops, with Windows 2000 operating system, went to the biological staff. The fifth laptop, a Gateway Solo 5300LS, went to the Park Ranger for educational outreach presentations. A new Dell Precision 340, with Windows 2000 operating system, was purchased to store the geographic information system files for the Refuge. An HP Laser Jet 4100DTN printer was purchased to replace the HP Laser Jet 4 downstairs that quit working. A Canon Laser Class 3170 fax machine replaced the previous fax machine. A Sony Mavica MVC-CD300 digital camera was purchased for taking Refuge photos.

## **I.8. Other- Aircraft**

2001

The Complex used four airplanes in 2001: one Cessna 185 (N714KH), two Piper Super Cubs (N4343 and N3874Z), and one Maule M-7 (N120G). The Cessna 185, Maule, and Super Cub airplanes are configured with floats during the summer and skis during the winter. Wheels are used only for a few weeks during transitions between seasons. The two Refuge pilots flew Refuge-assigned aircraft a total of 468.5 hours in 2001 (Table I.8.a.1).

The Complex used a borrowed Super Cub (N278Z) and Scout (N778AC) during some of the aerial wildlife surveys due to the unavailability of one or more of this station's own airplanes during these surveys. Additionally, these borrowed airplanes were used to conduct scientific testing for the final Super Cub Replacement Report submitted by this station to Alaska regional aviation managers at the Office of Aircraft Services (OAS), Fish and Wildlife Service and National Park Service. The total combined pilot time for the station's two pilots at 564 hours was 95.5 hours higher than the usage indicated for the four airplanes. All this flight activity was accomplished without incident, which represents this station's 18<sup>th</sup> year without an aviation accident or incident. Koyukuk/Nowitna NWR's flying activities have temporarily

declined due to completion of several aerial radio-telemetry studies and wildlife census projects; additionally increased bureaucracy and difficulties in obtaining airplane maintenance have also had a negative impact on the station's flight operations.

Three year-round Refuge-based airplanes are used to accomplish field operations on the Koyukuk/Nowitna NWR Complex. Traditionally, three aircraft have worked well because: (1) there are no airplane maintenance facilities in Galena so that when a plane is in Fairbanks or Anchorage for maintenance, it is usually gone for several weeks; (2) field work and outreach efforts can be most effectively accomplished with three pilots on staff; and (3) most of the flying occurs in two seasonal peaks-summer (waterfowl inventory, banding, other field studies, fire management) and early or late winter (moose, wolf, and caribou surveys, village meetings and EE visits). Most of these wildlife inventories have narrow phenological and weather windows within which the work must be accomplished; for example, two weeks for geese in late June-early July, and one month, November, for moose.

Two pilots worked on the staff in 2001: one dual-function GS-486 Wildlife Biologist (Spindler), and one full-time permanent GS-2181 Airplane Pilot (Huhndorf). In 2001 the Refuge recruited for a third pilot/staff member (expected to be a dual-function GS-486). Refuge pilots and aircraft provide the flexibility to schedule and conduct several types of work simultaneously, or to conduct similar comparative work in several areas of the complex, and accomplish it despite the unpredictable weather and limited daylight of the subarctic winter. Koyukuk/Nowitna NWR also chartered local bush pilot Colin Brown (a former employee) with Yukon Eagle Aviation. Charters are operationally most effective when Refuge staff and airplanes cannot accomplish all required flight missions simultaneously on a given day, such as during the extremely busy months of June and July, or during special moose and wolf censuses. During these major project times, there are often other projects being executed which also require airplane flights.

Government aircraft are "owned" and maintained by the OAS who bills the Service for hourly flight time and monthly availability rates. In fiscal year 2001 the annual cost of operating these three aircraft was approximately \$88,000, for an average cost of \$188 per flight hour (not including pilot salary).

The Department of Interior has implemented a Replacement Aircraft Program due to an aging fleet of airplanes. Two of the airplanes assigned to the station have been relinquished to OAS for replacement. Super Cub N4343 served the station from August 1988 through December 2000, mainly for aerial wildlife inventory and aerial wildlife telemetry flights. N4343 was replaced with Super Cub N3874Z in January of 2001. N3874Z is a refurbished Super Cub and has been modified to operate at a higher gross-weight of 2000 pounds (250 lbs. heavier than a standard Super Cub). N4343 had not been modified and it was deemed too expensive to rebuild the aircraft. N4343 had been operating under the authority of an FAA Waiver which allowed the station to operate the airplane in a 10% over-gross condition, but the FAA has since decided to rescind the approval rendering N4343 nearly unusable. The Refuge Complex's pilot staff has spent the better part of this year getting the newly assigned Cub mission-ready.

Maule N120G was the other airplane relinquished to OAS. The primary reason was that the M-7 was determined not to serve as a Super Cub replacement, based on extensive scientific testing at this station. The Maule was flown to Anchorage in October of 2001 to be assigned to another station. Since that time, this Complex has obtained the assignment of Super Cub N83669, another refurbished 2000 pound gross weight Super Cub. This airplane replaced the Maule as a second wildlife survey airplane and arrived at the station in May of 2002. Due to the low number of flight hours put on the Maule for the past two years, Regional Aviation Manager John Sarvis determined that this airplane will be shared between Koyukuk/Nowitna NWR and Innoko NWR. During the fall, winter and spring months it will be at Koyukuk/Nowitna NWR and at Innoko NWR during the summer. This arrangement should enable Koyukuk/Nowitna to maintain an optimum fleet of three airplanes during peak mission demands while minimizing associated fixed costs. This arrangement is expected to remain in place unless additional project flight demands re-establish a need for two full-time year-round Super Cubs. It will also depend on the station maintaining at least one full-time 2181 airplane pilot and two dual function pilots on staff so that there is adequate qualified personnel on staff to consistently operate all three airplanes.

The Cessna 185 (N714KH) spent the winter of 2000/2001 in Fairbanks and Anchorage to be evaluated by OAS and USFWS Management Personnel to decide whether OAS should replace this particular fleet airplane. It was determined that N714KH should be slated for replacement with another C-185 or like airplane for Koyukuk/Nowitna NWR; however, at the time of the final determination, a suitable replacement airplane was not available. The C-185 was having chronic electrical and avionics (radio) failures and required an electrical and avionics overhaul which cost the service a substantial amount of funds and down-time. Fortunately, most of the down-time occurred outside of our most critical required mission-ready times; although, it did stymie some of this station's less-critical missions from being accomplished. Due to the aging of the C-185 as a general aviation airplane, the FAA has been required to issue numerous Airworthiness Directives on this airplane type. The A.D.'s are issued to correct deficiencies discovered by the users of an airplane make and model and generally involve issues of pressing concern such as a potential structural, power plant, or control failure unless the directive is complied with. These directives *require* mandatory compliance by the aircraft owner/operator (in this case, OAS); some A.D.'s are requirements for recurring inspection of a specific part at intervals, usually annually or every 100 hours of operation. They can also require the replacement, one-time or recurring, of a defective part, normally with a redesigned and improved part. As time goes on and these airplanes continue to age, the list of A.D.'s on a given type generally increases causing the overall maintenance and sometimes, operating costs to rise. In the case of the C-185, this list has grown over the years and some of the A.D. inspection procedures are very invasive requiring complex disassembly of airframe, control, fuel and electrical systems components just to comply with a single A.D.

As the list of A.D.'s on the venerable C-185 continues to grow, so do the maintenance costs perhaps begging the question, should the Service be looking to replace the fleet of C-185's with a new logistics airplane which is currently in production? The Cessna 185 has been out of production now for nearly 20 years (roughly the OAS & the Fish and Wildlife Service's

projected lifespan for fleet airplanes). N714KH was one of the last 185's off of the Cessna 185 assembly line in 1982.



*Pilot/Biologist Mike Spindler with the Maule M7 aircraft which was assigned to the station from summer 1997 to fall 2001. We used the Maule for logistics and low-level wildlife surveys. It worked great for most missions except high density moose surveys and wolf track surveys, in which we found the Maule was not as maneuverable as the Cub. We exchanged the Maule for a second Super Cub. (Glenn Stout)*

## 2002

The Complex used three airplanes in 2002: one Cessna 185 (N714KH), two Piper Super Cubs (N83669 and N3874Z). The two Refuge pilots flew a grand total of 791 hours in 2002, the majority of which was in the three Refuge airplanes (Table I.8.a.1). All this flight activity was accomplished without incident, which represents this station's 19<sup>th</sup> year without an aviation accident or incident.

2002 was the first year that the Refuge operated under an agreement to share the Cub (N83669) with Innoko NWR. Innoko was to have the plane on floats from May through September, while Koyukuk/Nowitna NWR would have the plane the rest of the time on wheels or skis for fall/winter/spring surveys.



*Airplane Pilot Joe Huhndorf prepares to fly the Refuge's PA18 Super Cub. The Super Cub is the station's aerial survey workhorse. (MH)*

Two pilots worked on the staff in 2002: one dual-function Refuge Manager/Pilot (Spindler) and one full-time permanent GS-2181 Airplane Pilot (Huhndorf). The Refuge hired a third pilot/staff member in September 2002, Brad Scotton, as a dual-function GS-486 Supervisory Wildlife Biologist/Pilot. Scotton will be acquiring training and anticipates meeting FWS and OAS aviation requirements to fly resource missions during FY 03.

In fiscal year 2002 the total cost of operating three airplanes assigned to Koyukuk/Nowitna NWR Refuges was about \$98,558 for an average cost of \$151 per flight hour (not including pilot salary).

Maintenance was made easier for use in 2002 because the Galena School District opened their hanger and hired an A&P mechanic to reside in Galena and teach maintenance to students. She assisted us on numerous unexpected breakdowns. The Cessna 185 N714KH was used 251 hours in 2002. Numerous mechanical discrepancies, many of which were aging-aircraft related, were noted and most corrected (some deferred until the next scheduled maintenance interval in Fairbanks [when not safety-related]). A new set of Aerocet 3500 Floats was installed to replace the 20 year-old set of PK 3500's. The change was made at the OAS Maintenance Facility in Anchorage during late June. The Anchorage OAS Repair Station's mechanics did an excellent job with the installation of the new floats. The Aerocet floats are a fiberglass float with a large top deck and large cargo compartment in either float capable of carrying 100 pounds each. In 2002 these floats have proven to be extremely water tight and just as maneuverable as the PK's when on the water. The Aerocet compartments are slightly larger than the PK's and have a larger door making them capable of carrying two small action packers and two medium dry bags in each float, hence increasing the utility of the C-185 for summer logistics work.

Super Cub N83669 was delivered to Koyukuk/Nowitna NWR from OAS at Lake Hood in Anchorage in May by Airplane Pilot Joe Huhndorf. Pilots Spindler and Huhndorf flew N83669 a total of 99 hours from when it was delivered to Galena in May until the end of the fiscal year. The airplane is a partially refurbished Cub from within the fleet and has been equipped with a standard fleet-Cub instrument panel with new Garmin and Technisonic radios as well as a mode-c transponder. At our special request, OAS retrofitted this Cub as well as the other Cub (N3874Z) with stainless steel primer lines and engine oil filters. The old original copper primer lines failed in the field frequently (at least one or two times each 100 hours) causing avgas to spill inside the cowling creating a fire hazard during engine starts. The broken line, if not discovered right away, can also cause one of the four cylinders to run lean of its optimum fuel/air mixture, substantially reducing cylinder life for the affected cylinder. So far the steel primer lines, on both Cubs, have been in service for more than 200 hours without a problem (not possible with the old original copper lines). The addition of the oil filter reduces normal engine wear and allows the Refuge to operate the airplanes 50 hours between oil changes instead of only 25 hours with the standard oil screen. The extra 25 hours generally allows pilots to do oil changes in Galena even if they are deployed to a remote station with the airplane for aerial wildlife surveys.



The pilots and aircrew of Koyukuk/Nowitna NWR evaluated Cub N83669 during the first 99 hours of use and noted several concerns with items they wanted changed to improve the airplane's utility for its intended missions. Pilots Huhndorf and Spindler coordinated with Airplane Pilot Ladegard and Refuge Manager Schaff of Innoko NWR to ensure the airplane would come up to both stations' standards within a year. Problems with the tracking system were noted and corrected during the fall annual inspection. Scratched side windows were too bad to polish and had to be replaced before moose surveys. A short in the navigation light circuit was repaired after the third write-up of this problem. Other problems were deferred until a later inspection as they did not affect safety; the fall inspection done at Northland Aviation was performed during their very busy floats to wheels gear change season in Fairbanks and several of these discrepancies were corrected.

Cub N3874Z was flown a total of 372 hours by Refuge pilots this year. The majority of the hours were aerial wildlife surveys although a small portion were for logistics missions in support of field activities and village meetings. There was one serious problem with this airplane in FY 02. Oil samples taken in May indicated a high likelihood of premature wear of the camshaft. An inspection by Apex Aviation in Fairbanks confirmed this and determined that the wear was excessive, damaged other components and required installation of a new engine. A newly rebuilt engine was installed by Apex at this time. The new engine has been working flawlessly since installation at the end of May and has been flown 148 hours to the end of FY 02. Apex Aviation mechanics did an excellent job with the installation. Their vigilance in inspecting the engine and detecting the excessive camshaft wear is commendable and may have potentially prevented a premature engine failure in flight. The OAS-Maintenance sponsored oil sampling program also proved its value and thanks also go to OAS Fleet Management's expertise most often being applied to help keep our fleet airplanes and crews safe.



*Since 1984 this Cessna 185, N714KH, has been the main aircraft used by Refuge staff for heavy hauling, logistics, and village meetings. The plane is also used for some wildlife survey work such as swan surveys, long distance radio-tracking and moose census stratification flights.(MS)*



Table I.8.a.1. Summary of flight hours by Refuge pilots in government aircraft at Koyukuk/Nowitna NWR Complex, 1990-2002.

FY	M. Spindler	C. Brown	P. Liedberg	J. Huhndorf	J.D. Baxter	Total
1990	442	547	245			1234
1991	308	545	212			1065
1992	436	497	295			1228
1993	183	467	199			849
1994	315	397	232			944
1995	288	250	122			660
1996	306	206	40			552
1997	207	225	na			432
1998	252	249	na			501
1999	98 <sup>a</sup>	50 <sup>2</sup>		163	80	391
2000	318	43.4 <sup>2</sup>	na	416	na	777
2001	211	43.7 <sup>b</sup>	na	353	na	608
2002	329	44.3 <sup>2</sup>	na	462	na	835

<sup>a</sup>Total hours lower than usual due to broken leg

<sup>b</sup>Charter hours with Yukon Eagle Air Service

## **J. OTHER ITEMS**

### **J.1. Cooperative Programs**

2001

In April 2001 the Service cooperated with the Alaska Department of Fish and Game to bring non-toxic shot clinics to the villages of Nulato, Huslia, and Selawik. RIT Madros also assisted Yukon Flats NWR and ADFG with a clinic in Stevens Village.(See Section H.8.).

RIT Orville Huntington has been a member of the Alaska Native Science Commission since 2000, and was elected vice-chair of the Commission in 2002. The mission of the Alaska Native Science Commission is “to endorse and support scientific research that enhances and perpetuates Alaska Native cultures and ensures the protection of indigenous cultures and intellectual property.” It serves as a clearinghouse for proposed research, an information base for ongoing and past research and an archive for significant research involving the Native

community. The Commission provides information, referral and networking services for researchers seeking active partners in the Native community. As a Refuge Information Technician (and formerly as Wildlife Biologist) for the Service, Huntington was in a good position to facilitate communication regarding science, subsistence, and Native issues between the Service and the Commission.

In July 2001 we deployed 12 satellite telemetry transmitters on white-fronted geese at Innoko, Koyukuk, and Selawik NWR's. This was part of the Refuge's effort to obtain better information on the interior-NW Alaska population that may be declining (See Section G.3). This project was funded as part of a Challenge Cost Share proposal involving the Galena City School District, Iditarod Area School District, and University of Alaska-Fairbanks. The schools provided enthusiastic students who had an interest in science to accompany the field crews in goose capture, banding, and satellite implantation surgeries. Travel and liability insurance expenses were covered by the schools. The University of Alaska created a website ([http://mercury.bio.uaf.edu/~eric\\_rexstad/satellitegeese/](http://mercury.bio.uaf.edu/~eric_rexstad/satellitegeese/)) that students could tune into and follow the marked geese as they migrated from Alaska, across Canada and the U.S. to Mexico. This project provided the students and their communities with a better understanding of the goose decline issue and the challenges all along their migration path.



*High school student Ron Krueger holds a white-fronted goose prior to release. Several students from villages in the region assisted with goose banding and observed telemetry implantation in 2001 and 2002. (MS)*

In August 2001, SCEP Deborah Webb began a Master's research project with a partial goal of estimating stopover length of interior-NW white-fronted geese in Alberta and Saskatchewan. Duration of time the interior segment spends at migratory staging areas in Alberta may relate to their vulnerability to hunting and resultant declining population trends (See Section G.3). This project would not have been possible without the tremendous cooperation of Dan Nieman and his Canadian Wildlife Service (CWS) staff at the Northern Prairie Wildlife Research Centre, Saskatoon Saskatchewan. The Wildlife Management Institute (WMI) facilitated transfer of funds to the CWS. The CWS invested staff and travel costs, well above the level required in the WMI contract, to assist Webb with fall migration collar observations.

We continued positive and productive cooperation with the Alaska Department of Fish and Game with the completion of a moose population estimation survey on parts of Koyukuk, Northern Innoko, and Nowitna NWRs.

2002

The Refuge staff has had an excellent cooperative relationship with the Galena City School

District. In past years they have provided a teacher to join PR Karin Lehmkuhl to conduct the annual science camp. That camp continued in 2002 (See Section H.2.). Also, the Challenge Cost Share-funded white-fronted goose satellite telemetry project was increased in scope to include the Selawik school, as well as schools in Galena and McGrath. Students from each school helped with capture, banding, and satellite radio implantation in mid-July.(See Sections G.3. and H.2.).



*High school students Ron Krueger and Kyle Davis keep watch over white-fronted geese that are waiting to be banded. (MS)*

Cooperation with the Canadian Wildlife Service increased in 2002 as well. In 2002 they assisted with aerial radio telemetry of conventional VHF collared geese in addition to the neck collar resighting work begun in 2001. Cooperation with entities in Mexico also continued in 2002. The Refuge issued small contracts with Mexican researchers to describe habitat and hunting pressure in areas where satellite marked geese wintered in the highlands and coastal plain. Former Refuge volunteer and University of Tamaulipas alumnus Fabiola Yopez covered the Gulf coastal plain with her

mentor Alvaro Aragon. Former Refuge volunteer and University of Chihuahua student Manuel Ochoa, and advisor Dr. Rod Drewien, covered the central highlands. Both teams did more than their contract specified, and provided significant additional matching time and in-kind work.

The Refuge began a Challenge Cost Share project with Galena public radio station, KIYU, and the University of Alaska-Fairbanks Library Oral History Collection. KIYU hired a local student intern, Clint Brown, to record new Raven's Story subsistence oral history interviews and to produce episodes ready for airing on public radio. Brown produced and prepared several earlier recordings made by RM Mike Spindler. The UAF library cooperated by archiving all original recordings and producing CD's. The Library also provided on-line cataloging of these contributions, and distribution via streaming audio on their website (<http://uaf-db.uaf.edu/Jukebox/Ravens%20Stories/START.htm>).

In 2002 the Alaska Department of Fish and Game cooperated with the Refuge to collar and monitor 20 caribou of the Galena and Wolf Mountain caribou herds (see Section G.8).

In November 2001 Dr. Carolyn Parker, University of Alaska Museum Herbarium, identified plant specimens collected by Guy Hughes during the Ducks Unlimited habitat mapping project. Duplicate specimens were collected, with one set to remain at the UAF Herbarium and one set to be returned to the Refuge herbarium.

In January 2002 the Refuge staff assisted ADFG biologist Glenn Stout with conducting trapper education clinics in Huslia and Galena.

### J.3. Items of Interest

In April 2002 the Refuge hosted a field visit of Deputy Regional Director Gary Edwards, Alaska NWR System Chief Todd Logan, and Northern Alaska Refuges Supervisor Jerry Stroebele. The group spent a half a day touring the Galena FWS facilities, and a few hours visiting with village patriarch Sidney Huntington. DRD Edwards, the Service's representative to the Federal Subsistence Board, was interested in hearing Huntington's perspectives on the sale of subsistence-caught fish, a controversial issue the Board is wrestling with. As for field sites, the party overflowed the Refuge with a stop at Huslia to meet with RIT Orville Huntington. From there, the group split up. RM Spindler and DRD Edwards visited Lloyd and Amelia DeWilde's cabin on the Huslia River. DRM McClellan, RC Logan, and RS Stroebele visited



*Lloyd and Amelia DeWilde in front of their cabin, 40 miles NW of the village of Huslia. Having lived a subsistence lifestyle in this remote part of the Refuge for more than 40 years, they are experts in survival. The DeWilde's hosted RM Spindler and DRD Gary Edwards on a field visit in April 2002. It was one of Edward's first experiences talking with people who truly live an Alaskan subsistence lifestyle.*

David and Romey Atchley's cabin on the Nowitna River. These cabins are authorized by special use permits in accordance with the Alaska Lands Act. Such permits, unique to Alaska Refuges, are issued to support ongoing traditional subsistence activities, such as trapping, which were typical of the bush areas of northern Alaska when the Act was passed in 1980. This lifestyle is generally diminishing in Alaska. The DeWilde's and Atchley's are the best examples of this lifestyle remaining on the Koyukuk/Nowitna NWR Complex. Unfortunately, during 2003, the year this report was written, Amelia DeWilde passed away at their cabin. Lloyd is still trying to hang onto the remote lifestyle, but he is old and frail, and he likely will not be able to remain there much longer.

## **J.2. Credits**

- A. Highlights  
Mike Spindler
- B. Climate Conditions  
Jenny Bryant
- C. Land Acquisition  
C.3., Greg McClellan
- D. Planning  
D.4., D.6., Greg McClellan  
D.5., Karin Lehmkuhl
- E. Administration  
E.1., E.5., Greg McClellan  
E.4., Karin Lehmkuhl  
E.6., Joe Huhndorf and Greg McClellan  
E.8.,
- F. Habitat Management  
F.1.-F.6., Biology Department  
F.9, Bob Lambrecht  
F.12., Greg McClellan
- G. Wildlife  
G.1.-G.2., Biology Department  
G.3., Deborah Webb and Jenny Bryant and Mike Spindler  
G.4.-G.5., G.8, G.10, G.16, Jenny Bryant  
G.6.-G.7, Karin Lehmkuhl  
G.11., Geoff Beyersdorf
- H. Public Use  
H.1., H.17., Greg McClellan  
H.2.-H.3., H.6-H.7., Karin Lehmkuhl  
H.8.-H.10., H.20., Geoff Beyersdorf
- I. Equipment and Facilities  
I.1.-I.5., Greg McClellan  
I.6., Melanie Hans  
I.8., Joe Huhndorf
- J. Other Items  
J.1., Greg McClellan  
J.3., Mike Spindler  
J.4., Darcie Warden
- K. Feedback  
Mike Spindler
- Editors  
Karin Lehmkuhl  
Brad Scotton  
Darcie Warden
- Greg McClellan  
Mike Spindler  
Lucy Williamson



## **K. FEEDBACK**

Over the last 25 years I have had the opportunity to move back and forth a couple of times between several positions as Refuge operations specialist (ROS)/Refuge manager (485 series) and wildlife biologist (486 series). In late 2001 I was given the opportunity to become the Refuge manager at this station. This change was one that I never would have predicted when I started my career (I always thought that I would want to keep my hands on the wildlife and the resource as a biologist/pilot). I took the opportunity for several reasons. Foremost, having worked at this station for over a decade, I had gained an understanding of the subtle nuances of local and regional issues that were generating significant controversy, such as allocation of subsistence resources, moose, salmon, and geese, in the face of increasing demand and increasing regulatory complexity. As a biologist I conducted and led a major effort to improve the quality of our inventory and monitoring, and I knew the strengths and weaknesses of our data. I also began an effort to invite meaningful involvement of local people in our monitoring and management through local hires, contracts, outreach and most significantly, by recording the oral history and traditional knowledge of village elders. I hoped this experience would enable me to make a difference in our approach to solving some of our more pressing management issues. My hope was that I could offer the Service a chance to make progress in some of these areas, perhaps more rapidly than would be possible with a newly-arrived Refuge manager.

My transition back to a Refuge management slot has not been smooth or pleasant sailing all the way, but I expected that. I miss the extent of "hands-on" work in my former job. I really long for the times when I was an ROS in a much simpler era, before the onset of national electronic databases with often too-short annual deadlines and the overwhelming growth of email and electronic acquisitions. But most difficult to accept and deal with has been the fact that my tenure as Refuge manager occurred at a time when this station was targeted as an outsourcing/ privatization demonstration project. This first started in 2001 as an effort by a loosely-organized consortium of Koyukuk River villages to contract Refuge work under the Indian Self Determination and Education Assistance Act. This group, known as the "K-River Team" was led by a Fairbanks lawyer and came about mainly because of an allocation controversy among local and non-local moose hunters. After failing at lawsuits against the State of Alaska, the K-River Team stepped up their efforts in 2002. Legislation was introduced into the House of Representatives that proposed to hand over a substantial part of the Service's Koyukuk NWR monitoring and management activities to the K-River Team. Although we believe the K-River Team's main interest in contracting is to influence moose management on the Refuge, this demonstration project could have much larger ramifications nation-wide as various groups seek to influence Federal land management.

Koyukuk-Nowitna NWR has a long history of cooperative work and contracting for services with various local entities on projects such as harvest surveys, oral history documentation, science camps, outreach, GIS mapping, office-warehouse rental/maintenance/janitorial and construction. Another point often missed by our critics is the fact that during the last decade the staff at Koyukuk-Nowitna has included large percentage of local hire employees, mostly



Koyukon Athabascan. This has varied from 30-50% local-hire; the remaining staff has consisted of career Service employees who are non-locals but are long-time Interior Alaska residents. The mix of local, long-time, and new employees, all of whom have made working in wildlife resources a career, has provided the Service with an exceptional cadre of professionals able to carry out operations and management in a fair and unbiased manner. Our local-hire employees, (including pilot, biologist, RIT's, and administrative), and long-time Alaska residents (manager, deputy manager, biologists, and park ranger) have ensured that the Service makes management decisions with local perspective and sensitivity. Our long-time career Service employees also ensure that these decisions are made in accordance with Regional and National policies. In this manner, we have found a staffing mix that serves the public in the best manner possible from my perspective. During 2001-2002, this station had vacancies in six positions. We filled the vacancies by bringing on one person from another state, hiring some long-time Alaska residents, promoting from within, and recruiting two more local hires. By recruiting broadly, yet also considering our inner strengths, and using local hires, we were able to increase diversity, obtain much-needed expertise, and maintain our precious mix of local, regional, and national perspectives. We were able to do so in a manner that I hope will minimize a large amount of turnover in the future.

For about half of the time covered by this report three of our full-time positions were vacant at once. Everyone who was left here on this staff gladly pitched in to accomplish the most important work: monitoring the resources and resource use levels while keeping our budget in the black. I was impressed at the way everyone worked as a team and freely helped with "other duties as assigned" to keep things running smoothly. At times these other duties seemed to overwhelm our mission. It is a credit to this staff and the Service that a team of such fine dedicated people is willing to put in the extra time, and make the extra effort. This is all the more amazing to me when I appreciate the fact that this staff endures some unique hardships, such as extremely intense insects in summer and extremely cold temperatures in winter. Add to this, the isolation of working and living in a remote location like Galena, Alaska, 270 miles from the nearest road and the convenience of modern civilization. This all brought me to wonder: How would a staff of private contractors or consultants handle these challenges? How would a tribal organization minimize turnover? With such turnover how would they meet the obligations of their contract? My observations are that the tribal organizations in our region experience much higher turnover than the Service. While I recognize that a few more of our functions might be done more effectively through contracts, there are always extra and hidden costs that don't become apparent until after the contracts are negotiated. In the case of Koyukuk-Nowitna, I am convinced that the taxpayer gets, and will continue to get, a better overall product at a lower cost with the existing Refuge staff than could ever be provided by a privately-contracted entity. Furthermore, the collective actions of the unique mix of people on a Refuge staff translate into more than just economics. Quite simply, a career professional staff such as what we have assembled at Koyukuk-Nowitna provides the broader perspective that is vital to following our mandates. To dismantle this capability through a contractual attempt to save a few bucks will cost us dearly in the long run, in dollars, and in resource protection.

Without a doubt, the greatest reward and honor of my move over to the Refuge Manager

position has been the opportunity to help support such a dedicated staff of true "civil servants" with the funds, the equipment, and the enabling environment to be productive. Having the chance to be an advocate for this staff, to *truly* seek the best deal for the taxpayer, and to continue to work towards the protection of the resources we are entrusted to manage, has made my transition to a Refuge manager position highly rewarding and worthwhile. I am glad that we have supportive leadership and staff in the Regional Office, who are also trying to think ahead of the game and get the best deal for the taxpayer, the resource, and resource user, without sacrificing quality or the vision of the National Wildlife Refuge System.

**ARLIS**  
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