

outstanding pilots and were a pleasure to have at camp. Their assistance was crucial to the continuance of our biological program and insuring the safety of our field crew.

We were honored by a visit from USFWS Director Mollie Beattie in July. She was accompanied by Regional Director Walt Stieglitz. After delays caused by weather, we were able to provide Director Beattie with an aerial tour of the Refuge including an unexpected stopover to both our office in McGrath and field camp. RM Merritt was able to explain our habitat mapping project and provide her with examples of it's capabilities as a management tool.



U.S. Fish and Wildlife Service Director Mollie Beattie and Regional Director Walt Stieglitz and the McGrath crew, standing by the twin engine Otter aircraft used to transport the directors during their visits to various Alaskan Refuges (JD 7/94).



Director Beattie and RD Stieglitz visit with the field crew out at the Refuge field camp (KE 7/94).

F. HABITAT MANAGEMENT

1. General

Synthetic Aperature Radar (SAR)

Our cooperative work with Realty on SAR continued throughout the year. Scenes were obtained as was software for reading, calibrating, geocoding, and plotting. Our goal is to overlay at least one scene per month (12 scenes) and classify the data based on the different sequences of change in the data from month to month. We feel the different sequences of change are correlated with different plant communities or waterbodies. We did not accomplish this goal by years end due to technical difficulties and long waiting periods for equipment. Our excitement level is higher than ever and we look forward to a product next year.

Habitat Modeling and Mapping

Work continued this year with West Inc. (statistical consulting - Lyman McDonald and Wallace Erickson) on a technique to develop true wildlife habitat data and maps from landcover data and unbiased wildlife locations with a GIS (Geographical Information System). Our data set are the moose locations obtained during

our March 1994 moose survey and our present Thematic Mapper (TM) data. The process is designed to work with many species and other forms of imagery data.

The method uses concentric circles of several sizes around wildlife locations and resource selection techniques. A habitat landcover data set and map are generated to which the species in question is highly correlated. "Standard unit" landcover data are generally poorly correlated with species occurrence.

The first use of our moose habitat landcover data and map will be to post-stratify the 1994 survey area for reduced confidence intervals on our population estimate. The second use of this March data will be to delineate critical moose habitat for browse surveys.

A technical report is planned for next year.

9. Fire Management

Fire Fuels and Vegetation Data

Fire fuels and vegetation data were collected at approximately 550 sites during the summer. Most of these sites were accessed by helicopter. Incidental to the fuels and vegetation data, bird and small mammal data were collected to maximize our use of the helicopter time. The bird and small mammal information are reported elsewhere as are much of the vegetation information as it pertains to these animals.



Some of the tools used to conduct the fuels mapping/habitat assessment/mapping project (BA 8/94).

Information collected included site data such as elevation, aspect, slope, and vegetation data including percent cover of dominant species and height and diameter of trees and tall shrubs. The number of both standing and downed dead trees greater than 10 centimeters in diameter were also recorded in our 300 square meter plots.

Surrounding plant communities were mapped within 50 meters of our plots and described by their dominant plant species. Any evidence of previous fire was recorded.



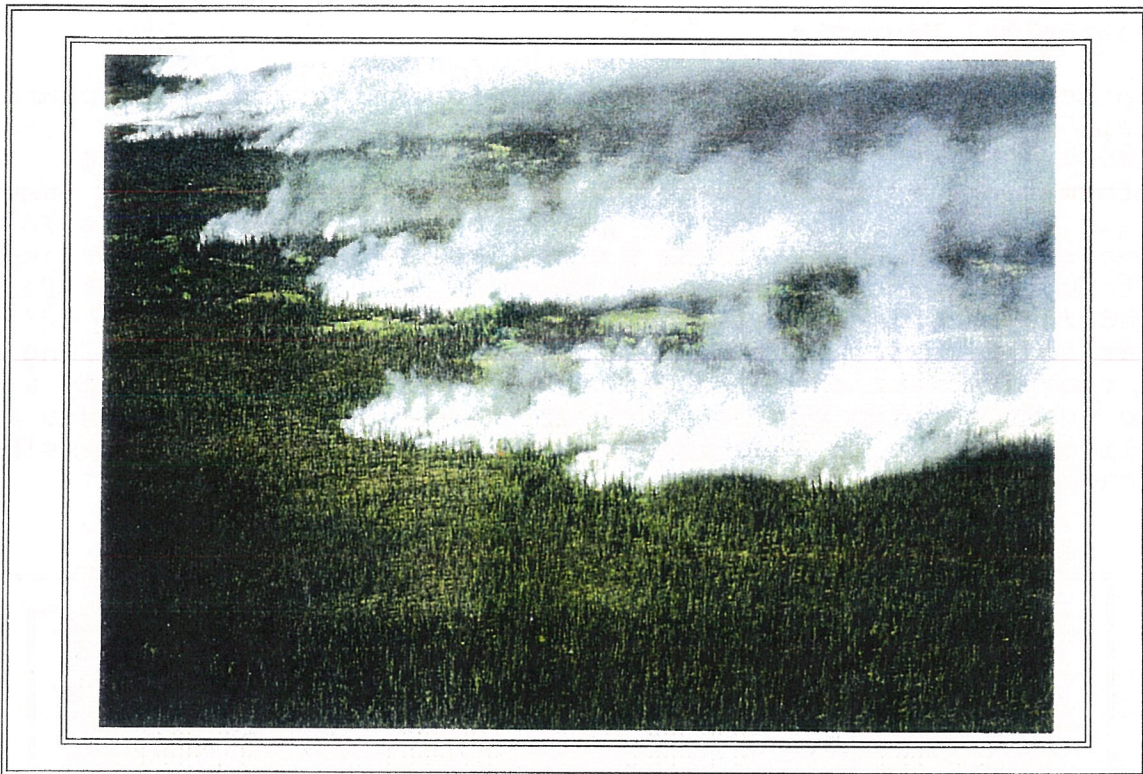
Short grass fuel type (tussock tundra) occurring within the Refuge (BA 8/94).



Innoko River corridor consisting of hardwood/litter, timber, and tall grass fuel types (BA 7/94).



Travel by helicopter allows us to access otherwise inaccessible areas, which is most of the Refuge (LER 7/94).



The fire at No Name Creek that eventually burned approximately 18,000 acres. These type of natural fires typically burn in this mosaic pattern (SH 6/94).

This data will be used where applicable to develop fuels models and maps, determine vegetation units (plant communities), and "ground truth" satellite imagery map data at locations other than where the data was developed.

G. WILDLIFE

3. Waterfowl

In May, an intensive pair survey was conducted on the Refuge. Jack Hodges, a pilot/biologist from Migratory Bird Management in Juneau worked with WB/P Finley in conducting the survey. The line-transect survey was generated using GIS technology. The data was then downloaded to the onboard GPS navigation unit in the Refuge aircraft and the survey was flown. Observations were recorded by both the pilot and observer using a continuous running cassette player. Hodges and Finley both took turns at piloting and observing during the survey. The survey was flown at an altitude of approximately 125 to 150 feet above the ground, at an airspeed of approximately 100 m.p.h.. At the time of writing this report the data from the survey had not been summarized.

7. Other Migratory Birds

Neotropical Migrants

Neotropical bird census and habitat investigations were continued during the 1994 field season. The two National Breeding Bird Survey (BBS) river routes set up in 1993 were run in 1994. Information was recorded for the Refuge habitat map data base while providing data for the Alaska off-road point counts in cooperation with the Alaska Neotropical Migratory Bird Project. Although the routes again ran over the time allotment set for BBS road routes, birds seemed active throughout the survey. Official starting time for both routes is 3:33 a.m. making for a long day on the river for the bird crews. By combining this survey with the fuels mapping project, we were able to use twenty hours of helicopter time in June to survey areas not normally accessible because of their remoteness.



Typical riverine habitat preferred by many of our neotropical migrant birds (KE 6/94).

routes were repeated from the previous year's pilot project and will continue to be repeated in future years for trend data.

The data collected in the 1994 field season suggests strong correlations with bird locations and habitat information. We are very optimistic about the production of quality habitat maps concerning site specific bird species. However, it must be noted that several years of data collection and a refinement of current vegetation and habitat mapping techniques (which we are in the process of completing) will be required to produce satisfactory results on a refuge wide scale.

In preliminary data analysis of several species, we have seen relationships between bird species and vegetation type or complex of types. The black spruce forests produced the most white-crowned sparrows and unidentified dark-eyed juncos. Birch forests with a relatively high occurrence of white spruce and low occurrence of black spruce produced the most white-winged crossbills and Swainson's thrush. Brushy understory (alder and willow) produced the most alder flycatchers, while a variety of plant communities and edge produced the most fox sparrows and common redpolls.

Selected Common Bird Species

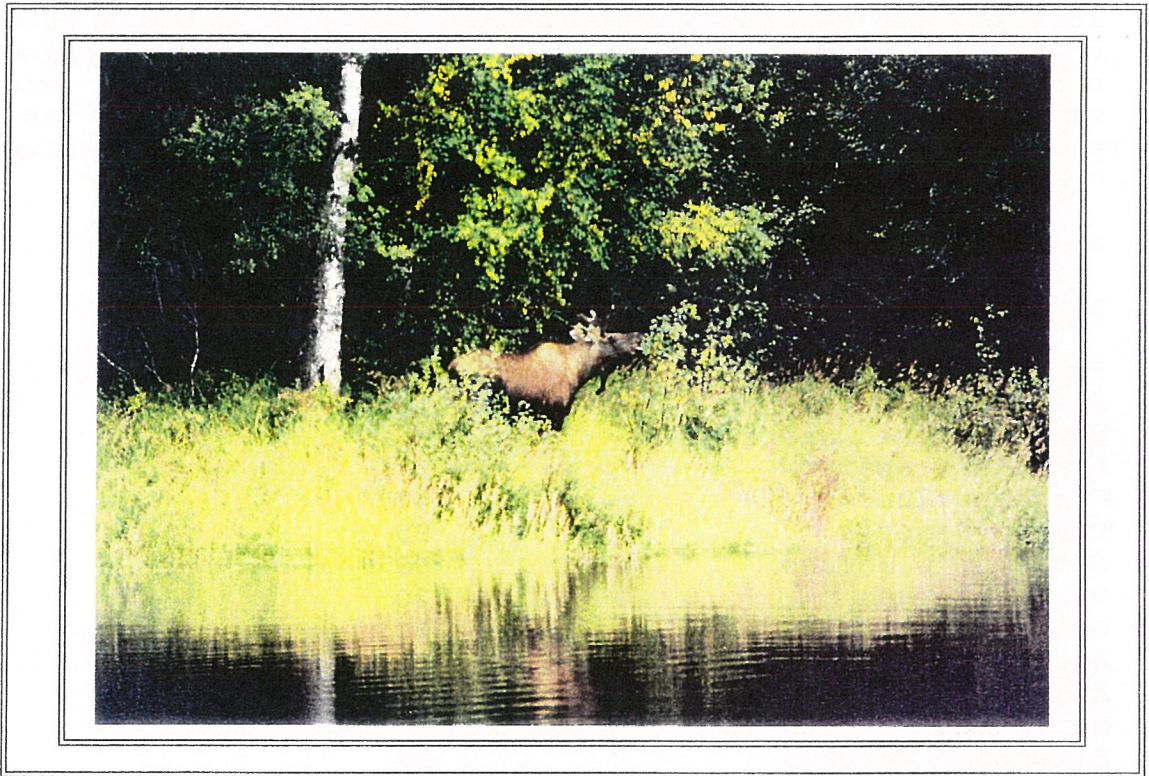
<u>Bird Species</u>	<u>No. of Sightings*</u>
Fox Sparrow	58
Savannah Sparrow	21
White-crowned Sparrow	106
Lincoln's Sparrow	31
Darkeyed Junco	47
Common Redpoll	95
Swainson's Thrush	69
Varied Thrush	20
Gray-cheeked Thrush	10
White-winged Crossbill	47
Alder Flycatcher	47
Northern Waterthrush	25
Blackpoll Warbler	27
Boreal Chickadee	20
Hudsonian Godwit	6

*Number of birds located within a 50 yard radius of listening location.

8. Game Mammals

Moose Browse Survey

A moose browse survey was conducted in late May and early June. Eighty percent of the available twigs of the principle browse plants in the critical moose habitats along the Innoko River corridor were browsed and 65% of these same twigs were browsed in the critical habitats of the Yukon corridor. The 1993-1994 winter conditions were average snowfall and above average temperatures.



Bull moose browsing on *Salix planifolia* in late summer (BA 8/94).

The purpose of the survey is to understand the link between the number of moose and the quantity of moose food in critical moose winter habitat. Also, the objectives are to gain insight into



Salix alaxensis, a favorite browse species for moose. It was heavily utilized on almost all our transects (BA 6/94).

Critical moose winter habitat maps are built from landcover data and unbiased moose locations taken during the March 1994 moose survey. The methodology for this habitat data development will be available in a report format in 1995.

In the Innoko Refuge moose eat primarily the willow species *Salix alaxensis* and *Salix planifolia* during the winter months. For moose survival during cold and snowy winters, these willows must occur in large and dense patches immediately adjacent to spruce-birch-poplar forest thermal cover. Birch and poplar are eaten in low quantities relative to the preferred willow species. Critical winter habitat occurs in the floodplain parallel to large rivers and is linear in shape.

Browse utilization is recorded along systematically located straight compass bearing lines in or near critical moose winter habitat. The lines begin on the riverbank and end on the far

A browse utilization survey of critical winter habitat relates moose food present and moose food used. This information in turn are related to the number of moose present in critical winter habitat during the year and the number of moose that habitat can support. A limiting factor affecting moose winter food quantity is the quantity of critical winter habitat. Spring, summer, and fall habitats are much larger; therefore a habitat factor limiting moose populations in large areas is relatively small quantities of critical winter habitat. In other words, in the long run the moose population of the land may be only that which the critical winter habitat can support.

A browse utilization of less than 50 percent from an "average" winter or a many year average would indicate to us that the moose population is below that which the land can support. Utilization greater than 50 percent under the same circumstances would indicate to us that the moose population is near or above that which the land can support in the long run.

We have observed during very cold and snowy winters almost all moose are in critical winter habitat. We have seen moose starve to death even in these best of places during bad winters. We have also observed that during mild winters many moose spend the entire winter away from critical winter habitat. Critical winter habitat contains larger and denser food resources in combination with forest thermal cover than does non-critical winter habitat. We speculate that it is a more efficient use of energy during mild winters than bad winters to move longer distances between food plants or live with less thermal forest cover.

The size of moose winter habitat decreases with increasing severity of winter. The moose population congregates into areas with more and more food and cover in combination as temperatures drop and snow accumulates. Browse utilization of whole regions may be quite similar in easy and hard winters because the moose must eat somewhere every winter. Browse utilization of critical winter habitat, however, increases dramatically with increasing severity of winter. During severe winters we have seen that moose browse virtually all current year twigs and also some of the older twig growth from the prior year.

Upland black and white spruce forest communities in which fire has burned most of the organic soil material often support for several years moderately dense willow growth. This upland willow growth is not as dense as is found in the lowland critical winter habitat but often does have forest thermal cover in close proximity. We observe moose using upland willow food resources moderately during mild winters but not during severe winters.

Some plant communities within the river floodplain flood so frequently and for such duration that forest cover cannot develop. Dominant plant species are *Carex rostrata*, *Calamagrostis canadensis*, and large and dense thickets of *Salix planifolia*. In some regions these plant communities cover contiguous areas of many square miles. When these communities

are large and thus far from forest cover we do not observe moose in them frequently during even mild winters despite the presence of large and dense willow food resources equalling that found in critical winter habitat. Moose are very common in these areas during other seasons. These same willow-grass-sedge communities are a component of critical winter habitat when intermixed in smaller patches with forest or where large patches adjoin forest.



Cow moose standing in a thick, yet heavily browsed stand of willows (BA 6/94).

We see that weather and habitat are inseparable and dynamic. Habitat changes with the climatic changes marking the seasons and between years during the same season due to changes in the weather.

A critical winter habitat browse survey also yields insight into the effects of habitat and killing of moose by humans and predators on the moose population. If browse utilization is high (>50%) we conclude that the effects of hunting and/or predation on the moose population are low relative to the capacity of the land to support moose. If browse utilization is low (<50%) we conclude that the effects of hunting and/or predation on the moose population are high relative to the capacity of the land to support moose.

Moose Survey

A moose population and critical winter habitat survey was conducted in March of 1994. This survey was a continuation of our efforts to use the helicopter and fixed wing aircraft and the line transect technique for moose population surveys as developed by Kenneth P. Burnham, David R. Anderson, and Jeffrey L. Laake and published in Wildlife Monograph No. 72, April 1980, entitled "Estimation of density from line transect sampling of biological populations".

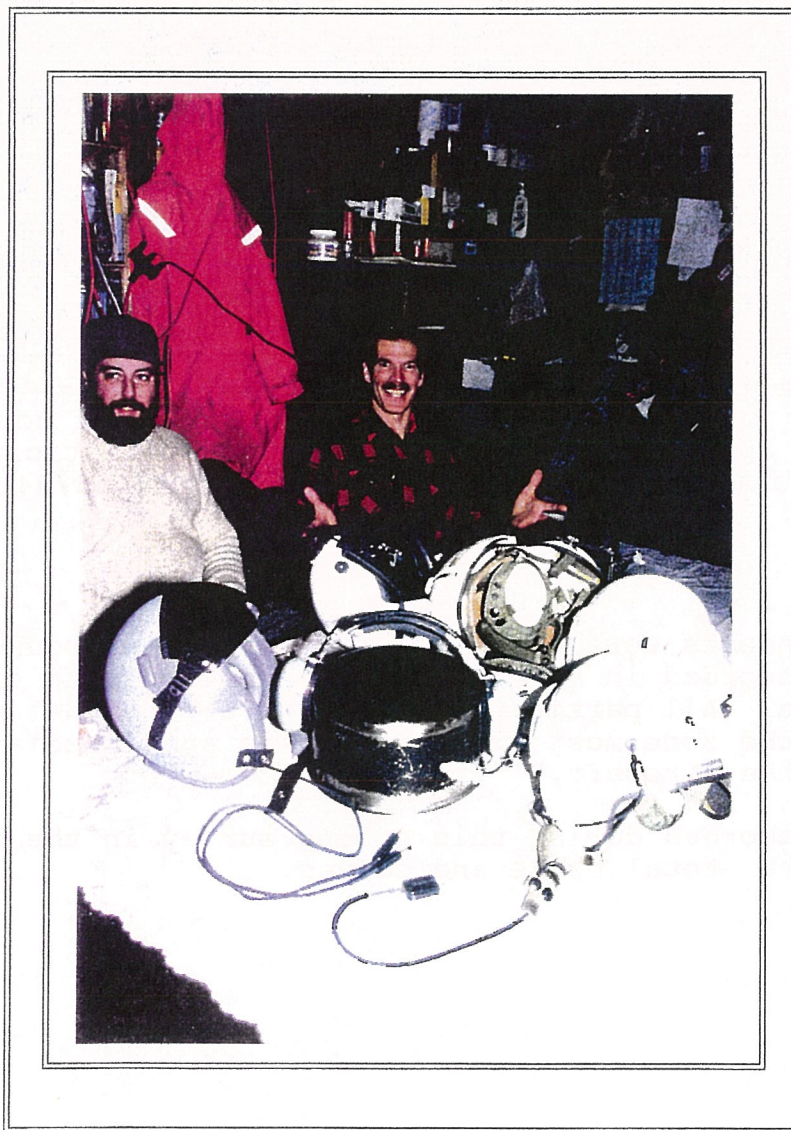
Our purposes are to develop safe, reliable, efficient, and cost effective procedures that obtain unbiased estimates of both moose populations and trends in large areas (>3000 square miles) with a 90% confidence interval of + or - 25% or less and can be conducted with a total crew of 4 or 5 people in few flight hours (<40 for 3000 square miles). In addition, our objectives are to field test different aircraft and other equipment that may improve the safety, reliability, efficiency, accuracy, or cost effectiveness of moose population and trend sampling.

The aircraft were a Bell 206 Jet Ranger helicopter, a Cessna 185 airplane, and a Piper Super Cub airplane.



The crew for a four-seat aircraft consists of a pilot, data recorder, left observer and right observer. The crew for a two-seat aircraft are a pilot/observer and a data recorder/observer.

Equipment consists of aircraft equipped with GPS navigation, radar altimeter, bubble windows, all way intercom, a data GPS unit, and a small computer/printer for recording moose locations, numbers, sex/age information, and flightpath. Other equipment needed included a flightline map for flight planning, flightline printout containing the locations of flightline beginning, turning, and ending points, clinometer, grease pencils, data forms, clipboards, pencils, rulers, calculators, paper, and Nomex flightsuits and gloves and helmets for safety equipment.



Regional Aviation Manager John Sarvis gets creative when the communication systems on one of the 'regulation helmets' fails (SC 3/94).



The 'dream team' (L to R) of Wildlife Biologist Bob Skinner, Computer Specialist Jerry Minnick, and Statistician Wally Erickson, discuss their next move (SC 3/94).

The line transects were flown at 400 feet above ground level. Moose were recorded in seven distance zones on both sides of the transect line. All participants concentrated on detecting moose in zone 1 - the zone most clearly visible and immediately adjacent to the aircraft.

Moose were recorded during this spring survey in the following two categories; total moose and calves.



The moose crew, 15 in all including Pilots, Biologists, Refuge Managers, the Regional Aviation Manager, Administration Technician/Camp Cook, Mechanic, Computer Specialists, and a Statistician (to keep us all honest) (SC 3/94).

The location of the aircraft, time, and date were obtained and recorded automatically by the GPS/computer at fixed intervals (every 10 seconds). This permits plotting of the actual flight path versus the planned. A radar altimeter was used to help the pilot keep the aircraft at the intended height above the ground.



The moose crew was housed in wall tents. A steady supply of wood was available as temperatures dipped down to -30° (SC 3/94).



After ten days in the field, the crew freshens up with a little help from the 'campers friend, Wet Ones' (SC 3/94).

The survey area was divided into two strata for sampling - the river corridors and the remainder of the area. A series of non parallel sawtooth flightlines were established in both strata. This pattern increases the amount of actual survey time relative to the total flight time.

The average probability of detection of a moose group was calculated with the computer programs DISTANCE and AERTRAN. The bootstrap technique (Manly 1991) was applied for estimating the observed density of moose and associated variance.

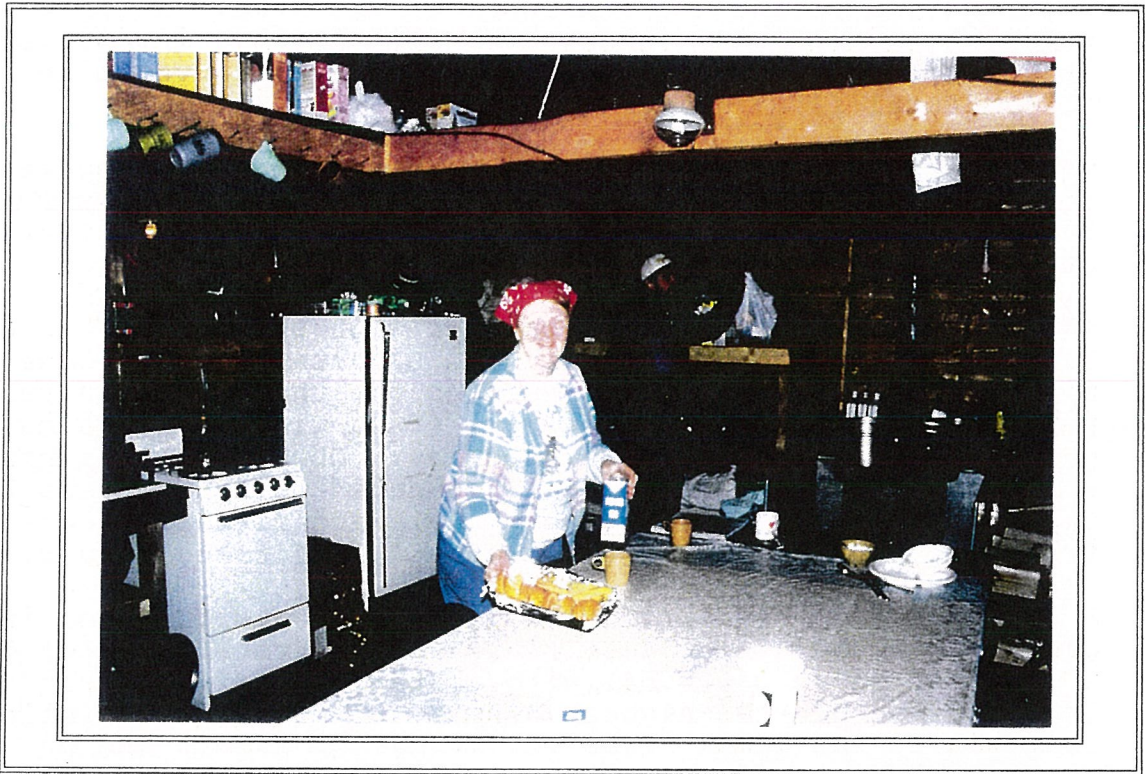
The number of moose groups observed with the helicopter was much higher than with the fixed wings. Because so many moose are missed with the fixed wings we conclude they are unsuitable for population inventories. However, fixed wing aircraft may be quite suitable for trend inventories. Observers miss more animals in fixed wing aircrafts compared to helicopters because the angle of view does not permit viewing directly down into trees and the speed cannot be reduced in forested cover.

A total of 229 moose including 18 calves were observed in 135 groups with the helicopter. The average probability of detecting a group of moose was 0.541 with a standard error of 0.079. The Innoko River had the highest density of moose (1.465/mile²), followed by the Yukon River (0.744/mile²), the tributary streams (0.361/mile²), and then by the non-river areas (0.110/miles²). The density of moose for the entire north half of the Refuge was estimated to be 0.380/mile². The estimated total number of moose in the survey area was 1253. The limits of the confidence interval were + or - 24.8% of the estimated total.

Observers in the Cessna 185 detected a total of 132 moose in 97 groups. In the Piper Super Cub observers detected 144 moose in 89 groups. These aircrafts traveled the same routes as the helicopter.

Because we have a GIS landcover data base of most of our lands we are able to post-stratify the landscape into habitat strata. These strata are to be used to reduce the variance of our population estimate. The strata are developed with unbiased animal locations (in this case - moose) and landcover data. New landcover units (habitat units) are developed from the landcover information surrounding animal locations. This data was not finished in time for this years annual narrative.

Future plans are to evaluate Forward Looking Infrared (FLIR) thermal imaging as a tool for conducting line transect surveys. This system may eliminate missed animals on the centerline, replace distance zones with distance measurement, eliminate the need for helicopters or slow flying fixed wings, and eliminate human observers in flight.

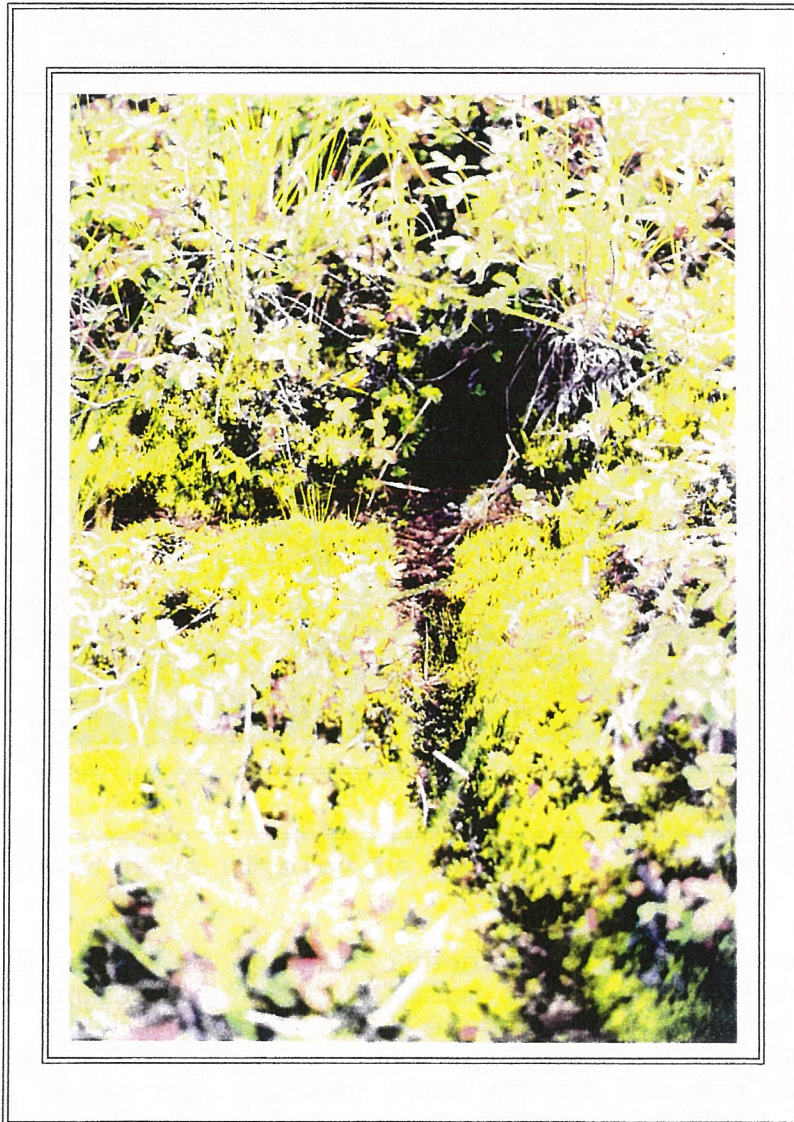


AT Collins kept the crew well fed with her delicious and hearty meals. A must to keep the brain cells working during long days and frigid nights (SC 3/94).

10. Other Resident Wildlife

Small Mammals

Small mammal habitat investigations were conducted within Innoko NWR during the 1994 summer field season. This project was a continuation of a small mammal habitat investigation that began in the summer of 1993. Data was collected along 26 systematic-stratified-random transects which contained a total of 256 trap locations. Each trap location contained five snap traps and a cone shaped pitfall trap. Vegetative and other habitat parameters were recorded at each site as well as the species and number of small mammals collected at each site. A variety of small mammal species were caught and included red back voles, yellow cheek voles, meadow jumping mice, and a variety of shrew species. The information obtained in these habitat investigations will enable a higher understanding of the habitat requirements of small mammals and where such areas exist on the refuge. This will also provide the refuge with critical data necessary to aid in the understanding of habitat parameters of predator species that prey on these small mammals.



Small mammals traps were placed along obvious trails and burrows...



with great success. Red backed vole in snap trap (BA 8/94).

While one years data is not nearly enough to understand the relative densities of small mammals, each additional year will assist in producing a data base large enough to map relative densities that will average yearly fluctuations in populations and distributions due to variable weather and other phenomena. This habitat mapping investigation will be incorporated in the refuge GIS to be used in predator/prey understandings, dependant species habitat mapping, ecosystem management, and for land management.



Both funnel and snap traps were used to conduct this survey
(BA 8/94).

Table G.1: Mixed raw data for redbacked and yellow cheeked voles, jumping mice, and shrews (catch per 100 trap nights)

MIXED COMMUNITY	YCV	JM	MS	DS	AS	PS	RBV
blue joint	0.71	0.00	0.36	4.64	0.00	0.00	0.36
blue joint/alder	0.00	0.00	0.00	0.00	0.00	0.00	0.00
bl jnt/willow/ald	0.95	0.48	0.95	1.90	0.00	0.00	0.00
blue joint/willow	0.26	1.32	0.53	7.41	0.26	0.26	0.00
willow	0.00	0.60	0.00	0.60	0.00	0.00	0.00
broad sedge	0.00	0.00	0.00	0.00	0.00	0.00	0.00
birch	4.84	1.81	0.15	6.95	0.45	0.30	0.23
white spruce	6.34	0.58	0.00	10.94	0.23	0.23	0.35
popal	2.38	1.20	0.00	8.93	0.00	0.00	0.00
cut bank	2.68	0.00	0.00	3.57	0.00	0.00	0.00
bog sedge	0.00	0.00	0.00	0.00	0.00	0.00	0.00
bog brush	0.00	1.24	1.24	2.48	0.00	0.00	0.00
larch	4.37	1.19	0.00	9.13	0.00	0.00	0.40
black spruce	7.44	1.18	0.00	7.67	0.12	0.00	0.47

KEY: RBV=red-backed vole, YCV=yellow-cheeked vole, JM=meadow jumping mouse, MS=masked shrew, DS=dusky shrew, AS=arctic shrew, PS=pygmy shrew

11. Fisheries Resources

Very little is known regarding fisheries resources in the Innoko River, Iditarod River, and the tributaries to these systems. This lack of information is due to both the expense associated with conducting minimally acceptable surveys, and regional priorities for fishery funds use.

Local concerns among subsistence users residing in villages along the Yukon and Innoko Rivers include the impacts of placer mining and associated contaminate levels in fish, the impacts of guided sport fishing on northern pike populations, and our lack of baseline knowledge regarding summer and fall run chum salmon, whitefish, and sheefish. We have a long way to go in terms of being in a position to meet our fisheries related mandates relative to the enabling legislation.

14. Scientific Collections

Preliminary Investigation of Stream/Aquatic Invertebrate Sampling

The first week of August was spent evaluating a variety of gear and techniques used to sample aquatic macroinvertebrates within a riverine environment. This work was completed out of a spike camp located within the middle-lower reaches of the Dishna River.



The crew closely investigates the net on the Surber sampler for the smallest aquatic invertebrates (SH 8/94).

This location was chosen because of the variety of substrate and invertebrates available to sample. The substrate sampled included organic, mud-muck, sand, and cobble-gravel.

A variety of macroinvertebrates were sampled and collected for identification and familiarization. This preliminary work will benefit future projects concerning wetland mapping/classification and investigations into invertebrates themselves and their role as a food base to higher fauna.

16. Marking and Banding

This was the last year of the five year greater white-fronted goose banding project on the Innoko Refuge. The Central Flyway Commission will continue to employ observers for two more years to monitor past banding efforts.



WB/P Finley prepares the nets for capturing white-fronted geese on the Iditarod (KE 8/94).

Over the course of two days, three aircraft and 13 personnel were involved in the banding operation this year. The total number of white-fronts banded with leg bands and red neck collars were 568. There were a total of 25 white-fronts recaptured from prior banding activity.

One of the recaptures was a Tule white-fronted goose equipped with a VHF collar-mounted transmitter. This transmitter was placed on the bird at Delevan N.W.R.. This caused WB/P Finley to question the equipment aboard the refuge aircraft. One day earlier he had completed tracking flights and failed to find any transmitter-equipped birds. It was discovered that the antenna had broken off the transmitter.



A successful drive results in the capture of several hundred white-fronted geese (KE 8/94).



MBM Project Leader Russ Oates is an old hand at decorating waterfowl (KE 8/94).

WB/P Finley conducted tracking flights for Tule's throughout the season. Tule's were found on the Refuge in late July and early August. Flights conducted in early September failed to come up with any birds and the tracking equipment was returned to N.B.S. in Dixon, California to monitor returning birds.

H. PUBLIC USE

1. General:

Resource Apprenticeship Program for Students (RAPS)

Three Native high school students were chosen in the spring for our summer Resource Apprenticeship Program for Students (RAPS). Kitty Edwards, a 10th grader from McGrath, John Paul Nikolai a senior from Telida and Darren Walker a senior from Holy Cross, each completed the program including the optional academic program. All three students had attended the Refuge Environmental Education (EE) science camp the previous summer (1993) and had shown an interest and ability in working on the Refuge during the field season. Kitty had also been involved in the school project that had built the tent frames on the Refuge the spring of 1993.

Both Kitty and Darren's appointments were extended beyond the normal six to eight weeks because of their continued interest and their excellent contributions to the field crew. Due to the outstanding role models our summer staff provided, Darren decided half way through the summer to apply to the University of Alaska's Wildlife Program and has successfully completed his first semester at the time of this writing. The Ecological Services Office in Fairbanks was able to continue his RAPS appointment part time through the end of the fiscal year at which time Tanana Chiefs Conference picked up his salary for a few hours a week. He is back at Fairbanks for his second semester and the Refuge plans to bring him back a second year under the RAPS program in 1995. Kitty has applied for the 1995 Rural Alaska Honors Institute (RAHI) summer program sponsored by the University of Alaska for Native college bound students and hopes to finish her summer with us under a shortened RAPS program. Kitty greatly impressed Refuge staff with her talent for learning the plants and their taxonomic names faster than some of the summer field biotechs, all of whom were college graduates. Our RAPS students participated in all aspects of the Refuge field season including many hours of helicopter time as crew members of the small mammal and fuel mapping projects.

The Refuge had the pleasure of hosting the two Vista volunteers responsible for coordinating the RAPS program for several days in August. Their two day visit, as so often happens here in Interior Alaska, turned into a four day stay but they seemed to weather the delay in stride and really got a first hand look at our program on site.



The two Vista volunteers were treated to a boat ride and pike fishing trip by RAPS student Darren Walker (KE 7/94).

The combination of the EE Science Camp and RAPS program has allowed us to evaluate and ultimately help students interested in the natural resources fields. We plan to continue to use these programs to recruit other Native students in the future.

Challenge Grant Cost Share

Challenge Cost Share (CCS) Proposals submitted and funded in the fall of 1993 were completed in the spring and summer of 1994. Public use activities primarily revolved around the two CCS Grants awarded the Refuge for 1994. In May, the Refuge, in conjunction with the Iditarod Area School District (IASD), sponsored the third annual week-long Earth Week program at the McGrath School. This was followed in July by the second Environmental Education (EE) Science Camp located on the Refuge. This program, in cooperation with IASD, McGrath School, Tanana Chiefs Conference (TCC), Alaska Department of Fish and Game (ADF&G), and Four Rivers Counseling took place at the Refuge field station with 12 students using the tent frames constructed by students the previous year.

Classroom visits at the McGrath School by ROS Skinner included topics ranging from local birds, plants, and animals to a several week-long orienteering class for middle and high school students. Several field trips were taken to area bogs and marshes as well as a day spent dip netting invertebrates at an area lake with the fourth/fifth grade class.

Starting in August, ROS Skinner began writing and airing a weekly three minute "Alaska Naturally" radio program on KSKO, the local McGrath public radio station. Subjects have ranged from short-tailed weasels to winter carrying capacity for moose and are seasonally appropriate.

The Alaska Natural History Association (ANHA) bookstore has had a successful first full year of operation more than doubling projected profits.

The headquarters natural garden continued to grow with new local plants and a sawdust ground covering being added.

ROS Skinner attended the fourth annual Regional Environmental Education Training at Anchorage from October 17-21. Other meetings attended included a 4-H inservice on fisheries education at Chena Hot Springs October 7-9 and the Alaska Recreation Association Meeting at Anchorage September 25-28.

New Challenge Cost Share Proposals for 1995 were submitted in the fall of 1994. Proposals included a third year of the EE Science Camp, a fourth year of Refuge sponsored Earth Week activities at the McGrath School, and an oral history project centered on the Yukon River communities adjacent to the Refuge.

ROS Skinner submitted a grant proposal through the U.S. Air Force Legacy Program to help fund a third breeding bird survey (BBS) along the Tatalina Radar Site road downriver from McGrath. This BBS would start at the Kuskokwim River at Sterling Landing and follow the road to Takotna. The route would include not only wetland areas but also alpine tundra which is currently not represented on a route in Alaska.

The 1994 McGrath Ducks Unlimited (DU) committee included two Refuge staff members: DM Reid as chair and ROS Skinner as co-chair. With an all woman committee, the banquet took on an air of more polish and glitz. A fun time was had by all in addition to a very successful fundraiser for DU, breaking the old McGrath record. Refuge staff are now ready to pass the baton onto another organization in McGrath so that we too can finally sit down and enjoy the meal and auction.

2. Outdoor Classrooms - Students

Classroom visits during the year included both in-class activities as well as local field trips. The McGrath Headstart children were visited in the spring for several short sessions on Alaska animals and animal tracks. This group of three through five-year olds are always a fun challenge to work with. They have short attention spans but are all very curious with unlimited stories to share. Life size animal tracks of Alaskan animals and paint are an unbeatable combination for this class and ROS Skinner hopes to continue this spring time tradition for many years to come.

Spring programs also included an "unnatural" trail for the third and fourth grade classes set in a spruce/birch woods near McGrath. This outdoor activity helps increase student's powers of observation and is a fun project for a beautiful spring day. Twenty-five objects not normally found outside were hidden along a trail at various heights - some quite well hidden and others in plain sight. Students work in teams and slowly make their way along the trail recording all the "unnatural" things they see. At the end they compare notes and help each other find the objects that were missed. This year's "mistake" by ROS Skinner was to include a "hidden" banana with the thought it really would be there an hour later when the students ran the trail. There must be a pretty smug squirrel in those woods.

For the first time this year ROS Skinner participated in the summer library reading program with a unit on plants. The first day plant books were explored and plants collected and pressed. The next day was spent out on the bogs to look for the carnivorous sundews as well as other wetland plants. A collection of 25 students, grades K-7, used field guides to key out plants and learned some of the traditional uses of some of them.

With their heavy emphasis on Alaska's natural world, the second grade continued to be a class well visited by ROS Skinner in the fall. This year's programs included a plant walk to identify and collect area plants and instruction on how to press and display their collections. Summer and winter bird slide shows were again a big hit as well as several programs on bird adaptations. The 'Bird Beak' game from Ranger Rick continues to be popular with this age group as well as the goose book from the Alaska 'Teach about Geese' curriculum. The loon kit was borrowed for the yearly "dress the teacher up as a loon" day.

Other fall programs included a two-day field trip to area bogs with the third grade students. The class learned about carnivorous plants as well as picked bog cranberries which were used in cranberry muffins for the Thanksgiving pot luck for the school.

A day was spent by ROS Skinner at the 4th and 5th grade camp out at Tatalina Creek dip netting for invertebrates. Unfortunately, with an early cold snap, most invertebrates were already seeking their winter hideouts and not much was found. A few inverts were brought back to the classroom for further study until being re-released a few days later.

McGrath School decided to combine their annual Science Fair with the now very popular Earth Week program sponsored by the Refuge. There were no winners in this program, only praise for all the wonderful projects. Funded by a CCS grant, teachers submitted project ideas and list of needed supplies to the ROS Skinner. Participants included the McGrath School student body, the McGrath School teachers, local volunteers, and staff members from the following local, State, and Federal organizations: Innoko

National Wildlife Refuge (NWR); Alaska Department of Natural Resources (ADNR); Tanana Chiefs Conference (TCC); McGrath Bahai'; and Alaska Department of Fish and Game (ADF&G). Also included in this year's program were the village schools of Nikolai and Takotna. Projects this year centered around the National Wildlife Week theme of Pollution.

Weekly planning meetings with McGrath teachers for the Earth Week program began in January. Each of the elementary and middle school classes (Head Start through 8th grade) planned a project idea related to pollution and it's effects on Alaska. Participation from the high school was at the same level as the previous year with the English and science classes designing projects. Because students of all ages learn best by hands-on activities, the teachers were encouraged to select projects in which the students themselves could participate. Teachers were encouraged to create unique and unusual projects demonstrating how pollution can affect Alaska's people and wildlife. Area wetlands were again included in projects as the Refuge wants to continue to stress to the students and community the importance of wetlands to wildlife as well as themselves and their families. In all, approximately 150 students and 12 teachers participated.

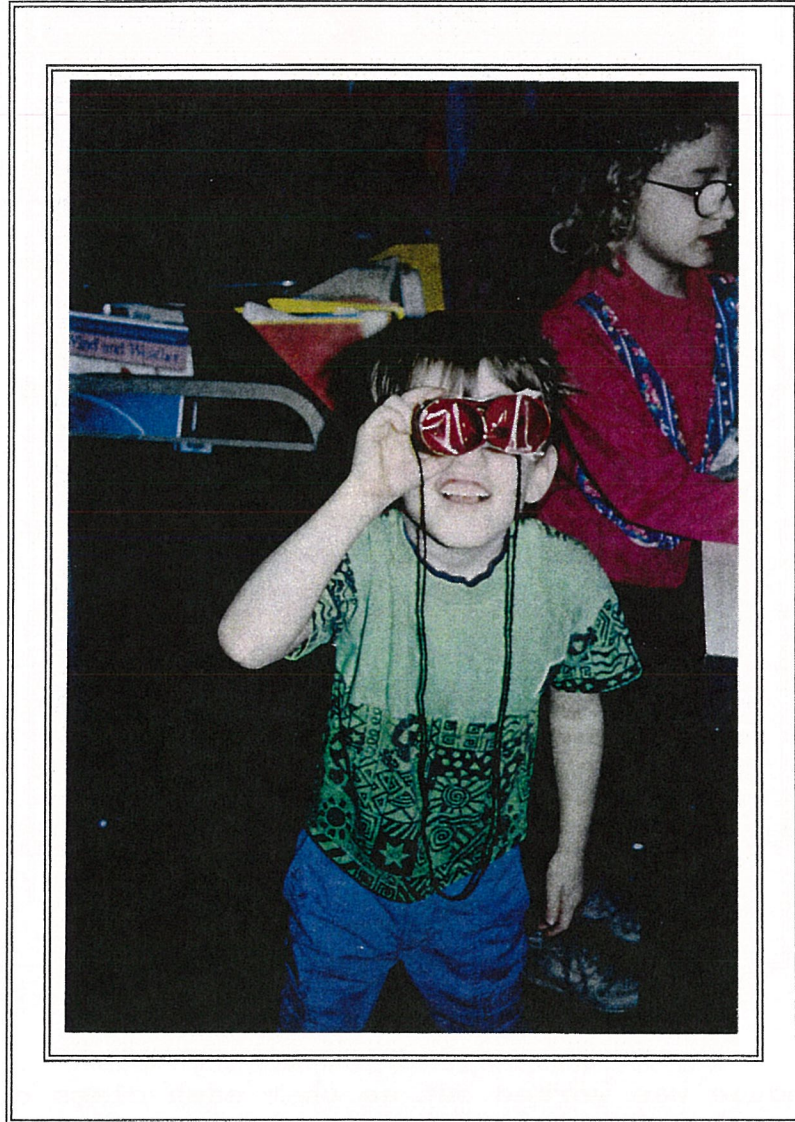


McGrath students learn a fun way to recycle by making toys from junk, like this 'monster bubble blower' made from a coffee can or....



an oldie but goodie, a phone made from cans and string (BS 5/94).

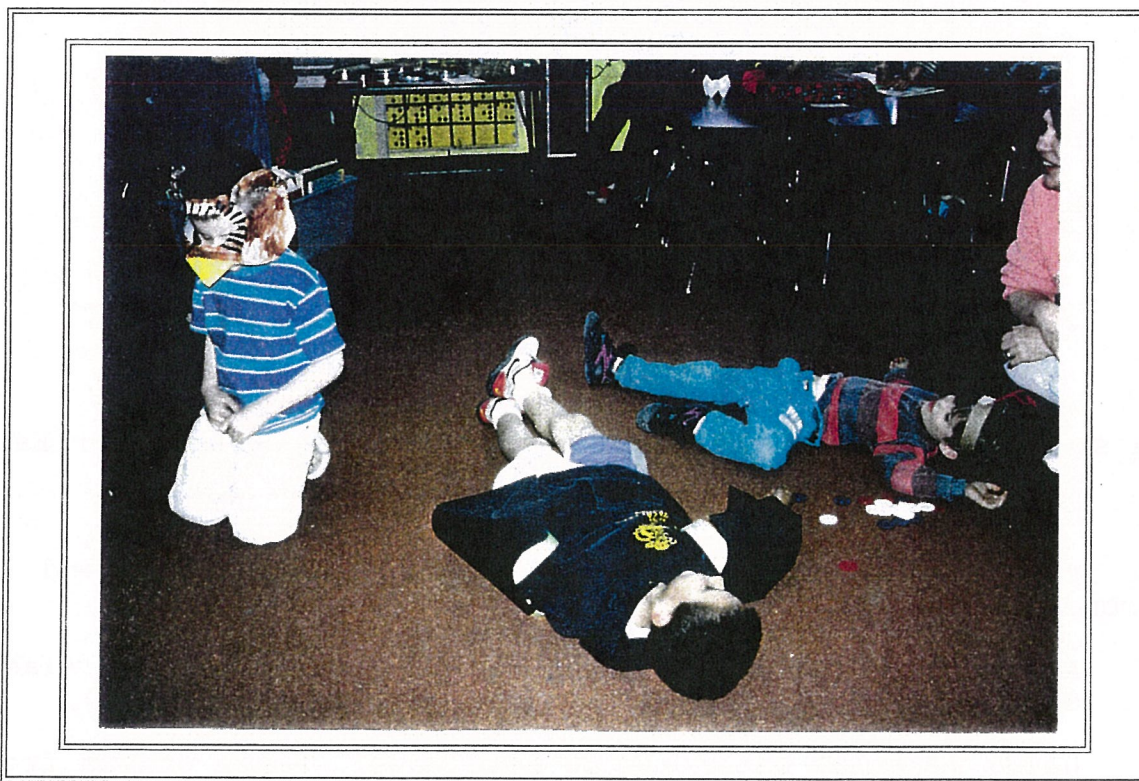
A final schedule was worked out so that each class could visit all the classrooms to view the projects. The student-generated projects were presented to each class in 30-40 minute blocks as well as an evening block one night for the community. The younger students especially enjoyed being peer tutors to their older siblings, friends and parents during these demonstrations. For a short while, they were the ones with the most knowledge on their particular subject and they were quite proud to share this new knowledge. The combined science fair/ Earth Week evening program drew large community support and will continue to be an added feature to this yearly event.



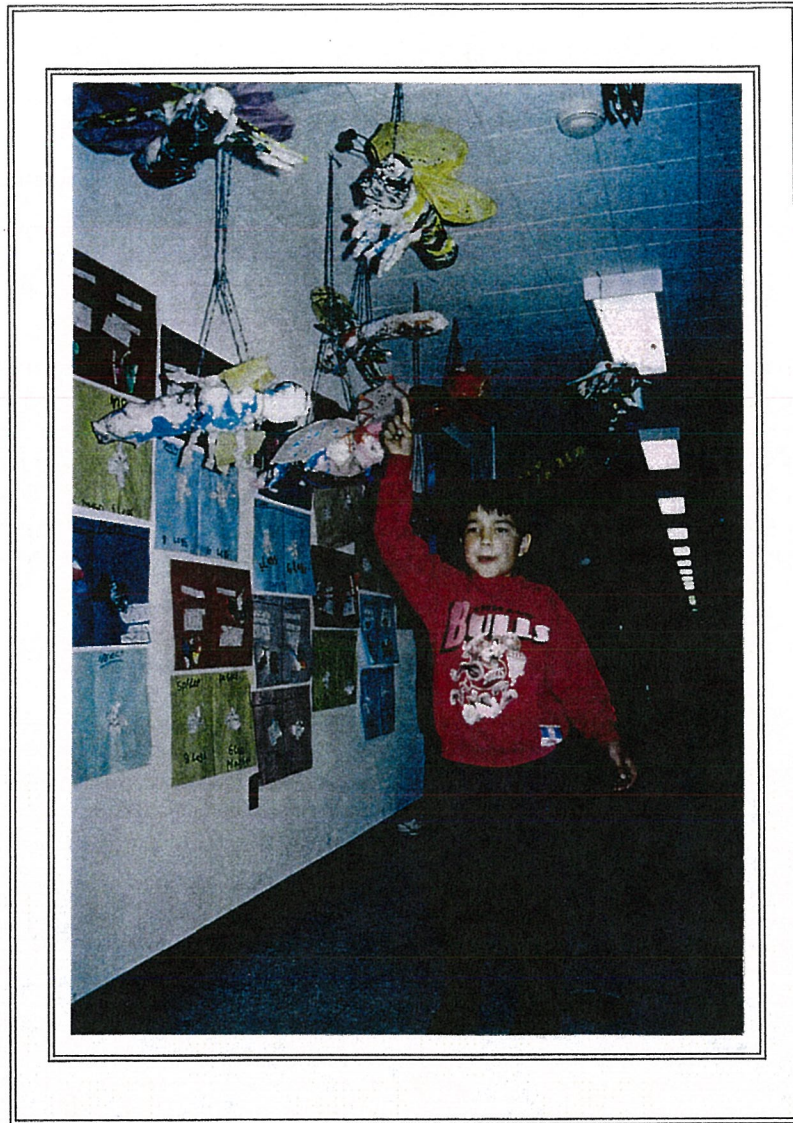
Student Matt Skinner having fun with some 'binoculars' made from recycled materials (BS 4/94).

The students were each issued an Earth Week 1994 passbook which they individually stamped with a class stamp after they had participated in each project. Refuge staff took pictures all week of the activities so a nice collection of photos record the week's work by the students and participants.

The Earth Week celebration was enjoyed by participants and observers alike. The students were enthused about their projects and took great pride in sharing them with their fellow students. The teaching staff put in a lot of extra work and time and each commented that it was well worth all the effort. The Refuge sent letters to all of the teachers and demonstrators thanking them for their enthusiasm and help in putting together an outstanding program.



Students demonstrate the 'Food Chain' game during Earth Week activities (BS 4/94).



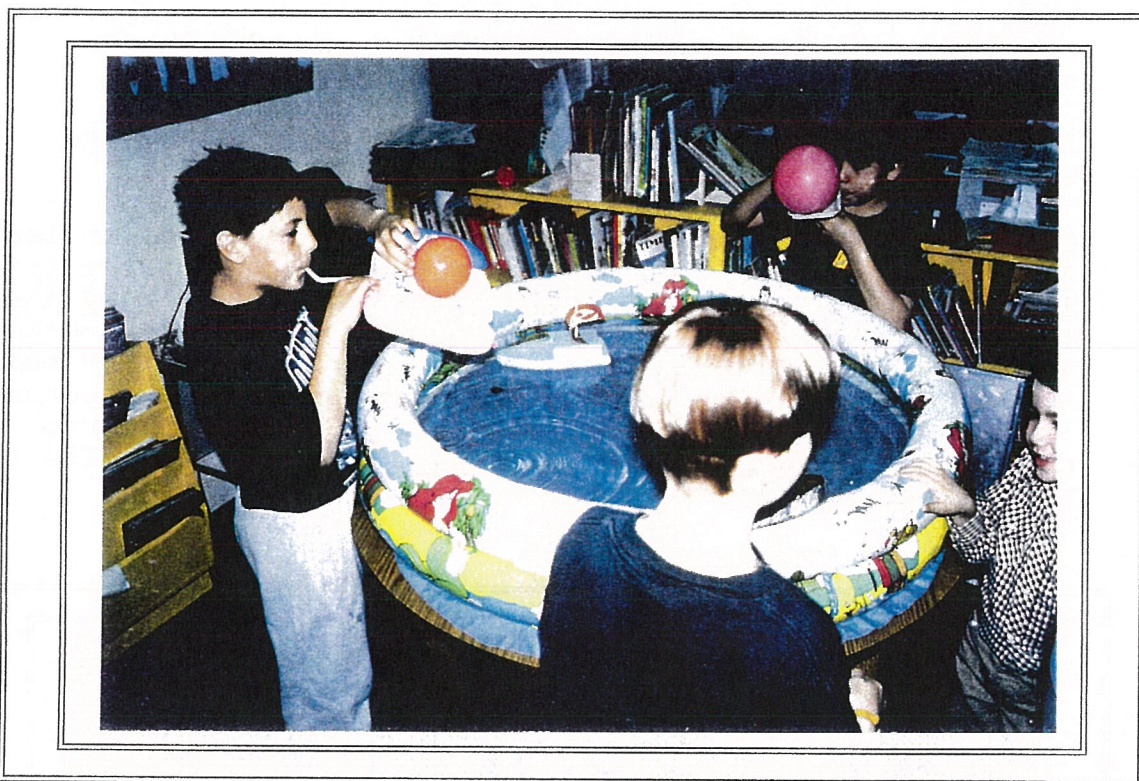
A student shows off the paper mache 'bug' he created for Earth Week (BS 4/94).

The following are subject areas of each of the projects and demonstrations:

A game about the food chain, the role of insects in Alaska and the effects of pollution on food chains.

Using recycled materials to make toys. Paper chains from old wrapping paper decorated the class and stations were set up showing a variety of toys that the students designed and made. A pool of water was set up with raw materials for students to design their own water toy.

A gym size wall mural with Alaskan animal and plant sponges was set up and everyone added to the mural as they days went on through the week.



Students make boat from recycled materials and design their own forms of propulsion, from paddle wheels to balloons (BS 4/94).

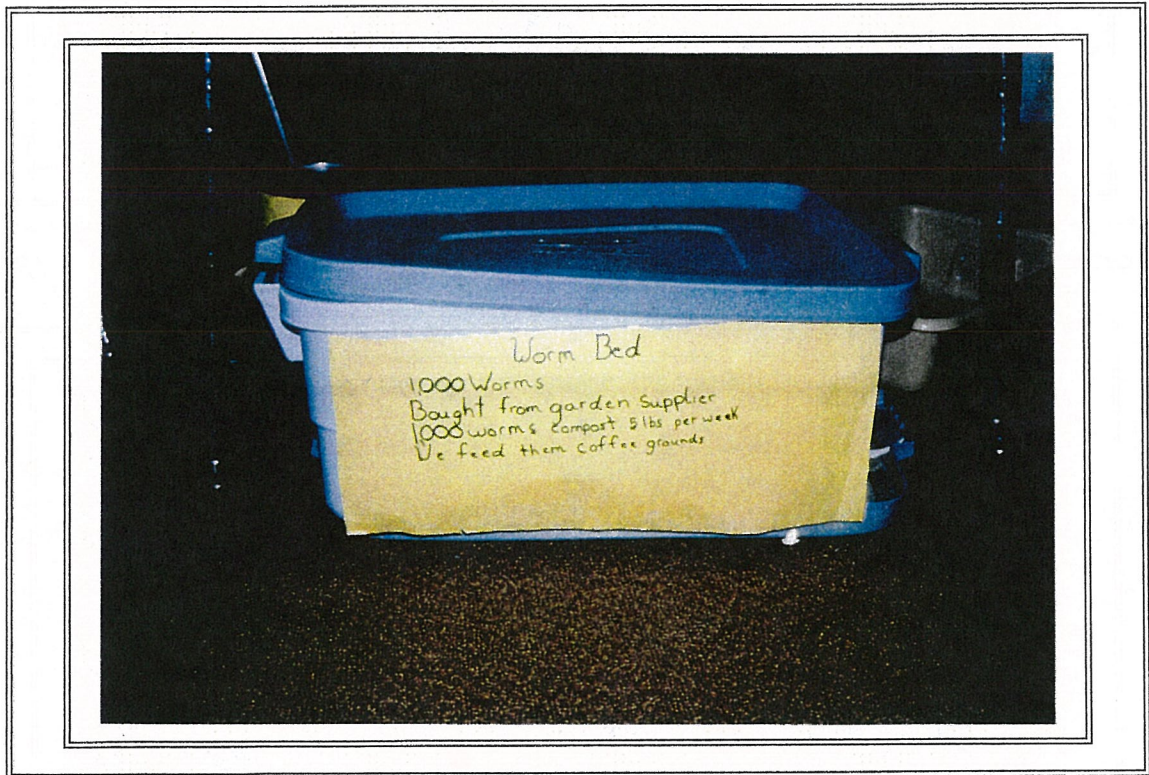


A colorful mural created by the entire elementary school using their imaginations and cutout sponges of Alaska animals (LER 4/94).

A wall size world map with endangered species affected by pollution pinpointed. This class also made hand paper games that highlighted their particular animal they researched complete with facts about the animals and why it was endangered.

Environmentally compatibly solar house designs by the Takotna school students complete with landscaping.

Red worm composting tubs were set up and students collected and weighed waste food from the school lunch program for several weeks. Favorite meals (pizza) had the least amount of waste while least favorite (soup and sandwiches) had the most with an estimated total of 6,000 pounds of food being tossed in one year from the McGrath School lunch program. Students took suggestions from other classes on how to reduce the amount of lunch waste and submitted results to the school Principal.



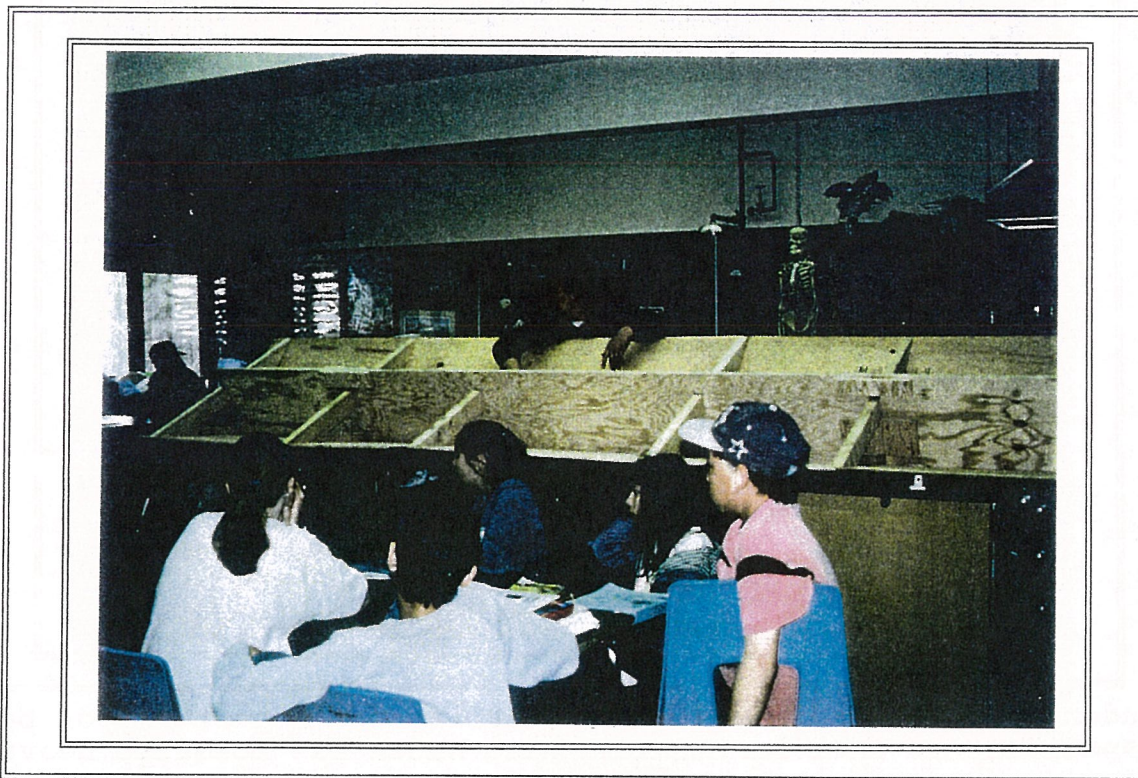
Students composted the school lunch waste for several weeks and found out that just like them, the worms liked pizza the best (BS 4/94).

Middle school projects included experiments on air, water, soil and noise pollution. A hand held sound meter made the rounds of school for several days recording noise levels. Snow machines were tested as well as area cars and the school bus. Students then calculated at what point these

levels would damage their hearing. Water was tested in different kinds of pipes in town and in the different parts of the school to show that pH was higher in the older pipes. The amount of dog manure generated by area dog lots was calculated by some students and some of its effects on the local dump were researched. Several games were designed by students to show the effects of pollution and a computer simulation game designed to allow students to participate in the decision making process was used by the older students.

The high school english classes were involved in a "Visit the Dump" photo essay and poem writing project.

The high school science class designed a swallow nesting structure with the purpose of discouraging birds from nesting on school buildings. Unfortunately, the structures weren't erected in time to catch the return of the birds.



High School students constructed a swallow nesting structure for their Earth Week activity (BS 4/94).

Guest programs included a slide show on Russian pollution and wildlife by the ADF&G biologist who had just completed a year in Russian working on snow leopards. The DNR forester presented a program on forest management and forestry waste products in Alaska. The TCC Public Health Nurse demonstrated the "smoking head" and showed students the effects cigarette smoke has on lungs. The Refuge

contribution was a combined staff effort on building bat boxes to be distributed in yards around town and out on the Refuge. Very little is known about bats in this area other than they are here during parts of the summer. The students each had a hand in building a box and holding a mounted little brown bat collected by the ADF&G biologist. They learned facts about bats and were given the responsibility of convincing their parents to have a bat box located in their yard. A sign up sheet for the boxes at the community program quickly filled up with interested host families.



Students build bat houses while learning the importance of bats, especially in interior Alaska, also known as 'mosquito heaven' (LER 4/94).



Using the smoking head, Health Nurse Holtshaser demonstrates the hazards of smoking to your health and the air (LER 4/94).

Although this kind of week-long program takes a considerable amount of work by both the Refuge staff and local teachers, the benefits to the students are immense; all areas of school curriculum can be used in these projects. It is also an opportunity to involve the entire community in environmental subjects of interest to the Refuge as either participants or observers.

3. Outdoor Classrooms - Teachers

The Iditarod Area School District (IASD), with headquarters in McGrath, administers schools in ten communities. Schools within the District are located on both the Kuskokwim and Yukon River drainage. Through cooperation with the District, the Refuge has an opportunity to effect positive change across a vast area of interior Alaska. ROS Skinner has been able to work closely with District personnel and area principals and teachers to include Service wetland and fire curriculum into the schools. Both Challenge Cost Share Grants for 1993/94 had the McGrath School and Iditarod District as cooperators.

National Wildlife Week materials were distributed to the ten IASD communities as well as several local home schooling families. ROS Skinner met with area principals and the District School Board to explain the services available through the Refuge and to also present a follow-up on the summer science camp. The

principals reported positive feed-back from their students who had participated and they are hopeful a third summer camp will follow.

ROS Skinner presented the summer science camp slide program to the IASD teachers inservice. After the presentation, CCS proposals were talked about and teacher input into possible future Refuge programs was noted.

Materials from the Refuge EE library were loaned to several outlying schools over the school year. Books and materials were also on loan to several teachers from the McGrath School for both science presentations and computer hypercard stacks generated by students. The Anchorage Regional Office Loon Kit was used several times by McGrath teachers as well as the Fire Curriculum. The Wetlands and Wildlife Curriculum as well as the Goose Curriculum continue to be heavily used in the classrooms.

5. Interpretive Tour Routes

The two Watchable Wildlife Great Adventure Trips along the Innoko and Iditarod Rivers brochures which were written by ROS Skinner and AT Collins were reviewed and edited. At this time they are in the Regional Office waiting for a second corrected printing.

The two brochures, 'Gold Panning on the Innoko River' and 'Iditarod River Float Trip' received some local interest and although both would entail much pre-planning by an interested individual, they have great potential as possible trips by the public.

Gold Panning on the Innoko River is a six day float trip down the Innoko River with stops at several historic sites along the way as well as suggestions of spots where "color" has been found in the past. Iditarod River Float Trip into Gold Rush History is a four day trip floating from the gold mine town of Flat past the ghost town of Iditarod to Dikeman.

The brochures give a short history of the Innoko Refuge area as well as cautioning visitors about mosquitos, bears, and laws concerning the collection of artifacts. Fishing areas are pointed out as well as recommendations for gear. Both trips are limited to visitors using float planes in the summer.

6. Interpretive Exhibits/Demonstrations

The Alaska Natural History Association (ANHA) bookstore has had a successful first full year of operation more than doubling projected profits. Although Innoko will remain a small branch due to our lack of seasonal tourists, the bookstore is filling a need for local users as well as fall hunters. Big sellers continue to be area topography maps as well as wildlife mobiles.



Our well stocked ANHA bookstore, including maps of the Refuge and the local area and...



gift shop comprised of local crafts such as beadwork, moccasins, and fur hats (BS 2/94).

An open house complete with free coffee and cookies supplied by the McGrath Little Dippers Head Start was held during the Iditarod race this year. Several people took us up on the warm room and free coffee but few sales were made. It seems that most Iditarod followers are here only for the race and have little interest in purchasing books or local art and crafts. A table was manned at the annual McGrath Christmas Arts and Crafts fair in December where the number one statement from locals was still "I didn't know you had a bookstore at the Refuge." The goal for this year will again be to let people know we are here and ready to meet their needs.

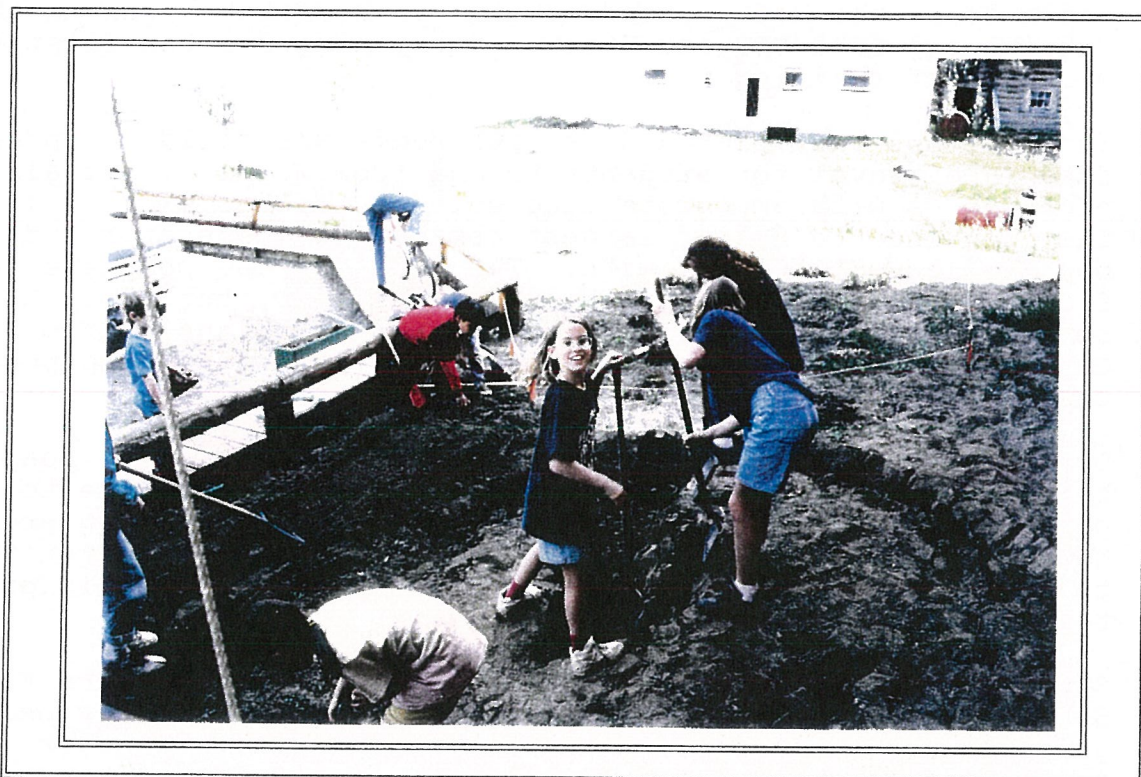
The December ANHA manager's meeting was attended this year by ROS Skinner. Our local arts and crafts case is unique in the state and many other branches attending the meeting were very much interested in how they could add this program to their store. Much of the fall sales were again handled by AT Collins while ROS Skinner traveled to area meetings.

Plans for the bookstore include a Refuge t-shirt and possibly publishing a set of historical postcards of Interior Alaska.

7. Other Interpretive Programs

Headquarters Natural Garden

The headquarters natural garden continued to thrive for its second summer. The black spruce area has been completed with the addition of several new small trees and plants. A sawdust ground cover was added to some areas of the garden and will continue to be added as it becomes available. The garden bog was dug and filled with water and a few plants were added. The bog seems water tight and more plants will be added this upcoming year. The marsh area will be the next area to be completed as well as continued work on weeding and adding new plants. The first summer plants had an encouraging high survival rate and flowers greeted the public through much of the summer. Plant labels are ready to be added this next year as well as the four interpretive signs describing the four major plant ecosystems of this area.



Local students volunteer to clear an area and install the liner for the bog portion of the natural garden (BS 7/94).

Weekly Radio Program

Starting in August, ROS Skinner, began writing and airing a weekly two minute "Alaska Naturally" radio program on KSKO, the local McGrath public radio station. Subjects have ranged from short-tailed weasels to winter carrying capacity for moose and are seasonally appropriate. The program has been well received in the community and is well worth the hour a week it takes to produce. ROS Skinner will continue to write and produce the segments as long as the creative juices continue flowing.

Residential Environmental Education (EE) Science Camp

The second Environmental Education Science Camp took place on the Refuge from June 27 through July 11, 1994. Partially funded by a Challenge Cost Share (CCS) grant, the 1994 science camp included 12 students from the Iditarod Area School District (IASD). Students from the 9th and 10th grades were given priority this year and were selected by application and interview. This year students were selected from the villages of Nikolai, Shageluk, Anvik, Holy Cross, Takotna, and McGrath.

ROS Skinner spent several months prior to camp recruiting camp presenters, ordering materials, planning meals, and putting together the camp notebook.

A three day safety/survival class, conducted by the Refuge staff, was held at the Refuge headquarters in McGrath. Tanana Chiefs Council provided CPR and First Aid training for the first two mornings of training.

The IASD not only provided us with funds for field equipment, food, and travel for students to and from McGrath, but also provided us with an outstanding science teacher, Norv Dallin. They continue to be our largest cost-share cooperater and have been a pleasure to work with. The camp has the complete backing from not only the Superintendent of the IASD, but also the entire School Board. Extra help with funding and planning from IASD Curriculum Specialist Karen Ladegard has made the camp possible these past two summers.

During their stay in McGrath, students were housed in boarding homes. Along with their training, they were also able to participate in two nights of bear trapping, an ongoing project of McGrath high school teacher Norv Dallin. Again we weren't able to catch any bears but they were able to see and participate in the trapping process.

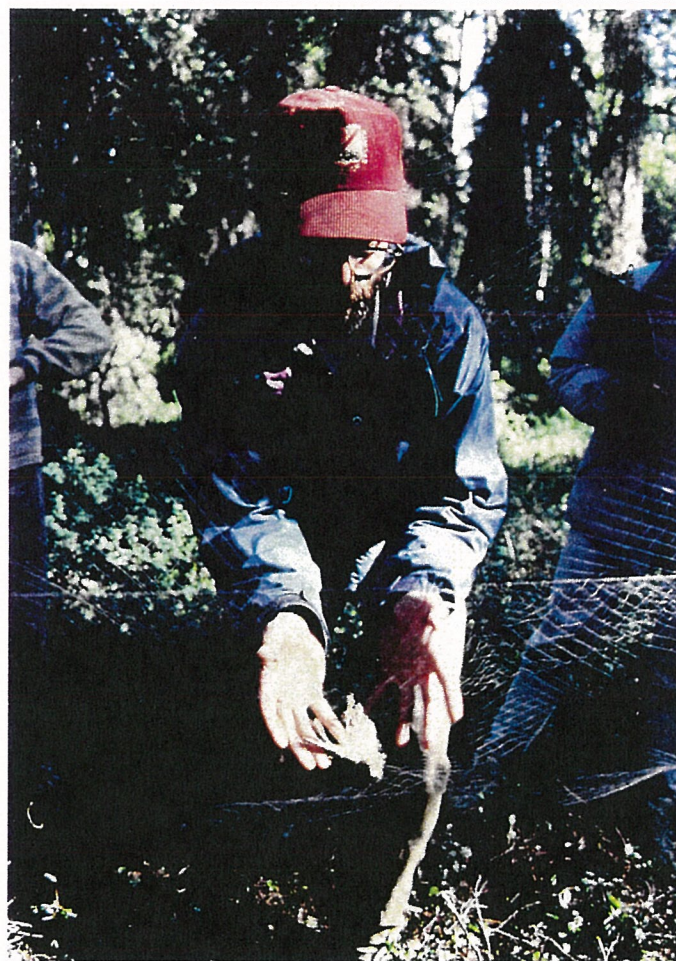
Students were flown out to the Refuge by High Adventure Flying Service out of Kenai. The logistics of moving so many people and gear precluded use of the station's Cessna 185. Weather cooperated this year and all students were delivered on time both for camp and return to McGrath and surrounding villages.



We contracted this Cessna 206 to transport students to and from the Refuge and project sites (KE 7/94).

The 12 students lived at the Refuge field cabin for ten days. Classes were conducted at both the field headquarters facility and in the field via boats. Several guest instructors participated as staff members and did an excellent job.

Jack Whitman, a biologist with the ADF&G demonstrated the uses of mist nets. Several birds were caught and banded over a two day period. Jack also presented a segment on trapping and fur bearers.



ADF&G Biologist Jack Whitman uses mist nets to give students a rare opportunity to see and identify songbirds up close (KE 7/94).

The Director of Four Rivers Counseling from McGrath added his unique talents with a daily self-esteem program as well as guitar classes, sketching lessons and numerous contributions to the theories behind the O.J. Simpson murder case.

Gretchen Coady, an Anchorage based B&W photographer, worked with the students and staff in our makeshift darkroom out at the cabin. Because of the large amounts of water required for film development, only the printing was done in the darkroom. Gretchen also took pictures of the students during the time she spent with us and produced a wonderful display of over thirty 8 X 12 matted photos which were displayed at the McGrath post office for several months.



Gretchen Coady, and professional black and white photographer, talks to the students about the use of light in photography (BS 7/94).

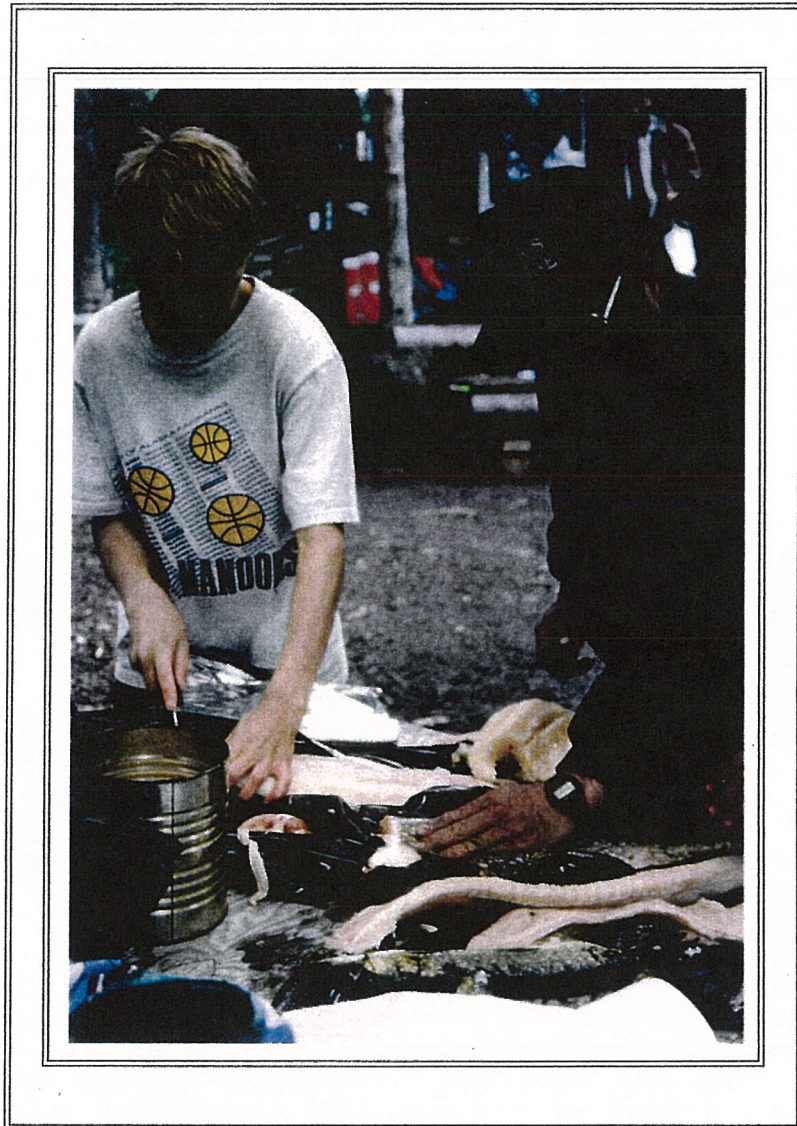
Owen Howell, a past McGrath resident who is currently attending Physicians Assistant school in Boston, spent a week with the students and gave several excellent classes in wilderness medicine. He was also one of our many excellent role models for the students since he was only a few years older than several of the students.

We also had a visit from Charlie Beatty, an Alaska State Fish and Game Protection Officer, when he flew into camp for a cup of coffee. He gave a tour of his plane and talked to the students about his job and other job opportunities within Fish and Game. Dan Bross, the news director of McGrath's public radio station (KSKO) visited us for a day and interviewed students for a feature story on the science camp. Unfortunately, the story aired before camp was over so none of us got to hear it.

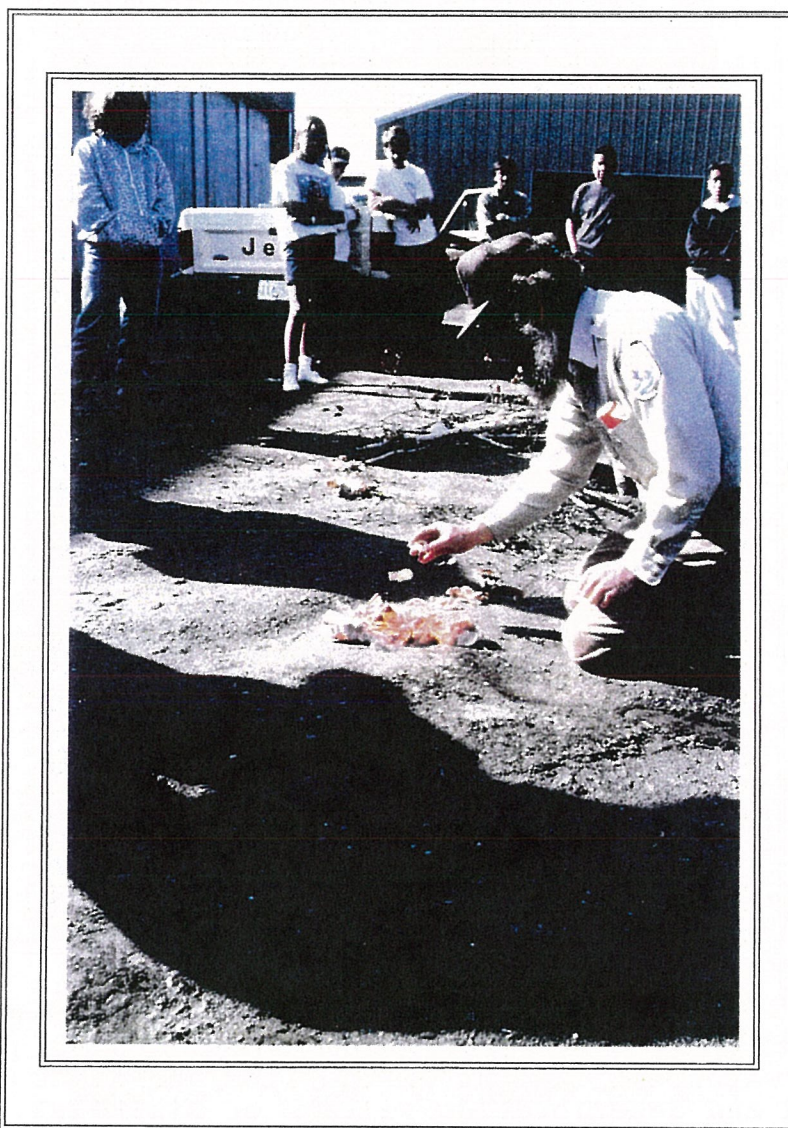


Alaska State Fish and Wildlife Protection Officer Charlie Beatty, gives students a tour of his specially-equipped plane (KE 7/94).

Shageluk resident Rudy Hamilton spent one weekend with us sharing his vast knowledge of traditional ways. He also spent one evening (from 9 pm to 4 am) telling traditional stories. His stories included growing up in a traditional lifestyle and his many encounters with wildlife including numerous bear stories. Including a cultural component in the camp continues to be a priority to the Refuge. Rudy has many past ties to the Refuge as his family maintained trap lines in the Mud River area when he was a child. He enjoyed being able to fly over areas of the Refuge he hasn't seen for over 30 years.

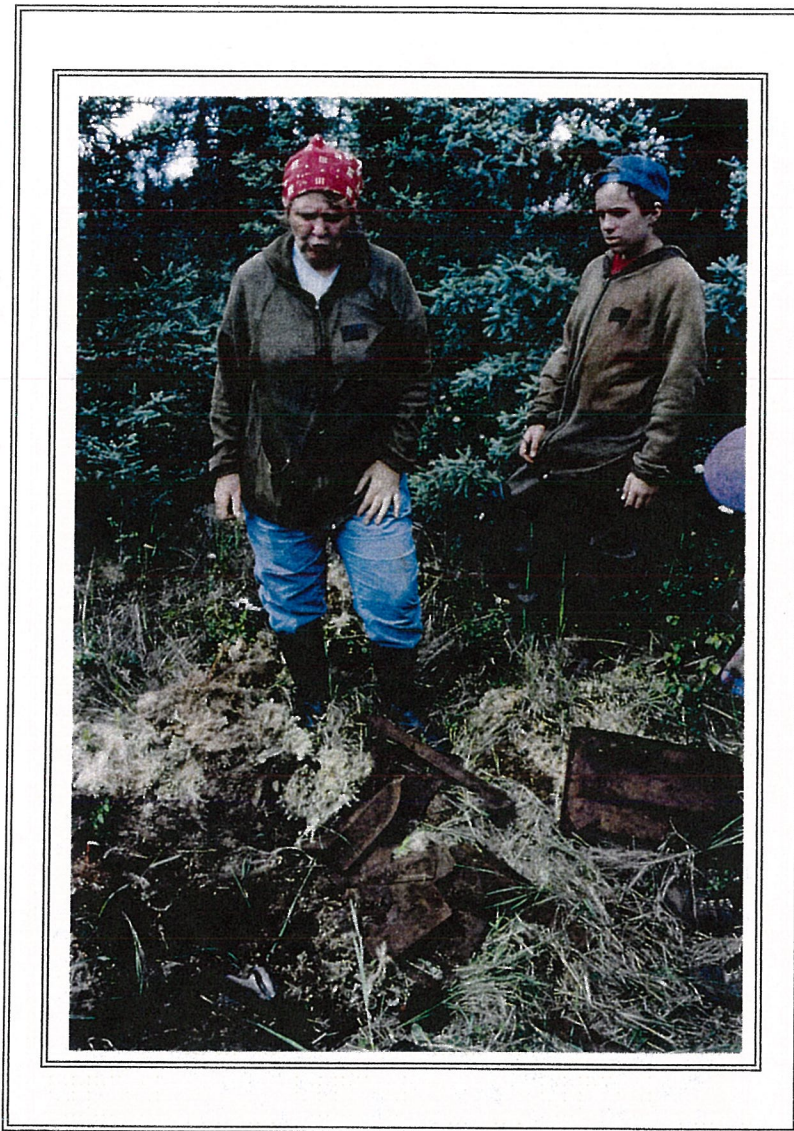


Native elder, Rudy Hamilton of Shageluk, shows students the traditional method of processing and cooking pike (KE 7/94).



Wildlife Biologist Skinner teaches the students the finer art of fire building, a skill which could save your life here in the frigid north (BS 6/94).

Refuge staff members and other Service employees also contributed to this year's camp. Both the paid and volunteer Refuge staff was a tremendous help throughout the camp. WB Skinner taught fire building while the students were in McGrath. RM Merritt gave the customary pre-camp pep talk to all the students while they were in McGrath. AT Collins and BT Medeiros provided backup support and expediting of materials and supplies.



Administrative Technician/Local Historian Collins provided the students with some insight on the life and times of the now abandoned and deteriorating village of Dishkakat (BS 7/94).

AT Collins and Regional Office Archeologist Debra Corbett spent a day with the students at the Dishkakat site showing them some of the materials found as well as the old cabin sites. The summer volunteers were not only excellent role models, but also willingly shared their particular areas of expertise with the students. BT Samantha Hall tried her hand at teaching a segment on moose browse and did an excellent job. Both BT Hall and Volunteer Guldager spent hours working in the kitchen to help feed the camp students and staff. All the summer staff members took turns helping out as boat drivers and designated shooters. Our three summer RAPS students also helped out both in the kitchen and also as boat drivers and designated shooters on field trips.



Student Doug Tony gets ready to enjoy a teenagers 'dream come true lunch'...nachos and oreo cookies (KE/94).

ROS Skinner took students out on early morning bird classes as well as spending time in the kitchen both as cook and director of dishwashers. Without a staff member specifically assigned to the position of Camp Director, many of the day to day duties of making sure the camp was running smoothly fell to her direction.

Biologist Keith Mueller from the Fairbanks Ecological Services office spent a day with the students teaching field methods for sampling invertebrates as well as identification skills.



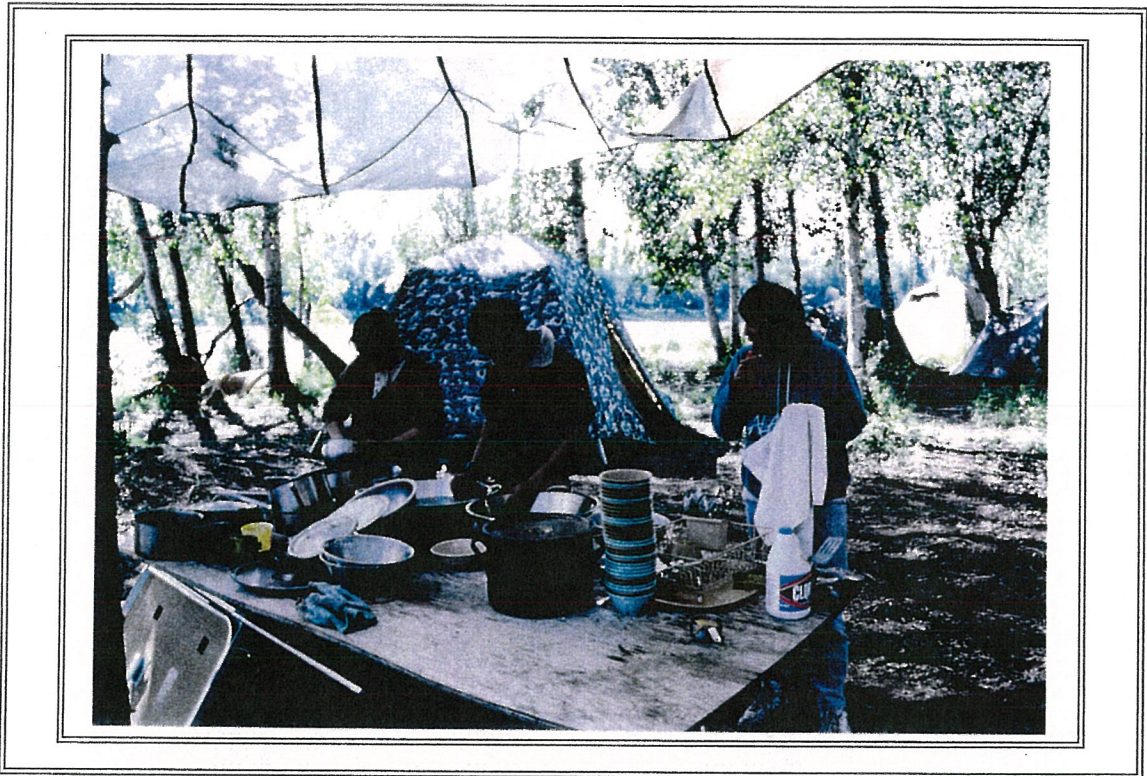
Ecological Services Biologist Keith Mueller (L) helps students discover the mystical underworld of the aquatic invertebrate (BS 7/94).

Again this year students were required to produce a student project during their stay at camp. Projects ranged from mapping the lake depth at over 30 sites, to determining favorite foods of the camp red squirrels. Many of this years projects involved fishing and students continue to be amazed that a science assignment can not only be educational but also fun.



Science Teacher Norv Dallin demonstrates to the students how a metal detector is used to locate buried treasures at the abandoned village of Dishkaket (BS 7/94).

After the final evaluations were in, the consensus was that all the cooperators were enthused about another camp next summer and the students had a good time and learned a lot. Complaints from the students ranged from having to do dishes, to their 11 p.m. bedtime, especially since it was still bright and sunny outside. We kept the students on a regular 9 a.m. starting time each morning, making the early bed time a necessity. The few problems we had encountered with students the first year of camp were eliminated because we were more selective in our recruitment of students and we also narrowed the age span difference.



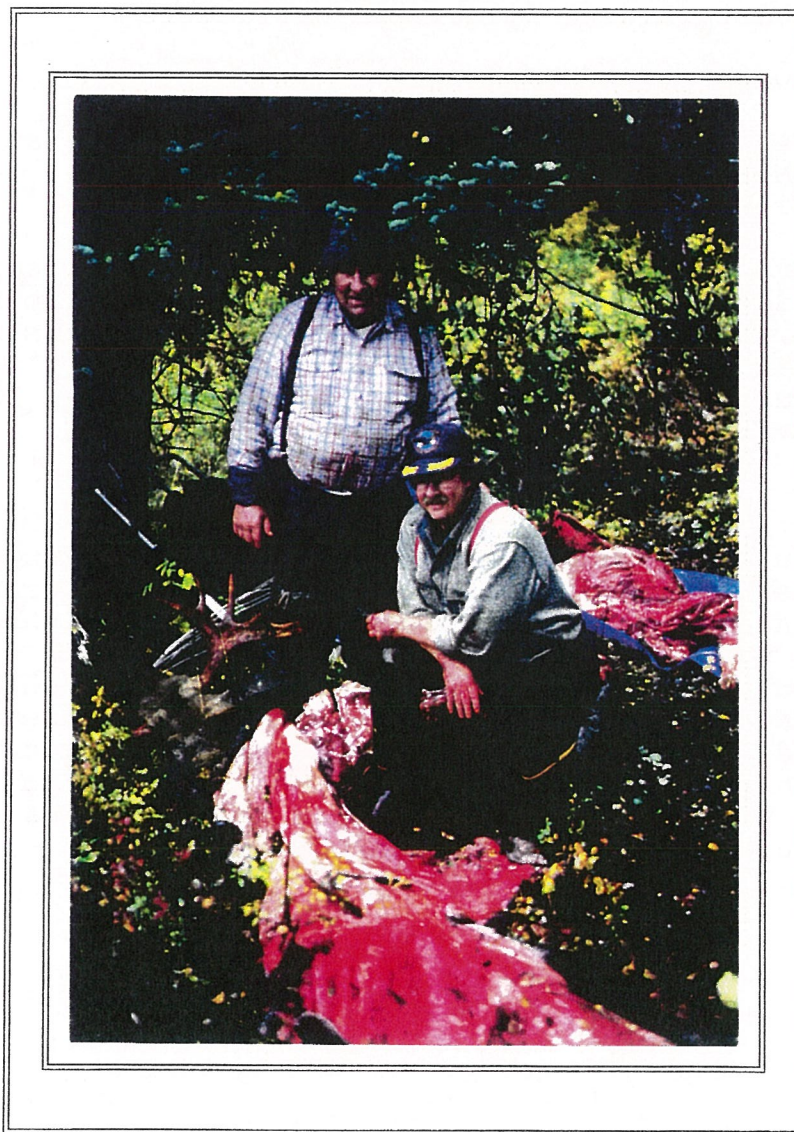
To the dismay of some of the students, daily chores, such as washing dishes were a regular and necessary part of the two-week science camp (BS 7/94).

The following list of activities and classes occurred during the 15 day program:

CPR/first aid
 safety training - boat, bear, survival, and aircraft
 black bear trapping techniques
 radio-telemetry
 B&W photography
 map and compass work
 small mammal trapping
 furbearer ecology
 waterfowl ecology
 fishing clinic
 fish ecology
 plant identification
 Native story telling
 moose ecology
 wetland ecology
 neo-tropical bird identification and ecology
 invertebrate sampling techniques and ID
 historic refuge sites
 fire ecology
 self-esteem awareness
 wilderness medicine

8. Hunting

Essentially all public use on the Innoko Refuge occurs in September during moose hunting season. Upland game bird, small mammal, and migratory waterfowl hunting are incidental to moose hunting, as are camping, river floating, and wildlife observation. Use of the area seems divided with sport hunters concentrating along the upper reaches of the Innoko River. Sport hunters access the area via air taxi operators out of Anchorage, Galena or McGrath, contracts with outfitters and guides, or in private aircraft. Subsistence use occurs mostly along the Yukon River, which forms the refuge's west boundary, and on the lower Innoko River. The confluence of the Innoko and Iditarod Rivers appears to be as far upriver as subsistence hunters usually travel. Subsistence use is primarily by residents of Holy Cross, Anvik, Grayling, and Shageluk, although Yukon Delta residents have traveled over 300 river miles to access the area.



Moose hunters with a skinned and quartered bull moose (BA 9/94).

Determining how many people hunt moose and obtaining accurate harvest data is difficult, and probably impossible, given current capabilities. Reports from state harvest ticket returns are at best a crude index, at least with regard to the subsistence take, as many hunters do not return their harvest tickets. Village traditional hunting methods include party hunting, with individual hunters exceeding bag and possession limits. The take is opportunistic and game taken is generally shared. Many traditional subsistence hunters fear that harvest ticket information will be used as a means for prosecution so compliance is low.

Under the newly developed guide allocation process implemented in 1993, the Innoko NWR was divided into four "sole-use" areas for commercial big-game guiding. Those guides issued a Special Use Permit (SUP) for Innoko NWR were:

Robert Magnuson, Innoko River Guides and Outfitters
Reinhold Thiele, Year Round Hunting
Jake Gaudet, Alaska Wilderness Outfitters

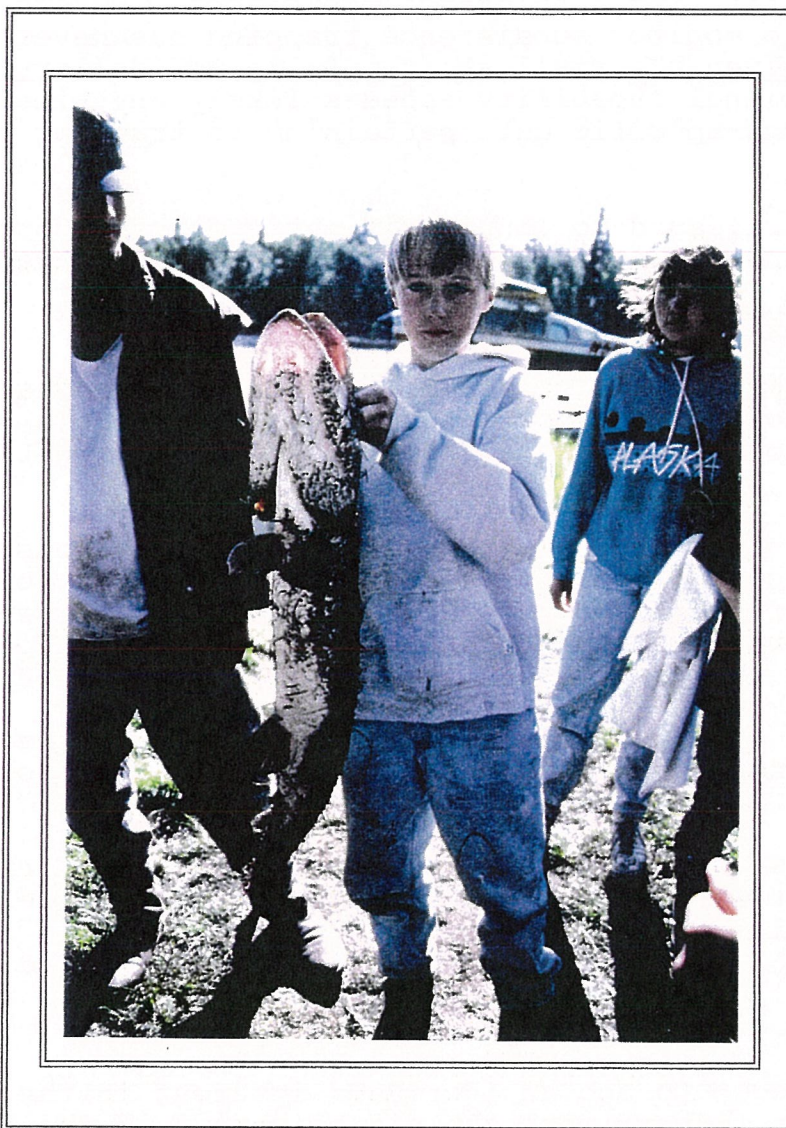
Three SUP's were issued to air taxi operators:

Tom Ratledge, Yukon Helicopters Inc. Yukon Aviation
Jeff McMillan, Willow Air
Steve Williams, Ptarmigan Air.

Permittees are required to provide information pertaining to their operations such as descriptions of aircraft to be used, tail numbers, number of client use days, and species and number of animals harvested. Hunter use data furnished by permittees indicated that 89 clients harvested 41 moose and no black bear. No other harvest data is available.

9. Fishing

Waters within the boundaries of the Innoko Refuge support a trophy northern pike fishery which is probably unsurpassed anywhere in Alaska. In addition, good numbers of sheefish are available in some areas. Both species are taken by sport users as an incidental activity while hunting. Other fish populations, primarily used by subsistence harvesters, use Refuge waters for migration and spawning. These include chum salmon and whitefish, both of which are significant subsistence species to the village of Shageluk, which is located approximately 30 miles downstream from the Refuge boundary on the Innoko River.



A trophy 42" northern pike taken by science camp student Joey Wittenkeller from the lake in front of the field cabin (KE 7/94).

The potential for overuse of the pike fishery is of real concern. Northern pike are slow growing and trophy size fish tend to be quite old and therefore easily over-harvested.

A guided sport fishing SUP was issued to Anvik River Lodge, Andy and Kim Cook, managers. Their operations on the Refuge basically centered around trophy northern pike fishing. They reported transporting 48 anglers, harvesting 15 pike, with four being in the range of 41-50", and catch and releasing 887 fish, with over half being in the 31-40" range, while 3 were in the 50+" range.

10. Trapping

The need to gather data pertaining to both furbearer populations and trapping activity has become critical with expanded federal responsibilities for subsistence management. Unfortunately, the capability to monitor subsistence trapping has never been sufficient given the small staff and limited dollars available, and no additional capability appears likely any time soon. We have no Refuge-specific data pertaining to trapping reportable for 1993-94.

One SUP was reissued to Connie Demientieff for construction of a tent frame and floor, to be used for subsistence trapping.

17. Law Enforcement(LE)

The Refuge boundary is 50 air miles from the headquarters; therefore, most of the law enforcement (LE) patrols are incidental to flying to and from the Refuge on non-LE assignments.

Specific patrols started with routine aerial patrols during March when climatic conditions provide ideal conditions for potential violations of the Airborne Hunting Act. Special Agent (SA) Stan Pruzenski from the Anchorage field office flew LE patrols during this time of the year. No illegal activity was observed.

During April and May, traditional spring subsistence waterfowl harvest was monitored. No major activity in the local area was observed.

We received several phone calls from villages bordering the Refuge reporting illegal activities occurring on the Refuge. Reports of illegal trafficking of black bears parts surfaced. In response, RO Finley conducted additional patrols and talked to several local people, but could find no evidence to substantiate these rumors.

In 1994 we began to see an increased interest in the trophy northern pike fishery with the establishment of the Anvik River Lodge. We issued the lodge a special use permit to conduct a guided sport fishing operation on the Refuge. Field checks were made by RO Finley. One fisherman was contacted in the field fishing without a fishing license in his possession. RO Finley asked the fishing lodge operators to fax a copy of the license to the Refuge headquarters. They cooperated, and no violation notice was issued.

Law enforcement efforts peak during the moose season. The general moose season on the Refuge ran from September 5th through the 25th. During the first week of the season, patrols were conducted by RO's Finley and Merritt. Later, Special Agent (SA) Pruzenski assisted Finley. RO Finley checked 95 hunters during the moose season. He estimates that this is about one-half the moose hunters using the Refuge.

Three violations were issued during the moose season. Another violation was issued from information collected during the 1992 moose season. The 1994 violations included; 1) conducting a commercial activity without a special use permit, 2) hunting without an Alaska hunting license in possession, 3) hunting without an Alaska harvest tag in possession. Several verbal warnings were given to hunters for various minor infractions. A notice of violation for conducting a commercial operation on a National Wildlife Refuge without a special use permit was issued by SA Mark Webb from information collected by RO Finley during the 1992 field season.

In March, RO Finley issued a Notice of Violation for same day airborne hunting in the 1994 moose season. The case went to Federal Court where the defendant was found guilty and fined \$5,000.00.

I. EQUIPMENT AND FACILITIES

The station's maintenance program benefited from some major "catching up" in 1994, but a significant backlog of maintenance needs remain. During the 14 years since passage of ANILCA, and establishment of the refuge, all aspects of the operation and the need for maintenance support have increased significantly. Our accountable property inventory includes 89 units of mission essential motorized equipment. This equipment inventory includes everything from vehicles, snowmobiles, boats and ATV's, to emergency generators and heaters, fire suppression equipment, and portable sawmills. In addition, we are responsible for the maintenance of a wide array of valuable facilities ranging from residences and cabins to fuel storage areas and seaplane/watercraft docks. Facilities include structures both in McGrath and remotely located. The combination of remoteness, isolation, severe environmental conditions, and the lack of maintenance support available from the private sector greatly complicates maintenance, logistics, and operations.

Unfortunately, approval to fill a permanent full-time maintenance position has eluded us. We have, for relatively short periods of time, employed a maintenance helper on a temporary part-time basis. An approach which is sorely inadequate. Our maintenance capability improved quantum leaps this year with the filling of a full-time, but temporary, small engine mechanic position. The incumbent was selected in January (see Section E.1.).

2. Rehabilitation

Two major rehabilitation projects, funded through the Maintenance Management System (MMS), were completed by year's end. In addition, the backlog of smaller equipment and facility rehabilitation projects diminished significantly. Our new maintenance worker, Small Engine Mechanic Joe Reid, took the lead and performed commendably. He received an On-The Spot award for accomplishing these projects.



Refuge field camp located on an oxbow lake adjacent to the Innoko River, 70 miles northwest of McGrath (BA 7/94).

The first major MMS project consisted of facility rehabilitation at the Innoko River field headquarters. Years of harsh environmental conditions including flooding, inadequate maintenance, and heavy use by up to 40 employees at a time had taken their toll. The field headquarters site includes a large administrative cabin, a two-story shop/cache building, a fuel storage and handling facility, and three seaplane/watercraft docks. In addition, there are numerous outbuildings including storage, sanitation, laundry, sleeping facilities and a mountain of field equipment.

The major components of work accomplished at the Innoko River field headquarters included raising all buildings on pilings or cribbing to a level sufficient to preclude flooding, replacing flood damaged insulation, replacing the roof and exterior siding on the shower house, replacement/improvement of electrical wiring, and interior work in both the cabin and cache. In addition, several outbuildings received minor repairs and were relocated to higher ground.



At this level the cabin was continuously flooded for several years causing damage to the structure and equipment (7/92).



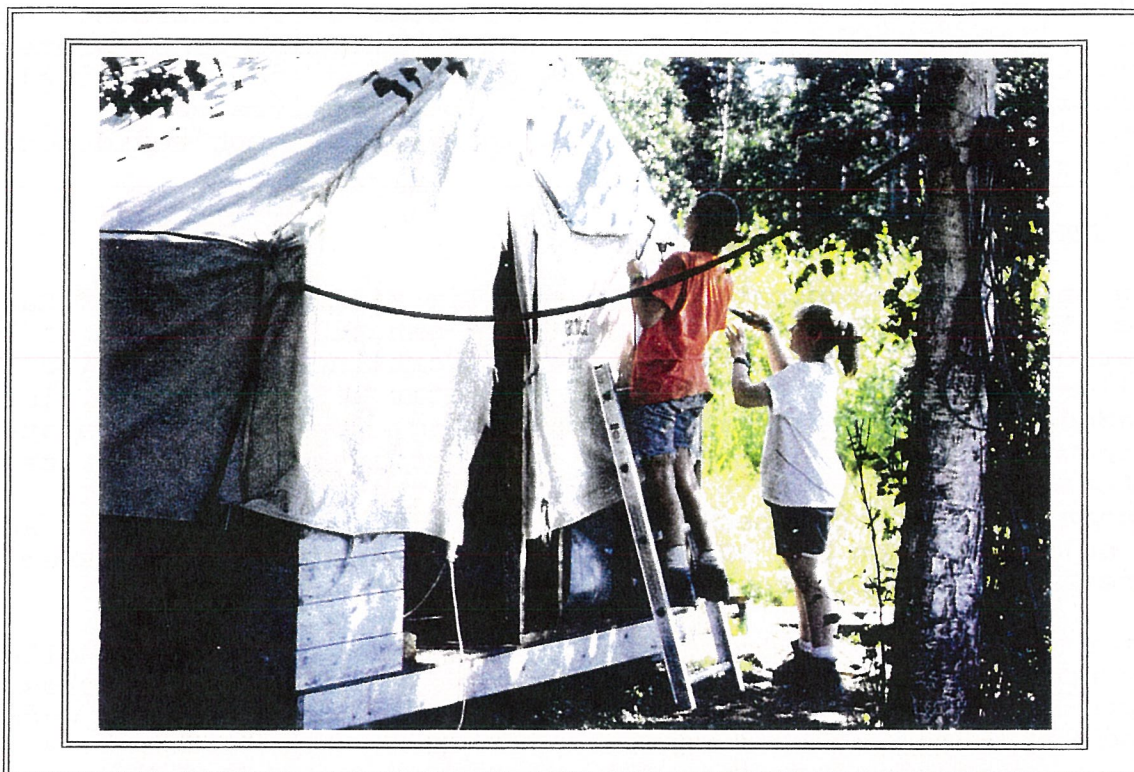
Using cribbing, Small Engine Mechanic Reid raised the cabin over four feet to prevent further flood damage. (KE 8/94).



Small Engine Mechanic (SEM) Reid uses foam to insulate the floor of the newly raised cabin (KE 8/94).



Raising these tent frames one foot above flood stage will alleviate the need to reposition them every spring (BA 9/94).



With assistance from SEM Reid, Volunteer Guldager and BT Hall took the lead on rehabing our tent showerhouse into a...



more easily maintained, not to mention, nice looking structure (KE 7/94).

Our second major MMS project involved rehabilitating the interiors of both government owned residences in McGrath. Work accomplished included the repair and refinishing of all interior surfaces, the installation of new appliances, new electrical fixtures, and bathroom remodeling. The exteriors were rehabilitated with an MMS project in FY-93 so both residences are now in excellent condition.

5. Communications Systems

Regional Telecommunications Manager Tim Miller and Alaska Radio Inc. Technician Ted Collins conducted annual maintenance of the station's radio system on May 10th. Work included visiting, via helicopter, the Beaver Mountain repeater site and our field headquarters for adjustments and testing. Our two base station transceivers located in McGrath also received annual service. Unfortunately, a squelch adjustment at the Beaver Mountain repeater site became necessary and required a return trip, again by helicopter, on May 27th. Our radio communications system functioned reliably throughout the remainder of the year.

Prior to the summer field season, Biological Technician Mallek inspected and tested the station's thirteen hand-held radios. Parts or repairs were ordered as necessary and all units were in good working order by June 1.

6. Computer Systems

Information Resource Management (IRM) Computer Specialist Andy Mooney visited our McGrath headquarters on September 13-14. The purpose of the visit was to handle a variety of computer related tasks. His accomplishments included networking our computer work stations and printers, installing a new modem for CC:MAIL, getting our GIS system large color plotter up and running, and resolving several software "glitches".

The addition of three computer work stations, including the GIS system, late in 1993 improved office efficiency significantly in 1994. However, we are still in need of three new stations in order to totally eliminate standing in line.

J. OTHER ITEMS

3. Credits

Sections A-D, I.1-7, and K were written by RM Merritt. Sections F and G (except G.7, 10, and 16) were written by WB Skinner. Sections E.2, G.7, and H (except H.8-10 and 17) were written by ROS Skinner. Section G.16 and H.17 were written by WB/P Finley. Section G.10 was written by BT Mallek. Section A, E.3, 4, 6, and 8, H.8-10, and J.1-3 were completed by DM Reid. In addition, DM Reid compiled and edited this entire report.

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