ANNUAL NARRATIVE REPORT
Calendar Year 1981

KENAI NATIONAL WILDLIFE REFUGE
Soldotna, Alaska

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REGION SEVEN
U. S. Fish and Wildlife Service

Review and Approvals

DER 8/25 TC 10/22/82

Mike Hedrick 8/24/82

Submitted by Date

Regional Office Date 8/25/82

KENAI NATIONAL WILDLIFE REFUGE

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PERMANENT

1.	Robert L. Delaney	Refuge Manager	GS-13	PFT	
2.	Vernon D. Berns	Asst. RM, Enforcement	GS-11	PFT	
3.	Robert A. Richey	Asst. RM, Oil & Gas	GS-11	PFT*	
4.	Linda K. Gintoli	Asst. RM, Recreation	GS-11	PFT	
5.	Theodore N. Bailey	Wildlife Biologist	GS-11	PFT	
6.	Theodore "Al" Johnson	Forester	GS-11	PFT	Trans. 10/3/81
7.	Richard K. Johnston	Recreational Planner	GS-9	PFT	
8.	Eugene P. Heath, Jr.	Administrative Officer	GS-9	PFT	
9.	James E. Lewandoski	Asst. Forester	GS-7	PCS	Res. 1/16/81*
10.	Leslie G. Blaylock	Administrative Clerk	GS-5	PCS	
11.	James D. Woolington	Biological Technician	GS-5	PCS	Res. 9/18/81*
12.	Edward E. Bangs	Biological Technician	GS-5	PCS	Conv. 5/17/81
	to	Wildlife Biologist	GS-7	PCS	
13.	Richard D. Kivi	Equipment Operator	WG-10	PFT	
14.	Patricia A. Fencl	Clerk/Typist	GS-3	PPT	

TEMPORARY

1.	David C. Dickson	Park Tech.	GS-5	EOD 6/8/81	Term: 9/19/81*
2.	William P. Eickhoff	Park Tech.	GS-5	EOD 6/8/81	Term: 9/19/81*
3.	L. Mark Kibler	Park Tech.	GS-5	EOD 6/14/81	Term: 10/1/81*

YACC CREW

1. Brian P. Canaiy	Group Leader	GS-7	PCS	Terminated 11/13/81

*Not Shown

A. HIGHLIGHTS

The year began with one of the mildest weather patterns during January since records have been maintained. The largest lakes on the refuge, Skilak and Tustumena, reopened of ice by mid-January. The Kenai Lowlands were devoid of snow the entire spring.

On January 2, Secretary of Interior, Cecil D. Andrus, designated the 60-mile Swan Lake Canoe Route and the 80-mile Swanson River Canoe Route as National Recreation Trails.

The five year wolf moose investigation study on the refuge under control with Michigan State University was completed. The subject, study, and management implementations have been and are anticipated to remain controversial.

A comprehensive sign plan for the refuge was completed and approved and over $20,000 of new signs were ordered.

A Kenai Peninsula Borough proposal to locate a dump site for special waste on the refuge through a land exchange proved to be an exciting, controversial, and a time consuming proposal. The matter is still pending.

A major land exchange was negotiated with the Kenai Native Association which could return 6,562 acres to the refuge. Only a public hearing and hierarchial approval remains on the exchange.

On February 6, Walter Soroka, Special Agent with Law Enforcement, and family were able to "break the ice" and introduce themselves to the refuge staff. Wally had been living in the area for sometime prior to the date as an undercover agent while working on a major ivory case. He now maintains an office in the refuge headquarters building.

Contracts were let for the last of Kenai's BLHP funds this year. The Headquarters entrance drive and parking area were black-topped. Site work and utilites were completed for a shop, storage building, fuel building, residence, bunkhouse, floatplane fueling station, and access road.

On May 10, the following dignitaries and participants of the Alaska Audubon Conference toured the Kenai Refuge:

> Dr. Russell W. Peterson, President, National Audubon Society; Keith Schreiner, Regional Director, U.S. Fish and Wildlife Service, Alaska; Stewart Brandborg, Environmental Task Force Consultant; Laurence R. Jahn, Vice President, Wildlife Management Institute; Nancy Russell LaBlond, Executive Director, Arctic International Wildlife Range Society; Clay Schoenfeld, Professor of Journalism and Wildlife Management, University of Wisconsin; Thomas L. Kimball, President, National Wildlife Federation; William A. Butler, Vice President for Government Relations and Counsel, National Audubon Society; Pat Goggin, Assistant Director, National Wildlife Federation Resource Defense; John S. Gottschalk, Counsel,

International Association Fish and Wildlife Agencies; Forrest Carpenter, Executive Director, National Wildlife Refuge Association; and Dr. Durwood L. Allen, Professor, Purdue University Department of Forestry and Natural Resources.

During September, Dr. Jeremy Anderson, Director of the new Pilanesberg National Park, Republic of Bophatusan, Africa, visited the Refuge.

B. CLIMATIC CONDITIONS

The refuge experienced one of the warmest Januarys in recorded history. It was not unusual to find above freezing temperatures many days during the month, and on January 31, the thermometer reached 47 degrees at the Kenai Airport.

Although all lakes on the refuge froze during December of 1980, 2-3 weeks early for Skilak and Tustumena Lakes, (these two vast bodies of water reopened in mid January).

Poor weather hampered flying opportunities and the lack of snow made locating radio-collared wolves and moose difficult. The warm, wet weather also reduced public use activities such as ice fishing and skiing.

February was generally mild with two brief periods of normal freezing temperatures. Several rainy days melted most snow cover that was present. Roads were slippery due to above normal temperatures and intermittent rain.

Mild weather continued into March with a series of clear, warm days and temperatures in the 40's. Most of the snow cover in the lowlands melted by mid-March and geese and trumpeter swans were observed as early as March 27.

Ice was completely gone on all the larger lakes by April 5. Several of the smaller lakes became ice free the last week of the period. Mosquitoes were observed by the end of the month. The clear, warm April weather also brought hordes of campers, fishermen, and other recreationists seeking outdoor activities.

May, like April, was unseasonably clear and sunny, resulting in favorable weather conditions for local, and Anchorage recreationists. Campgrounds were full most weekends.

Like the preceding months, June was clear and dry. Rain occurred on only one day when .15" was measured. Scattered pockets of the refuge, particularly near the mountains, received slightly more precipitation, but still below normal. Two fires, originating from lightening, occurred on the refuge during June, a rare occurrence on the Kenai Peninsula.

July weather was cool and rainy, lacking only a few tenths of equalling the record level rain fall for July. River levels during July ranged from normal to slightly above normal following the rainy conditions. Peninsula lake levels approached near normal with the increased rains in July. Only one fire occurred during July which burned approximately one fourth acre.

Late August signaled the end of summer on the Kenai Peninsula as birch trees assumed their yellow foliage and traffic from sport fishermen decreased. Early morning temperatures were in the low 30's, leaving frost on car windshields. The heavy rains in July and early August brought all rivers, streams, and lakes to near flood levels.

September was one of the most colorful months on the Kenai Peninsula during the past 5 years. Birch, aspen, and fireweed retained their brilliant yellow to red until their leaves fell after a frost on September 21. Moose hunters also enjoyed an improved season, compared to the 1980 moose season, a result of the mild 1980-81 winter and favorable browse conditions caused by the 1969 burn area.

The first light snow of the season came on October 4, but by the end of the month 6 to 10" accummulated over the Kenai Lowlands. Only the smallest of lakes and potholes received a cover of ice. Water levels were near normal with hunting success good to excellent. Silver salmon fishing remained good through the middle of the month.

The refuge received snow on different occasions during November and it reached a depth of 13-1/4" at the headquarters by November 30. Although snow depth varied considerably at different elevations and locations, there was enough to spark a flurry of telephone calls from anxious snowmobilers for the season to open on the refuge.

Temperatures hovered near zero degrees for most of December. Snow depths were approximately 12.4 inches at the start of December and the refuge was opened to snowmachines in designated areas on December 4. A short period of rain came on December 17, temporarily dampening spirits and leading to speculation that the winter could turn out as dismal as the previous two. To everyone's relief, an additional 8 inches of snow was dumped December 23 that made a beautiful white Christmas. Subsequent cold temperatures, and an 18 inch snow cover were responsible for the large number of people using X-country ski trails surrounding the headquarters complex during the season.

C. LAND ACQUISITION

1. Fee Title

a. Alaska Native Claims Settlement Act (ANCSA)

1) Kenai Native Association, Inc. (KNA) - Following conveyance of 18,083 acres of refuge lands on March 21, 1980 to KNA it was quickly apparent under 22 (g) of ANCSA (i.e., lands remain subject to the laws and regulations governing use and development of this refuge), this

Native group would have difficulty developing their land as they desired. Plans to establish a 480 lot subdivision for KNA members, other commercial operations, aircraft landing areas, roads and other proposals were unable to be provided KNA under the 22 (g) stipulations.

Negotiations between KNA and FWS, regarding a possible land exchange, continued throughout this period finally culminating in a document, "Agreement for the Exchange of Lands." This agreement provides for the return of 6,562 acres to the refuge in exchange for "clear title" to the remaining acreage, i.e., use of those lands unencumbered by the constraints of Section 22(g). In addition, KNA has the right of free use of sand and gravel for the development of those lands and will receive, as well, title to the old Kenai National Moose Range Headquarters site at Kenai. A public hearing on this land exchange will be conducted in early 1982.

2) Cook Inlet Region, Inc. (CIRI) - CIRI submitted a "Kenai National Wildlife Refuge Trade/Settlement" proposal to FWS in late 1980 which was approved May 18, 1981 as the "Beaver Creek Settlement Agreement." This land exchange between FWS and Native corporations in the Cook Inlet Region provides appropriate land entitlement under ANCSA while maintaining the national interest in natural resources in the Kenai NWR.

The Beaver Creek Settlement Agreement identifies lands within the refuge previously available for selection by CIRI which will be retained in the refuge; settles an outstanding dispute between the parties over what acreage in the refuge is yet to be conveyed to CIRI; provides CIRI with subsurface rights or interests in certain lands to be conveyed to the village of Salamatof and KNA; and resolves any potential dispute between the parties once the intent of Section 1406(d) of ANILCA is fulfilled.

Certain refuge lands to be conveyed to Salamatof and to CIRI under Section 1432 of ANILCA and the present Agreement are to be removed from the Kenai NWR.

3) Tyonek Native Corporation - Since conveyance of approximately 32,938 acres of refuge lands to the Tyonek Native Corporation under interim Conveyance No. 173 dated April 6, 1979, there has been no change in the status of those lands.

4) Salamatof Native Corporation - The dispute concerning the eligibility of Salamatof as a Village Corporation under the Alaska Native Claims Settlement Act (ANCSA) was resolved December 2, 1980 with passage of the Alaska National Interest Lands Conservation Act (ANILCA). The Salamatof Agreement between Salamatof Native Association, Inc., Cook Inlet Region, Inc. (CIRI), and the United States of America was finalized by those parties August 17, 1979 with the understanding this agreement would become binding only upon legislative authorization. Section 1432 of ANILCA provided that necessary approval.

Salamatof asserted it had selection rights under ANCSA to 57,480 acres within the boundaries of the Kenai National Moose Range. This surface estate was reduced to 16,535 acres under the Agreement providing such lands were removed from the Range and were also released from Section 22 (g) of ANCSA ["such lands remain subject to the laws and regulations governing use and development of such Refuges"]. The subsurface estate under the agreement was conveyed to CIRI.

The surface estate lands conveyed involved nearly 10,000 acres surrounding Elephant Lake, about 3500 acres north of the City of Kenai, and all refuge lands north of the Funny River Road to the refuge boundary.

5) Point Possession, Inc. - This native group was found ineligible as a village by BLM. Although Point Possession, Inc. claims negotiations to appeal this ruling have been active, it has never appealed the denial of its eligibility as a village. The status of this appeal is holding up the publication of final entitlement acreage figures for over 200 eligible villages and regional corporations.

Point Possession, Inc. we understand is in the process of filing as a native group under ANCSA. Approval of group status under a negotiated settlement with FWS may convey about 300 acres of refuge lands near Point Possession to them.

2. Easements

a. State Material Sites - Several right-of-way grants were issued in 1965 to the State Department of Highways as material sites adjacent the Sterling Highway for use in construction and maintenance of this facility. Once established, these open gravel pit sites have over the years remained generally unused, open to the vehicular public, staging areas for vehicle stripping, garbage disposal and other associated uses. During 1978, and again this construction season, the refuge staff has negotiated with State Highway contractors to rehabilitate some sites. Two major material sites well spaced along the highway remain active and provide adequate material for required uses on the Kenai NWR. Although the staff has on several occasions requested the State Highway Department to officially abandon these smaller restored sites, some less than two miles apart, the State has refused to relinquish these grants stating, "we may need them someday." The grants unfortunately remain in force as long as the State expresses some need in the future.

b. Naptowne Radio Relay Site - This 275 foot tower site, commonly referred to locally as "Site 19", was constructed in 1955 for the Department of the Air Force by the District Engineer without proper authorization and "in direct disregard of refuge regulations." Special use permits have subsequently been issued to the Air Force to cover this facility in support of the existing White Alice Communications Radio Relay System. The Air Force has requested approval to relinquish their interest to Alascom, Inc. who will assume responsibility for the facility and its operation.

3. Other

a. Oil and Gas

1) Beaver Creek Field - Drilling operations commenced on Beaver Creek Unit No. 6 well November 19, 1981 from a surface location on well pad No. 3. This directionally drilled well should reach the total depth location of 15,860 feet by April 1982. Drilling operations continued mostly through the end of the year reaching 10,000 feet. This is the third well to be drilled from this pad since 1968.

Only two of the six wells in this small field are producing crude. The additional wells are gas and except for one used for gas lift, remained capped. The two crude producers, wells Nos. 4 and 5, together average about 500 BBLS/DA. Cumulative production totals 2,503,431 BBLS.

All produced crude continues to be trucked from the Field in 200 BBL. tanker trucks. One of these semi-tankers, while driving briskly through a curve on the access road from the field November 6, 1981, slid on the ice covered surface avoiding another on-coming tractor-lowboy truck and rolled over on its side off the road. About 64 BBLs of crude were spilled over ice/snow covered peat from the vent pipe atop the tanker unit. More than 13 BBLS were immediately recovered with vacuum truck units, the balance required removal of the saturated peat.

2) Swanson River Oil Field - Two new water disposal wells were drilled and completed in the Sterling zone shallow salt water sands. During this reporting period the Field produced nearly as much salt water as crude per day, 8,132 BBLS. and 8,033 BBLS. respectively. This drop in production from the maximum 40,000 BBLS/Da in February 1964 is expected for the 25 year old facility. Cumulative crude production through December 1981 was 192,431,376 BBLS. or 42.6 percent of the estimated original in place crude. All revenue crude is shipped via Kenai Pipelines 19.6 mile 8-inch line terminating at the Nikiski tank farm.

The Hemlock crude production zone pressures are maintained by fifteen huge compressor units developing 38,000 H.P. Injection wells stratagically placed throughout the field maintain down-hole pressures at about 4,700 gpsi. As much as 320,000 MCF/D is reinjected @ 5,700-6,000 gpsi to maintain formation pressures.

Propane production is a spin-off of gas recovery/compression operations and is sold commercially. About 7,000 gallons of propane was produced daily during this period.

On March 11, an explosion in the emergency generator/boiler room caused extensive damage to the building including electric power and alarm/shut down systems for Plant 10 compressors. Plant 10 was returned to operation on March 26.

The collapse of a 5,000 BBL. water holding tank due to corrosion December 4, 1977 began a chain reaction which burned and destroyed three 1-33 tank setting buildings and four additional tanks. The rebuilding of

this facility is now 80 percent complete with all buildings erected and all vessels set. Instrumentation work should be complete by May 1982.

During a routine inspection of field transformers September 15, crews located a hairline crack on one transformer that had been leaking oil. The oil showed 55 ppm PCB, it was estimated about 2 gals. may have leaked onto the surface. The oil was drained and the crack weld repaired. Oil from a second similar transformer was also drained and replaced. The supporting concrete pad was chipped away, gravel removed, and all contaminated material, work clothes, tools, and the oil were drummed in 19 containers and shipped outside for proper disposal. Total cost for this operation to the operator was $54,000.

3) Seismic Operations - The second of a three season seismograph program conducted by ARCO Alaska, Inc. under agreement with CIRI began in earnest the first week in January. An additional camp had been erected at an old gravel site adjacent Funny River Road to support a second crew working generally southeast of refuge headquarters. The original camp in the Swanson River Field was also manned with about 35 persons mostly working those areas west of the field. During the first project season the Swanson River camp supported both crews, a total of 70 persons. Because of the logistics involved working the two distant areas it was logical to establish separate facilities near the work areas.

Satellite navigation was used to obtain vertical control of selected points and a mini-ranger program provided the X-Y coordinates. We understand accuracies to the meter were routine.

The two-mile grids, shot by both crews, were for the most part shot in stakes using two one-pound explosive packages. Minimal snow cover this season did not allow charges to be detonated on the surface and, unlike the proceding season, few, if any, individuals required snowshoes.

The second season's program was terminated April 6, with a project total from both crews of 257.22 miles. The first season's program was completed March 31 with 205.91 miles shot.

The third season began mid-November with the arrival of a survey crew. This year, ARCO decided to use only a 35 person crew working first from the Funny River Camp to complete a few lines south and east of the refuge headquarters, then back to the Swanson River camp to complete lines mostly south of the Swanson River Field.

This total portable program by Mile-Hi using only helicopters to support men and equipment along the lines has been without doubt the cleanest and to surface resources least damaging seismic program conducted on these lands.

The final three-year effort was continuing at year's end, only 18.57 miles had been shot since data acquistion began November 20. Equipment failure, weather and limited daylight all contributed to the slow progress. This season's last effort should involve approximately 100 miles of line and be completed in early April of 1982.

Despite the numerous daily helicopter trips along these lines, various winter weather conditions, long line (150-175 ft.) operations, no accidents had been reported.

CIRI and ARCO representatives on tour, inspect surface source lay-out of a shot array along a seismic line route. Lack of sufficient snow cover requires use of stakes supporting explosive charges. (Staff Photo)

Surface source used was Kinepak, normally a one or two pound configuration. All charges were connected by 50 grain detonation cord for instantaneous detonation.
(Staff Photo)

Detonation of a shot array, comprised of 36 individual shotpoints, arranged in a 220 foot parallelogram. The most disturbing environmental factor is the very loud report accompanying the detonation. (Staff Photo)

Following detonation, observed disturbance is limited to the immediate adjacent surface vegetation at the shot point location. Stakes and associated debris are recovered for proper disposal. (Staff Photo)

D. PLANNING

1. Master Plan

The Kenai comprehensive conservation plan is scheduled for completion December 1983, with the first draft to be completed by August 1982. Much of the work done in 1981 was collecting background information. Classification systems were developed for vegetation, wildlife, fisheries, and recreational resources. Data gaps, other information needs and special refuge resources were identified.

Vegetation was analyzed by LANDSAT imagery (14 classes). Refuge wildlife was grouped into one of 16 life forms and wildlife habitats were classified into 14 major types. Each major habitat type was associated with species requiring that habitat for reproductive purpose, groups of indicator species were associated with each habitat, and at least one species of the indicator group was chosen to represent the wildlife values associated with each habitat class.

Fisheries resources were classified into four major water habitat classes. The four fishery classes, anadromous fish streams, anadromous fish lakes, resident fish streams, and resident fish lakes, were all assigned a diversity index, ecological dominant species listed, and representative species for output production were selected.

Recreation was classified into Recreation Opportunity Settings ranging from primitive to modern. All the settings and existing recreational uses on the refuge were mapped.

The first two sections of the plan were drafted.

3. Public Participation

A special edition of the Kenai Planning Bulletin, involving all the issues and concerns raised at a series of public meetings during the fall of 1980, was prepared and sent to several hundred people on the planning mailing list. A copy is attached as an appendix to this report.

5. Research and Investigations

a. Wolf-Moose Predator - Prey Study - Investigators: Rolf O. Peterson and James D. Woolington.

In 1976, uncertain relationships of the moose population to increased human pressure, weather, changing habitat, and predation lead to a co-operative Federal-State study of wolves, bears and early moose calf mortality. The refuge staff has been involved with the portion dealing with wolf and coyote ecology.

The wolf ecology project was scheduled to end September, 1980 but because of a high mortality caused by humans, the study was extended one year to assess the impact of their harvest. Data were limited because of the usually mild winter of 1980-81. However, 43 wolves were taken,

many from the refuge, from a Kenai Peninsula-wide population estimated to be 180 animals. Despite local overharvest, the refuge-wide population was apparently not significantly lower in 1981-82 and appeared to confirm Peterson's findings that wolf populations could maintain themselves if their harvest by humans did not exceed 30%-40% of the early winter population. Research was concluded in the fall, 1981. Only three packs remained radio-collared and no additional animals will be tagged. Wolf research findings are being published at the current time by Dr. Peterson. Coyote ecology information will be published by J. Woolington. (See appendix)

b. Nutritional Basis for Qualifying the Capacity of the Kenai National Wildlife Refuge to Support Moose. Investigator: Wayne Regelin, Denver Wildlife Research Center. Period: 1977-1982.

Work continued using six captured moose that were raised at the Moose Research Center. These moose have been trained to accept handling and confinement in the respiration chamber for metabolic rate measurements. These and other moose will be used to:

1) Estimate the quantity of food intake during each season.

2) Obtain activity budgets of free-ranging moose for 24-hour periods each season.

3) Measure the fasting metabolic rate of moose each season.

4) Measure rumen turn-over time each season.

5) Determine rumen volume in different sex and age classes of moose.

Other objectives to develop a carrying capacity model for moose of the wildlife refuge include:

1) Mapping vegetation types on the Kenai NWR.

2) Sampling each type for estimates of shrub density and standing-crop biomass of herbage and forage.

3) Determine forage preferences of moose throughout the year.

4) To evaluate the nutritional quality of major forage species throughout the annual cycle.

c. Moose Research Center Studies - Investigators: A. W. Franzmann and C. C. Schwartz, Alaska Department of Fish and Game.

Research continued on the black bear project that was initiated in 1977. Black bears were captured in the vicinity of the Moose Research Center in the spring and monitored throughout the summer and fall. During the winter, bears were drugged in their dens and physiological data collected. Preliminary results suggest black bear avoid open habitat and that this behavior may result in the different mortality rates witnessed among moose calves born in open versus dense vegetation types. Cranberries appear to be an important food for black bears on the Kenai Lowlands.

An experiment in moose reproductive biology, started in 1979, was attempted again in 1981, but once more failed. The experiment was to test the effect of late breeding in moose. All bulls were removed from a one square mile enclosure in which 6 cow moose were held. The plan was to allow cows to go through their first estrus cycle unbred, then introduce a bull. A large bull in an adjoining enclosure had a different plan of what should be done and battered down a 10 foot chain link gate to join the cows. The experiment will be attempted again next year.

d. Summer Ecology of the Common Loon - Investigator: Elizabeth Smith.

Liz Smith finished her master's thesis at the Colorado State University in 1981. Liz estimated a refuge loon population of 1,668 birds north of the Kenai River. Territory size for the canoe system loons (6 pair) averaged 40 ha., while territories for loons on control lakes (11 pair) averaged 44 ha. Nesting success was similar for both study areas but only half as many loons nested in the canoe lakes compared to the control lakes. It appears that canoeists do affect common loon production.

e. Willow-Insect-Moose Relationships - Investigators: E. Bangs and T. Bailey.

A field project was initiated in 1980 to measure possible differences in moose browsing preference of willow in relation to saw-fly parasitism. Data collected to date indicate that the average annual growth of parasitized twigs in 1980 was 10.1 inches while unparasitized twigs averaged 16.8 inches. Only 29 out of 150 twigs with galls were browsed while 81 of 150 unparasitized twigs were browsed by moose. Nine twig groups of fifteen with galls were browsed, while 14 twig groups without galls were browsed. Saw-fly parasitism of willow stems effects both the amount of annual growth per twig and the palatability of those stems to moose. Additional stems were marked for 1981 and work is scheduled to continue into 1983.

f. Moose Movement and Distribution in Response to Winter Seismological Exploration on the Kenai National Wildlife Refuge, Alaska - Investigators: E. Bangs and T. Bailey.

This project is being conducted by refuge personnel under a grant from Atlantic Richfield Company. The project started in November, 1980, with the capture, and collaring, of 60 moose, 30 in each of two study areas. In the Slikok Lake area, moose are being tracked and observed to assess their response to a 4-month long seismic exploration program being conducted by ARCO for the Cook Inlet Region Corp. In the control area near Finger Lakes, there is no seismic program and moose are monitored there to obtain data for comparison to the Slikok Lake area. The radio-collared moose are tracked from aircraft as often as weather permits. Information from this study should not only determine what effect blasting, helicopters, and human activity have on wintering moose, but also provide data on moose migration routes, calving areas, predation rates, habitat selection, and the herd sex and age structure.

Six radio-collared moose have died so far in the study, but the causes of mortality were unexpected. Two cows were killed by cars, but not reported to the State Troopers. Two bulls were killed during hunting season, one was killed by hunters who did not report the marked animal, but shot the radio-collar (fortunately it remained operating). One cow was killed by a brown bear and another had its leg caught in a tree fork and died. The latter moose, when found, had been dead two weeks but had not been fed on.

The final report on the impact of seismic exploration on wintering moose will be completed in July, 1982.

g. Alaska Department of Fish and Game Fisheries Project

1) Tustumena Lake - Approximately 8.8 million sockeye fry were planted in Tustumena Lake in 1981 and 20 million eggs were taken for brood stock (10 million - Bear Creek, 10 million - Glacier Flats Creek) in Bear Creek and Glacier Flats Creek. Studies on the productivity of Tustumena Lake continues and include smolt outmigration estimates, peak sockeye escapement counts on seven index streams into Tustumena Lake (Bear Creek, Glacier Flats Creek, Moose Creek, Nikolai Creek, Seepage Creek, Clear Creek, Crystal Creek), limnological sampling and tow-netting to estimate fry abundance in Tustumena Lake.

There is a 20 million sockeye egg take scheduled for August 1982 with a fry release (approx. 15.0 m) scheduled in June 1982.

2) Hidden Lake - Although limnological studies of Hidden Lake continued, sockeye salmon fry were not stocked in Hidden Lake in 1981 because of hatchery problems. Low water flow and siltation in the hatchery water supply at Crooked Creek Hatchery were mainly responsible for the loss. It is now planned to stock sockeye fry into Hidden Lake after the Trail Lake Hatchery is in production sometime in 1982.

A 3 million sockeye egg take is scheduled for September 1982 with a fry release in June 1983.

3) Russian River - High water levels occurred in Russian River during the 1981 spawning period. Because of this, the Russian River fish pass was opened to enable sockeye to by-pass the Russian River Falls. Other aspects of the Russian River sockeye salmon study include assessment of adult escapement, a creel census, and fecundity investigations. A 500,000 coho egg take is scheduled for September 1982.

Fishery biologists from the Alaska Department of Fish and Game annually enumerate red salmon (sockeye) populations as they travel upstream in the Russian River and around this weir located just below Lower Russian Lake. Russian River red salmon are the most intensively used sport fishery on the Kenai NWR.
(Staff Photo)

Summer employees for the ADF&G sample red salmon for length-weight relationships, fecundity, and age information at the Russian River weir. Most fish passing through the weir continue upstream to spawn in Russian Creek which flows into Upper Russian Lake. (Staff Photo)

4) Fisheries Research - A cooperative study by the FWS and ADF&G to document spawning areas used by Kenai River king and silver salmon revealed that radio-equipped king salmon moved up the Kenai River and Killey River to the confluence of Benjamin Creek. It appears that the major early run king salmon spawning area is located in this region. The extent and locations of other salmon spawning areas on the refuge will be documented in a report in 1982 by Carl Burger, FWS.

E. ADMINISTRATION

1. Personnel

During 1981 the Kenai NWR had a staff of 10 permanent full time (PFT), 4 permanent career seasonal, 1 permanent part-time, and 3 summer temporary positions. On October 31, 1981 Forester Theodore "Al" Johnson transferred to BLM in Anchorage, Alaska. Assistant Forester Jim Lewandoski accepted a job with the State of Alaska in Fairbanks, Alaska on January 16, 1981. Biological Technician James Woolington resigned on September 18, 1981, after completion of the Wolf/Moose Predator/Prey Study and accepted a position with the University of Alaska to study otters in Southeast Alaska. Asst. Refuge Manager Robert A. Richey was detailed to the Regional Office on May 17, 1981 and returned full time to this refuge on September 16, 1981.

Vernon D. Berns was detailed to Becharof NWR for a two week period to assist with aerial surveys August 2 thru 15, 1981. Edward Bangs was promoted from bio. technician GS-5 to wildlife biologist GS-7 on May 17, 1981. The maintenance man position and the janitor position were not filled this year due to lack of funds.

Table 1. Staff Breakdown from FY 1977 to FY 1981.

	Permanent		Temporary
	Full-Time	Part-Time	
FY 77	9 FT 3 CS	0	9*** (2 were converted to CS during the year)
FY 78	9 FT 3 CS	0	8
FY 79	10 FT 3 CS	1	9
FY 80	10 FT* 3 CS	1	4**
FY 81	10 FT* 4 CS	1	4**

*(1 FT vacant due to lack of funds)
**(1 Temp. janitor vacant due to lack of funds)
***(1 Bio. Aide student transferred from Bethel)

A major staff realignment was undertaken this year to provide a staff line reorganization which would best meet the management needs of this diversified and complex station. Table #2 depicts the old staffing pattern and Table #3 reflects the new approved reorganization.

Table #2. The Refuge staffing pattern prior to reorganization.

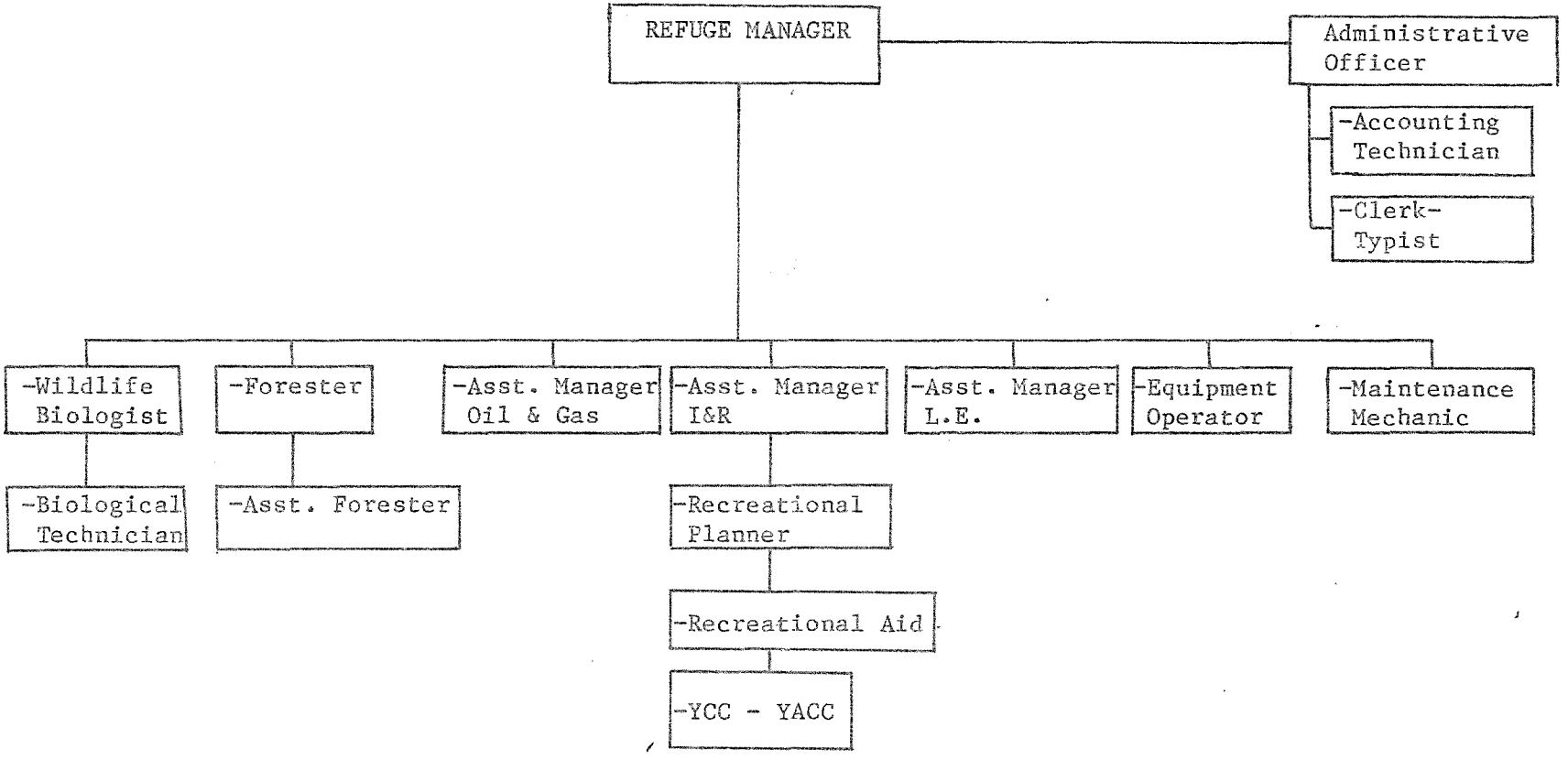
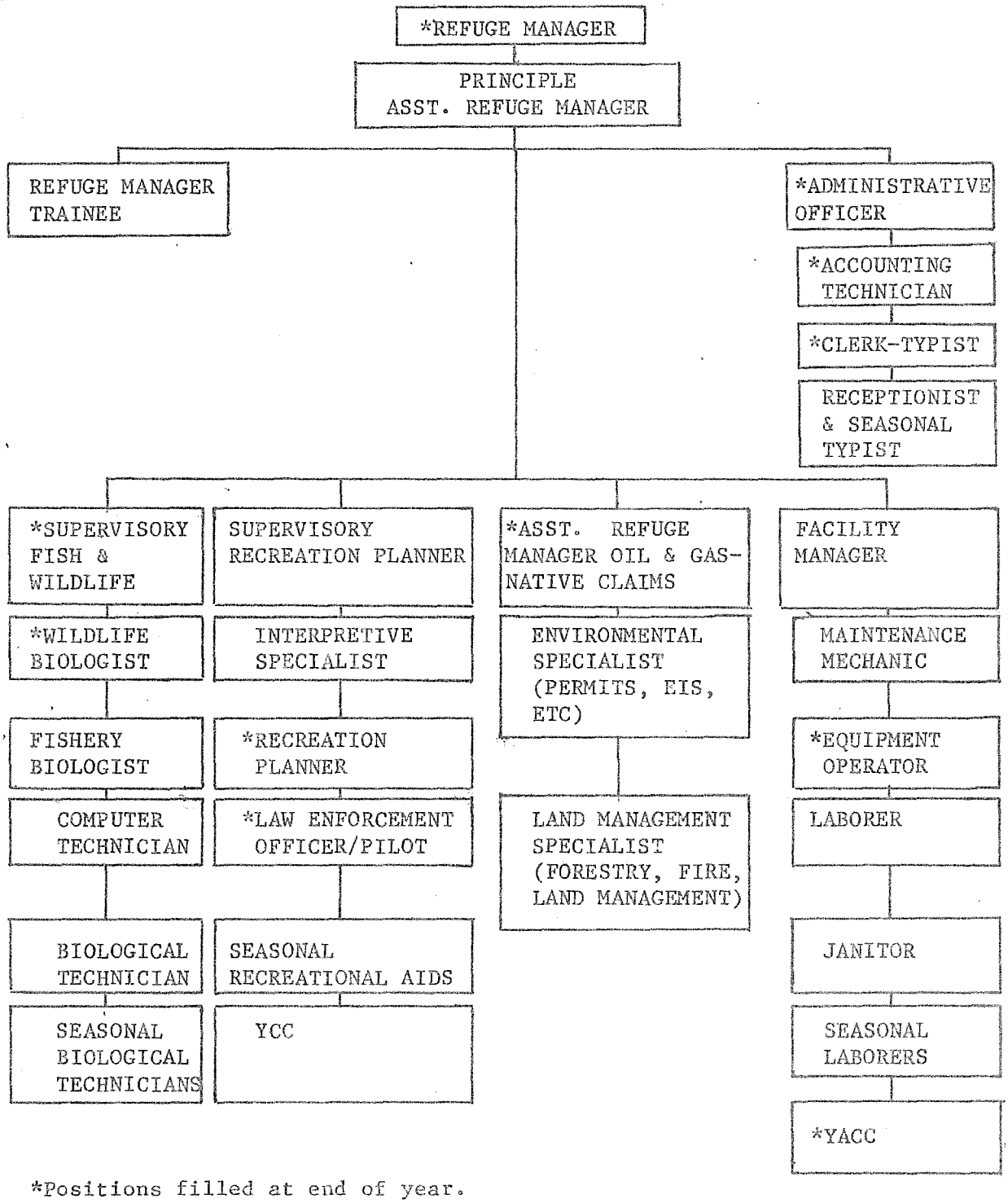


Table 3. The new approved Refuge staffing organization.

KENAI
ORGANIZATION CHART



*Positions filled at end of year.

2. Youth Programs

a. YCC - After a brief flurry of paper work to get a YCC staff hired, the refuge received word that we would not host a YCC program during 1981 due to national YCC budget cuts.

b. YACC - The refuges four-year effort to get a successful YACC program going paid off in 1981. The YACC program has proved to be a great asset to refuge operations. Under the direction of crew leader Brian Canaiy, the refuge has had assistance in administration activities in the form of receptionist/typist, biological aids, recreation aids, and two field maintenance crews. We have also been able to provide manpower to the Denver Wildlife Research Unit, Alaska Department of Fish & Game, and to Fisheries assistance. The entire crew performed at a professional level where self motivation and quality work were essential. We thank all our enrollees and particularly Brian for carrying the refuge through the year.

YACC crews replaced parking bumpers in several campgrounds during the 1981 season. (Staff Photo)

Projects of major significance which were accomplished include, but are by no means limited to: completion of seven EE cabins, installation of over 200 barrier posts in parking areas, painting of sign posts, daily maintenance of all recreation facilities, cutting of hazardous brush along roadways, assisting in operation of the Russian River area, compiling public use data, developing graphic layout of refuge brochures and maps, developing an environmental education program, running the

Alaska Natural History Association sales outlet, providing information for the development of the new visitor center, collecting and tabulating wildlife use information, manning hunter check stations, disection and analysis of furbearer carcassess, typing, answering visitor inquiries, and often acting as all around "gofer".

c. CETA - Kenai Refuge also gained assistance from the Kenai Native Association and Cook Inlet Region's CETA program. Ten youths and a crew leader spent four weeks this summer brushing trails, building resting sites, and replacing directional signs along the 15 km cross-country ski trails. This is the second year the program has been available to us. In exchange for the equipment and a project, the youths are taught good working skills and an appreciation for the agency they are helping.

4. Volunteers Program

During 1981, the Kenai NWR utilized one volunteer who worked 8 hours during December helping with janitorial work around the office. No expenditures were made and approximately $88.00 were saved.

5. Funding

Table 4 displays Kenai's funding and manpower situation from FY 1978 through FY 1981.

Table 4. Kenai National Wildlife Refuge funds and manpower patterns - FY 1978 through 1981..

FISCAL YEAR	1978	1979	1980	1981
YACC Camp	N/A	N/A	2-10	5-22
PFT Manpower	9	9	9	9
PPT Manpower		1	1	1
Career Seasonal	3	3	4	4
Temporary	4	6	5	3
Intermittent	3	1	2	0
YCC Staff	7	5	0	0
YCC Enrollees	30	20	0	0
MB	43,000	61,000	71,000	92,000
MNB	250,000	310,000	296,000	297,000
I&R	180,600	192,400	191,000	190,000
Exp. for Sales	32,000	32,000	37,000	49,000
Subtotal	505,600	545,700	595,000	628,000
I&R-Fee Area	N/A	11,750	7,500	7,300
BLHP	1,300,000	0	75,000	1,494,000

Station funding increases over the past four years have failed to meet inflationary increases except in the MB account. A continuing larger percentage of station funds are obligated to salaries and fixed cost, leaving a dwindling percentage available for operations. With two

headquarter sites to maintain, this continues to be an acute problem. The cost of basic services and supplies such as recreational restroom pumping, trash pickup contracting, and materials to keep 43 separate recreational facilities maintained have far exceeded the capacity of our operating budget. The forecast of a loss of the YACC program, with no replacement type program, will force some very serious belt-tightening within the next 2 years. Recreation facility closures and consolidation will become a reality.

6. Safety

All serious accidents occurring this year involved the visiting public. All involved human error. None were caused by wildlife.

In one instance, a backpacker carrying a "hair trigger" .357 magnum revolver in a shoulder holster, was standing by his campfire when the gun discharged causing a wound about 8" long to his left thigh. Fortunately, one of his two companions was able to stay with him after they stopped the flow of blood and covered him to keep warm, while the other one hiked out for help. He was evacuated to the hospital at Soldotna by helicopter.

An incident at Hidden Lake Campground involved a child falling under a trailer being towed by her father. The trailer ran over her abdomen causing internal injuries which required extensive surgery. An ear was also severed.

A lady angler at the Kenai/Russian River area was struck in the eye by a sinker. Her husband removed the sinker and her eye began to bleed. She was rushed to the Soldotna Hospital by one of our summer employees where her eye was saved although some muscle damage occurred.

Another incident involved a 1974 Catabria airplane which crash landed alongside the Swan Lake Road after stalling when the operator was apparently making a low altitude during a left bank turn. The pilot and his passengers walked away from the crash with minimal injury and were transported to the hospital in Soldotna for treatment.

Personnel injuries were confined to YACC and summer temporary employees. One employee hurt his back while lifting. Another bounced a spud bar he was using to tamp dirt around a post, off the post and onto his toe. The third received a knife puncture wound while removing teeth from collected moose jaws.

Again, this year, we devoted three days to defensive driver's and first aid training, plus general orientation for our summer crew (including safety and procedures for obtaining medical assistance). Various staff members participated in the orientation . Region 7 Safety Officer Ginny Hyatt handled the defensive driver and first aid training.

Monthly safety meetings were held with chairmanship rotating each month. The monthly chairman was responsible for the monthly safety meeting and completion of accident reports.

The annual inspection of our old headquarters service building and the Kenai aircraft hangar by the Kenai Fire Department revealed one fire extinguisher which needed sealed and an updated service tag. Corrections were made.

Many tail-gate safety sessions are held throughout the year to discuss safe way to accomplish work being performed, especially when new tasks or new employees were involved.

Regional Safety Officer Hyatt inspected the old refuge office in Kenai in October, to determine its suitability for temporary conversion to housing for YACC personnel. About all that was necessary, safetywise, was reopening a back door on the quonset hut to provide additional escape route.

On November 3, Tom Belleau, Flight Training Officer, and Dick Erickson, fuel specialist, with OAS in Anchorage, inspected the station aircraft fueling facilities and collected fuel sample for analysis. One correction was made by the contractor who installed the aircraft fuel filter in the new facility at Headquarters Lake upside down. Alaska OAS inspectors also requested we padlock the filter pipe on our aircraft fuel supply tank at headquarters Lake, which we did.

7. Technnical Assistance

Local elementary schools from Kenai, Soldotna, Ninilchik and Sterling participated in "Sea Week", during the months of April and May. "Sea Week" is an environmental education program sponsored by the University of Alaska to familiarize students with the marine environment. The refuge staff attended planning meetings and provided displays, learning materials, assistance to teachers, orientation, and conducted birding field trips to the Kenai River Flats.

For the past three years Kenai staff have served as judges for the annual Sterling Elementary School Science Fair. In May of 1981 Bangs, Woolington, Bailey, and Johnston filled this post.

F. HABITAT MANAGEMENT

3. Forests

a. Only two commerical timber permits were active this period. Permit KN 5-80 was extended to allow permittee Habighorst to complete harvest of 5 and 16 acre areas just south of the Funny River Road. This activity was completed December 16.

A second permit, KN 4-80, also extended, allowed permittee Knutsen to complete harvest of a 13 acre plot and move south onto a 7 acre area, both west of Swanson River Road.

Although some interest was expressed regarding commercial Christmas tree harvest, no permits were issued.

b. The gathering of firewood, houselogs, fence posts, and poles from the refuge continue to be popular activities. In 1981, 549 permits were issued for these purposes. The following is a 6-year summary of the trend in the free use program: 1976 - 194 permits, 1977 - 204 permits, 1978 - 411 permits, 1979 - 290 permits, 1980 - 543 permits, and 1981 - 549 permits.

12. Wilderness and Special Areas

Wilderness management during the calendar year, following wilderness designation, has been largely continuing monitoring of ongoing activities that previously occurred in what is now designated wilderness. Ongoing activities are being reviewed for compatibility with the Wilderness Act and ANILCA.

The access road to Upper Jean Lake was blocked off because it fell within Kenai wilderness.

Wilderness boundaries were included on all new leaflets being developed and maps distributed to the public or to other agencies. Wilderness boundary signs were received from the contractor but will not be placed until spring and summer of 1982.

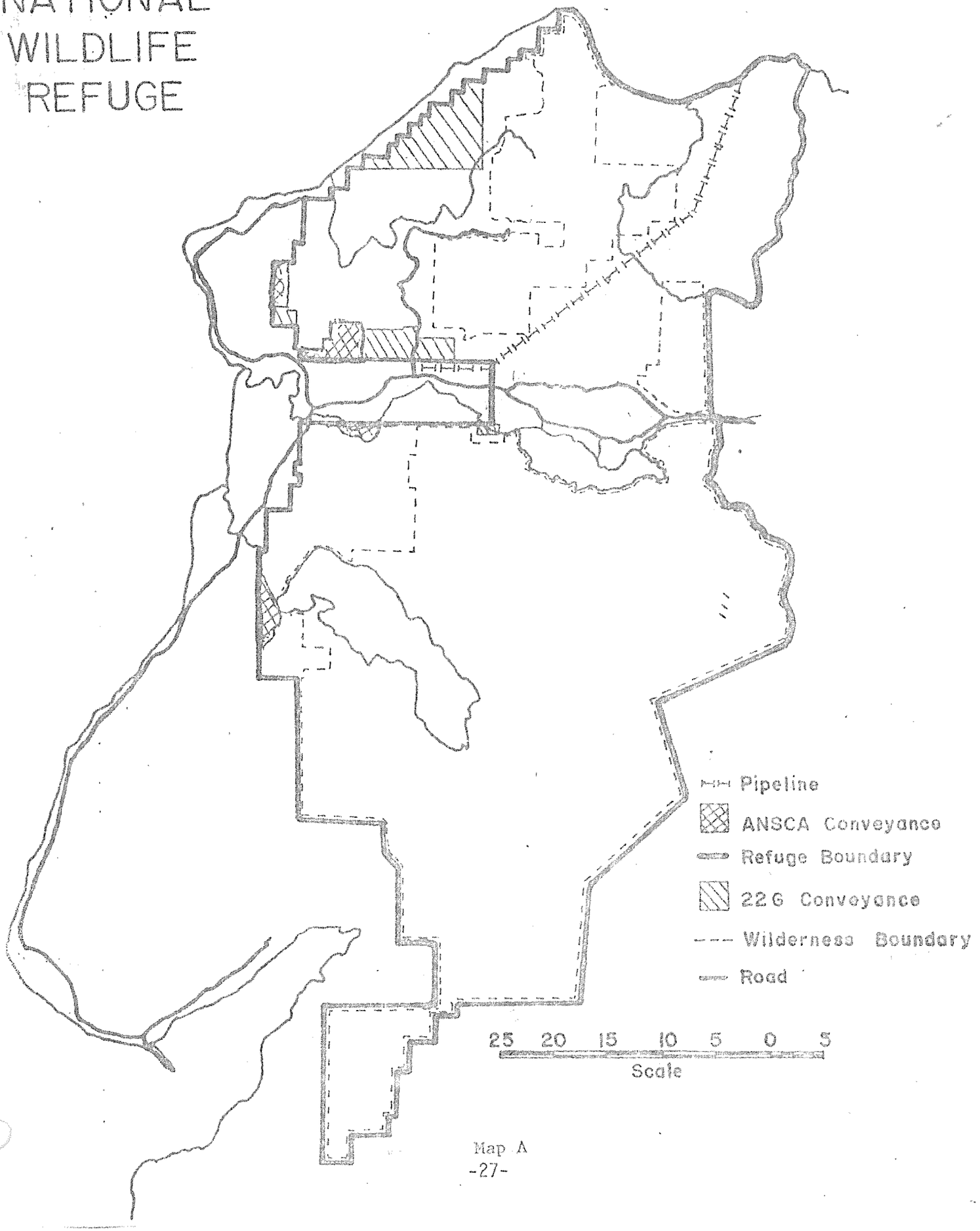
This fall photo, taken from the Sterling Highway, illustrates adjacent Kenai Wilderness at the Highway. Mountains in the background and land right of the powerline is within the Mystery Creek Unit of Kenai Wilderness. (Staff Photo)

Certain portions of Kenai National Wildlife Refuge have generally been managed for wilderness conditions, i.e. no motorized equipment since the mid 1960's. They include the Swan Lake and Swanson River canoe routes, Andy Simons Unit, and Mystery Creek Unit. These units generally coincide with the 1970 recommendation for designation of wilderness. While wilderness proposals moved through the executive branch, these units were expanded and were eventually expanded significantly from the management of the original refuge administration of <u>defacto</u> wilderness.

Several cabins are located within Kenai NWR, most within the Kenai Wilderness. This cabin at Lake Emma, like many on the refuge, is available for public use.
(Staff Photo)

The Alaska Lands Act established 1.35 million acres of wilderness on Kenai NWR to be managed under the guidance of the Wilderness Preservation and Management Act of 1964. Designated Kenai wilderness encompasses all or portions of the major physiographic areas of the refuge. It is the policy of the Fish and Wildlife Service to manage wilderness areas to preserve the wilderness resources for the use and enjoyment of Americans now and in the future (Policy Update No. 12, May 1977). (See Map A next page).

KENAI NATIONAL WILDLIFE REFUGE



Map A

Title 50 CFR states that units of the National Wildlife Refuge System have been established by diverse legal means and are administered for a variety of wildlife program purposes. The establishment of each wilderness unit is within and supplemental to the purposes of which specific units are of the National Wildlife Refuge System was established and are administered (CFR 50, 35.2).

National Wildlife Refuge Administrative Manual states the objectives of wilderness management as follows:

Objectives

1. To manage so as to maintain wilderness resource for future benefit and enjoyment;

2. To preseve the wilderness for research character of the biological and physical features of the area;

3. To provide opportunities for research, solitude and permitted recreational uses;

4. To retain the same level of pre-wilderness designation condition of the area; and

5. To ensure that the works of man remain substantially unnoticeable.

G. WILDLIFE

1. Wildlife Diversity

Wildlife diversity on the Kenai NWR was evaluated according to 14 major wildlife habitats which were classified from the LANDSAT vegetation cover mapping project, knowledge of major wildfire burn boundaries, and other features significant to wildlife. Based on the known presence of breeding species and the expected habitat preferences of non-breeding species uncommon to rare on the refuge, riparian, islands in lakes, wetlands, mature forest, and intermediate stage forest provide breeding habitats for most species, in order of decreasing importance, on the refuge (Table 5).

Table 5. Wildlife habitats and numbers of breeding species[1] or potential breeding species[2] on the Kenai NWR.

Type of habitat	Habitat	Number of species
Unique	Cliffs	15
	Islands in lakes	148
Special	Riparian Zones	199
	Wetlands	96
Boreal Forest	Old-growth (200-300 years old)	56
	Mature (70-200 years old)	68
	Intermediate (40-70 years old)	66
	Intermediate (20-40 years old)	47
	Early (0-20 years old)	39
Permanent Scrub	Lowland Scrub	41
	Subalpine Scrub	31
Alpine	Alpine Shrub-tundra	24
Other	Mudflats, rock, gravel outwash	18
	Snow, glaciers, ice	0

[1]Vertebrates only excluding fish, known to reproduce on refuge.
[2]Vertebrates only excluding fish, observed on refuge but not observed nesting or with young.

The status of four mammalian species is unknown on the refuge (least weasel, northern flying squirrel, brown lemming, western jumping mouse); several mammalian species are extremely rare (marten, red fox); uncommon (wolverine); occur in relatively low numbers (brown bear); or little is known about their status (river otter, lynx) on the refuge.

In terms of abundance, the most abundant species on the refuge appear to be those species associated with early successional stage forests or disturbed environments (moose, coyote, red-backed voles) and the least abundant are those associated with old-growth or undisturbed forest habitats (marten, great grey owl, black-backed three-toed woodpecker, northern three-toed woodpecker) or open grasslands (meadow vole) or alpine environment (brown bear, red fox).

Birds comprise the largest number of species on the refuge and of these, most are migratory. The most important factor contributing to wildlife diversity on the refuge is the presence of thousands of lakes, ponds, and wetland areas. Habitats supporting uncommon to rare species include cliffs, islands in lakes, alpine, and old-growth forest habitats.

2. Endangered and/or Threatened Species

The taxonomic status of falcons utilizing the refuge during the nesting period is unknown, but expected to be the Peale's Peregrine Falcon, a non-endangered subspecies. No other species on the FWS endangered list is known to use the refuge. The Tule Goose, which nests on the west side of Cook Inlet, apparently uses the Chickaloon River Flats on the refuge during the waterfowl season. The Tule goose is a dark race of the white-fronted goose, with an estimated 3,500-5,000 population, and its status is currently being investigated in Alaska and California.

3. Waterfowl

Trumpeter swans continued to dominate waterfowl related surveys on the Kenai NWR during 1981 because relatively few trumpeters nest on the refuge. During 1981, 34 trumpeter swan nests were located, average clutch size of 6 nests was 4.3, 93 cygnets were observed in 23 broods during the early brood survey, and 60 cygnets were observed in 17 broods during the late brood survey. Location of nests in 1981 are shown in Table 6.

Table 6. Locations of Trumpeter swan nests and numbers of cygnets observed on Kenai Peninsula, 1981.

Nest Location	Cygnets	Nest Location	Cygnets
Donkey Lake	4	Pipeline Rd. Beaver Pond	4
Beaver Lake	6	Gribe Lake	5
Mink Creek Lake	2	Trapper Joe	4
Finger Lakes	4	S. Brown's Lake	4
Timberlost Lake	4	Bay Lake	3
Grey Cliff Lake	4	Clam Gulch	3
Tony's Lake	3	Pollard's Lake	6
Hook Lake	3	Fox Lake	4
Quill Lake	4	Harvey Lake	0
N. Pepper Lake	2	Windy Lake	0
Dipper Lake	5	Crooked Creek Lake	0
Two Island Lake	2	N. Curlew Lake	0
Lonesome Lake	3	Diamond Lake	0
N. Scenic Lake	5	Kenaitze Lake	0
Warbler Lake	5	SE Diamond Lake	0
W. Lonesome Lake	4	Bedlam Creek	0
Camp Island Lake	5	Bear Lake	0

A summary of swan data was completed for the years 1957-1981 in preparation for one or more publications. A preliminary analysis of productivity in relation to disturbance by humans suggests a decline in productivity when pre-1970 and post-1970 data are compared. Although a more thorough analysis of the data is required, a trend appears to be that trumpeters are being forced into marginal habitat where cygnet

mortality is higher than in prime habitat. Prime habitat in the form of large productive lakes is being jeopardized by aircraft and other lakes by recreational uses. One swan was shot by hunters and abandoned along the Swanson River during moose season and biologist Ed Bangs recovered a dead cygnet in the Donkey Lake area. This is the second year trumpeter swans have been shot and abandoned by hunters on the refuge and later found by or reported to refuge staff.

Six trumpeter cygnets were banded on the refuge in 1981 at Moose and Quill Lakes (Table 7). Reports of swans banded on the Kenai NWR continued to be received from observers on the wintering areas in the Mount Vernon area of Washington State and east Vancouver Island, Canada. Swan 18VY banded on the Kenai NWR on 22 Aug 1972 was observed near Errington, B.C. (Vancouver Island) on 22 Feb 1981.

Table 7. Trumpeter swan cygnets banded on Kenai NWR, 1981

Location	Date	Sex	Neck Band	Leg Band
Moose Lake	8-18-81	M	29VR	619-01179
"	"	M	30VR	619-01180
Quill Lake	"	F	31VR	619-01181
"	"	F	32VR	619-01182
"	"	M	33VR	619-01183
"	"	F	34VR	619-01184

Snow geese were first observed on the Kenai River Flats on 14 April (11 geese), reached a peak of about 5,000 on 20 April an left sometime on either 7 or 8 May 1981. Maximum number of Canada geese observed on the Kenai River Flats was 230 (April 17) and 270 Sandhill cranes (April 30). Percentage of juvenile snow geese ranged from 6.6% on April 20 (n=1,157) to 30% on April 30 (n=186).

4. Marsh and Water Birds

An investigation of bird use of the Kenai River wetlands by Dan Rosenberg, FWS Special Studies, has provided information that probably is applicable to many of the Kenai NWR wetlands. A brief summary of his findings is presented in Table 8. In terms of diversity, lake habitat, (followed by reticulate bogs and string bogs), supported the greatest number of species of birds.

A comparison of the breeding habitat requirements of the three species of loons using the Kenai River wetlands revealed: 1) common loon was most abundant on large lakes (average 347 ha); 2) Arctic loon most abundant on small lakes (average 9.3 ha) and ponds (average 4.8 ha); 3) the red-throated loon most common on small ponds (average 1.0 ha) and patterned bog ponds (average 0.2 ha). Loons arrived on the breeding

areas from April 26 to May 10, young loons hatched from June 14-21, and loons left their breeding areas from August 4 (red-throated loon) to October 9 (common loon). These, and other data will be valuable in the planning and management of wetlands on the Kenai NWR.

Table 8. Numbers of species and most abundant species using wetlands habitats along Kenai River (data from Dan Rosenberg, USFWS, Special Studies).

Wetland Type	Number of Species	Most abundant Species
Marsh	33	Mew Gull - Tree Swallow
Reticulate Bog	44	Mew Gull - Arctic Tern
String Bog	36	Savannah Sparrow - Northern Phalarope
Senescent String Bog	25	Mew Gull - Savannah Sparrow
Wet Meadow	8	Greater Yellowlegs - Lesser Yellowlegs
Bog Meadow	26	Savannah Sparrow - Least Sandpiper
Pond	32	Mallard - Barrow's Goldeneye
Lake	57	Tree Swallow - Arctic Tern
Graminoid Marsh	31	Tree Swallow - Northern Phalarope

5. Shorebirds, Gulls, Terns, and Allied Species

In addition to the studies mentioned in Wildlife Section 4, a survey of seabird colonies on Skilak Lake was conducted on July 22, 1981, by Art Sowls, Wildlife Operations Office, and Mary Portner, YACC, Kenai NWR. At least 650 adult herring and glaucous-winged gull hybrids were observed on a rock island in Skilak Lake, as well as two nests containing four and five chicks of double-crested cormorants. Another island near Skilak Campground (Upper) had about 100 chicks of herring-glaucous-winged gull hybrids in about 50 nests. About 32 hybrid gulls were seen near another nesting area along the south shore of Skilak Lake.

The two nests of double-crested cormorants on Skilak Lake represent the only known nesting sites of that species on the Kenai NWR. Double-crested cormorants have suffered serious population declines throughout much of North America with human disturbance of nest sites contributing to population declines in many cases.

It was recommended that breeding bird information signs be posted at boat launches on Skilak Lake to help prevent disturbance of the Skilak Lake bird colonies, that the colonies be censused annually, gull chick counts be conducted, and that the hybrid gulls be banded on an annual basis to facilitate fall and winter sightings.

Mary Hogan and Dan Rosenberg, USFWS, Special Studies, and refuge biologist Ted Bailey banded approximately 100 Herring Gull chicks on an island in Shadura Lake on June 25, 1981. A nest of a white-winged scoter and red-breasted merganser were also observed on the island. No reports of these banded gulls were received during the remainder of 1981.

6. Raptors

During 1981, 31 active bald eagle nests were located during aerial surveys and of these, 20 produced at least 44 eaglets and 8 other nests produced an unknown number of eaglets. (Table 9)

Table 9. Active bald eagles' nests located on the Kenai Peninsula, 1981

Nest Location	Eaglet Produced
Afonasi Lake	1
Beaver Lake	1
Big Indian Creek	2
Birch Hill	3
Bishop Creek	2
Bradley River	1
Camper's Lake	1
Campfire Lake	0*
Camp Island Lake	2
Canoe Lake	0*
Clearwater Slough	0*
Daniel's Lake	0
Fox River	0*
Gavia Lake	1
Gene Lake	1
Kenai River	1
Kenai River	2
Killey River	2
Killey River	2
Mink Creek Lake	1
Moosehorn Lake	0*
Moose River	0*
Moose River	0*
Otter Creek	2
Pincher Creek	0
Russian River	2
Sheep Creek	1
Skilak Lake	2
Suneva Lake	0*
Swan Lake	2
Torpedo Lake	0

*Nest was used, eaglets probably left nest before census.

An analysis of eagle productivity in relation to human disturbance on and adjacent to the refuge indicated that 15 eagle nests not subject to or subjected to little human disturbance produced more eaglets per active nest (1.6 eaglets/nest) than the seven nests that were subjected to human disturbance (0.9 eaglet/nest) during 1981. These data, and similar data from 1979 and 1981, indicate the eagle population is being impacted by intensive human use on and near the refuge. Off-refuge disturbance is intensive motor boat traffic along the Kenai River during the nesting and incubation period and development of land adjacent to rivers and lakes. On refuge disturbance is primarily recreational use of the canoe systems and the Moose, Killey, and Kenai Rivers.

An attempt was made in May to verify the location of a possible peregrine falcon nest along the Skilak Glacier Flats, but the river was too high to safely cross. A nest on the cliffs was observed through a spotting scope but no sign of falcons were made during the relatively brief period the nest was under observation.

Great-horned owl numbers appear to be increasing as a result of the increasing number of snowshoe hares, but no quantitative information is available for most raptors (excluding eagles) on the refuge, particularly owls, and other raptors which depend on mature or old-growth forest for nest sites.

7. Other Migratory Birds

Passerine Bird-Forest Habitat Program

Passerine and other birds were censured for the third year in a 10 ha plot in a 10-12 year old (1969) burn and a 100+ year old forest each dominated by paper birch (Betula papyrifera) on the refuge. The number of contacts (visual and auditory) per species in each plot indicated that over the 3 year period, 18 species were observed in both study area, 8 species only in the mature forest, and 5 species only in the early succussional stage forest. Based on relative number of contacts 16 species were most abundant in the mature forest, 14 in the early successional stage forest, and 1 species was observed equally frequent in both areas (Table 10). Of those observed in the early successional stage forest, 5 species were present only because of small unburned stands of trees left after the burn and because of standing dead snags. This indicates the importance of leaving standing dead (burned) trees and small unburned undisturbed stands of trees to passerine birds. Without these habitat features, the overall wildlife diversity of such areas would have been reduced by at least 29% in these habitats on the refuge, and relative to mature forest, there would have been 37% fewer species of passerine birds in the early successional stage forest compared to the mature forest. These surveys have demostrated the importance of leaving potential nesting, cover, and feeding sites when setting back forest succession in terms of maintaining wildlife diversity. This can be accomplished by leaving snags, dead trees, and mature trees as well as small stands of mature trees in areas that are logged, crushed, or burned. In terms of overall diversity and abundance, the mature forest plot supported more species and individuals of passerine birds than the early successional stage forest plot.

Table 10. Species of passerine, and other birds, observed in a 10 ha early successional type forest plot (10-12 years old) and a mature forest plot (100-years old), 1979-81.

Species	Only in early successional stage plot	Only in mature forest plot	Common to both plots: Most abundant in Early successional forest	Common to both plots: Most abundant in Mature Forest
Alder Flycatcher	X			
Common Flicker	X			
Downy Woodpecker	X			
Orange-crowned Warbler	X			
Pine Grosbeak	X			
Ruby-crowned Kinglet		X		
Olive-sided Flycatcher		X		
Northern Phalarope		X		
Hermit Thrush		X		
Great-horned Owl		X		
Raven		X		
Brown Creeper		X		
Blackpoll Warbler		X		
Common Redpoll			X	
Gray Jay			X	
Hairy Woodpecker			X	
Rusty Blackbird			X	
Song Sparrow			X	
Unidentified Warbler			X	
Tree Sparrow			X	
White Crowned Sparrow			X	
Yellow Warbler			X	
Robin			X	X
Black-capped Chickadee				X
Boreal Chickadee				X
Dark-eyed Junco				X
Northern 3-toed Woodpecker				X
Swainson's Thrush				X
Varied Thrush				X
Wilson's Warbler				X
Yellow-rumped Warbler				X

8. Game Mammals

a. Moose - A moose density count was not conducted in 1981 due to poor weather conditions and lack of snow.

The Kenai NWR moose population continues to increase because of three consecutive mild winters and the production of browse in the 150mi^2 1969 Burn area. The 1980-81 winter was the mildest on record enabling moose to move freely across the refuge and browse on low-lying and ground vegetation. (Staff Photo)

Moose are probably one of the most adaptable species of wildlife on the refuge and are often observed in back yards, gardens, cities, and along highways where many (100-200) are killed each year by vehicles. Unlike wilderness species, such as wolves, brown bears, and trumpeter swans, the greater the level of human activity and disturbance on the refuge, the more favorable the environment seems to become for moose.
(Staff Photo)

A spring moose count was conducted by Alaska Department of Fish and Game biologists from May 21 to June 11, in five areas believed to be used as traditional calving areas (Table 11). Fourteen $1/mi^2$ plots were intensively surveyed, nine of which had been surveyed by refuge staff in 1979. A total of 263 moose were counted in 19.3 hours of effort. The breakdown indicated that there were 54 calves/100 cows, 21 bulls/100 cows, 37 yearlings/100 cows, 40 twins/100 producing cows, and one set of triplets. Overall production and recruitment appeared high. However, the large variability between areas, small sample sizes, and relatively high cost led ADF&G biologists to the same conclusions refuge biologists came to in 1979. Aerial spring moose counts produce poor quality, unreliable information, and these types counts on moose should be discontinued.

Table 11. Summary of ADF&G spring moose counts, 1981.

Unit	Date	Cow w/calf	Cow w/2 calves	Cow w/0 calf	Bull	Yearling
S.E. Beaver Pond Lk	5/21	1	0	1	0	0
	6/1	3	3	5	1	4
	6/11	1	0	4	0	0
E. Moosehorn Lk	5/21	1	1	0	0	0
	6/1	2	0	2	2	3
	6/11	0	0	0	0	0
E. Swan Lk	5/21	1	1	1	0	1
	6/1	4	2	0	0	3
	6/11	0	1(3)	7	1	5
S. Muskrat Lk	5/21	0	1	0	2	0
	6/1	1	2	4	5	2
	6/11	2	0	4	5	2
N.E. Bear Lk	5/21	1	0	0	0	0
	6/1	2	0	3	1	0
	6/11	0	0	3	1	2
E. Muskrat Lk	5/21	0	0	2	0	1
	6/1	0	0	7	0	2
	6/11	0	0	1	0	0
S.E. Muskrat Lk	5/21	0	0	3	2	0
	6/1	0	0	1	0	1
	6/11	0	0	0	1	0
Scenic Lk	6/1	0	0	2	1	2
	6/11	0	0	1	1	1
Mink Creek Lk	6/3	3	1	5	1	5
Willow Lk	5/22	0	0	2	1	0
	6/3	2	0	7	1	4
Akula Lk	5/22	0	1	1	0	0
	6/3	0	1	0	0	2
Gas Well Rd	5/22	2	1	2	0	0
	6/3	2	4	2	0	2
Lower Cohoe Lk	5/22	0	0	1	0	1
	6/3	1	0	3	0	0
Slikok Lk	6/3	0	0	1	0	1
Total		29	19	76	26	46

Fall composition counts (Table 12) varied widely but calf/cow ratios appeared fairly high. One point of future concern is the extremely low bull/cow ratios in some of the heavily hunted areas. If this trend continues, there may be a need to further restrict hunting activity in the more accessible areas of the refuge.

Table 12. Fall moose composition counts on the Kenai NWR, Nov. 1981.

Area	Bull/100 Cows	Calves/100 Cows	% Calves	Sample Size
1969 Burn	16	44	28%	303
Slikok Lake	15	70	38%	103
Skilak Loop N.	2	29	22%	59
Skilak Loop S.	25	37	23%	13
Mystery Creek N.	44	35	20%	61
Mystery Creek S.	44	68	25%	48
Mystery Creek Lowlands	20	25	17%	93

Recent research in moose survey techniques and an analysis of radio-collared moose on this refuge suggest that spring-fall composition count data may be of limited value because of variability due to sightability and weather conditions.

The moose harvest on the Kenai Peninsula was up considerably from last year (Table 13), which is representative of the rapidly growing moose population. Most of the moose harvest on the Kenai Peninsula takes place on the refuge in Game Unit 15A.

Table 13. Moose harvest on the Kenai Peninsula.

Harvest	1979	1980	1981
15A	120	159	233
15B(W)	28	41	48
15B(E)(Trophy)	16	15	15
15C	130	132	182
7	37	24	45
Total	331	371	607 (Includes 73 not listed to subunit.)

b. Dall's Sheep and Mountain Goats - Dall's sheep and mountain goat surveys were conducted in July, 1981, by the Alaska Department of Fish and Game (Table 14). These data indicate that the refuge Dall's sheep population is continuing to decline. The goat population is recovering due to severely restricted sport hunting and is recolonizing areas where they were eliminated due to past overharvest. The winter of 1980-81 was very severe for sheep and goats with record deep, crusted, snow; however, goats appeared to withstand the winter conditions better than sheep.

Table 14. Sheep and Goat Survey Data, 1981.

	Sheep					Goat		
Count Area	Total	Legal 7/8 Curl (M)	All (M)	(F)	Lambs	Total	Adults	Kids
834	10	2	5	5	*	21	21	*
837	26	--	3	19	4	5	4	1
838	74	--	7	53	14	--	--	--
839	48	2	14	24	8	72	52	20
853	63	--	9	41	13	--	--	--
Cooper Lndg Closed Area	181	13	47	89	45	--	--	--
855	35	6	20	9	--	15	11	4
856	242	13	29	157	43	11	8	3
1981 Refuge Harvest		11				1		
Over Entire Kenai Peninsula		12				37		

*Spring Count

Two campers observe Dall's Sheep within the Kenai Mountains. A trail feasibity study was completed this season, analyzing trail opportunities in the areas. This study indicates much of the attraction of the area lies in its open and unlimited character. (Staff Photo)

Dall's sheep populations on the refuge continue to remain at low levels. Eleven of 23 observed legal rams were taken by hunters on the refuge in 1981. This, and harvest and survey data from previous years, suggests that most older rams on the refuge are taken by hunters and only a few die natural deaths. (Staff Photo)

Harvest of goats was low on the refuge because most of the refuge was closed to goat hunting because of past overharvest. Sheep harvest was also low, but may still be too high for the number of legal rams present. (11 of 23 legal rams over a 420 sq. mi. area were killed.)

c. Caribou - The number of caribou in the lowland herd was surveyed on October 15, 1981. (Table 15). A limited-bull only-permit hunt took place this fall. This hunt was strongly opposed by the refuge because of lack of herd growth, but strongly supported by ADF&G, because the bulls are record class animals. In fact, antlers obtained from one radioed bull would have placed first in the Boone and Crockett record books.

Table 15. Caribou - Survey by helicopter by ADF&G, 1981.

	Date	Bulls/ 100 Cows	Calves/ 100 Cows	% Calf	% Cow	% Bull	Sample Size
Lowland Herd	10/15/81	42.1	5.3	3.6	67.9	28.6	56
Upland Herd	10/19/81	29.7	46.9	26.6	56.6	16.8	256

In opposing this hunt, the refuge maintained that there was no surplus, the animals are tame, next to town, could be better enjoyed for viewing purposes, and would not provide a trophy hunting opportunity. The ADF&G maintained there was a surplus of bulls, the animals were not near town when they were to be hunted, it would be a difficult hunt, and was an opportunity to harvest a world record class animal.

Four of five permittees killed animals, one did not hunt. Three bulls were shot, just off the airport road in town. Four of the six large bulls in the herd were killed, but the biggest antlered bull was not killed. The hunt was cancelled in 1982, due to overharvest, only one calf lived until fall and it appears none of the harvested animals will be replaced.

The major portion of the upland caribou herd's habitat, previously on Forest Service land, is now part of the Kenai Refuge with the passage of ANILCA. The herd inhabits a mountainous-alpine zone on the new extension in the NE portion of the refuge. This herd was surveyed by ADF&G in October (Table 15), and data indicate the herd is healthy with good production and recruitment. The harvest of 20 animals by permit hunt was considered low and the refuge staff has recommended the number of permits be increased from 100 to 150 to protect the limited alpine tundra habitat until an evaluation of the habitat can be undertaken.

d. Black Bear - ADF&G research biologist Dr. Chuck Schwartz continues his research on black bears. He estimates the 1947 burn is prime black bear habitat and has approximately 6 bears per 10 square miles. Bear densities in other areas are lower. Harvest was much lower in 1981 than 1980 or 1979 (Table 16), but for unknown reasons. Work on black bears will be expanded in 1982 when bears will be captured in the 1969 burn to compare bear density between newly disturbed habitats and the 1947 burn.

e. Brown Bear - The brown bear population remains unsurveyed on the Kenai Peninsula. Population levels and trends are unknown; however, "gut" reactions from the refuge staff, using extrapulations from other studies, are 180 degrees from those of the local ADF&G biologist, who believes bears are increasing. One thing is for sure, and that is harvest is increasing rapidly (Table 16). While ADF&G is seeking to further increase harvest of brown bear, the refuge staff believes harvest may already be excessive in several areas, especially because of the large numbers of females in the harvest.

Table 16. Bear harvest on the Kenai Peninsula, 1981.

	Year	Total	Units 15A	15B	15C	7	Unk
Black Bear	1981	158	43(32M/11F)	23(14M/9F)	30(21M/9F)	56(44M/12F)	6
	1980	237	37(19M/15F) (3 Unk)	43(21M/22F)	76(50M/25F)	69(42M/22F) (5 Unk)	(9M/3F)
				Unit 15		Unit 7	
Brown Bear	1981	18(9M/9F)		15		3	
	1980	14(5M/9F)		11		3	
	1979	4(2M/2F)		4		-	

g. Wolf - Radio tracking of wolf populations in Game Units 15A and 15B indicate that animals recolonized the Skilak Lake area where they were totally trapped out in 1980. Wolf populations seemed as high in 1981 as in 1976 and some indications suggest the lower harvest of wolves in 1980-81 allowed populations to recover. A radioed wolf was found dead in an abandoned snare, the second radioed animal to die this way, and may indicate traps left in the woods after season closed may be responsible for a number of "wasted" animals.

h. Other Furbearers - The population levels of other furbearer on the refuge is unknown. Harvest data is an unreliable indicator since trappers' success depends on numerous factors not related to furbearer population levels. Generally, catches of land furbearers were low and aquatic furbearers high (Table 17). This is primarily due to the weather conditions during 1980-81. However, the staff is concerned that the lynx harvest was only two animals, while hare populations are very high in many areas. It is likely that in some accessible areas of the refuge, recreational trapping has greatly reduced some furbearer species.

Table 17. Total reported furbearer harvest on the Kenai National Wildlife Refuge, 1960-1981.

		Land Furbearer					Aquatic Furbearer			
Season	Total Permits	Lynx	Coyote	Wolverine	Weasel	Wolf	Beaver	Otter	Muskrat	Mink
1960-61	16	13	15	1	1	--	145	16	2	42
1961-62	24	23	30	4	13	--	79	19	0	69
1962-63	28	28	27	2	0	--	109	19	2	66
1963-64	33	28	39	1	6	--	150	26	0	83
1964-65	17	24	11	6	10	--	6	3	0	15
1965-66	16	17	16	4	2	--	17	4	0	13
1966-67	25	7	5	4	35	--	22	9	0	45
1967-68	--	--	--	--	--	--	--	--	--	--
1968-69	22	18	44	1	81	--	14	10	207	64
1969-70	58	62	23	3	35	--	33	32	75	82
1970-71	59	67	30	10	79	--	25	9	29	60
1971-72	61	181	13	14	35	--	23	8	18	9
1972-73	65	146	51	8	4	1	76	24	111	48
1973-74	81	245	58	7	149	0	40	26	334	160
1974-75	52	162	24	10	68	0	6	8	21	33
1975-76	70	113	32	6	16	1	34	13	82	25
1976-77	86	53	25	6	10	2	24	7	8	39
1977-78	86	43	34	4	14	8	19	9	140	33
1978-79	96	36	44	3	7	32	22	6	73	25
1979-80	104	12	64	3	58	19	83	17	127	57
1980-81	102	2	38	0	14	16	82	30	191	111

9. Marine Mammals

One harbor seal pup was discovered on the beach severly injured from a commercial fishing net. It was nursed back to health by YACC enrollee M. Portner and was released two months and many pounds of fish later.

This once-emaciated and injured harbor seal pup found abandoned on a nearby beach is now ready for release back into Cook Inlet because of the care, feeding, and attention of YACC enrollees M. Portner (left) and L. Landstrom (right). Each year the refuge staff receives injured eagles, waterfowl, shorebirds, raptors, and in 1981, marine mammals. A positive attitude by the public toward the FWS is obtained each time the refuge is able to take in and save injured individual wildlife.
(Staff Photo)

A beached and severely wounded young beluga whale, weighing about 115 lbs., was picked up by a commercial fisherman and reported to the refuge wildlife biologists on August 20, 1981, It apparently had been separated from its mother during a severe storm. Because it was in poor condition, it was humanely dispatched. The specimen was shipped to a marine biologist, Dr. Francis Fay, at the University of Alaska, Fairbanks.

10. Other Resident Wildlife

The population of snowshoe hare on the Kenai Peninsula is expanding rapidly which is expected as the 11 year cycle continues towards a peak which is expected next year. Hares are common and are much sought after as a small game species. It is not uncommon for a hunter to bag more than a dozen for a days effort.

Spruce grouse and snowshoe hare populations are near their peak of abundance on the refuge. Peak populations occur every 9-12 years with the last snowshoe hare population peak occurring in the early 1970's. (Staff Photo)

Small mammals were sampled in five different locations on the refuge (Table 18). The survey revealed the patterns of abundance typical to those observed in the past where a mature forest-crushed area had the most small mammals and burned-early successional stages the least number.

Table 18a. Small mammal data on the Kenai NWR, 1981.

Area	Date	#Trap/nights	Captures /100 trap nights Cr	Sc	Sv	Mp
Willow Lake Mature Crushed	Sep 29-Oct 2	360	23.3	5.5	0.3	0.3
Willow Lake Mature Forest	Sep 29-Oct 2	360	11.7	1.9	0	0
Sunken Island Lake 1969 Burn	Oct 20-Oct 23	360	8.3	7.5	0.5	0
Sunken Island Lake 1947 Burn	Oct 20-Oct 23	360	5.0	0.3	0	0
Headquarters Lake Mature Forest	Oct 20-Oct 23	360	13.1	4.4	0.3	0

Table 18b. Small mammal data on the Kenai NWR, 1980

Area	Date	#Trap/nights	Captures/100 trap nights Cr	Sc	Sv	Mp
Willow Lake Mature Crushed	Oct 7-8	180	22.8	2.2	2.2	0
Willow Lake Mature Forest	Oct 7-8	180	13.3	3.8	1.1	0
Sunken Island Lake 1969 Burn	Oct 16-17	180	7.2	1.7	1.1	0

Cr = Redback Vole
Sc = Common Shrew
Sv = Vagrant Shrew
Mp = Meadow Vole

The red-backed vole and common shrew dominate the small mammal community. Relative densities appear similar and there has been no evidence of cyclic population behavior since surveys were started in 1977.

Ptarmigan populations remain unsurveyed on the refuge but Biologist Bangs, who has hunted in the same area around Twin Lakes in the Kenai Mountains, indicates that willow ptarmigan have increased yearly since 1976 and that during the fall of 1980 and 1981 flocks of over a hundred birds were common along alpine creeks.

An aerial beaver survey was flown over a 64 mi^2 (8x8 mi) in the 1969 burn of October 6, 1981. Three active and 6 inactive lodges were located for an estimated beaver population of 13.9 km^2/beaver (assuming 4 beaver/active lodge). This beaver population estimate was similar to the 13.4 km^2/beaver estimated in the 1969 burn area in 1977 or a decrease of 4% during the 4 year period. Lakes where beavers were located four years ago did not have active lodges on 1981 and most of the 1981 active lodges were located in small lakes which appeared to be marginal beaver habitat.

Joe Krueger, YACC, investigated beaver lodges in the 1969 burn, 1947 burn, and mature forest areas and discovered that 62%, 100%, and 92% of the 8, 5, and 12 active lodges he examined during the trapping season had been trapped. This survey and others (harvest and aerial survey data) indicates the intensive trapping pressure on the refuge beaver population which is relatively low compared to other areas where beaver have been studied.

Transects of woody plants browsed by beaver indicated birch and alder were the most commonly browsed species with little willow and aspen available as food. Spruce was utilized by beaver in 3 of 29 areas examined.

Furbearer populations are currently not surveyed on the Kenai National Wildlife Refuge. Population trend data is obtained from ADF&G sealing forms and a mandatory furbearer harvest report that is issued with a refuge trapping permit. The period covered by these permits and harvest data is the winter of 1980-81.

The amount of trapping effort for land furbearers was low in 1980-81 due to poor trapping conditions throughout the winter even though the number of permittees was similar to last year (Table 18). Frequent freezing rain, no snow, and no authorized snowmobile use on the refuge greatly reduced trapper effort.

Even with lower trapper effort, the very low catch of lynx (a highly sought species) at a time when hares were abundant, raises concern that this species is being overharvested during its naturally occurring low cycle. The trapping season also extends beyond when wolves breed and presents the possibility that the entire reproductive effort of a pack could be eliminated with the capture of the alpha female in March. Trapping for wolverine occurs when females are nursing young and could present problems in regards to harvesting only surplus animals. Heavy trapping pressure on the Kenai may necessitate more restrictive bag limits or seasons in the future.

Weather conditions and fur prices were favorable for aquatic furbearer trapping. The catch of all aquatic furbearers, except beaver, was higher, but did not necessarily indicate populations were higher. As a result of increased otter catch and a relatively high beaver harvest, the season for otter and beaver was shortened by 30 days and the limit on beaver was lowered to 20 per person, from 40 per person.

The large variation in catch, caused by non-biological factors, show the unreliability of harvest data to manage furbearer populations on the refuge where trapping is almost strictly recreational and is conducted regardless of furbearer population densities.

Furbearer carcasses are purchased from trappers to help refine and clarify furbearer management on the Kenai NWR. Fifty-seven carcasses were examined last winter, 17 wolves, 23 coyotes, and 17 river otter. These carcasses are examined for parasites, carcass condition, age, sex, and food habits. This information will serve as background data for more intensive species-specific programs that will assist managers in properly managing furbear populations and the increasing human demand for recreational trapping.

11. Fisheries Resources

During 1981, efforts of the Kenai Fisheries Resource Station were directed primarily toward a study of sockeye salmon stocks on Tustumena Lake, in cooperation with ADF&G, and providing assistance to the the Kenai NWR staff in preparing the refuge master plan.

The Tustumena Lake Project was initiated in 1981, and is scheduled to continue for five years. The project's objective is to determine what level of sockeye fry stocking can be implemented without detrimental impact to the lake's natural sockeye stocks. Tustumena Lake is a major contributor to the sockeye stocks of the Cook Inlet commercial fishery. It ranks third among the five major sockeye-producing systems in Cook Inlet and comprise about 15% of the Inlet's total sockeye production. The 74,000 acre lake lies entirely within the boundaries of the Kenai NWR.

The Service's major role in this cooperative study is in two investigations. One employs the use of hydroacoustics to obtain estimates of sockeye fry abundance and distribution in the lake during their freshwater rearing stage. The second investigation, developmental in nature, is to determine of hatchery stocks can be distinguished from natural stocks by a laboratory procedure to detect oxytetracycline, an antibiotic contained in hatchery feeds. If this method is feasible, it would eliminate the need for fin clipping prior to stocking - a costly, time consuming, and sometimes ineffective procedure.

The above investigations, combined with several on-going investigations being conducted by ADF&G will provide a better understanding of life history stages of sockeye salmon and the effect freshwater environmental conditions have on young sockeye. Only with this knowledge, can effective regulations and management pratices be implemented to maintain and enhance sockeye stocks.

The Kenai FRS staff was assigned to aid with the fishery portion of the Kenai NWR master plan. Efforts consisted of compiling lake acreages and stream miles from maps and classifying these fisheries habitats into units which could be used in completing the Master Plan. Habitat criteria was developed for the major fish species found on the refuge. The plan is expected to be complete in 1983.

Kenai FRS personnel were involved to a lesser degree in numerous fishery-related activities on the Kenai NWR. These activities include assistance to FWS fishery research personnel on the Killey River king salmon study; assistance to ADF&C on the Kasilof River smolt study; assistance to ADF&G on the Tustumena Lake sockeye egg take; and assistance to ADF&G in conducting spawning ground counts of adult sockeye salmon in tributaries to Tustumena Lake. Additionally, the staff presented several fishery-oriented talks to grade school students at schools in Kenai and Soldotna.

Hidden Creek drainage into Skilak Lake is accessible by a 1.5 mile trail from Skilak Lake Road. The Hidden Creek drainage has been a recipient of sockeye salmon fry enhancement for the past several years. (Staff Photo)

12. Wildlife Propogation and Stocking

Refuge staff attended a meeting which was sponsored by ADF&G to gather public input in regards to stocking black-tailed deer on one or more islands off the Kenai Peninsula's southern tip. The idea seems poorly thought out but many people were for it and recommended bison and elk also be transplanted. The local ADF&G biologist has encouraged stocking bison and ruffed grouse on the refuge but so far the lack of funds has prohibited any serious exotic animal introductions on or near refuge lands.

16. Marking and Banding

Approximately 100 gulls were banded as well as six trumpeter swans.

H. PUBLIC USE

1. General

Public use for 1981 was up from the relatively stablized period of 1975-80. Monthly records show an annual use of 168,500 for 1981 which is a 24% increase over past years average of 136,000 visits.

The overall trend in recreational use at various locations on Kenai NWR is somewhat difficult to generalize. Based on contracts with the Anchorage Convention and Tourist Bureau, the Department of Transportation, and Chugach National Forest, it appears overall use is growing steadily over time. The Kenai NWR 1976 recreation management plan identified an overall 11% increase, though not necessarily for every activity. Information provided within this report indicate a considerable amount of other influencing factors. A major growth area; however, seems to be the out-of-State viewing, and incidental use of refuge resources. The 1975 refuge card survey shows much fewer tourists during 1975 than previous years have shown. Chugach National Forest confirms this and also informally reports that certain dispersed use have also increased in several portions of the forest during 1981.

While use of several areas of the refuge seems to be remaining relatively static, other areas reflect a significant growth in use. Based on increases in overall population, increased tourism, and annual increase trends in traffic values, the potential for future increases in refuge use is significant.

Increasing use of canoe routes, use of horses on trails, group use of recreational areas, aircraft, and snowmobiles, "crowding" of several wilderness settings, and other factors are combining to present new problems for the land manager. Programs which restrict public use by prohibiting certain modes of transportation, use of zoning or permits, or seasonal closures are being employed on many areas in order to maintain the basic values which attracted the visitor initially.

Public use on the refuge, although not generally considered excessive, has produced some of the problems associated with over-use, level of over-use, and development of a control program to prevent deterioration of the land and resources while maintaining a compatible level of recreational opportunity for the visiting public. To date, the use of time or spatial zoning, or the use of a mandatory permit system, has not been employed on the refuge to control public use --- but these methods have been discussed. Closures have been employed to protect a wildlife resource and visitor experience, and special use permits are issued to manage commercial fly-in fishing camps but no direct-use limits have been included at this time.

Visitor need for wildland and refuge dependent recreation opportunities may be expected to continually increase as similar wildland opportunities are lost on state and private lands throughout the Kenai Peninsula. Although the Kenai Peninsula is one of the few areas in Alaska accessible by road and particularly influenced by development, a total range of opportunities, including pristine wilderness, will need to be maintained. Wildland and wildlife recreational opportunities available only in remote refuges will not serve the majority of Alaskan users. Maintaining the opportunity to observe and experience wildlife and wildlands will be a significant challenge in the developing southcentral portion of Alaska.

Though several locations on the refuge receive significant amounts of public use, other areas remain wildlands. Tustumena Glacier, originating from the vast Harding Ice Field, forms the headwaters of Tustumena River and 73,100 acre Tustumena Lake. (Staff Photo)

In conjunction with refuge comprehensive planning, a significant portion of 1981 was spent evaluating "where we have been, where we are now, and where we are going" concerning public use.

A report summarizing all facets of Kenai National Wildlife Refuge recreation program was developed in support of the Kenai National Wildlife Refuge comprehensive plan. This document addresses the following aspects of the program: Recreation program (general), legislative and policy, existing recreation opportunities settings, past to present use report, present and potential interpretation program, updated facility classification and inventory, adjacent refuge recreation opportunities and facilities and a series of 1:250,000 scale maps depicting amount and location of all known refuge recreation activities, structures, interpretive facilities, and human use related values. (Table 19)

Table 19. Total visits to the Kenai National Wildlife Refuge, 1973-1981.

Category	VISITS 1973	1974	1975	1976	1977	1978	1979	1980	1981
Interpretation	1,240	1,600	2,900	1,700	1,411	1,060	8.615	17,749	14,300
Environmental Education	2,200	800	900	92	137	235	201	189	449
Hunting-Resident Game	23,500	30,700	15,000	10,385	10,223	11,760	13,910	15,420	17,120
Hunting-Migratory Birds	2,300	1,500	2,000	1,115	1,185	150	500	802	1,050
Fishing	45,300	71,400	50,000	40,430	42,830	98,580	51,700	58,700	79,200
Other Consumptive Activities	1,050	500	900	995	925	2,300	2,850	3,000	3,300
Trapping	10,000	8,000	7,800	3,430	5,500	4,350	2,525	2,000	1,100
Rec. W/W Non-Consumptive	68,500	166,000	142,600	76,717	84,353	134,882	129,475	120,775	172,260
Rec. Non-W/W	47,100	10,300	5,200	4,245	4,605	4,020	7,127	6,450	10,000
Total Visits	140,300	156,000	105,000	104,630	116,544	137,500	134,001	136,401	168,475
Total Activity Visits	201,190	271,000	227,300	139,109	151,169	257,337	216,903	225,085	298,879

2. Outdoor Classrooms - Students

Recreation, YACC, and biological staff provided leadership for several occassions to local schools and organized groups. Topics explored during the year included wildlife adaptations, wildlife habitats of Kenai NWR, wildlife populations, recreation opportunities, wildlife research being conducted on Kenai NWR.

3. Outdoor Classrooms - Teachers

A draft environmental education curriculum for use by local school groups ages 7-16 was initiated during 1981. Work will continue during 1982. The curriculum will be geared to Kenai NWR and support the objectives of the school district .

6. Interpretive Exhibits/Demostrations

The visitor center at Kenai NWR Headquaters has been filled with several temporary exhibits during 1981 and a refuge audio-visual program was available from mid summer through December. Temporary exhibits included a "System 70 display, wildlife mounts, maps, photo displays, skins, paintings, and a salmon spawning display.

Two community school courses were conducted at the new facility for the spring semester of the Soldotna Community School.

During September, the formal contract for permanent exhibits for the headquarters visitor center was awarded to Good Industrial of Toledo, Ohio . Technical support has been provided by the refuge staff since awarding the contract.

7. Kenai Interpretation and Information Program: General Analysis

The interpretive program on Kenai NWR has in the past been fairly passive with interpretive efforts evolving in recreation to a management need to get information across to various groups of visitors. Interpretive programs on Kenai NWR will need to be as diverse as the various challenges and opportunities available.

While designing the theme and exhibits for the new headquarters visitor center. The present interpretive programs as well as future objectives were analyzed. The planning fixes firmly the new visitor center as being the center of Kenai's interpretive and education programs.

The National Wildlife Refuge System places education and interpretation at the top of the priority list for public use of refuges. Though public use activity management remains the most important aspect of the Kenai's I&R program, the refuge will, in the future, give a higher priority to interpretation and education. The following factors make Kenai an excellent opportunity for interpretive programs:

1) Central location in a heavily populated and the most visited area in Alaska.

2) Over 3,900 students attend schools within 15 mile radius of the headquarters building (Fall, 1981 enrollement).

3) Variety of resident year round wildlife species.

4) Variety of landforms including mountains, lakes, glaciers, rivers, marsh, etc.

5) A rich history interwoven with Native, Russian, and European influence and their utilization of wildlife resources.

Two young anglers view the Russian River Sockeye Salmon life cycle display before trying their luck.
(Staff Photo)

In examining the past programs of the refuge, it becomes apparent that several programs have been effective, but they will need additional support. Ideas initiated previously should be continued, and several new opportunties should be explored.

Kenai NWR is a large area with many dispersed sites which offer potential for use of interpretive media. In addition, there are several areas which may require a concentrated effort and may offer the opportunity to contact many visitors in a single day. These, for example, include the Russian River access area and the headquarters visitor center. During 1981, park technicians and Y.A.C.C. recreation aids developed information related exhibits for several bulletin boards. There are several potential sites on Kenai NWR that offer an excellent opportunity for "interpreting" the geography, natural history, management practices, and individual wildlife species on the Kenai

Peninsula. There are also many prescription programs that can be used on specific sites or on the refuge at large. Additionally, the recently completed headquarters offers an outstanding opportunity for several types of programs involving educational and interpretive media.

8. Hunting

Moose hunter check stations were staffed in 1981 in the same manner as 1980. These data (Table 20) indicate that they were fewer moose hunters in 1981, hunter success was the same both years but more bulls were seen by hunters, most of the hunters coming through the check station (80%) were Kenai Peninsula residents. Fifty-percent of the bulls were yearings and 43% of all bulls still had velvet on their antlers.

Table 20. Combined Data from Swanson River and Mystery Creek Moose Hunter Check Stations, 1981.

	Moose Season	
	1980	1981
Number of Hunters		
First 3 Days	836	713
First 7 Days	1,435	1,330
Hunting Success		
First 3 Days	5%	5%
First 7 Days	4%	4%
Bulls Observed		
(Includes harvested bulls)		
First 7 Days	113	153
Percentage of hunting parties from Kenai Peninsula		
First 7 Days	81%	80%
Bulls Harvested		
First 3 Days	42	35
First 7 Days	59	52

Sheep hunters enjoy a sunny August afternoon in the Kenai Mountains. Hunters generally gain access to remote areas using aircraft, transporting them to high mountain lakes. Float plane operations are authorized on certain lakes and areas within the designated Kenai Wilderness.
(Staff Photo)

9. Fishing

Fishing activity takes place at several locations on Kenai NWR and within a wide range of management situations. In a recent report completed in behalf of the comprehensive planning project, it was generally noted that Kenai NWR has all or a portion of several recreational fisheries of a state wide significance. According to a State-wide harvest report for 1980 that became available during 1981, Kenai Peninsula fisheries supported 560,000 man-days of effort. Including the Russian River, the Kenai River watershed provided approximately 17% of the State-wide fishing effort. Other refuge fisheries provided significant portions of the total effort. Hidden Lake (1%), Swan Lake and Swanson River Canoe Route lakes and rivers (1%), and other refuge lakes 3.5%. The survey estimates that 14% of all Kenai Peninsula fishing days take place at Kenai NWR.

Russian River fishing, probably the most popular and concentrated fishery in Alaska occurs partially on Kenai NWR. The following tables illustrate 1963-81 use figures and vital statistics.

Two float fishermen enjoy the Upper Kenai River. Due to increased fishing pressure, limits have been reduced for rainbow trout. The season is now closed from April 1 through June 14. (Staff Photo)

Table 21. Estimated sockeye salmon harvest, effort and success rates on Russian River, 1963-1981.

Year	Harvest			Total Effort (Man-Days)	Catch/ Hour	Census Period
	Early Run	Late Run	Total			
1963	3,670	1,390	5,060	7.880	0.190	6/08-8/15
1964	3,550	2,450	6,000	5,330	0.321	6/08-8/16
1965	10,030	2,160	12,190	9,720	0.265	6/15-8/15
1966	14,950	7,290	22,240	18,280	0.242	6/15-8/15
1967	7,240	5,720	12,960	16,960	0.141	6/10-8/15
1968	6,920	5,820	12,740	17,280	0.134	6/10-8/15
1969	5,870	1,150	7,020	14,930	0.094	6/07-8/15
1970	5,750	600	6,350	10,700	0.124	6/11-8/15*
1971	2,810	10,730	13,540	15,120	0.192	6/17-8/30*
1972	5,040	16,050	21,090	25,700	0.195	6/17-8/21
1973	6,740	8,930	15,670	30,690	0.102	6/08-8/19*
1974	6,440	8,500	14,940	21,120	0.131	6/08-7/30*
1975	1,400	8,390	9,790	16,510	0.140	6/14-8/13*
1976	3,380	13,700	17,080	26,310	0.163	6/12-8/23*
1977	20,400	27,440	17,840	69,510	0.168	6/18-8/17
1978	37,720	24,530	62,250	69,860	0.203	6/07-8/09
1979	8,400	26,830	35,230	55,000	0.136	6/09-8/20*
1980	27,220	33,490	60,710	56,330	0.245	6/13-8/20
1981	10,770	23,720	34,440	51,030	0.156	6/09-8/20**
1963-80 Mean	9,863	11,398	21,261	27,068	0.177	

* Census period was not continuous during these years due to emergency closures required to increase escapement levels.

** Census was not conducted from 7/7/81 through 7/14/81, as sport fishing harvest during these dates was negligible. (Nelson, 1981)

Table 22. Differences between weekday and weekend day fishing pressure and rates of success at Russian River, 1964-1981.

	Mean Angler Counts		Catch/Hour		Mean Hours Fished	
Year	Week-days	Weekend Days	Week-days	Weekend Days	Week-days	Weekend Days
1964	29.6	70.6	0.444	0.209	3.3	3.9
1965	31.7	78.1	0.305	0.223	4.5	5.4
1966	53.2	143.1	0.297	0.183	4.8	5.5
1967	68.9	110.5	0.171	0.100	5.3	5.4
1968	71.5	124.9	0.153	0.107	5.3	5.8
1969	64.5	111.7	0.110	0.074	4.9	5.1
1970	83.5	127.8	0.140	0.100	4.8	4.7
1971	87.9	157.2	0.194	0.189	4.8	5.3
1972	73.3	138.5	0.203	0.187	4.0	4.4
1973	147.1	195.0	0.113	0.088	4.8	5.5
1974	123.8	144.4	0.164	0.085	4.7	5.7
1975	65.0	149.6	0.145	0.136	4.5	5.1
1976	72.5	134.4	0.165	0.161	3.5	4.5
1977	201.7	438.6	0.172	0.164	3.9	4.3
1978	264.1	425.7	0.205	0.191	3.9	4.2
1979	190.6	276.8	0.158	0.117	3.8	3.9
1980	299.1	317.8	0.270	0.210	4.2	4.7
1981	195.6	238.5	0.167	0.141	4.1	4.1
1964-1980 Mean	113.4	185.0	0.201	0.148	4.4	4.9

(Nelson 1981)

The Kenai-Russian River Access area managment continued with few problems during 1981. Two of three park technicians were on duty during peak salmon runs.

Crowd management, litter control, information and interpretive signing and the U.S. Fee program continued with few problems. Higher profile management and increased law enforcement were continued for 1981. Approximately 18,430 visitors utilized the area and $5,613.00 in fees were collected. 15,430 utilized the current powered ferry.

Fishing effort in the upper Kenai River seemed to be significantly up from previous years. The Alaska Department of Fish and Game (in response to increased harvest in this area) closed the area. The Kenai River, from the Moose River confluence to Kenai (excluding Skilak Lake), was closed from April 29 to June 14.

The popular Russian River provides the boundary between Chugach National Forest and Kenai National Wildlife Refuge. Agency cooperation, necessitated by high public use and a shared resource is required for effective management. (Staff Photo)

10. Trapping

The number of trappers using the refuge in 1981 was similar to 1980 (104) but the catch of land furbearers was much lower while the catch of aquatic furbearers was higher. Unusual weather conditions during the winter of 1980-81 were responsible for the different vulnerability of the two classes of furbearers. There was no snow cover and no snowmobile use, so most trappers did not make sets for land furbearers, but directed most of their attention to aquatic species. Trapping on this refuge is a recreational hobby and takes place almost independent of fur prices, weather conditions, furbearer populations, or trapper density.

11. Wildlife Observation

Typical of many Federal and State land management areas, many refuge visits are multi-purpose in nature. Refuge visitors participate in a variety of activities during a single visit. Associated with many activities on the refuge is wildlife and wildland observation. Scenic driving occurs along the Sterling Highway, Skilak Lake Road, Hidden lake Road, Upper Skilak Campground Road, Lower Skilak campground road, Funny River Road and Tustumena Campground road. Though a significant amount of traffic volume is not wildlife related a majority of travelers enjoy and appreciate wildlife and wildland seen while traversing the refuge. Annual traffic volumes are as follows. (Table 23)

Table 23. Annual Traffic Volumes and Daily Averages, 1980

Annual Traffic Volumes (1980)	Average Daily Traffic	Annual
Sterling Highway (Approx. Watson Lk)	1,350	492,750
Sterling Highway (2 Mi. west of Russian River)	1,800	657,000
Sterling Highway-L. Skilak Cmpgrnd.	120	43,800
L. Skilak-Upper Skilak	100	36,500
U. Skilak-Hidden Lk Road	100	36,500
Hidden Lk Rd-Junc. /Sterling H.	100	36,500
Hidden Lake Road	65	23,725
Lower Skilak Campground Road	50	18,250
Upper Skilak Campground Road	50	18,250
Swanson River (Refuge Boundary)	175	63,875
Ski Hill Road	35	12,775
Funny River Road	200	73,000
Tustumena Campground Road	65	23,725

Note: The above includes vehicles traveling both directions.

The Swan Lake and Swanson River Canoe Routes, totalling approximately 140 miles, were designated National Recreation Trails in 1981. (Staff Photo)

12. Other Wildlife/Wildland Oriented Recreation

Other Consumptive Recreation - Mushroom hunting and berry picking continue to be favorite activities during late summer and fall. The Cranberry harvest was excellent in some areas during September and provided an income supplement to many Alaskans including the women from the local Ninilchik Russian village.

On January 23, a letter was received from outgoing secretary Andrus designating the Swan Lake and Swanson River Canoe Routes as National Recreational Trails. This designation demostrates the U.S. Fish and Wildlife acknowledgement of the important wildland and wildlife recreation opportunities within this scenic lake country.

The availability of outdoor recreation opportunities on an annual basis makes Kenai NWR a popular ice fishing destination for recreationists.(Staff Photo)

13. Camping

The Kenai NWR provides a spectrum of camping opportunities from formal campgrounds with standard amenities, to dispersed roadside areas, to primitive settings where the sights and sounds of other people are not present. In our planning and management discussion camping is referred to not as an activity in and of itself but rather in terms of the setting in which it occurs. Of the estimated 168,000 visitors using refuge lands, 103,900 were recorded as engaging in camping activities during 1981. These figures are good indicators of the relative importance of camping to enjoyment of the Alaskan environment.

A significant increase has been noted in the amount of winter camping activities. Group survival classes or simply individuals enhancing their ice fishing opportunties have been the major factor. Kenai NWR provides a significant portion of the spring, winter, and fall camping opportunities as many other federal and state campgrounds are closed during these seasons.

Several maps were developed during 1981 locating specific activities and facilities at a 1:250,000 scale. These maps describe camping areas on the refuge. The following chart was also developed and represents the various types of developed facilities available at Kenai to date, their location, their capacity, and their percentage of total destination use.

Recreational sites have been grouped according to available access as follows:

Swanson River Recreation Area

1-15

Skilak Lake Recreation Area

16-28, 47

Kenai River Corridor - Sterling highway

29-40

Tustumena Lake Area

43-46

Other

41,42

Note: Facilities #1-47 keyed to U.S.G.S. 1:250,000 overlay map.

Kenai's Recreational Facilities Inventory List

Site	Campground capacity	Access site	Wayside	Trailhead		✓=Inadequately maintained Trail length	Adequate capacity for present use	# of potential sites possible at exact location	Estimated % of total facility visitation
1. Sunken Island Lake		X/8					YES	10+	1.94
2. Mosquito Lake		X/5					YES	0	.04
3. Silver Lake				X/6		1.0	YES	0	.12
4. Forest Lake			X/3				NO	2	.08
5. Weed Lake			X/5				YES	0	.12
6. Drake/Skookum Lake				X/4		1.3	YES	0	.19
7. Breeze Lake		X/3					YES	0	.08
8. Dolly Varden Lake	X/12						YES	6-8	3.26
9. Rainbow Lake		X/4					YES	0	1.09
10. Swanson River Canoe Trail				X/80		✓ 80	YES		
10a. Swanson River Landing		X/8		X/12			YES	0	2.72
10b. Paddle Lake				X/15			YES	0	4.31
11. Fish Lake		X/3					YES	0	1.05
12. Swan Lake Canoe Trail				X/60		✓ 60	YES		
12a. Canoe Lake Entrance				X/12			NO	2-present 30-new site	7.18
12b. Portage Lake Entrance				X/5			NO	0-present 10-new site	1.90
13. Sucker Creek			X/2				YES	0	.27
14. Merganser Lake		X/3					YES	5+	.39
15. Nest Lake		X/4					YES	5+	.58
16. Bottenintnin Lake		X/3					YES	20+	.47
17. Lower Silak Lake	X/30						NO	0-present 30-new site	8.70
18a. Engineer Lake-Seven Lakes Trail		X/8		X/6		7.0	YES	30	? .51
18b. Engineer Lake			X/8				YES	0	?
19. Lower Ohmer Lake		X/5					YES	0	1.28
20. Upper Skilak Lake	X/15						NO	0	3.88

Kenai's Recreational Facilities Inventory List

	Campground capacity	Access site	Wayside	Trailhead	√=Inadequately maintained Trail length	Adequate capacity for present use	# of potential sites possible at exact location	Estimated percent total facility visitation
21. Upper Ohmer Lake (closed)		X/5						.35
22. Bear Mountain Trail				X/3	1.0	YES	5	.04
23. Skilak Lookout Trail				X/4	2.6	NO	6	.08
24. Hidden Creek Trail				X/4	√1.4	NO	4	? .43
25. Hidden Lake	X/30					NO	0-present 40-new site	6.87
26a. Kenai River Trail-East				X/8	6.3	YES	0	1.40
26b. kenai River Trail-West				X/4	6.3	YES	4	.85
27. Jim's Landing-Surprise Creek Trail	X/7			X/8	√4.2	NO	0	5.17
28. Jean Creek			X/8			YES	0	.54
29. kenai-Russian River		X/180				NO	0	19.26
30a. Kenai River			X/?8			NO	0?	?
30b. Kenai River			X/?7			NO	0?	?
30c. Kenai River-Visitor Contact Station			X/25			YES	0	?
31. Fuller Lakes Trail				X/20	√4.8	YES	0	.66
32. Jean Lake		X/6				NO	0-present 15-new site	.77
33. Skyline Trail				X/20	6.5	YES	0	?
34. Upper Jean Lake		X/2				NO	trailhead (10)	.16
35. Kelly Lake		X/6				YES	10+	.82
36. Peterson Lake		X/6				YES	10+	1.01
37. Watson Lake		X/6				NO	20+	1.75
38. Equmen Lake			X/10			YES	0	.06
39. East Fork Moose River			X/?				10+ (?)	?
40. Lily Lake			X/in			YES	-10	.3
41. Funny River Horse Trail				X/8	√20.8	YES	8	.3

Kenai's Recreational Facilities Inventory List

	Campground capacity	Access site	Wayside	Trailhead		✓=Inadequately maintained Trail length	Adequate capacity for present use	# of potential sites possible at exact location	Estimated percent of total facility visitation
42. Ski Hill Trails				X/8		7.2	YES	0-present site 40+-new site	.08
43. Tustumena Lake	X/10	10					YES	Campground 10	6.60
44. Moose Creek Trail				X/-		✓ 7.7			
45. Bear Creek Trail				X/-		✓ 16.5			
46. Lake Emma Trail				X/-		✓ 4.6			
47. Cottonwood Creek Trail				X/-		✓ 3.1			

Work continued in identifying non-developed traditional camping sites in backcountry and dispersed road settings. The program called Code-A-Site allows us to "bench mark" the conditions at a particular site and monitor its condition over a period of years. Work will continue on Code-A-Site during future field seasons.

15. Off-Road Vehicles

The only off-road vehicles authorized on the Kenai is snowmachines in designated areas. The winter of 1981 produced poor snow conditions in all areas of the refuge except in the high country. Though never officially open to snowmobiles quite a bit of activity did occur in the Caribou Hills. Refuge enforcement officers were unable to make contact with these users.

Seven citations were issued during the year for illegal ORV use, though considerably more violations occur.

The snowmachine regulations were revised in the fall of 1981 prior to what looks like a heavy snow year. A copy of these regulations is in the appendix showing the new refuge boundaries and the traditionally closed areas. The wording of the regulations was changed to align snowmobiling with wildlife oriented activities such as access for ice fishing and trapping.

16. Other Non-Wildlife Oriented Recreation

a. Ice skating - January and February weather conditions provide several days of rain and nights of freezing temperatures. The result was a blanket of ice covering the lowlands of the Kenai Peninsula. Though this ice hampered cross-country skiers and hikers, it provided exceptional ice skating opportunities. Skating is becoming a significant access means to backcountry areas via frozen lakes.

b. Down-hill Skiing - The rope-tow and slope on Ski Hill Rd. have not been used since 1976 because of continuous poor winter snow conditions. However, during the late fall of 1981 as early snow falls hinted at a promising winter several requests came to Kenai's office to reactivate the ski slope. A determination has been made not to authorize at this time the down hill ski slope because non-compatibility with refuge objectives, poor to marginal annual snow conditions, and because revegetation of the slope has already taken place.

17. Law Enforcement

This year the refuge was fortunate enough to have a FWS law enforcement agent stationed at the refuge headquarters. Although he had many other duties elsewhere in the State, he issued several citations for state and refuge violations making the law enforcement program very visible to the visiting public.

Rick Johnston, another member of our staff attended the 10 week course at FLETC in Glynco, GA starting October 15, 1980. He was detailed for another 40 hours in August of 1981. This brings the refuge staff up to three that have qualified through the refuge training program at FLETC.

The Alaska Fish and Wildlife Protection have been very helpful in obtaining information and reporting refuge violations while patrolling the refuge. We in turn, give the State the information on most resident game violations that we pick up on the refuge. This is satisfactory in that the State requires a court appearance within a few days and it is held at Kenai. With the federal system, the defendent must appear in Anchorage and the court date is three to four weeks after the incident. The advantages are that the defendent may send the court a bail fine and the case is closed, thus the defendent does not have to appear and it helps the overcrowded court system.

One incident that occurred during this past summer deserves discussion. One of the park technicians, a summer employee, noted a parked camper and an unattended campfire on a road side late one evening. As he got out of a marked government vehicle the camper door opened. The employee saw a flash and heard a blast as someone shot over his head. There were a few words exchanged and the employee left as soon as possible. The individual had been drinking heavily and was perturbed at the FWS for closing a small campground at Jean Lake (a few miles down the road) and further indicated he did not want anyone around his camper.

LE Agent Soroka investigated the incident and had the defendent summoned to court. At the trial the jury's verdict was "Not Guilty."

The point we wish to bring out here is that most of the temporary summer employees have not had enforcement training. They are the individuals that are in the field everyday. They are the ones that represent the Service because they are wearing the FWS uniform. They are the ones that get involved with situations and incidents in the field. Yet, they are the ones that have had no training or only a briefing on enforcement. There is certainly a need for adequate basic enforcement training of new or temporary employees to be able to handle situations such as this.

Violations that were processed during 1981:

	Violation type	# of cases	Fine
1.	Fishing w/o license	5	$50.00 each
		7	------ State
2.	Overlimit of fish	1	$50.00 each
		2	------ State
3.	Fishing in closed waters	3	$50.00 each
			$00
		1	pending
		7	------ State
4.	Snagging of fish	14	$50.00
		1	$00
		12	------ State
5.	Driving off roads	6	$100.00
		1	$00
6.	Parking in unauthorized area	17	$15.00
		1	$00
		1	pending
7.	Disposal of waste (littering)	3	$100.00 each
		2	L&E
8.	Unauthorized Aircraft landing	1	$100.00
9.	Cutting wood in closed area	1	$50.00
		1	dismissed
		1	not guilty
10.	Bear baiting	1	$100.00
11.	Speeding	1	pending
12.	Wreckless operations of MV	1	dismissed
13.	Spotlight game	2	$50.00 each
14.	Unattended fire	1	dismissed
15.	Interference w/ employee	1	not guilty
16.	Unauthorized boat storage	3	pending

18. Cooperating Association

Kenai Branch, Alaska Natural History Association

Year End Narrative FY '81 - Nineteen eighty-one has been a year of steady growth for the Kenai NWR branch of the Alaska Natural History Association. Gross sales have more than doubled from $386 in 1980 to $947 in 1981. Visitation at the refuge has increased as more local residents have become aware of our new location.

Eight titles have been added to our inventory this year. We have added other titles throughout the year on a temporary basis to help reduce the inventory of other branches. Four of the eight permanent titles are not selling and were poor choices for our inventory. In the future, it would be prudent to choose titles more carefully, rather than tie up funds in unmovable inventory. We have picked up several titles, three of which were to replace titles that had gone out of print. At present, we are carrying 20 titles and eight visual aids.

One project that we have not yet completed this calendar year, is the purchase of books for the Kenai Headquarters library. Of the $1500 budgeted for this purpose, only 30% of the funds has been utilized. We hope to use the rest of the money year and we plan to request a similar project for next year. A good deal of time has been spent finding the best titles on the most important subjects to the organization and the refuge.

The Alaska Natural History Association outlet at Kenai NWR is still in a fledgling stage. The visitor center is not yet complete and the location is not well-known except perhaps to local residents. At present, the visitor center is not open to the public between 5:00 P. M. Friday and 8:00 A.M. Monday. This is the part of the week when the majority of tourists pass through the area. In the future, after the visitor center is complete, we would like to have a full time clerk working for the association who could be at the visitor center on the weekends during the tourist season. This would also alleviate the pressure on the refuge staff. Most sales are handled by the staff but the bookkeeping is done by a Y.A.C.C. enrollee. As association business grows with increased visitation to refuge headquarters, we hope to be able to meet the various needs of the visitor by having a full time receptionist.

19. Concessions

Although there are no formal concessions on the Kenai we find this section the most appropriate for reporting the special-use-permit program. The Kenai is under growing demand by commercial operators to provide guiding and transportation services. To respond to this demand special-use-permits were rewritten in a standarized format and all known commercial operators were out under permit. A copy of the permit is appended. To date 30 special-use-permits for commercial operators have been issued: 4 permits for use of the canoe camps, 8 permits for fly-in tent camps. 11 permits for guiding on the Kenai River, 1 permit for

operation of the Russian River ferry, 6 permits for guiding, hunting, and hiking trips, etc. The demand for guiding in some areas is expected to continually increase. As was done for fly-in tent camps in 1979 a policy for issuing permits on the Kenai River is necessary. The foundation this policy should be developed from the completed comprehensive conservation plan.

Twenty-six tent platform camps are located on 14 refuge lakes. These camps, under SUP and owned by fixed base air taxi operators, provide a remote setting for fishing and camping enthusiasts. (Staff Photo)

Other special use permits issued during 1981 include: 1 for Alaska National Guard training session, 7 for fish sites on Tuxedni Refuge, 1 to Kenai Peninsula Borough for soil tests, 2 for sand and gravel removal, 8 for fishery research studies, 1 for water rights, 1 for state champion sled dog race, 549 free use timber cutting permits, and 102 trapping permits for 1980-81 trapping season.

I. EQUIPMENT AND FACILITIES

1. New Construction

During March, Regional Office Engineers Berus and Rhodehamel made field engineering studies of site locations for the new BLHP shop, storage, and residence facilities at the headquarters site. In April, an archeologist and Ecological Services personnel made a wetlands survey of the proposed site locations. The funding had been made available in 1980.

Construction of the headquarters complex started in September for right-of-way clearing for roads, paths, water, gas, and telephone lines. Dirt was moved and gravel was placed for the shop-vehicle storage area and for the main access road. The construction work on the

shop and storage building contract began the last of October. However, cold weather and snow in early November caused the contractor to stop work until spring.

In April, several subcontractors repaired minor contract discrepancies at the new refuge headquarters.

Northwest Paving Company had asphalted 52,600 square feet in September 1980. They returned in June and painted the vehicle parking lanes on the asphalt in June.

Contracts were let for installation of 8 new refuge entrance and one headquarters signs, fence construction, water well drilling, parking lot paving, and handicap fishing facilities at the Russian River area in October. Work will begin on these projects next spring and should be completed by mid-summer.

A docking facility for two float plans was constructed at Headquarters Lake by YACC and Kivi. The Av-gas tank from Sports Lake was moved to the new site to facilitate refuge float plane operations from our new headquarters locations.

2. Rehabilitation

The Kenai NWR sign plan was completed during spring of 1981 and will be implemented in the near future.

An early spring break-up produced several serious erosion problems along refuge roads and campgrounds. Repairs were made during May and June and Lower Skilak Lake campground received a major effort.

Jim's Landing and Upper Skilak Lake campgrounds were slightly redesigned during 1981. During the year barrier post and bulletin boards were replaced and/or refurbished in most refuge campgrounds. All campground roads were graded and gravel added where neccessary. As part of a continuing program to reduce under utilized dispersed camping facilities, several pit toilets were removed. Pit toilets were removed at Sucker Creek, and Engineer and Hidden Lakes. A more modern facility will replace those removed at Engineer Lake.

Trail and sign rehabilitation in backcountry areas particularly Swanson River Canoe routes was extremely limited during 1981. One day of a four day maintenance trip, conducted by Y.A.C.C. crews, was on the Swan Lake Canoe route and park technicians rebrushed several trails in the Skilak Loop area.

3. Major Maintenance

Maintenance efforts were again at minimum levels during 1981. Due to budget constraints, the maintenance mechanic and three summer laborer positions were not filled for the second year. It fell on the shoulders of Dick Kivi, our equipment operator, and Brian Canaiy, YACC crew leader, to see that facilities on the nearly two million acre refuge were kept in at least basic repair.

The new headquarters building and increasing public use demands did not lighten the maintenance requirements. The equipment operator, with the aid of a YACC staff, completed the following maintenance projects: 22 vehicles and 8 pieces of heavy equipment were kept running and in fair condition, two headquarters sites were kept clean and landscaped, the remains of 4 old cabins in backcountry areas were removed, 75 miles of road were graded, 2 weeks spent on the canoe system repairing portages, all outhouses were kept cleaned and maintained regularly, and trash was removed from roadsides and trails. Trail work was accomplished on Skilak Lookout, Bear Mountain, and Skyline Trails.

Contractors were again successfully used for the removal of trash and maintenance of restrooms at high use areas. Although contract costs increased 200% from 1979, we find this to be the only reasonable method of maintaining our area when staff is limited.

4. Equipment Utilization and Replacement

There are several pieces of equipment at the refuge which have not been utilized in several years. We will be excessing this equipment next year, most all of which was acquired by the refuge from surplus military property.

The three pieces of new equipment most needed by the refuge, in priority order, are: Road grader, front-end Llader, and a hydro-axe. We currently have a military surplus Model-22 Caterpillar road grader but its useful life is over. We do not currently have a front-end loader or a hydro-axe. The front-end loader is needed for gravel loading onto dump trucks in road and campground maintenance and the hydro-axe in clearing and maintaining several miles of road and campground entrances.

Our vehicle fleet is adequate, except in some cases of high seasonal use. It is being supplemented by the impending transfer of four YACC vehicles. Future replacements will include several small pickups to help the fuel situation. We went big with previous units, such as crew cabs and suburban carryalls, when the YCC and YACC programs were active here in order to carry the maximum of personnel and work materials. With the discontinuation of these programs, our needs have changed.

5. Communications Systems

At the end of Fiscal year 1981, we requisitioned ten radios to upgrade those purchased in 1970 when we first began using two-way radios after the 1969 burn. The wires in our old radios had become so brittle from old age that repairing them was becoming quite expensive.

The radio repeater installed during 1970, at a prominent location along Swanson River Road, continues to function well (with maintenance) in transmitting signals received from our portable and mobile units. There is a possibility this repeater may be relocated to an even better communications site saving the refuge substantial funds currently expended for electrical power.

6. Energy Conservation

Our most significant effort in reducing energy consumption has been in vehicle use. We use the most energy efficient vehicles available in our fleet whenever possible. We assign the highest mileage per gallon vehicles to the personnel who do the most driving. We use credit cards for fuel at service stations when it will eliminate a trip to our old headquarters site in Kenai for fuel (a 22-mile round trip).

Total gasoline consumption of 8,296 gallons in 1981 compared with 6,418 gallons in 1980. YACC vehicles furnished their oun gas in 1980 while we supplied YACC vehicles 730 gallons of gas this year. In addition, YACC crews accounted for 933 gallons of gas used in refuge-owned vehicles. Our net use gain by eliminating gas used by YACC, is only 215 gallons. YACC crews racked up considerable mileage in replacing signs required by the new sign plan and in accomplishing campground maintenance on widely scattered areas. Dump and stake truck use increased this year also, which lowered miles per gallon over-all.

Miles traveled by refuge vehicles increased from 75,983 in 1980 to 85,152 in 1981 due largely to increased maintenance activities by YACC personnel. Because we have a 29% increase in vehicle gasoline consumption in the calendar year, it may be extremely difficult to meet out 1982 fiscal year goal. We did not anticipate the need for supplying fuel to our YACC vehicles, nor did we realize that amount of travel YACC work projects would require.

Over-all electicity consumption declined from 113,462 kilowatt hours in 1980 to 106,578 in 1981 for a 6% reduction. Electricity costs fell from $7,413.37 in 1980 to $7,341.85 or only 0.9%. We barely held our own on costs.

Natural gas consumption was lowered from 1,665,300 cu. ft. in 1980 to 1,529,700 cu. ft. in 1981 or 8.1%. Cost declined from $2,810.43 in 1980 to $2,630.61 in 1981 or 6.3%.

Aviation gas delivered in 1980 totalled 4,559 gallons. In 1981 it was 6,313 gallons. However, 2,011 gallons of this went into our new tank at Headquarters Lake and had not been used by year end. We actually used less aviation gas this year, accordingly.

J. OTHER ITEMS

1. Cooperative Programs

A special-use-permit was issued to the ADF&G to maintain their research/management cabin near Chickaloon Flats in February. Until ANILCA this cabin was located with the Forest Service lands adjacent to the flats.

Following several meetings and phone conservations, a Special Use Permit was issued in February to the ADF&G's Fisheries Rehabilitation and Enhancement Division (F.R.E.D.) for authorization to continue conducting a Fisheries project on Tustumena Lake. However, it was not finalized until June.

State highway contractors met with refuge staff to complete an agreement to rehabilitate and enhance inactive existing sand and gravel sites along the Sterling Highway and Skilak Loop Road. This work was completed in July.

In early May a Memorandum of Understanding with the Alaska Department of Fish and Game on the operations of the Russian River Fish Pass was forwarded to the Regional Office for signature.

There were several meetings during the year with the Chugach Native, Inc. and the Kenai Native Association to discuss refuge boundaries amd land exchange that are within the Kenai National Wildlife Refuge. RM Delaney met with assistant Kenai Peninsula Borough Engineer, Skip Bambard and FWS Reality Specialist Clyolyn Campbell on July 16 concerning a land exchange for a borough special waste site.

Refuge staff supplies an aircraft and time to the Soil Conservation Service in establishing a snow-pillow measuring device, snow course and aerial snow markers in the Upper Russian Lake drainage during early October. The snow information will be used to measure winter severity and its impact on sheep, goat, and salmon resources.

2. Items of Interest

Assistant Forester, Jim Lewandowski accepted a position with Alaska State Forestry at Fairbanks in January. Jim has worked with the refuge forestry program for the last five years and was the key person of the Computer Program since its inception at Kenai NWR.

Biological technecian Ed Bangs and YACC group leader Brian Canaiy attended the winter survival course presented by the U.S. Air Force at Fairbanks in January.

On January 6, Walter Soroka, special agent with Law Enforcement, and family were able to break the ice and introduce themselves to the refuge staff. Wally had been in the Kenai area several months but working as an undercover agent on a walrus ivory case.

Leslie Blaylock, administrative clerk, was awarded a Quality Performance Award and a monitary award of $400. Les has been employed by the refuge since June 1977. Les does most of the purchasing, personnel management, organinzed an extensive filing system, and has learned enough about wildlife habitat and recreation opportunities to answer most visitors' questions. Recognized by her co-workers, she is rated as "indispensable to refuge operations".

Jim Woolington, biological technician, received a Superior Performance award and $400 on June 18. Jim performed beyond the "call of duty" working on a long-term wolf-moose study in the refuge for the last five years. He donated much of his personal time after working hours, on weekends, and under physically uncomfortable conditions to carry all the functions of this study.

Al Johnson, refuge forester accepted a position with the BLM in Anchorage as a resource specialist-trespass officer in early October. Al had been with the Kenai Refuge since March 2, 1975 after transferring from Necedah NWR, Necedah, WI.

Doctors and nurses restrained wildlife biologist Ed Bangs from radio collaring and ear tagging Tara Morgan Bangs born on October 21. Congratulations Ed and Nanette!

Group leader Brain Canaiy terminated his employment during November. Brian accepted a seasonal position with the State Highway Department in Girdwood, Alaska, where he will be involved in avalanche control among other duties.

3. Credits

Assistant Refuge Manager Vern Berns initiated preparation of this report and made original section assignments to other staff members, prior to his transfer to the Alaska Peninsula National Wildlife Refuge. In addition, Berns drafted the climatic conditions, law enforcement, concessions, and other items sections. Refuge Manager Bob Delaney completed highlights and funding. Assistant Refuge Manager Bob Richey prepared the land acquisition section. Wildlife Biologist Ed Bangs completed the planning sections and Bangs and Wildlife Biologist Ted Bailey prepared the habitat management and wildlife portions. Administrative Clerk Leslie Blaylock prepared the personnel section. Outdoor Recreational Planner Rick Johnston prepared the wilderness management and public use sections, and Linda Gintoli, assistant refuge manager, the sections on construction, rehabilitation, major maintenance, voluntary programs, and technical assistance. Administrative Officer Gene Heath completed safety, equipment utilization, communications systems, and energy conservation. Primary Assistant Refuge Manager Mike Hedrick edited the report and the job of compiling, typing, and photo placement was done by Clerk-Typists Pat Fencl and Heather Bardy.

L. APPENDIX

Recent Publications of the Kenai National Wildlife Refuge.

Bailey, T.N. 1978. Moose populations on the Kenai National Moose Range. Proc. 14th North Am. Moose Conf. & Workshop. 14:1-20.

Bailey, T.N. and E.E. Bangs. 1980. Moose calving areas and use on the Kenai National Moose Range, Alaska. Proc. N. Am. Moose Conf. 16:289-313.

Bailey, T.N., E.E. Bangs, and V.D. Berns. 1980. Back carrying of young by Trumpeter swans. Wilson Bulletin. 92(3):413.

Bailey, T.N. 1981. Factors influencing furbearer populations and harvest on the Kenai National Moose Range, Alaska. 1980 Worldwide Furbearer Conf. Proc. Vol 1:249-272.

Bailey, T.N. 1981. Characteristics, trapping techniques, and views of trappers on a wildlife refuge in Alaska. 1980 Worldwide Furbearer Conf. Proc. Vol II:1904-1918.

Bailey, T.N. and A.W. Franzmann. 1983. Mortality of resident versus introduced moose in a confined population. J. Wildl. Manage. (Manuscript accepted, publishing date unknown.)

Bailey, T.N., A.W. Franzmann, P.D. Arneson, and J.L. Davis. 1983. An evaluation of visual location data from neck-collared moose. J. Wildl. Manage. (In press). (To appear in Jan or Apr 1983 issue.)

Bailey, T.N. and E.E. Bangs. 1982. Passerine bird use of early successional and old growth forest habitats on Kenai NWR. (Abstract only) Proc. Alaska Migratory Bird Conf., Anchorage, Alaska. March 15-18.

Bailey, T.N., E.E. Bangs, V.D. Berns, and R.A. Richey. 1982. Trumpeter swan numbers, habitats, and breeding success on Kenai National Wildlife Refuge (Abstract only) Proc. Alaska Migratory Bird Conf., Anchorage, Alaska. March 15-18.

Bangs, E.E. 1979. The effects of tree crushing on small mammal populations in Southcentral Alaska. M.S. Thesis, Univ. of Nevada, Reno. 80pg.

Bangs, E.E. 1980. History of wildlife on the Kenai National Moose Range. Three part newspaper feature published in the Outdoor section of the Kenai Peninsula Clarion, Kenai, Alaska. May 2, 9, 16.

Bangs, E.E. and T.N. Bailey. 1980. Interrelationships of weather, fire, and moose on the Kenai National Moose Range, Alaska. Proc. N. Am. Moose Conf. 16:255-274.

Bangs, E.E., V.D. Berns, and T.N. Bailey. 1981. Leech parasitism of Trumpeter swans in Alaska. Murrelet. 62(1):24-26.

Bangs, E.E. 1981. A modified museum special snap trap. J. Wildl. Manage. 45(4):1079.

Bangs, E.E., T.N. Bailey, and V.D. Berns. 1981. Ecology of nesting Bald Eagles on the Kenai National Wildlife Refuge, Alaska. Proc. Raptor Manage. and Biology in Alaska and Western Canada. (In press)

Bangs, E.E. and T.N. Bailey. 1982. Human activity and Bald Eagles: Conflict on the Kenai Peninsula, Alaska. (Abstract only) Proc. Alaska Migratory Bird Conf., Anchorage, Alaska. March 15-18.

Bangs, E.E., T.H. Spraker, T.N. Bailey, and V.D. Berns. 1982. Effects on increased human populations of the wildlife resources of the Kenai Peninsula, Alaska. Trans. N. Amer. Wildl. and Nat. Res. Conf. 47. (In press).

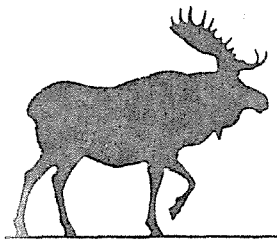
Fuller, T.K. 1981. Small mammal populations on the Kenai Peninsula, Alaska. N.W. Sci. 55(4):298-303.

Peterson, R.O. and J.D. Woolington. 1979. The extirpation and reappearance of wolves on the Kenai Peninsula, Alaska. Proc. Portland Wolf Symposium. (In press)

Peterson, R.O., T.N. Bailey, and J.D. Woolington. 1981. Wolf management and harvest patterns on the Kenai National Wildlife Refuge, Alaska. Proc. Edmonton Wolf Symposium. (In press)

Peterson, R.O., J.D. Woolington, and T.N. Bailey. Wolf-moose relationships on the Kenai Peninsula, Alaska. J. Wildl. Manage. (In review)

Smith, E.L. 1981. Effects of canoeing on Common Loon production and survival on the Kenai National Wildlife Refuge, Alaska. M.S. thesis, Colorado State University, Fort Collins, Colorado. 54pp.



kenai planning bulletin

KENAI NATIONAL MOOSE RANGE COMPREHENSIVE PLANNING PROJECT
U.S. Fish and Wildlife Service, 1011 E. Tudor Rd., Anchorage, Alaska 99503

Issue Number 1 October 22, 1980

- What should future management of the 1.7 million-acre Kenai National Moose Range in Alaska be like?
- How should management for moose and other large and popular animals be balanced against the needs of small, less known species of plants and animals?
- What kinds and levels of fishing and other recreational uses should be permitted, and where?
- Should commercial activities be allowed to continue or expand, and if so, what kinds, where, and to what extent?
- What sorts of educational and interpretation programs and facilities are needed?

These are some of the questions the U.S. Fish and Wildlife Service will be seeking, over the next year, to answer. WE NEED YOUR HELP.

The Fish and Wildlife Service is beginning development of a Comprehensive Conservation Plan for the Kenai National Moose Range. The Range is a unit of the National Wildlife Refuge System. It lies southwest of Anchorage, Alaska on the scenic Kenai Peninsula. In addition to the moose for which it was established, the Range supports caribou, wolves and other furbearers, Dall sheep and mountain goats, black and brown bears, world famous salmon fisheries, and a host of other natural resources. It is a favorite outdoor recreation area for thousands of Alaska residents, particularly from the Anchorage area, and tourists from the 'lower 48', Japan, and other parts of the world.

The comprehensive plan will be a long term (10 to 20 year) foundation upon which management and operations plans for the Range will be based. It will describe existing uses and capabilities of the lands and the biological communities they support. It will establish objectives for the Range and the broad management strategies necessary to attain them.

We wish to ensure that future management of the Moose Range accommodates the needs and desires of the public to the extent that laws and regulations permit. To help us identify these needs and desires, we will be actively seeking the opinions of a wide spectrum of the public throughout the planning process.

In the past, you or your organization has indicated an interest in one or more aspects of Kenai National Moose Range management; that is why you are receiving this announcement. If you desire further information on the Range, the comprehensive planning process, and how you can participate, please fill in the "PUT ME ON YOUR MAILING LIST" below, and send it to:

Kenai N.M.R. Planning Team
U.S. Fish and Wildlife Service
1011 E. Tudor Road
Anchorage, Alaska 99503

Photocopies of the "PUT ME ON YOUR MAILING LIST" form will be accepted from persons or organizations who did not receive this bulletin, but would like to receive future mailings related to the Kenai Moose Range planning effort.

Thank you.

Keith M. Schreiner
Alaska Area Director
U.S. Fish and Wildlife Service

PUT ME ON YOUR MAILING LIST

To: U.S. Fish and Wildlife Service

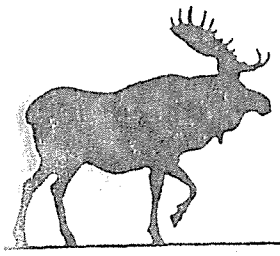
I wish to be placed on your mailing list to receive information on Comprehensive Planning for Kenai National Moose Range. I understand that names and addresses on U.S. Government mailing lists may be released to the public, upon request, under provisions of the Freedom of Information Act of 1974.

Name: _____

Address: _____

City, State, Zip Code: _____

Signature: _____ Date: _____



kenai planning bulletin

KENAI NATIONAL MOOSE RANGE COMPREHENSIVE PLANNING PROJECT
U.S. Fish and Wildlife Service, 1011 E. Tudor Rd., Anchorage, Alaska 99503

Issue Number 2 November 7, 1980

This issue of the Kenai Planning Bulletin describes the Kenai NMR Comprehensive Conservation Planning process and how you can participate. Please study this bulletin and give us your opinions, by letter or at public meetings. YOU CAN MAKE A DIFFERENCE!

We have several reasons for asking you to participate in this planning effort. First, we can be sure to address all public concerns, needs, and desires only if the public tells us what those concerns, needs and desires are. Lands of the National Wildlife Refuge System are not multiple-use lands. Only those kinds of uses that are compatible with the wildlife conservation purposes of refuges may be permitted. Compatibility, however, usually depends upon the amount, location, and timing of the use. So we need to know not only what uses are desired by the public but how much, where, and when.

Secondly, we want to be sure to examine all alternatives for resolving conflicts. Public input may well identify alternatives the planning team would otherwise miss. If such alternatives provide better solutions to problems, we will use them.

Finally, public understanding of the potential conflicts between various uses, and how those conflicts can be prevented, is likely to reduce future conflicts. When people understand why certain activities are restricted or prohibited, they are more willing to tolerate those restrictions. This allows the always-limited staff of the Range to put more time into effective management and less into law enforcement. Both wildlife and human users benefit from such a change.

The rest of this bulletin is made up of answers to questions we think you might like to ask at this point.

What is a Comprehensive Conservation Plan?

Comprehensive planning for a refuge is a lot like planning for a new home you wish to build. Assuming you have already chosen the site for your home, some of the things you have to look at first are how large a home the land will accommodate, what zoning and other ordinances will limit your design freedom, and what characteristics of the land point you in the direction of certain designs. That is, you must look at land capabilities and suitabilities and planning constraints. All of your subsequent planning and construction must remain within these boundaries.

Once you have done that, you can set about designing the home to fit those circumstances. How large a home do you need? How many bedrooms? What exterior style? What special activities must the home provide space for? The answers to these and similar questions will become the objectives of your home; the goals you want it to attain.

Once you know what the objectives are, you would probably design several alternative floor plans to fulfill those objectives. These can be considered alternative strategies for attaining the objectives.

Ultimately you choose the floor plan, or strategy, that best fulfills your objectives and fits your budget. Throughout the construction process, every action taken is designed to contribute to completion of the house; that is, fulfillment of the objectives.

Using the same logical sequence of steps, comprehensive planning yields three principle products:

1. Long-term (10 to 20-year) refuge objectives;
2. A land use plan;
3. Long-term management strategies to attain the objectives.

We begin by looking at land capabilities and planning constraints. What sort of outputs or benefits could refuge lands produce? What outputs, if any, are we legally mandated to produce? What legal limitations are there on refuge uses? The answers to these questions provide the boundaries within which planning must be done.

Within those boundaries, objectives are chosen based upon long-range public priorities and needs, both local and national. Objectives for refuges are stated in terms such as numbers of animals or species supported, numbers and types of recreational users, acres of wilderness protected and similar expressions.

Once objectives have been set, various land use patterns and management strategies are developed, like alternative floor plans for a house, and compared for effectiveness and efficiency. The best combination is chosen, and subsequent operations on the refuge are based upon the chosen land use pattern and strategies.

The completed comprehensive plan serves as the foundation for management plans that guide day-to-day refuge operations.

More specifically, the comprehensive planning process works like this:

Step 1: We identify the legal mandates that must be met by the refuge and the legal and other constraints that limit the alternatives we can address.(see page 4 for details)

Step 2: We identify what kinds of outputs or benefits the refuge has the capacity to produce (Examples: moose, salmon, environmental education, recreation, etc.);

Step 3: Using public input and FWS policies and regulations as guides, we identify those outputs or benefits that are needed or desired and appropriate for the refuge;

Step 4: We determine, based upon importance and degree of controversy or conflict with other benefits, the outputs that will require numerical objectives;

Step 5: We inventory refuge lands and facilities to determine the amount of each objective output that can be produced and to identify the likely conflicts between outputs;

Step 6: We develop several alternative sets of objectives. These alternative sets of objectives are presented to the public for study of potential conflicts and ways to resolve them. We request public opinion as to the best alternative;

Step 7: One of the alternative objective sets resulting from Step 5 is selected, based upon public input, legal mandates, and FWS priorities. The output levels in that set will become the long-range objectives of refuge.

Step 8: Several alternative land use and long-range management proposals are developed, each of which represents a way to attain the objectives established in Step 6. The public is asked to review, and comment upon, those alternatives.

Step 9: After consideration of public preferences, cost, effectiveness, and practicality, the FWS selects one of the alternatives as the long-range plan for refuge.

Step 10: The finished plan, together with appropriate environmental documents, is made available for final public review and comment. This is expected to occur, for the Kenai Moose Range, around September, 1981.

What are the Constraints on Kenai Planning?

Any responsibility or activity of the Federal government, including management of Kenai National Moose Range, is based upon Federal law and Executive Orders. These mandates are, for planning purposes, not debatable. Questions as to their constitutionality, legality, desireability or effectiveness could be addressed by Congress or various courts. We simply cannot address them in this planning effort, however.

These mandates include Federal laws relating to the establishment, organization, and responsibilities of the U.S. Department of the Interior and the Fish and Wildlife Service.

They also include the various State and Federal laws dealing with the taking and conservation of wildlife. One of the most pertinent of these is Public Law 94-223, the National Wildlife Refuge System Administration Act. This law requires, among other things, that the Secretary of the Interior permit only those uses of refuge lands that he determines "are compatible with the major purposes for which such areas were established". In effect this means that public or private use of refuge lands or resources cannot be permitted if they conflict with the needs of wildlife. Another important conservation law affecting Kenai is the Wilderness Act. Several areas in the Range are being considered by Congress for designation as wilderness.

Finally, the legal mandates relating to Kenai Moose Range include the 1941 Executive Order (#8979) that established the Range, as well as subsequent Executive and Public Land Orders expanding or otherwise modifying it.

We hope that as you think about and offer input to this planning project, you will concentrate on providing guidance related to questions and issues we have the authority to resolve.

What about the Alaska Lands Legislation in Congress?

At this time, no one can say whether the legislation now in Congress, which would increase the size of the Moose Range and change its name and purposes, will be enacted. However, enactment does seem likely. For this reason, we will consider in long-range planning, lands that would be added as well as those already in the Range. Also, since passage appears imminent we are considering, temporarily and for planning purposes only, the purposes of Kenai Moose Range to be as described in the "Tsongas Ammendment" to HR39.

What are the Decisions to be Made?

Some of the more vital decisions we need to make during this planning process are:

1. Should individual species receive special emphasis? If so, what species and how much emphasis?

2. How can increasing demand for recreational use be accommodated without sacrificing quality? If quality must be sacrificed, to what degree?

3. What kinds and amounts of economic use (such as timber harvesting, oil and gas exploration, grazing, etc.), if any, are compatible with the purposes for which the Moose Range was established?

4. What kinds of public use should be favored when conflicts between uses arise?

5. Should the fishery resources of the Range be managed for maximum harvest, for natural population levels, or for some intermediate level of productivity?

6. What kinds of and how much public access should be provided for the Range?

7. Where are the best areas for environmental education, interpretation and land management training? How should these benefits be provided?

These are only a few of the decisions we need to make. We are asking you to help us make them.

How will My Input be Used?

One of the decision points in the Kenai NMR planning process is coming up shortly. Around the middle of December, we will be determining which outputs on Kenai will have the highest priority and which outputs we need objectives for. Another such point is scheduled to occur next May when we will decide which of several alternative sets of objectives will be chosen for the Moose Range.

We need your input to help us make these decisions. Prior to each major decision point, we will ask for public judgement relating to the issues and their resolution. The input received will be carefully analyzed to identify public priorities. Wherever feasible, considering legal mandates and conflicts between outputs, the desires expressed in public input will be accommodated. Where public concerns cannot be accommodated, we will explain, in subsequent mailouts, why they cannot.

Our most immediate need, in terms of public input, is to identify the general concerns of the public and the issues that people consider most important.

What are Issues?

For the purpose of this planning effort, "issues" are areas of actual or potential competition, conflict, or controversy that can and should be addressed in the Kenai NMR Comprehensive Conservation Plan. Some obvious examples are:

1. Competition between sport and commercial fishermen for salmon;

2. Conflicts between wolves, bear, and Man as predators of moose, and;

3. Potential competition between increased or improved refuge camping facilities and nearby commercial campgrounds.

These are, as we said above, only examples; there are literally dozens of existing or potential issues. No doubt, there are some we haven't thought of. We ask you to tell us what issues are of special interest to you and how you would like to see them resolved.

How can I Participate?

If you, as an individual citizen, want to provide input to the planning effort, you can do so in several ways. They are:

1. by participating in public workshops (see schedule, page 7);

2. by mailing cards or letters stating your concerns to the Kenai NMR Planning Team at any time (address on page 7);

3. by communicating your concerns by telephone, to the 24-hour planning hotline operated by the League of Women Voters. (Telephone numbers on page 7)

Established business, professional, social, or other organizations can provide input through:

1. organizational representatives participating in public workshops

2. describing the organization's concerns in letters to the planning team;

3. designating a special representative to meet with members of the planning team to discuss mutual concerns (Contact planning team members for information on use of this approach).

What about Public Meetings?

The League of Women Voters of Alaska has scheduled a series of public meetings on the Kenai Peninsula and in Anchorage. The purpose of these meetings is to gather information, for the Fish and Wildlife Service, on issues of concern to the public regarding future management of Kenai National Moose Range. The League has designed the meeting format, will run the meetings, record issues and concerns voiced by the public, analyze meeting results, and provide a written report of expressed issues and concerns to the Service. Fish and Wildlife Service personnel will be present to provide technical information related to the planning process and Kenai Moose Range.

The meeting schedule is as follows:

Monday, November 17, 1980: Seward Elementary School
Wednesday, November 19, 1980: Soldotna Borough Building
Thursday, November 20, 1980: Homer High School
Tuesday, November 25, 1980: Anchorage, Romig Junior High School

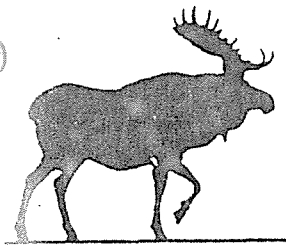
Each meeting will begin promptly at 7:30 p.m., end at about 10:00 p.m., and be conducted in the form of a workshop. Participants will spend the first portion of the workshop discussing issues and concerns in groups assisted by League members. Then each group will present, through one or more spokesmen, its findings with regard to issues and concerns. Those persons who arrived too late to participate in the group discussions, or who feel their concerns were inadequately addressed, will be urged to express their opinions in writing or by telephone. A telephone hotline will be operated by the League from November 17 through December 5 for this purpose. From Anchorage, this line can be reached by dialing 349-2131. From the Kenai Peninsula, ask your operator for Zenith 2131. This is a toll free call.

If you wish to provide written input, please address your letters to:

Kenai NMR Planning Team
U.S.Fish and Wildlife Service
1011 E. Tudor Road
Anchorage, Alaska 99503

We thank you for your interest and participation.

Area Director
U.S. Fish and Wildlife Service



kenai planning bulletin

KENAI NATIONAL MOOSE RANGE COMPREHENSIVE PLANNING PROJECT
U.S. Fish and Wildlife Service, 1011 E. Tudor Rd., Anchorage, Alaska 99503

Issue Number 3 January 21, 1981

A lot has happened since we issued our last bulletin on November 7, 1980. At that time we were beginning the scoping phase of our planning to identify those issues which you, our public, felt we should consider. Many of you participated directly in one or more of the four public workshops conducted for us by the League of Women Voters. Some of you conveyed your thoughts on our telephone hotline and many more provided written input. We are very pleased with the interest you have shown and would like to thank each of you who have helped us so far. This is a beginning and we look forward to your continued participation.

How Was The Public Input Handled?

During the two weeks following the public workshops, the League of Women Voters prepared a report on the information given to them at the meetings and over the hotline. This report, and all of the letters the Fish and Wildlife Service received, were analyzed by Alaska Information Management Systems (AIMS), the data analysis group in the Fish and Wildlife Service Anchorage Regional Office. AIMS produced a summary of the information which we will discuss in this newsletter.

What Issues Were Identified?

Most of the issues or concerns expressed fell into four major categories. They were (not in priority order):

1. Access.
2. Refuge Land Use Management Programs.
3. Federal vs. Non-Federal Responsibilities on the Refuge.
4. Refuge Wildlife Management Programs.

The issues identified in the Access category were:

A. Should access to refuge lands be increased, decreased or remain as is?

B. Is motorized or non-motorized access most desirable.

C. Should access be controlled by area, by climatic seasonal restrictions, or by a mix of both?

D. How extensive should the variety of access types be and should access for all ages and capabilities be provided?

The issues in the category of Refuge Land-Use Management were:

A. Should structures and private dwellings located on refuge lands other than inholdings be retained or removed?

B. To what degree should public use cabins, viewing areas, viewing ramps, etc., be developed on the refuge?

C. What is an acceptable level of commercial use of refuge lands for such purposes as oil and gas development, hydroelectric, timber, etc?

D. Should more refuge land be open to firewood harvest by local people?

E. How much logging or grazing is acceptable as a means of modifying habitat?

F. How much stream rehabilitation and fishery enhancement is acceptable if it conflicts with the needs of other species?

G. Should commercial development to support public use be encouraged or discouraged?

H. To what extent should natural fire be used as a management tool and how much planning is needed?

The issues identified in the category of Federal vs. Non-Federal Responsibility were:

A. To what extent should the state control management practices on the refuge?

B. Should priority be placed on local demand for refuge resources when designing refuge management programs and, if so, how much?

C. Should an advisory group be established to guide future refuge management?

D. How can law enforcement and facilities maintenance be improved on the refuge and what part should the state play in the improvement?

E. Is current refuge funding adequate to meet the public desires without eliminating activities which are now taking place on the refuge?

F. Should the refuge exist and is it too large or too small?

G. How much and what type of control should be placed over commercial, public, and cultural uses of the refuge?

The issues identified in the Wildlife Management Programs category were:

A. How much predator control is acceptable and which species of predators should be controlled?

B. Should the refuge be managed primarily for the benefit of selected species or should a balance be struck to benefit all species found on the refuge?

C. Are current hunting, fishing, and trapping regulations adequate or are changes desirable?

D. Should species of fish and wildlife be introduced or propogated on the refuge under a special program (Aquaculture)?

Other issues expressed include:

A. Will the FWS be able to produce more educational programs and interpretive literature to help increase public understanding of the refuge and its workings?

B. Is it possible for the FWS to provide better public notice in the local area when management changes are anticipated?

C. What kind of controls on the carrying and use of firearms on the refuge are necessary?

D. Will the refuge be able to increase its public information program and reopen the visitor contact station?

E. How does the FWS propose to protect the wilderness and scenic values on the refuge?

F. How does the FWS propose to handle the research needs on the refuge?

As you can see some of the issues presented have two sides and some do not. Some of the desires expressed will clearly conflict with others, some will not. Some of the issues and desires presented are beyond our authority to deal with. One of the most difficult parts of the job we have before us is developing a plan that resolves as many of the various conflicts as possible in a manner compatible with the purposes for which the refuge was established.

What Happens Next?

In our previous bulletins, we briefly discussed refuge "outputs" or benefits. These are the products the refuge can produce for people. Some, like public recreation or economic use provide direct benefits for people. Others, such as maintenance of various kinds of animals and protection of forests, tundra, and other habitats, provide indirect benefits. In the upcoming months, we will be hard at work studying the capability of Kenai N.W.R. to produce various outputs. How much of each input can be produced? Where? How will production of each output affect production or people's enjoyment of other outputs? How would the refuge environment as a whole be affected?

As we learn about these things, we will develop a number of alternative mixes of outputs that could be produced. One of these sets may be oriented more toward a specific land use such as recreation than another which may emphasize habitat enhancement. We will try to develop sets which address as many of your issues and concerns as possible. Each of these sets will be analyzed to determine the acceptability of short term benefits versus the effect of these benefits on the long range health and stability of the refuge, keeping in mind our commitment to protect natural resources for the benefit of future generations.

When we complete the development of these ouput sets we will again call upon you for help. We will need to know which of the alternatives best fulfills your needs and desires. We will also discuss how the laws governing management of refuges constrain our choices of alternatives.

Once we have analyzed your comments on the output sets we will recommend to our Regional Director the legally acceptable output set that seems to best meet everyone's needs. This set will become the basis for the 10-20 year management objectives of the Kenai Refuge. Our recommendation and the Director's decision will be the subject of a subsequent planning bulletin.

What Part Has My Input Played So Far?

Your input has given focus to local and regional issues. This has created a greater awareness of your desires. In our attempt to select the best mix of outputs we are now better able to understand your priorities. As the planning effort continues we will make a special effort to ensure that these concerns will be addressed.

We hope you will continue to assist us in this process and contact us whenever there are questions we might answer or clarifications we might give.

Kenai planning bulletin

KENAI NAT'L WILDLIFE REFUGE COMPREHENSIVE PLANNING PROJECT

U. S. Fish & Wildlife Service, 1011 E. Tudor Rd., Anchorage, Alaska 99503

Issue Number 4 October 2, 1981

What's Happening?

Many of you have written since Kenai Planning Bulletin #3 was published and have asked this very question. It has been quite a while since Bulletin #3. One reason for this was a moratorium placed on all federal publications and information-gathering activities by the new Administration. Following review of the justifications for the Kenai Planning Bulletin, we finally received authorization to continue publishing.

Another delay has resulted from diversion of planning personnel to other activities required by the Alaska National Interest Lands Conservation Act (ANILCA). The Act contains mandates for several other kinds of planning activities, including the Bristol Bay Regional Plan, Wild and Scenic River assessments, the Arctic North Slope wildlife assessment, and mineral assessments of Federal lands. Some of these mandates have required attention from the refuge planning staff, forcing us to delay the scheduled completion date for the Kenai Plan.

Additional planning personnel, including specialists in land use planning, geology, sociology, economics, public involvement, and various support functions have been allocated and are now being hired to carry out these tasks for Kenai and other refuges. Once these folks are on board, the pace of planning will accelerate.

Our present activities related to Kenai NWR are primarily concerned with surveying and classifying habitat types, fish and wildlife populations, economic and recreational potential, and wilderness suitability and the identification of significant issues and concerns. Funding and personnel constraints have forced us to rely largely upon existing information. Some field work, however, is being done in relation to habitat classification and wilderness suitability.

Ultimately, we must meet all of the mandates of ANILCA relating to comprehensive conservation planning of refuges. These mandates are quite specific. We must, for example, prepare inventories and descriptions of wildlife populations and habitats, archeological, historical, paleontological, geological and cultural resources.

The highlights of the new schedule are as follows:

PLANNING ACTIVITY	DATES
Collection of resource and socioeconomic information	June, 1981 September, 1981
Identification of significant issues to be addressed by plan	November, 1981
Analysis of information, development of alternative refuge objectives sets, and assessment of environmental and social impacts. Also wilderness assessments.	October, 1981 thru January, 1982
PUBLIC REVIEW OF ALTERNATIVES AND OPTIONS	Feb.-March, 1982
Development of management strategies to attain objectives, together with draft wilderness recommendations and environmental compliance documents.	April-August, 1982
PUBLIC REVIEW OF DRAFT DOCUMENTS	Sept.-October, 1982
Preparation of final documents	Nov.-December, 1982

Ecological, wilderness, and scenic values must be identified. Access needs must be determined and areas suitable for administrative and visitor facilities must be identified. The plan must identify all uses of refuge lands that may be compatible with refuge purposes, describe recreation, interpretation, education, and research opportunities, and specify management programs for conserving fish and wildlife and for maintaining the other values of the refuge.

ANILCA clearly sets forth the purposes for which Kenai National Wildlife Refuge (Kenai NWR) was established and must be managed. Simplified and listed in order of priority these include:

1. to conserve fish and wildlife populations in their natural diversity;

2. to fulfill international fish and wildlife treaty obligations;

3. to ensure water quality and necessary water quantity;

4. to provide opportunities for scientific research, interpretation, environmental education, and land management training;

5. to provide opportunities for fish and wildlife-oriented recreation.

The primary purpose of comprehensive planning is to determine how the resources of a refuge can best be used to fulfill these purposes. Management goals must be determined, problems in meeting the goals identified, and broad management programs to deal with significant problems prescribed. The plan will not, however, describe in detail the day-to-day or month-to-month management of the refuge. It cannot ensure a certain level of funding or service but will demonstrate needs for funding. It cannot resolve legal disputes or modify administrative requirements. It cannot establish or change laws; it can only prescribe what is needed to ensure compliance with them. In summary, the plan identifies 'what' is to be accomplished, but deals with the 'how' only in a broad, long-range manner.

With this in mind it becomes clear that some issues that were identified through public input are questions or issues that, regardless of their importance, cannot be resolved in a comprehensive plan.

By November, analysis of the 29 separate issues and concerns listed in the Kenai Planning Bulletin #3 will be completed. We will identify the issues which would have serious consequences if no action is taken, are of high public concern, or which may provide benefits to the public if action is taken. Then we will produce a document which describes the issues and concerns to be dealt with in the plan and identifies those which will not be addressed. This document will be mailed to everyone on the Kenai mailing list, providing an opportunity for you to evaluate our focus upon these major issues.

PUT ME ON YOUR MAILING LIST

To: U.S. Fish and Wildlife Service

I wish to be placed on your mailing list to receive information on Comprehensive Planning for Kenai National Wildlife Refuge. I understand that names and addresses on U.S. Government mailing lists may be released to the public, upon request, under provisions of the Freedom of Information Act of 1974.

Name: _____

Address: _____

City, State, Zip Code: _____

Signature: _____ Date: _____

kenai planning bulletin

— a special edition

november 1981

Issues and concerns for comprehensive planning on the Kenai National Wildlife Refuge, Alaska

ISSUES AND CONCERNS

FOR

COMPREHENSIVE PLANNING

ON THE

KENAI NATIONAL WILDLIFE REFUGE, ALASKA

-- a special edition of:

The Kenai Planning Bulletin

prepared by:

U. S. Fish & Wildlife Service
Kenai NWR Planning Team
1011 E. Tudor Road
Anchorage Alaska 99503

To the Reader:

This special edition of the Kenai Planning Bulletin represents the culmination of the initial scoping phase of comprehensive conservation planning for the Kenai National Wildlife Refuge. Comments received from the public have helped to formulate each of the issues presented.

I would like to take this opportunity to thank all who have offered comments for participation in our planning effort. Your help has been valuable, and I hope you will continue to assist us by providing us with your views about the material presented in this and future documents.

Thank you

Keith M. Schreiner

Regional Director

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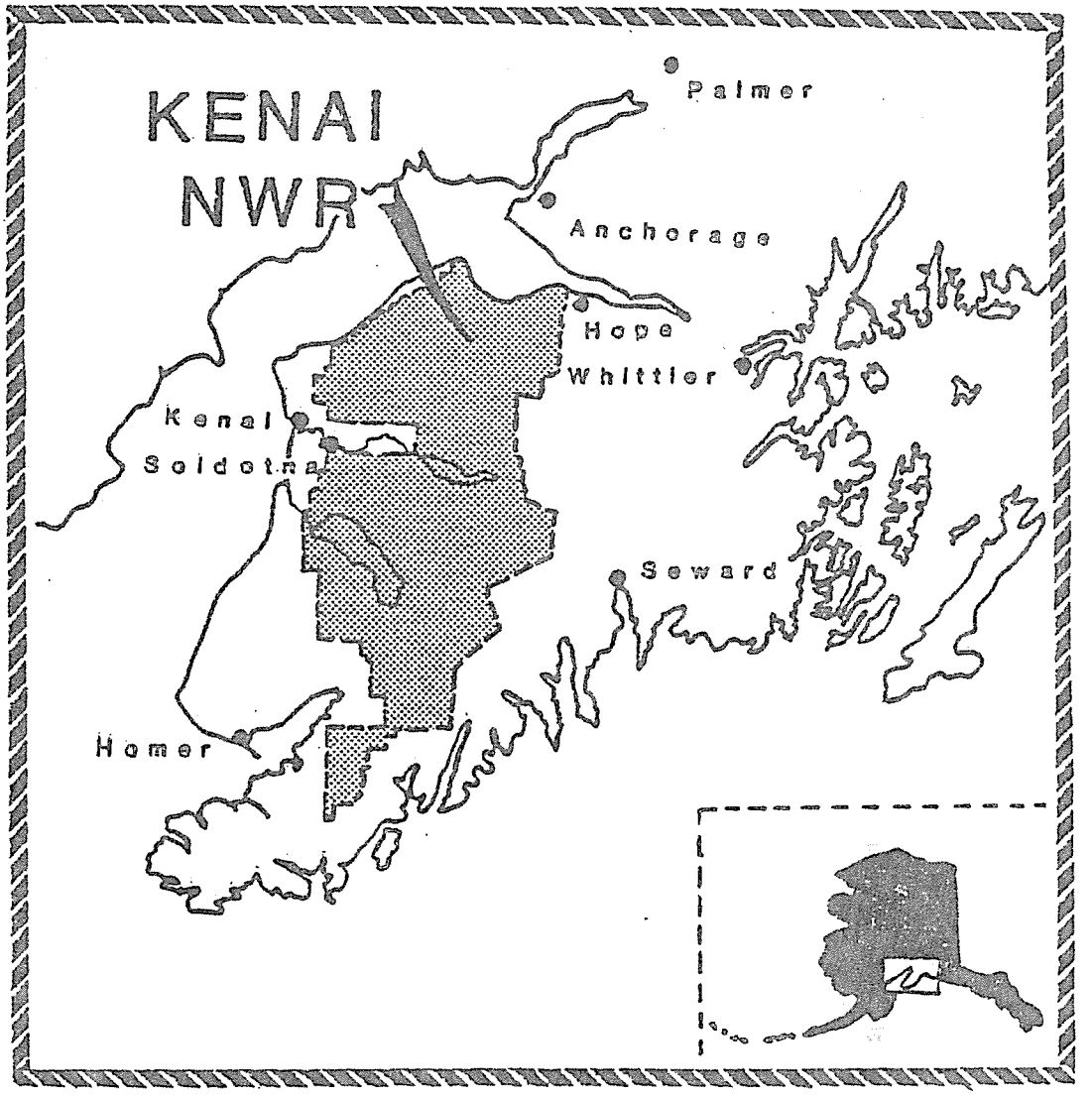


Description of the Area

The Kenai National Wildlife Refuge lies to the south of Anchorage, Alaska on the Kenai Peninsula. The 2,000,000 acres of federal land administered by the U. S. Fish & Wildlife Service include much of the Kenai lowlands, an area of spruce, birch, and aspen forests dotted with bogs and shallow lakes. Where the lowlands have been swept by fire, willow and aspen thickets have grown up and are an important source of browse for moose, the best known game species on the refuge. The lowlands also support black and brown bear and a variety of smaller mammals and birds.

East of the lowlands, the refuge rises into the Kenai Mountains. Mountain goats and Dall sheep inhabit the rocky crags and alpine tundra slopes. Glaciers cut through the mountains from the Harding Ice Field to feed the Kenai, Kasilof, Bradley, and Fox

rivers. These and other streams flow through the mountains and lowlands, supporting rainbow trout, dolly varden, and all five species of Pacific salmon.

Planning Requirements

Established as the Kenai National Moose Range in 1941, the refuge was enlarged and redesignated the Kenai National Wildlife Refuge by the Alaska National Interest Lands Conservation Act of 1980 (ANILCA).

Today, the refuge is managed to conserve the populations and habitats of all wildlife within its boundaries. But it lies in the heart of the most populous and rapidly growing portion of the state--southcentral Alaska, and human needs for recreation, oil, gas, transportation corridors, timber and a variety of other purposes are making an ever increasing number of conflicting demands on the resources of the refuge.

Recognizing the potential conflicts that might arise from such competing needs, Congress directed in ANILCA that a comprehensive conservation plan be developed for the Kenai (and for all other national wildlife refuges in Alaska).

The comprehensive plan will attempt to identify both the human demands and the needs of wildlife. The plan will evaluate possible uses of refuge lands to determine what activities are compatible with the purposes for which the refuge was established and for which it will be managed.

Public Participation to Date

Since November 1980, the Fish & Wildlife Service has been seeking comments from the people who live in the area of the refuge and from other interest groups about the kinds of activities that should be permitted on refuge lands. At meetings in Seward, Soldotna, Homer, and Anchorage, local residents expressed their concerns about the refuge. Other comments have been received by telephone and in writing from interested citizens and local government officials. Representatives of the Alaska Department of Fish & Game and the Department of Natural Resources have met with the refuge planning team to express their concerns. Comments also have been made by the refuge management staff and other Fish & Wildlife Service personnel.

Methodology for Defining Issues

The comments from all sources have been grouped into areas of similar concern, and a series of issues have been identified based on these concerns. Each issue is presented as a question which the planning staff will explore in preparing the comprehensive plan.

MAJOR ISSUES

I -- Fish & Wildlife populations and habitats:

Issue I-A.

How can the refuge best accommodate the demands for consumptive use of fish and wildlife without depleting game and fish populations?

Hunting, fishing and trapping on the refuge are at high levels and are expected to increase. The human population is continuing to grow in southcentral Alaska, and the demand for harvest able wildlife is clearly exceeding the supply. Concerns have been expressed about the populations of bears, wolves and other predators, and if they should be reduced or portected. Desire for more hunting opportunities for moose, sheep, waterfowl, and other game species also have been noted.

Issue I-B.

What kinds of fish & wildlife management practices should be considered?

A variety of techniques exist for manipulating the capability of some portions of the refuge to support certain species of fish and wildlife. For example, tree crushing, controlled burning and timber harvest are among the ways in which plant succession may be controlled to favor species requiring early successional stages. Five control and the prevention of disturbance to vegetation are ways to enhance habitat for species requiring a mature forest.

Issue I-C.

How should fish and wildlife habitats be protected as human use of the refuge and the demand to develop resources increase?

As development increases in southcentral Alaska, it may encroach on critical wildlife habitats. For example,

demand for water for human consumption and for hydroelectric power may conflict with requirements to maintain enough stream flow for salmon spawning.

Issue I-D.

Should the management of the refuge focus on protecting a few species or on whole ecosystems?

The refuge was originally established for the purpose of protecting the natural breeding and feeding range for moose. There is localized support to concentrate management efforts on enhancing the moose habitat and population. ANILCA requires that the refuge be managed for all species. The comprehensive plan will seek to determine whether such concerns conflict with one another, and if so, how such conflicts can be resolved.

Issue I-E.

How can the habitats and populations of those species dependent upon vast, relatively undeveloped areas be conserved?

Increased use and demands for more access to the refuge may have harmful effects on some species. It has been suggested, for example, that canoeists on the Swanson River system disturb nesting loons.

Issue I-F.

What should be the role of the refuge in maintaining or enhancing fisheries?

Sport and commercial fishing are important to the economy of the Kenai Peninsula. The Alaska Department of Fish and Game is involved in stocking and in developing hatcheries on the peninsula. Some opportunities may exist for the refuge to cooperate in such activities.

II - Special Values

Issue II-A.

What and where are the wilderness, archeological, paleontological, historical, and scenic values of the refuge?

The Kenai Peninsula has a long history of human use. Tanaina Indians lived on the Peninsula for centuries, and the area's Russian heritage is two hundred years old. In addition, the peninsula offers opportunities for

wilderness experience in the heart of the state's most densely populated region. Scenic attractions include mountains, glaciers, lakes, streams and wildlife. An inventory of such values will be developed in preparing a comprehensive plan.

Issue II-B.

What protective measures are appropriate to assure that the special values are preserved?

The sites of ancient native villages and Russian settlements are often the same locations that appeal to modern-day hunters, fishermen and campers. Recreationists may unwittingly disturb archeological sites. Recreation and other human uses may also threaten scenic wonders and potential wilderness areas.

III - Economic Use

Issue III-A.

What specific uses will be compatible with the purposes of the refuge and under what circumstances?

The refuge may contain a variety of resources which have possible economic value, including gravel, coal, minerals, water and timber.

Most resource development is unrelated to the purposes for which the refuge was created. Whether a particular action is permissable will depend largely on whether it is compatible with refuge management goals. Factors to be considered will include impacts on fish and wildlife, their habitats, wildlife-oriented recreation and other resources.

Issue III-B.

Under what conditions should continued oil and gas development occur?

Oil and gas production is a significant element of the economy of the Kenai Peninsula. Factors to be considered in determining the compatability of future development will include impacts on fish, wildlife, their habitats, and other resources.

IV - Wilderness

Issue IV-A.

Should more wilderness be recommended for the refuge?

Wilderness designation can be an effective way to protect certain resources because it tends to limit human disturbance to that resource. Human activities in wilderness areas are allowed within established guidelines designed to protect these values. At the same time, however, wilderness designation precludes some management practices. Additional wilderness potential will be evaluated based upon need to protect important resource values, using criteria established in the 1964 Wilderness Act.

Issue IV-B.

How and under what conditions should access to wilderness be allowed?

Consideration will be given to establishing and maintaining additional trail and canoe systems within wilderness areas. Aircraft, motor boat and snowmobile access must be considered in accordance with guidelines provided by ANILCA and the Wilderness Act.

Issue IV-C.

What management guidelines should be established for human use of wilderness areas on the refuge?

Heavy public use in some wilderness areas has caused adverse environmental impacts.

V - Research, Education, and Interpretation

Issue V-A.

How can research be directed to insure wise management of resources?

More information is needed about Fish and Wildlife and their habitats on the refuge to insure wise management practices.

Issue V-B.

What opportunities exist for environmental education and land management training? What role should the refuge play in providing education and training programs?

The proximity of the refuge to the bulk of Alaska's population and the high number of visitors which the refuge receives suggest that there should be ample opportunity to develop environmental education programs. Comments from public meetings indicate that the public is keenly interested in learning more about the refuge.

Issue V-C.

How can opportunities for interpretation be used to minimize the impact of human use on the resources of the refuge.

The use of interpretive techniques is a possible approach to reducing vandalism and other law enforcement problems including the unintential misuse and disturbance of the land and wildlife.

VI - Recreation

Issue VI-A.

How can conflicts between visitors be minimized?

Conflicts arise when visitors try to use the same place at the same time. In some cases, the conflicts may involve too many people trying to do the same thing, such as when the Kenai River or the Swanson River become crowded with boaters. Conflicts also occur between visitors engaging in different kinds of activities. Float planes and boats on the same lake may represent a safety hazard. Visitors wishing to view or photograph wildlife may interfere with hunters and vice versa.

Issue VI-B.

How can the effects of people on refuge resources be minimized?

Visitors to the refuge sometimes make their own trails and campsites. The results can include the trampling of vegetation, damage to soil and water pollution. The presence of humans also may disturb some wildlife species.

Issue VI-C.

What facilities are required to support public use of the refuge?

Consideration will be given to the recreational opportunities available in the refuge as well as in other parts of southcentral Alaska. The level of recreational development and kinds of service the refuge should offer must be determined. While large and elaborate campgrounds might be appropriate for some locations, other areas might offer more modest accommodations or none at all. Present and future needs for trails, canoe portages, scenic viewing areas and boat launch facilities will be evaluated.

Issue VI - D

What kinds of recreation should be permitted in what areas?

A variety of different recreational activities are now taking place on the Kenai. Increased population growth will not only increase the number of recreationist but also the variety of types of recreation. Whether a particular type of activity is permissible will depend largely on whether is is compatible with refuge management goals. Factors to be considered will include impacts on fish and wildlife, their habitats, other wildlife-oriented recreation and other resources.

VII - Access

Issue VII-A.

Where and what kinds of motorized and non-motorized access are needed to support recreational uses of refuge lands?

Existing and anticipated needs for road access will be evaluated. Accessibility to remote areas of the refuge by aircraft, power boats, snowmobiles and other off-road vehicles also will be considered. Evaluations will be made of the trail needs relating to hiking ski touring, canoeing, dog mushing, hunting, and fishing. In recommending access improvements, the needs and desires of the public must be weighed against the impacts that such improvements may have on the fish, wildlife and other resources of the refuge.

Issue VII-B.

What are the access requirements for non-recreational uses of the refuge lands? How can they best be accommodated?

Owners of private inholdings may require access to their property by air, land, or water. Access may also be needed for oil and gas development and other activities considered compatible with refuge purposes. Refuge management also requires access to conduct reasearch, enforce laws, maintain facilities and other activities. In all cases, the access needs must be identified and, where feasible, provided in a manner that minimizes adverse environmental impacts and conflicts between user groups.

Issue VII-C.

What lands, if any, should be identified for future transportation and utility corridors?

To the extent possible, future needs for roads, pipelines, transmission lines and railway lines will be identified. Potential corridor routes will be evaluated, and recommendations will be based on compatibility with refuge purposes and the need to minimize adverse impacts.

ISSUE OUTSIDE THE SCOPE OF THE COMPREHENSIVE PLAN

Cooperative Management of Refuge Lands.

How should the USFWS seek and accept cooperation with State and local governments, other federal agencies and private citizens for the management of refuge lands?

Many comments have been received regarding the involvement of various agencies and private citizens in refuge management decisions. Suggestions have included cooperative management agreements with the Alaska Department of Fish and Game, the National Park Service and the U. S. Forest Service. Suggestions also have been made that a citizen advisory committee be established. Comments from the Kenai Peninsula Borough Assembly and from some private citizens have recommended that the refuge be abolished or transferred to the state.

These concerns cannot generally be addressed in a comprehensive

plan for several reasons. First, questions of cooperative management are frequently matters of law or agency policy, neither of which are appropriate subjects of comprehensive planning for a single refuge. Second, the desirablity of cooperation depends in many cases upon the details of the cooperative agreement, details that will not be available at the time of comprehensive planning. Third, cooperative management is not an end in itself. It is a means, one of several alternatives to be considered as management requirements dictate. Finally, the possibility of a transfer of ownership of the entire refuge is beyond the authority of the USFWS. The refuge was established by an act of the Congress, and only that body has the power to abolish it.

The plan may identify opportunities for specific kinds of cooperative efforts, in which case, further exploration of cooperation will be recommended.

Where do we go from here?

Having identified the issues to be investigated, the refuge planning effort can concentrate on collecting and analyzing information to answer the questions related to the issues. Data have been collected from agency files and elsewhere for use in identifying and describing refuge resources and local human needs. LANDSAT scenes (satelite pictures) have been analyzed to develop information on vegetation and other physical features. Additional field investigations may be needed to gather data that is not available in the literature, is outdated, or is needed to address specific planning requirements.

Information collected will be studied and organized to develop recommendations and alternatives for the present and future management of the refuge. The various alternatives will be submitted for public review so that citizens can express their preferences. The alternatives which offer the best opportunities to meet public needs and conserve fish, wildlife, and other natural resources will be incorporated into the Kenai National Wildlife Refuge Comprehensive Conservation Plan.

Although specific periods for public review will be provided at key stages throughout the development of the plan, comments and questions may be presented to the planning team at any time. Comments regarding this document or any other element of the planning effort may be addressed to:

Kenai NWR Planning Team
U. S. Fish & Wildlife Service
1011 E. Tudor Road
Anchorage, Alaska 99503

APPENDIX - Table of Concerns

The concerns expressed by private organizations, government agencies, and individual citizens relate to a variety of planning issues. The following tables group the concerns according to the issues groups which address them.

I - Fish and Wildlife Populations and Habitats

Concerns About Wildlife Populations and Habitats

1. Protection vs. reduction of large predators (wolves & bears).
2. Management of refuge for all species vs. emphasis on few, selected game species.
3. Continuation of trapping on the refuge.
4. Enhancement of sport and/or commercial fisheries (includes stocking, stream rehabilitation, use of fish passes, etc.).
5. Subsistence uses of refuge resources.
6. Continuation of public hunting and fishing (including trophy moose hunting, waterfowl hunting on Chickaloon Flats, and needs for better access).
7. Protection of sensitive populations (particularly nesting swans and loons in canoe area).
8. Continued habitat manipulation (including fire management, tree crushing.
9. Excessive human disturbance in heavy public use areas.
10. Maintenance of "brood stocks".
11. Reintroduction of native species into areas not now occupied.
12. Proposed introduction of exotic species (deer, bison).

II - Special Values

Concerns About Special Values

1. Compatibility of human use with refuge purposes.
2. Resource development impacts.
3. Lost fish and wildlife habitat capabilities.
4. Degradation of air quality.
5. Increased noise.
6. Dust on roads.
7. Gravel removal.
8. Special waste dump sites.
9. Impacts of off-road vehicle use.
10. Litter.
11. Water quality and quantity necessary for fish and wildlife.
12. Safe-guarding of cultural/historical values.
13. Protection of archeological and paleontological sites.
14. Forest pest damage.
15. Areas of high scenic value.
16. Increase number of viewing areas.

III - Economic Use

Concerns About Economic Uses

1. Renewable vs. non renewable resource use.
2. Compatibility of uses.
3. Development of oil and gas resources.
4. Hydoelectric development.
5. Timber harvest.
6. Water allocation.
7. Commercial fishery.
8. Gravel removal.
9. Development of coal resources.
10. Economic contributions of resources use.

IV - Wilderness

Concerns About Wilderness

1. Amount of area in Wilderness (more vs. less).
2. Human use of wilderness areas.
3. Limitations on access into wilderness areas.
4. Aircraft access into wilderness areas.
5. Boat access into wilderness areas.
6. Restrictions on canoe trail use.
7. Development and maintenance of trails in wilderness.

V - Research, Education, and Interpretation

Concerns About Research, Education and Interpretation

1. Need for additional research.
2. Research programs related to refuge management.
3. Lack of data on fish and wildlife for certain areas of the refuge.
4. Continued operation of Moose Research Center.
5. Upgrading education and interpretation.
6. Environmental education.
7. Desire for public information office.
8. Need for public notice of refuge management decisions.
9. Need for visitor information.
10. Land management training.
11. Enforcement and maintenance problems.

VI - Recreation

Concerns About Recreation

1. Overcrowding by boaters (Kenai River, Swanson River).
2. Snowmachine conflicts with ski tourers.
3. More trails and better maintenance.
4. Need for wildlife viewing areas.
5. Need for recreation cabins.
6. Need for more interpretation.
7. Need for increased staffing of visitor contact facilities.
8. Preservation of all existing structures (cabins).
9. Aircraft/boat conflicts on lakes.
10. Land-and-shoot "trapping".
11. Consumptive vs. non-consumptive use of wildlife.
12. Visitor-developed campsites and trails.
13. Cooperative trail development (with NPS, USFS).
14. Visitor safety.
15. Road maintenance.
16. Lack of law enforcement capability.
17. Recreational impacts on archeological sites (Russian River).

VII - Access

Concerns About Access

1. Level of access (maintain current level vs. increased level).
2. Motorized vehicle access.
3. Snow machine access.
4. Boat access.
5. Aircraft access.
6. Trail maintenance.
7. Limitations on wilderness accessibility.
8. Increase use of Mystery Creek Road.
9. Access for resource development.
10. Access to inholdings.
11. Impacts related to access.
12. Access for refuge management and facilities maintenance.
13. General transportation and utility access needs.
14. Road maintenance.
15. Enforcement problems related to access.

United States Department of the Interior

IN REPLY REFER TO:

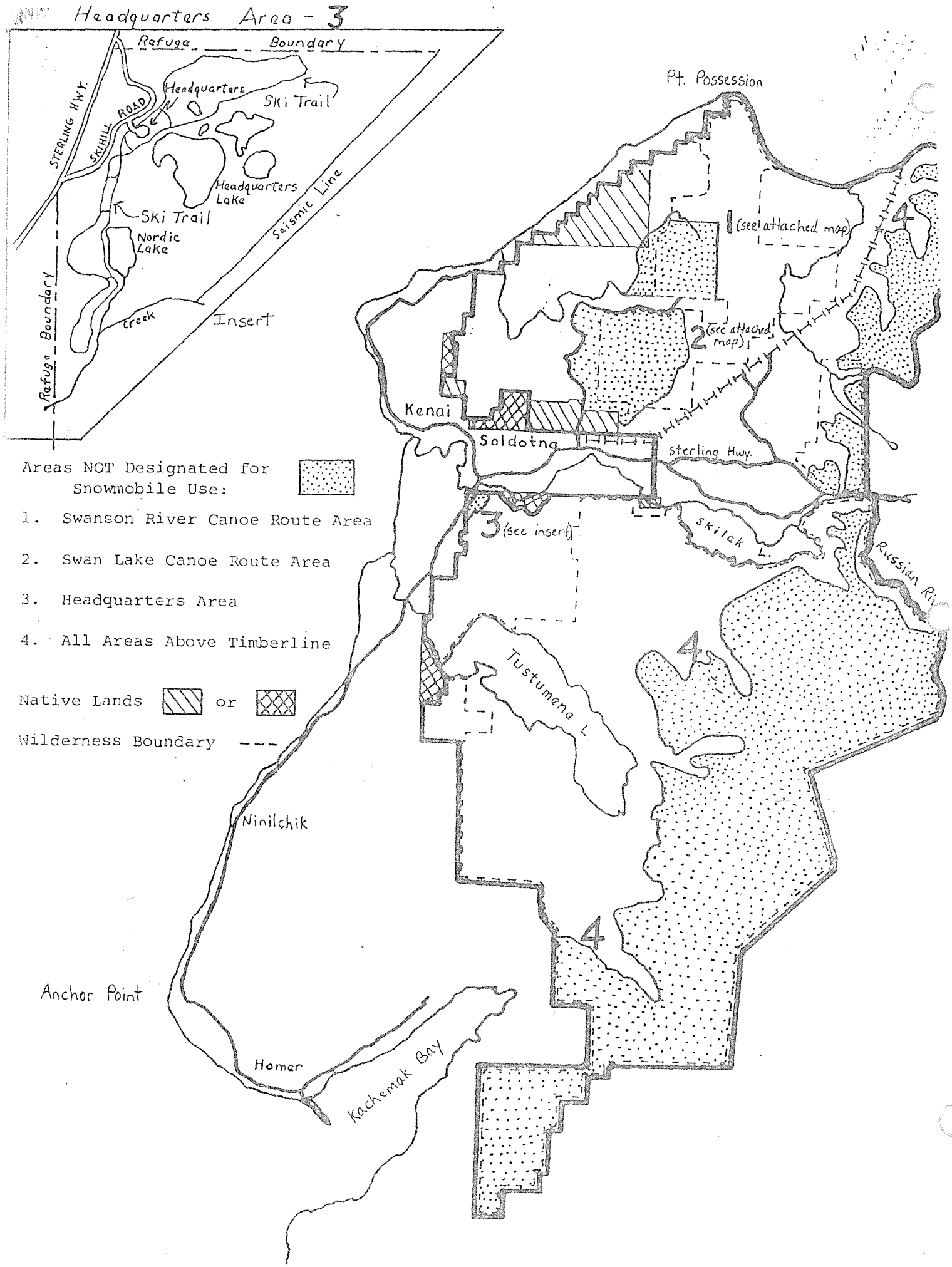
FISH AND WILDLIFE SERVICE
KENAI NATIONAL WILDLIFE REFUGE
P. O. Box 2139
SOLDOTNA, ALASKA 99669-2139

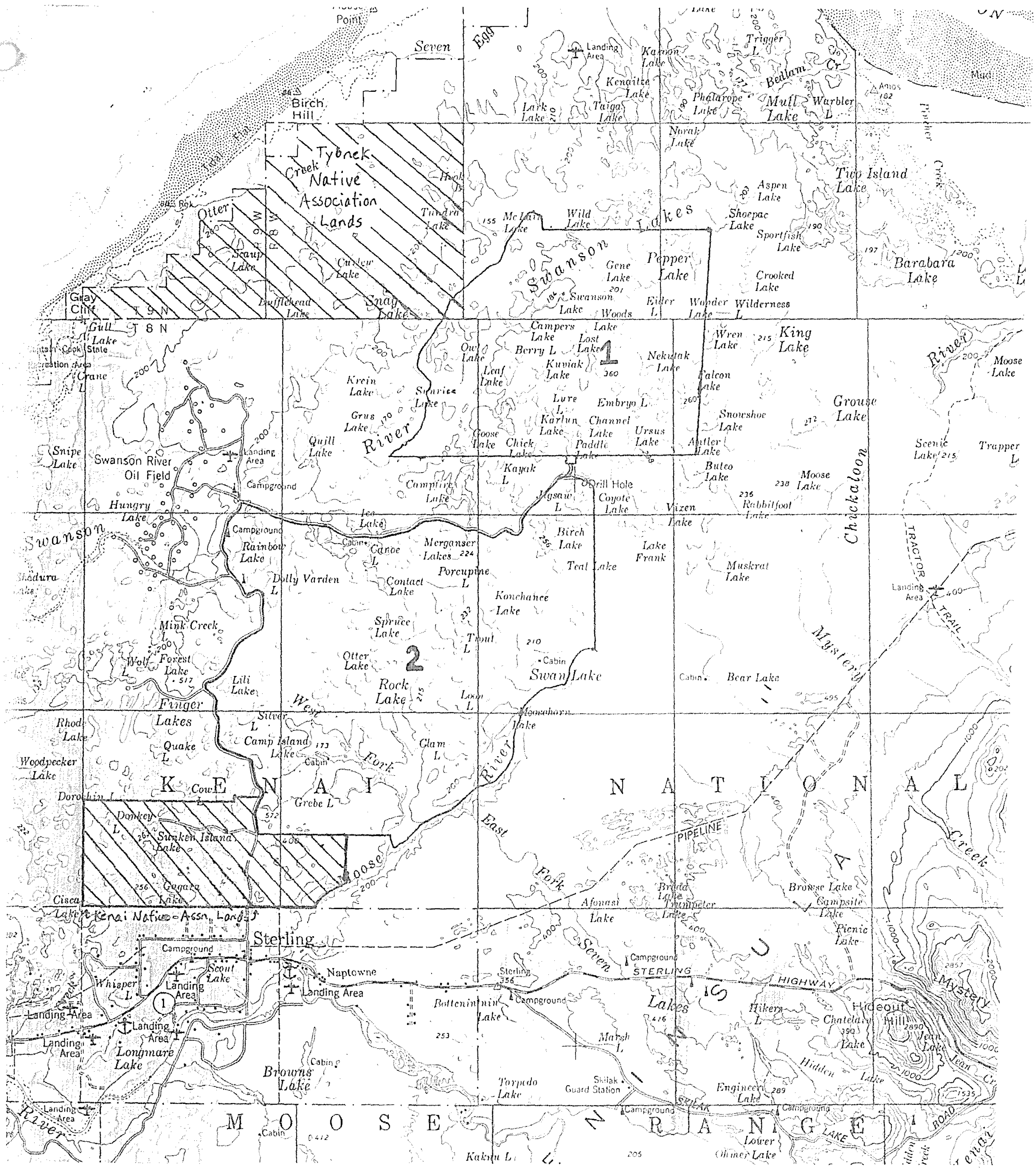
SNOWMOBILE REGULATIONS AND INFORMATION

The operation of off-road vehicles, commonly referred to as all-terrain vehicles (ATV's is prohibited on the Kenai National Wildlife Refuge, with the exception of seasonal use by snowmobiles. Snowmobiles are authorized only on designated areas as delineated on the attached maps and subject to the following special conditions:

1. Only snowmobiles with an overall width less than 40 inches and under 1000 pounds are permitted.
2. The use of snowmobiles may be authorized by the refuge manager between December 1 and April 30 only when snow depth is sufficient to protect the underlying vegetation and terrain along the route of travel and only after public notification.
3. The use of snowmobiles as an aid in big game hunting or for transporting big game animals, except fur animals, is not authorized.
4. The use of snowmobiles on maintained roads within the wildlife refuge is not authorized. Snowmobiles may only cross a maintained road after stopping and when traffic on the roadway allows safe snowmobile crossing.
5. The areas within T 4 N, R 10 W, Section 5, 6, 7, and 8, east of the Sterling Highway right-of-way, including Refuge Headquarters, the cross-country ski trails, Headquarters and Nordic Lakes, and that area north of the East Fork of Skilak Creek and northwest of a prominent existing seismic line to Funny River Road, is not a designated snowmobile area.
6. All areas above timberline, as designated on the attached maps, are not authorized for snowmobile use.
7. The use of snowmobiles for racing purposes, harrassment of wildlife species, or non-wildlife-oriented activities is not authorized.
8. The area, including the Swanson River Canoe Route and portages, starting at the Paddle Lake parking area, west to the east bank of Swanson River, north along the river to Wild Lake Creek, east to the west shore of Shoepac Lake, south to the east shore of Antler Lake, and west to the beginning point near Paddle Lake, is closed to snowmobile use.
9. An area, including the Swan Lake Canoe Route, and several road-connected public recreational lakes, is not a designated snowmobile area. That area closed to such use is bounded on the west by the Swanson River Road, on the north of the Swan Lake Road, on the east from a point at the east end of Swan Lake Road to the west bank of the Moose River, and on the south, by the north boundary of the Kenai Native Association lake boundary.
10. Refuge lands, conveyed to native groups under the Alaska Native Claims Settlement Act or Alaska National Interest Lands Conservation Act, are private lands and snowmobiling privileges must be obtained from the appropriate native group.
11. Authorized snowmobile use must be compatible with the purposes for which refuge lands were established, such as support for wildlife-oriented recreation activities of fishing and trapping. Any detrimental influence to wildlife habitat needs, distribution or abundance, resource values, or other authorized public use may require a review of such snowmobile use and new regulations proposed.
12. Please contact Refuge Headquarters, off Ski Hill Road south of Soldotna, if additional information is required, or call the refuge office at 262-7021.

November 1981


Headquarters Area - 3
Refuge Boundary
Sterling Hwy.
Skilak Road
Headquarters
Ski Trail
Headquarters Lake
Ski Trail
Nordic Lake
Seismic Line
Refuge Boundary
creek
Insert
Areas NOT Designated for Snowmobile Use:
1. Swanson River Canoe Route Area
2. Swan Lake Canoe Route Area
3. Headquarters Area
4. All Areas Above Timberline
Native Lands or
Wilderness Boundary
Pt. Possession
(see attached map)
4
2 (see attached map)
Kenai
Soldotna
Sterling Hwy.
3 (see insert)
Skilak L.
Russian Ri
Tustumena L.
4
Nikilchik
4
Anchor Point
Homer
Kachemak Bay


Tyonek Creek Native Association Lands
Kenai Native Assn. Lands
Swanson River Oil Field
Swanson Lakes
Swanson River
Birch Hill
Gray Cliff
Sterling
Naptowne
Sterling Highway
Skilak Lake Road
Skilak Guard Station
Hideout Hill
Mystery Creek
Chickaloon River
Tractor Trail
Pipeline
West Fork
East Fork
Moose River
Finger Lakes
Seven Lakes
K E N A I   N A T I O N A L   M O O S E   R A N G E
T 8 N
Landing Area
Campground
Cabin
Drill Hole
Pepper Lake
King Lake
Grouse Lake
Barabara Lake
Two Island Lake
Mull Lake
Rock Lake
Swan Lake
Bear Lake
Browns Lake
Longmare Lake
Scout Lake
Whisper L
Rainbow Lake
Dolly Varden L
Mink Creek L
Woodpecker Lake
Sunken Island Lake
Gogarn Lake
Donkey L
Cow L
Grebe L
Camp Island Lake
Silver L
Lili Lake
Otter Lake
Spruce Lake
Trout L
Loon L
Clam L
Konchance Lake
Porcupine L
Merganser Lakes
Contact Lake
Canoe L
Ice Lake
Campfire Lake
Jigsaw L
Coyote Lake
Vixen Lake
Birch Lake
Teal Lake
Lake Frank
Muskrat Lake
Moosehorn Lake
Afonasi Lake
Browse Lake
Campsite Lake
Picnic Lake
Hikers L
Chatelain Lake
Jean Lake
Hidden Lake
Engineer Lake
Marsh L
Torpedo Lake
Bottenintnin Lake
Kakna L
Lower Ohmer Lake
Snipe Lake
Hungry Lake
Crane L
Gull Lake
Rhod Lake
Quake L
Dorothin L
Cisca Lake
Quill Lake
Grus Lake
Krein Lake
Sunrise Lake
Owl Lake
Leaf Lake
Goose Lake
Chick Lake
Kayak L
Karlun Lake
Lure L
Kuviak Lake
Berry L
Campers Lake
Lost Lake
Embryo L
Channel Lake
Paddle Lake
Ursus Lake
Nekutak Lake
Falcon Lake
Antler Lake
Buteo Lake
Snowshoe Lake
Moose Lake
Rabbitfoot Lake
Wren Lake
Wonder Lake
Wilderness L
Eider L
Swanson Lake
Woods Lake
Gene Lake
Crooked Lake
Sportfish Lake
Shoepac Lake
Aspen Lake
Wild Lake
McLain Lake
Tundra Lake
Curlew Lake
Snag Lake
Bufflehead Lake
Scaup Lake
Otter
Lark Lake
Taiga Lake
Kenaitze Lake
Phalarope Lake
Norak Lake
Trigger L
Bedlam Cr
Warbler L
Scenic Lake
Trapper L
Moose Lake
Seven Egg
Tidal Flat
Mud
Captain Cook State Recreation Area