KENAI NATIONAL WILDLIFE REFUGE
Soldotna, Alaska

ANNUAL NARRATIVE REPORT
Calendar Year 1983

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

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Standing L to R: Richey, Kenagy, Bang, Bailey, Gibson, Portner, Hedrick, Fencl, Delaney, Sanders, Kivi, Blaylock, O'Guinn, Johnston
Kneeling L to R: Boylan, Chio (Staff Photo)

1983 PERSONNEL

Permanent

1.	Robert L. Delaney	Refuge Manager	GM-13	PFT	
2.	Michael B. Hedrick	Principle Asst RM	GS-12	PFT	
3.	Robert A. Richey	Asst RM Oil & Gas (Pilot)	GS-12	PFT	
4.	Michael F. Boylan	Supv. Recreation Planner	GS-11	PFT	
5.	Theodore N. Bailey	Fish & Wildlife Biologist	GS-11	PFT	
6.	Benjamin R. Chio	Facilities Manager	GS-11	PFT	Promoted from
		Facil. & Equip. Mechanic	WG-09	PFT	eff. 4/17/83
7.	Richard K. Johnston	Recreation Planner	GS-09	PFT	
8.	Eugene P. Heath, Jr.	Administrative Officer	GS-09	PFT	Retired 4/22/83
9.	Leslie G. Blaylock	Budget Assistant	GS-06	PFT	Promoted from
		Accounting Technician	GS-05	PFT	eff. 9/6/83
10.	Edward E. Bangs	Wildlife Biologist	GS-09	PFT	
11.	Richard D. Kivi	Equipment Operator	WG-10	PFT	
12.	Patricia A. Fencl	Clerk/Typist	GS-03	PPT	
13.	Cynthia K. Sanders	Clerk/Typist	GS-03	PFT	EOD 07/11/83
14.	Robert P. Campbell	Maintenance Helper	WG-05	PPT	EOD 06/20/83

Temporaries

				EOD	TERMINATED
1.	Mary F. Portner	Bio. Tech. Kenai	GS-05	05/03/82	10/01/82
2.	John L. Malloy	Bio. Tech. Kenai	GS-05	05/19/83	10/28/83
3.	Gay A. Muhlberg	Bio. Tech. Tuxedni	GS-05	05/23/83	09/30/83
4.	Donna M. Kafka	Bio. Tech. Tuxedni	GS-05	05/17/82	10/15/82
5.	William P. Eickhoff	Park Technician	GS-05	05/17/82	09/17/82
6.	David K. Kenagy	Park Technician	GS-05	05/16/83	12/23/83
7.	Diane Macfarlane	Park Technician	GS-05	05/16/83	09/30/83
8.	Karen P. Farrar	Park Technician	GS-05	05/16/83	09/30/83
9.	Patricia M Mueller	Park Technician	GS-05	05/24/83	12/23/83
10.	Ronald A. Levy	Park Technician	GS-05	05/25/83	09/30/83
11.	Donna M. Bartman	Laborer	WG-03	05/17/82	10/15/82
12.	Albert V "Bud" Marrs	Laborer	WG-03	04/05/82	10/29/82
13.	Mark O. McVee	Laborer	WG-03	05/31/83	07/22/83*
14.	Daniel L. Henry	YCC Director	GS-07	05/10/83	08/19/83
15.	Lori J. Landstrom	Park Tech./YCC Ldr	GS-05	05/17/82	09/03/82
16.	Roger G. Lockwood	YCC Group Ldr	GS-05	05/16/83	03/03/83*
18.	18 individuals	YCC Enrollees		06/14/82	08/06/82
19.	26 individuals	Volunteers			

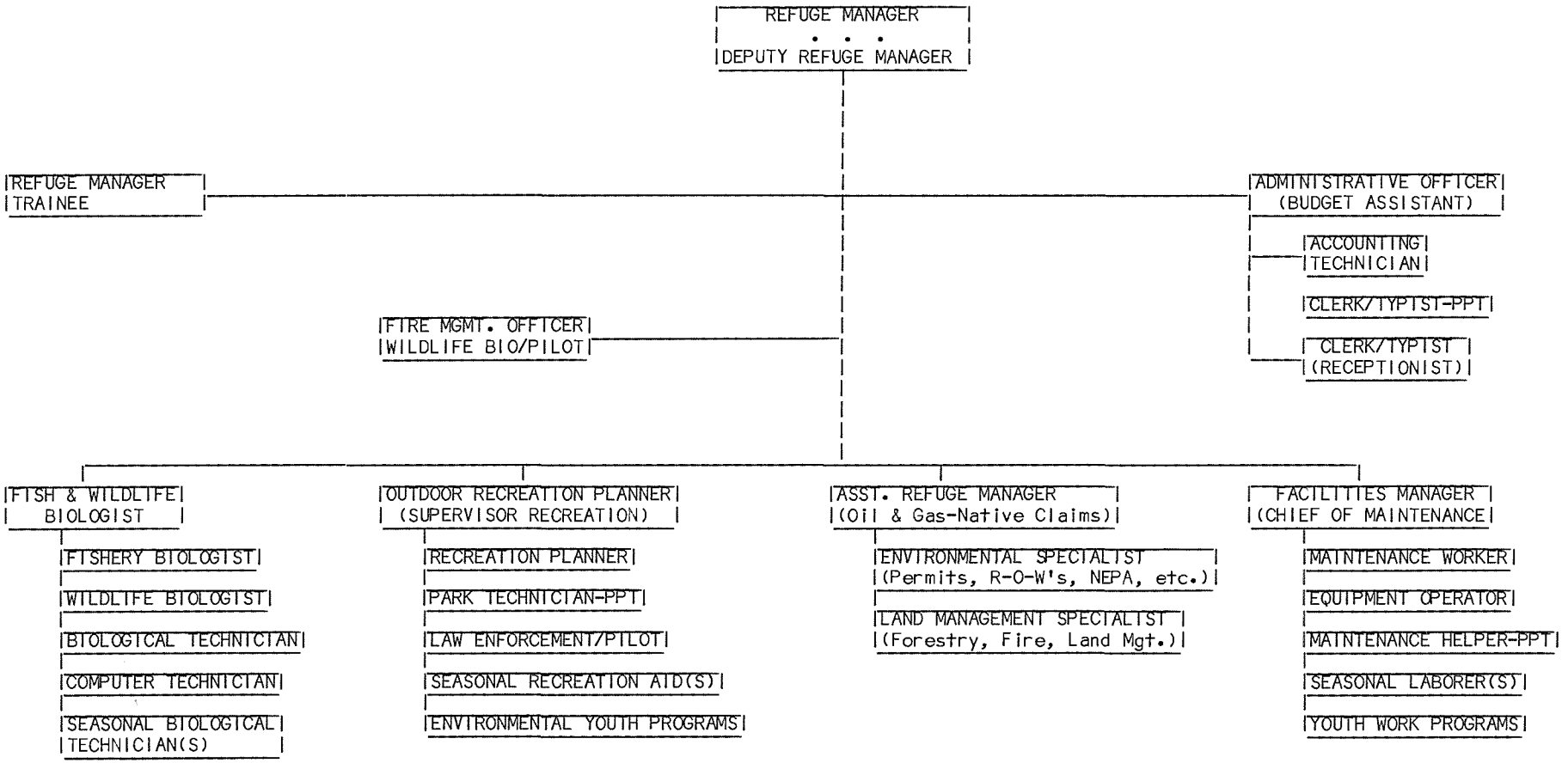
*Resigned

Review and Approvals

Mike Hedrick 3/19/84
Submitted by Date

Larry T. Calvert 3/30/84
Regional Office Review Date

KENAI NATIONAL WILDLIFE REFUGE
ORGANIZATION CHART



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A. HIGHLIGHTS

The Kenai National Wildlife Refuge is situated on the Kenai Peninsula in southcentral Alaska. The northern portion of the refuge is only 20 air miles from the State's largest population center, the City of Anchorage. Although a scenic 112 mile drive through the Kenai Mountains is necessary to reach the wildlife refuge via road, commercial commuter aircraft fly into Kenai and Soldotna daily from Alaska's largest city, 60 air miles north.

Located within the center of the Kenai Peninsula and extending 115 miles from Turnagain Arm on the north to nearly the Gulf of Alaska on the south, this refuge encompasses about one-third of the Peninsula. The western portions of the Kenai Mountains generally form the eastern refuge boundary, a common boundary shared with our Chugach National Forest and Kenai Fjords National Park neighbors.

Since the establishment of the refuge on December 16, 1941, under E.O. 8979, these lands have undergone at least two boundary changes and a name change. The original refuge included 2,058,000 acres and, among other mandates, authorized settlement, location, and other disposition under public land laws applicable to Alaska. At that time, the refuge was bounded on the northwest, from Point Possession to the Kasilof River, by the waters of Cook Inlet. A six mile wide strip of land from Boulder Point to the Kasilof River and a six mile strip of land, including portions of the Kenai River, were open for development. Homesteads, grazing areas, road systems, and other developments occurred in these areas which were eventually excluded from the refuge during a 1964 boundary adjustment. Also excluded were Cook Inlet coastal lands one to three miles inland and considerable portions of the Harding Ice Field, reducing the refuge area to 1.73 million acres.

Passage of the Alaska National Interest Lands Conservation Act (ANILCA) December 2, 1980, not only changed the Kenai National Moose Range to Kenai National Wildlife Refuge but further increased the refuge acreage to 1.97 million, with the addition of mostly mountainous regions, an area of approximately 150,000 acres on the extreme south and about 90,000 acres of formerly adjacent Forest Service lands to the extreme northeast near the Chickaloon Flats. At the same time the passage of ANILCA, commonly known as "The Alaska Lands Act," withdrew from the refuge 16,535 acres to satisfy the claims of the Salamatof Native Association under the Alaska Native Claims Settlement Act (ANCSA). The now-1.953 million acre refuge has been reestablished and is managed to 1) conserve fish and wildlife populations and habitats in their natural diversity; 2) fulfill international treaty obligations with respect to fish and wildlife; 3) insure water quality and quantity; 4) provide opportunities for scientific research, interpretation, and environmental education; and 5) to provide opportunities for fish and wildlife-oriented recreation. In addition to establishing new boundaries, new purposes, and a new name, 1.35 million acres of the refuge were formally designated as wilderness.

The final draft Kenai Comprehensive Conservation Plan/Environmental Impact Statement was accepted by the Service and interim personnel in late October. The plan went to the printers in late December with plans to make it available for public review in mid-January 1984.

The refuge hosted the 1983 Interagency Moose Conference in Alaska at the International Hotel in Soldotna. Refuge Biologist Ted Bailey organized the conference. About 30 participants from BLM, USFS, USFWS, ADF&G, and the Kenai/Soldotna Game Advisory Board attended.

Pursuant to a decision, after public hearings and "outside" expert opinion, to forego the Alaska Department of Fish & Game's recommendation for aerial elimination of all refuge wolves because some had lice, all known wolves (21) infested with lice were treated with 2cc of the drug Ivermectin.

The North Pacific Legal Foundation filed a lawsuit against the Fish & Wildlife Service, among others, in behalf of Oscar Haynes, who is appealing an earlier decision by the Secretary regarding covenants attached to 156 acres of the Haynes' native allotment with the Tuxedni National Wildlife Refuge.

Through a cooperative State-Federal program, ADF&G initiated a habitat manipulation program to increase moose browse by using tree crushers in mid-December.

A permanent refuge exhibit of color photographs was installed in the newly remodeled Kenai Airport. A viewer-activated slide tape program on the refuge is scheduled to be installed next year.

The refuge manager served on the Governor-appointed Kenai River Task Force. The Task Force held several public meetings and formulated final recommendations to the Governor on management of the Kenai River.

The fourth year of Atlantic Richfield Company (ARCO)/Cook Inlet Region Incorporated (CIRI) oil & gas seismic operations on the Kenai Peninsula began January 5. The focus of the season's efforts concentrated within the 6-mile corridor of private lands east of Soldotna and extending onto refuge lands north and south. Vibrators for the energy source were utilized where road systems were available. Of the 107 miles programmed, about 44 percent of the operations were conducted on refuge lands.

The ARCO/CIRI Wolf Lake exploratory oil/gas well No. 1 was officially abandoned following the cement plugging of the well in November. The new ARCO/CIRI Funny River exploratory well No. 1 was initiated in late November. Under this program, Alaska's deepest well may be drilled.

Refuge Fish & Wildlife Biologist Ted Bailey was assigned lead responsibility to complete the National Species Special Interest Plans for trumpeter swans- Pacific Coast.

The first cow moose hunt (limited to 30 permits) since the late 1960-early 1970's was held on the refuge this year. Twenty eight of the 30 permittees were successful.

Administrative Officer Gene Heath retired, effective April 22, 1983, after 32 years of service working in refuges.

The Kenai refuge was featured in the July issue of Audubon, along with several other lucky refuges, in an article about the refuge system. Kenai was also the subject of several articles in the "Ruralite," a magazine distributed through the northwest states.

Two new local environmental groups were formed on the Kenai Peninsula in October; a local chapter of Ducks Unlimited and the Kenai Peninsula chapter of the Audubon Society.

After the mid-January opening of the new refuge Visitor Center, over 20,000 visitors and 1,500 students used the facility during the year.

The first annual Christmas Bird Count was initiated this year on the refuge and was conducted by the newly formed Kenai Peninsula Audubon Society Chapter.

Kenai was awarded a Certificate of Appreciation from the Alaska Natural History Association for the greatest sales increase in one year (1000%).

U.S. Senator Frank Murkowski paid a surprise visit to Headquarters Lake in August, accompanied by local developers who advocated its use as a municipal float-plane basin. After substantiating that the lake's wildlife-oriented educational and recreation benefits were significant, in addition to the fact the City of Soldotna had no interest in acquiring the area, the issue disappeared (at least temporarily).

B. CLIMATIC CONDITIONS

The year continued a four-year trend of below normal snowfall on the Kenai Lowlands and above normal winter temperature conditions. Indeed, December broke last year's record as the mildest on record at Kenai with temperatures as high as 30° and the lowest recorded a mild -6°. Total precipitation for the year was 13.32" which represented 6.59" below the normal of 19.91"
(Table 1). Snowfall was approximately two-thirds the normal of 68.7" with only 42.2" recorded.

Table 1. Monthly temperatures and precipitation data*.

Month	Temperature High	Temperature Low	Precipitation Total	Precipitation Snow
January	40	-25	.14"	1.6"
February	45	-10	.33"	2.4"
March	48	- 3	.04"	.4"
April	57	22	1.10"	7.8"
May	66	32	1.98"	0
June	78	34	.28"	0
July	79	38	.40"	0
August	72	34	2.43"	0
September	65	17	2.40"	Trace
October	53	14	2.63"	9.5"
November	48	4	.55"	4.0"
December	37	- 6	1.11"	16.0"
38-Year Average Total			19.91"	68.7"
Total for 1983			13.32"	42.2"

*Reported by FAA at Kenai Airport

Primarily as a result of the past four years of mild weather conditions, the refuge moose population continues to increase. The 1982 winter moose population survey resulted in an estimated 5,000 moose, up from the last count in 1979 of 3,350 moose. Low snow depths again allowed the moose herd access to all available browse plants and movements were unrestricted. Moose population surveys were not conducted in 1983 due to lack of sufficient snow cover.

The large lowland Skilak and Tustumena Lakes became ice covered in mid-January. By mid-March, almost the entire lowlands were free from snow. A early April snowfall produced nearly 8 inches, but melted within two days.

Mild temperatures prevailed through March and April, producing an early spring breakup. Tustumena and Skilak Lakes became ice free in mid-April. The Kenai River became ice free on March 23, as compared to April 9, in 1982. Swanson River became ice free on March 26.

Average, or slightly above average snowpack existed above valley bottoms up to elevations of approximately 1,500 feet. Higher elevations received significantly above average snowpack.

Snow geese arrived on the Kenai River Flats on April 10, one week earlier than 1982. Trumpeter swans on Skilak Lake Outlet were observed as early as March 26.

June through August was exceptionally dry and sunny with many days in the mid-70's.

September was dry and sunny with less than 2-1/2 inches of rain. The dry conditions greatly increase moose hunter activity hours and hunter take.

The first snowfall on the lowlands occurred on October 8, and all lakes, except Skilak and Tustumena, were ice frozen by the end of November.

C. LAND ACQUISITION

1. Fee Title

a. Alaska Native Claims Settlement Act (ANCSA)

1) Kenai Native Association, Inc. (KNA) - KNA, under ANCSA, was conveyed 18,083 acres of refuge lands March 21, 1980. The native association has, they believe, been unduly restrained from the construction of roads, buildings, and other facilities under the provisions of Section 22(g) ANCSA governing land use and development as subject to refuge laws and regulations. An agreement document between the FWS and KNA, to resolve these constraints through an exchange of certain lands, was rejected by the KNA Board. Later in the year KNA President George Miller, Jr., and several Board members were provided with the status of existing land values associated with their refuge conveyance. Although a new agreement has yet to be approved, land exchange negotiations continue.

At the request of the KNA Board, the long established (1967) refuge boundary gate on the Marathon Oil Road associated with KNA's conveyance was displaced two miles along this access road to the east KNA inholding boundary. This 60-foot road right-of-way within this inholding is now open to public vehicular travel.

2) Salamatof Native Association, Inc. (SNA) - The Salamatof Native Association received, with passage of the Alaska National Interest Lands Conservation Act (ANILCA), under Section 1432 (b), and an agreement dated August 17, 1979, 16,037 acres of refuge lands. Certain powerline rights-of-way and adjacent lands within the now conveyed area were held from the original conveyance document dated October 4, 1983, until Association agreements with the power company were resolved. Those lands were later conveyed under document No. 755 dated October 21, 1983.

In early September, the surface clearing for rights-of-way and the construction of roads for Salamatof's new subdivision, appropriate named "Moose Range Meadows," began immediate adjacent to the north bank of the Kenai River. The utilization by Salamatof of refuge sand and gravel (only the surface was conveyed to Salamatof) during road construction has yet to be resolved under on-going land exchange negotiations. As

many as six boat ramp facilities are proposed for development along this Kenai River conveyance, only one of which was constructed on the north bank by December.

Native Claims, land exchanges, and demand for housing are all represented by this sign on former refuge lands, now adjacent to our boundary. (Staff Photo)

3) Tyonek Native Corporation - The Tyonek Corporation received approximately 32,938 acres of refuge lands under ANCSA by an Interim Conveyance dated April 6, 1979. No requested use of those lands by the Native group has been received; however, some shareholders believe the Corporation may eventually use these holdings for land exchange purposes.

Of further interest, is the Kenai Peninsula Borough development of two major subdivisions immediately adjacent Corporation lands. Both the Gray Cliff and loose Point Subdivisions cover those lands between the refuge boundary and Cook Inlet shoreline, an area of approximately 13,000 acres. Since the public lottery of 1982 and conditions of that action, numerous private dwellings have been constructed adjacent the now common Refuge-Tyonek boundary.

This August, Chevron, U.S.A. Inc., as operator of the Birch Hill Unit well 22-25, conducted a well integrity test as required by the BLM Minerals Management Office. This 1240 acre oil and gas leased area is wholly within the native conveyance.

4. Point Possession, Inc. (PPI) - The Bureau of Indian Affairs (BIA) issued a certificate of eligibility dated June 15, 1983, certifying PPI as a native group. Whether or not the group can select refuge lands under current authorities has yet to be determined.

5. Cook Inlet Region, Inc. (CIRI) - Following the Beaver Creek Settlement Agreement of May 18, 1981, CIRI's 10,240 acre selected surface and subsurface lands under the Terms and Conditions for Land Consolidation and Management in the Cook Inlet Area (as clarified August 31, 1976) were contracted to the remaining 7,040 acres adjacent and south of the Kasilof River. The land status of this selection has not changed and remains under refuge management.

Seven parcels of land yet to be conveyed, including 2,120 acres near the Kasilof River, as previously discussed, and 356 additional acres selected for evaluation for eligibility as historic places under 14(h)(1) ANCSA at five other sites may, if conveyed, become parcels for exchange under the St. Matthew Land Exchange negotiations currently in progress. These negotiations involve, in addition to Kenai NWR lands, interests within the Alaska Maritime NWR and Yukon Delta NWR. The exchange provides CIRI temporary use and development of certain St. Matthew Island lands.

Of the 13 Regional Native Corporations established under ANCSA, CIRI earned in excess of $15 million in 1982. CIRI's gains were based largely in oil and gas production as well as real estate investments. CIRI representatives suggest earnings for 1983 should parallel the previous year.

Also, CIRI has been conveyed, under P.L. 94-204, the subsurface estate of oil, gas, and coal surrounding the unitized areas of both the Swanson River Oil Field and Beaver Creek Oil and Gas Field within the refuge. Numerous leases containing considerable acreage adjacent to these unitized areas are currently held by oil and gas production. Under the provisions of Section 14 (g) ANCSA, CIRI is entitled to a proportionate amount of the Federal Royalty revenues accruing from these active leases. These monies, we understand, amount to roughly 35 percent of the annual federal revenue royalty for the entire Alaska Region or about $7 million. Approximately 37 percent of Federal royalty collected at the Swanson River Field and 58 percent of the gas royalties at Beaver Creek may post CIRI accounts.

2. Easements

The Salamatof Native Association resolved their concerns with Homer Electric Association, thereby releasing, under conveyance document No. 755, dated October 4, 1983, a balance of 920 acres associated with selected lands in and near the existing 69/115kV transmission line rights-of-way.

The Homer Electric Association, Inc., through their consultants, Commonwealth Associates, Inc., conducted the initial phase of a study designed to identify a route for development of a 115kV (possibly upgraded to a 230kV) transmission line. The line would travel between the existing substation at Fritz Creek near Homer to the Substation at Soldotna. This line would provide a loop system to tie into the existing facility adjacent the Sterling Highway to Homer, thereby providing continuous service to this entire area should there be a failure in the single existing line. The proposed line may also provide a trunk line for the planned Bradley Lake Hydropower Project.

Commonwealth Associates identified three possible rights-of-way alternatives for the proposed transmission line. The preferred corridor, west of the refuge Headquarters complex, involves about 4 miles of refuge lands requiring an additional 60-foot strip adjacent to the existing 115kV transmission line right-of-way.

3. Other

a. Oil and Gas

1) Beaver Creek Field - No drilling operations were conducted this year.

A new gate facility was constructed near mile 7, Marathon Oil Road, at the eastern boundary of the Kenai Native Association inholding. Public vehicular use on this access road is now authorized to this facility. Other new facilities include an 80 foot microwave communication tower on a hill about 250 feet west of the field office. A potable water well was also drilled in the same area for office use. Archeological site clearance for these facilities and other field areas in anticipation of future expansion programs was conducted.

New signs, replaced posting, bridge railings with reflectors, and fresh paint for pipelines, buildings and other above ground facilities were also accomplished. The northern portion of the Pad 3 reserve pit was deactivated in its entirety and now provides a solid base for possible future well sites. The southern portion of this pit was permanently reclaimed. This one acre pad facility now supports one crude and two producing gas wells in addition to separator and scrubber production units, portable office, other facilities, and storage area.

Records indicate 6454 cubic yards of gravel used in field support this period. The fair market price, as reflected from an August 1982 Realty survey, was $1.50/cu.yd.

Beaver Creek is the fourth largest gas field in the Cook Inlet Basin but has long been shut-in for lack of market. Reserves are estimated at 239 billion cubic feet of dry gas and 1 billion cubic feet of associated gas. Gas wells 1A, 3, 6, and 7 were put on production to Alaska Pipeline Company January 8, 1983 via facilities and pipelines installed in 1982. Well No. 2 has remained shut-in as a reservoir monitor well.

Initial production of 20,000 MCF/DA was increased to 25,000 MCF/DA August, 1983. The produced gas enters a 12-inch gas line to Alaska Pipeline Company's 8-inch royalty pipeline about 3 miles southwest and eventually enter their main pipeline system about 10 miles east for transport across Kenai NWR lands to the Anchorage market.

Oil wells 4 and 5 together continue to produce about 475 BBLS/DA crude oil, transported from the field in a 200 BBL tanker truck to a North Kenai refinery.

2) Swanson River Oil Field - The remedial workover of five wells within the field this period is a continuation of last year's busy season. Down hole tubing, casing and liner failures lead the list but well SCU 42B-5, for example, was side-tracked and recompleted as a producer. The first month's workover cost on this well averaged almost $56,500 per day.

The major modification and expansion of the field's high pressure (5,700-6,000 gpsi) gas lift facilities in conjunction with lab work and simulation studies, have indicated additional oil can be recovered in the Soldotna Creek Unit (SCU) fault block if reservoir pressure is raised to miscible pressure levels. A revised gas rental agreement ("make-up" gas from outside the field) was negotiated that when combined with the current changes in oil prices, resulted in favorable economics for the project. As a result, the Swanson River Field is expected to produce crude beyond the year 2000. Estimated oil reserves in 1982 using production decline curves in conjunction with water-oil-ratio histories and producing pool data determined 19 million barrels remaining at Swanson River.

Daily crude production averaged 8,269 BBLS. Cumulative production over the past 26 years was approximately 198,691,000 BBLS or about 44 percent recovery of the total estimated original oil-in-place. Nearly 10,000 B/D (barrels per day) of water is also produced and injected into disposal wells completed in shallow salt water sands. All revenue crude is shipped via Kenai Pipeline's 8-inch facility terminating 19.6 miles west at a Nikiski tank farm.

About 292,000 MCF/DA were reinjected into field formations through eight gas injection wells to maintain and increase reservoir pressure. This injected gas will ultimately be recovered during "blowdown" of the reservoir.

Nearly 5700 gal/day of propane was produced for commercial sale. This production is a spin-off of the normal gas recovery and compression operation.

New 750 BBL gauge tank facilities were installed at six of the seven tank settings at a cost of $60,000 each. These facilities provide increased capacity and should eliminate occasional tank overflows and pressure relief problems. Only the 1-33 tank setting facilities rebuilt in August 1982, were excluded from this program.

During June, a refuge road right-of-way clearing program using Hydro-ax equipment was conducted in cooperation with Chevron U.S.A., Inc., operator of the Swanson River Field. Not only were field road rights-of-way cleared of brush but also numerous sections of the Swanson River Road overgrown with alder. Maintenance of this major road, authorized for public use, remains the responsibility of Chevron. The Hydro-ax under contract involved sixty hours of use at $109/hr.

In support of field operations, 4220 cubic yards of gravel, mined from refuge lands, were utilized by Chevron through the first three quarters. These sales totalled approximately $6330.

3) Alaska Pipeline Company (APC) - APC receives gas from several sources in the Kenai area, including the Kenai Gas Field, State of Alaska Royalty gas from the North Cook Inlet, West Fork gas, from refuge lands now conveyed to the Kenai Native Association, and Beaver Creek Field gas (20-25,000 MCF/D). Gathering lines eventually deliver this gas to the main natural gas APC transmission line facilities consisting of parallel 12-inch and 16-inch pipelines crossing 40 miles of refuge lands, (Sterling to Burnt Island) to users within the Anchorage Basin. Gas transported during the winter may reach more than 200,000 MCF/DA while summer needs average 80-90,000 MCF/DA. No construction or major maintenance was undertaken within the refuge rights-of-way.

Alaska Pipeline Company 50-foot right-of-way supports two natural gas transmission lines crossing 40 miles of refuge lands to Anchorage Basin users. (Staff Photo)

The Mystery Creek road, providing direct access from the Sterling Highway to this APC pipeline right-of-way, was opened on August 31 to allow public vehicular use to the northeast portion of the refuge. This seasonal opening is used by moose, duck and grouse hunters as well as berry pickers.

4) Kenai Pipeline Company (KPL) - This company controls the 8-inch pipeline delivering Swanson River crude to Nikiski facilities 19.6 miles west. The Tesoro Refinery in North Kenai has been the major recipient of an estimated 2,745,540 BBLS of Swanson crude during the year. This fall KPL posted, using orange plastic markers with KPL's identification and phone number, certain locations within the active field area and at the refuge boundary, warning of the existing underground line location.

5) Tesoro Alaska Pipeline Company - This 10-inch pipeline crosses about 4700 feet of refuge lands of the extreme northern tip at Point Possession. The 50 foot right-of-way, cut through mature forest during the late winter of 1976, was covered with the trees removed during installation of the pipeline, thereby limiting unauthorized vehicle access along this route. This facility carries more than 10 million barrels of refined petroleum products from the Tesoro plant at North Kenai to Anchorage. The approximate breakdown of products shipped includes: 60 percent gasoline, 30 percent jet fuel, and 10 percent heating oil.

6) ARCO Exploration Company (ARCO) - The Wolf Lake Exploratory Well No. 1, drilled by ARCO on lands to which CIRI holds partial mineral rights, was abandoned in October as a dry hole. This $10.5 million project spudded-in December 6, 1983. Restoration of the pad and short access road will commence summer 1984.

A second exploratory well, Funny River No. 1, began drilling operations November 26, also on lands to which CIRI was conveyed oil, gas and coal resources. A 2.6 mile access road was constructed to the drill site using existing seismic lines, roads and generally disturbed areas. Most of the road construction gravel was mined from Salamatof Native Association lands adjacent this road access entrance. Pool Arctic Alaska Drilling Rig No. 7, continues to drill ahead passing 10,000 feet at year's end. The 18,000 foot proposed total depth, if reached, would surpass the Kenai Peninsula's deepest well by 316 feet.

Pool Arctic Alaska Drilling Rig No. 7 at Funny River well will complete the Peninsula's deepest hole (18,000 Ft. +) during oil and gas exploration within CIRI subsurface inholdings. (Staff Photo)

7) Geophysical Operations - A fourth season of geophysical operations conducted by NORPAC Exploration Services, Inc. under contract with ARCO to explore CIRI's partial subsurface mineral holdings began January 5. The focus of this season's effort concentrated within the 6-mile corridor of private lands east of Soldotna. About 20 percent of this program involved refuge lands on lines north and south of the corridor using portable equipment supported by helicopter and rubber tired vibrosis units using existing roads. This program was completed March 17.

Dog teams were used to freight equipment along certain ARCO/CIRI seismic exploratory lines. (Staff Photo)

D. PLANNING

1. Master Plan

The draft Kenai Comprehensive Conservation Plan/EIS/Wilderness Review was completed and printed in December 1983. The plan, summaries, and maps, explaining the five management strategies were sent out for public review in early 1984. Based upon public comment, a comprehensive land management strategy should be adopted by summer. The Kenai planning effort, which began in 1980, is nearly over and hopefully the time invested will cut a better deal for wildlife on this refuge then they have had in the past. A summary and set of maps are attached.

2. Management Planning

Although Comprehensive planning neared completion in 1983, management planning has only begun. The wildlife inventory plans for moose, caribou, Dall's sheep, mountain goat, wolf, beaver, furbearers, small mammals, trumpeter swans, bald eagles, and passerine birds were drafted. Work also began on the refuge trapping plan, probably the most needed of all, a fire management plan, and a sign plan. The list of required management plans is extensive and will consume a great deal of time the next few years.

4. Compliance with Environmental Mandates

The Kenai NWR Environmental Assessment for Habitat Manipulation was amended on December 14, to allow a habitat manipulation program, conducted by the Alaska Department of Fish & Game (ADF&G), to start during the winter of 1983-84. An archeological survey of the effected area was conducted on December 16-18. No significant impacts were likely and habitat work began December 19.

5. Research and Investigations

a. Feasibility of Studying Lynx on the Kenai National Wildlife Refuge-
Investigators: T.N. Bailey, E.E. Bangs, M.F. Portner, J.C. Malloy.

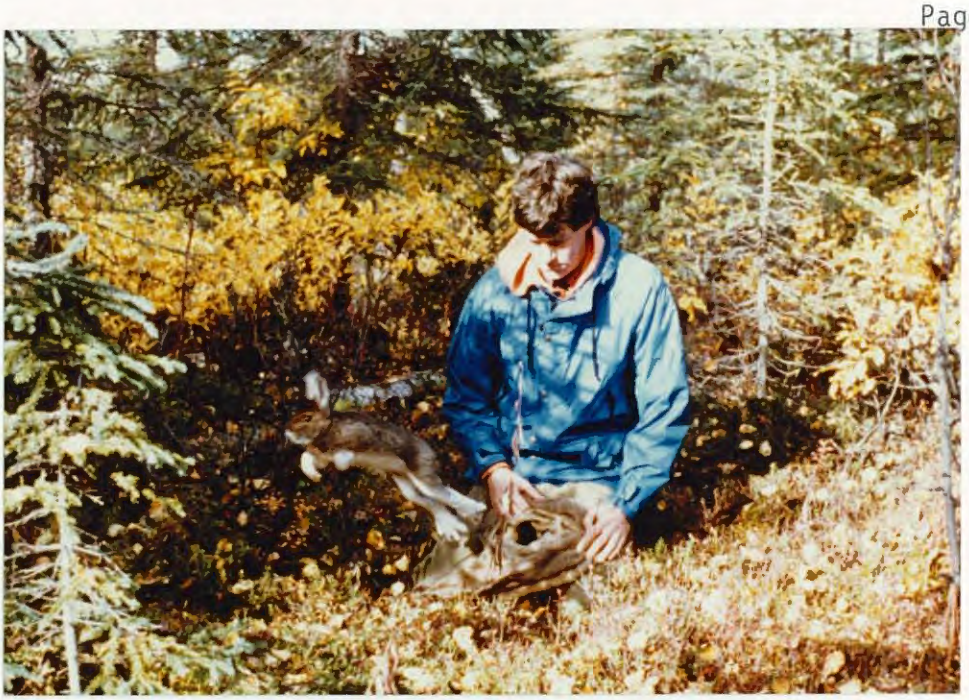
A project designed to determine the problems involved in initiating a study of lynx on the refuge was initiated in 1982. Information is needed on lynx on the refuge because despite an abundance of snowshoe hares and expected peak in lynx numbers, harvest of lynx on the refuge is low relative to the harvest during the same period in the last cycle. Fourteen of 46 lynx reported taken on the refuge during the 1982-83 trapping season were examined while they were alive, and of these, 9 were fitted with radio collars. As of 31 December 1983, only 1 of these radio collared lynx was still alive, the majority of those dying were taken by trappers (5=62%).

Young lynx before being fitted with a radiocollar. Lynx populations on the refuge, especially north of the Kenai River, appear low relative to the high number of snowshoe hares that are available as prey.
(Staff Photo)

Two radiocollared females produced young in 1983 and the areas encompassing the radio locations of the lynx ranged from 3.7-782.8 km^2. Two additional lynx were radiocollared during the 1983-84 season, but one had already been taken by a trapper at the date of this report (15 Feb 84). Although requested pelt sealing information is unavailable from ADF&G at this time, verbal reports from trappers do not suggest any significant change in harvest during the 1983-84 season. Fates of the radiocollared lynx suggest the mortality rate of <u>adults</u> is high and due entirely to trapping. Only young-of-the-year may have died from non-trapping related causes.

Biologist Ted Bailey fits radio collar on an adult female lynx. Four of 5 radiocollared lynx were taken by trappers within 40 days of the opening date of trapping season. (Staff Photo)

Concurrent studies on snowshoe hares, during the summer of 1983, indicated minimum population densities of 197-759 hares/km^2 in the 1947 Burn. Hare pellet counts suggest the highest hare densities occur in the 1947 Burn and mature forest-alder ecotones at high elevations.



Biological technician John Malloy releases an eartagged snowshoe hare in a study grid in the 1947 Burn along the Funny River Road. Mark recapture methods were used to estimate snowshoe hare densities. (Staff Photo)

The difficulties of keeping radiocollared lynx alive long enough to obtain needed information will play an important role in determining the future of the project.

b. Wolf-Louse Study - Investigators: T.N. Bailey, E.E. Bangs, M.B. Hedrick, T.N. Spraker, R. Zarnke, B. Taylor.

In the winter and spring of 1983, all wolves known to be infested with dog biting lice were captured by helicopter darting and injected with Ivermectin, a drug that is apparently 100% effective against this louse. In May, 1983, drug treated baits were aerially dropped at the den of three wolves representing the Skilak Lake and Elephant Lake packs, and a lone female. On June 8, pups were examined for lice at the Skilak and Elephant Lakes' dens. Contact was lost with the lone female. All pups examined, 5 at each den, were lice free, one pup was found dead at the Skilak den, apparently from a common canine intestinal disorder. Two pups from each den were taken by ADF&G and given to the Alaska Zoo in Anchorage.

At the beginning of trapping season in 1983, it appeared as if wolves from several previously infected packs, Elephant Lake, Bear Lake, and Swanson River, were lice free. Point Possession pack again had lice. Lice were later discovered in Swanson River and Skilak packs. A wolf pack near Sunrise (east of the refuge in the Kenai Mountains) was also infected.

The dog-biting louse was also found in dogs from Kenai, Soldotna, Kasilof, Anchorage, Glennallen, Fairbanks, and McCarthy, and it appears that infected dogs are common statewide. There is still no evidence the louse effects wolf condition or health, although it certainly irritates infected individuals.

Treatment of infested packs on the refuge resumed in the fall of 1983, by aerially dropping treated baits on moose kills. Intensive recreational trapping harvest has reduced pack sizes by 60% to 73%, so any treatment program for 1984 should be fairly inexpensive due to the low number of wolves needing treatment. Serious questions have been raised regarding the potential for success in this expensive program since the source of infestation is widespread and not treatable. At any rate, the wolf treatment program is scheduled to continue at least through 1984, and if unsuccessful, we may be dealing with another proposed wolf extermination program in 1984-85.

The common dog louse Trichodectes canis taken from a wolf on the Kenai NWR. These biting lice have been discovered in 5 wolf packs on the refuge. Lines are wolf hairs. (Staff Photo)

c. Moose Movement and Distribution in Response to Winter Seismological Exploration on the Kenai National Wildlife Refuge, Alaska. Investigators- E.E. Bangs, T.N. Bailey, and M.F. Portner.

Monitoring of moose, collared in 1980, continued at a low level throughout 1983. Although most of the moose continue to use their home range in established patterns, some interesting developments occurred.To date, there have been 17 documented fatalities, 8 hunting (7 bulls, 1 cow), 5 auto accidents, 2 accidents, 1 illegal kill, and 1 predation by

a brown bear. An unexpected early movement by tagged bull moose into early succession stage forest during hunting season resulted in the harvest of all four remaining tagged bulls in 1983. All seven of the tagged bulls were harvested within three years, and it is doubtful if many bulls die other than by hunting north of the Kenai River.

Some cows again traveled off the refuge into developed areas to calve, apparently to avoid a high rate of predation by black bears.

Limited monitoring of the remaining collared moose will continue to document seasonal movements and any additional mortalities.

d. Moose Habitat Model, Moose Research Center - Investigators: Alaska Department of Fish & Game, Research Division.

Work on the moose carrying capacity model by the ADF&G continued throughout 1983. The project includes measurements of plant productivity and browsing pressures within the moose pens. Moose density within the pens will be manipulated to test the model's predictions. The metabolic rates, fat deposition and depletion, food digestability, and condition of tame moose were also measured. Mike Hubbard, a Ph.D. candidate from the University of Alaska, started work on his project, "Bioenergetics of Moose" in 1983. The effect of certain immobilizing drugs, such as carfentanil, on moose and physiological indicators of moose condition were also studied.

e. Black Bear Ecology - Investigators: Alaska Department of Fish & Game, Research Division.

Studies of black bear biology continued in the 1969 Burn and 1947 Burn areas. This long-term project is looking at the differences in bear density, movements, reproductive success, food habits, and behavior in two major habitat types on the refuge. A subject of this study was completed by Paul Smith, a University of Alaska M.S. student, who investigated black bear food habits and cranberry abundance.

f. Kenai black bears and cranberries: bear food habits and densities: Investigator: Paul A. Smith, U. of Alaska, M.S. Thesis.

Fecal droppings, collected from 1979 through 1983, were analyzed to determine black bear (Ursus americanus) seasonal food habits on the northwestern Kenai Peninsula, Alaska. Lowbush cranberries (Vaccinium vitis-idaea) were sampled in areas of different successional stage and habitat type to assess production levels. Methods for scat analysis and cranberry sampling were developed or improved upon, and evaluated.

Berries, animal matter, and green vegetation all formed major portions of the black bear diet. Lowbush cranberry was an important spring food and was important in both spring and fall where it was highly abundant. Black bears were more carnivorous and predatory than has been reported elsewhere.

Cranberry yield from an area burned in 1947 was 8.2 times the yield from an area burned in 1969. Cranberry yields were quite variable as has been reported in other cranberry studies. Cranberry densities had no effect on area-wide bear densities.

g. Moose Research Center - Investigators: Alaska Department of Fish & Game, Game Division.

An experiment on the effect of late breeding in moose was conducted last year. A group of 3 cow moose were separated from contact with males until they had completed their first estrus cycle in the fall of 1982. The cow moose were maintained on a relatively high quality supplemented diet throughout the winter. In the spring of 1983, one cow gave birth to a dead calf, which may not have been related to the test. The other 2 cows gave birth to normal sized calves one week and 3 weeks later than normal. This experiment was dropped for other priorities but has some obvious management implications, since bull/cow ratios are low through much of the refuge and most of the remaining breeding bulls are yearlings. There were a series of early calf surveys, conducted in the 1960s, which indicated two peaks in births, but it is unknown why they peaks occurred. The occurrence of a prolonged calving period could increase the susceptibility of moose calves to bear predation. This experiment may be resumed after completion of the moose carrying capacity model which is not a priority effort.

h. Calf Mortality Study - Investigators: Alaska Department of Fish & Game

Thirty-nine newborn moose calves were captured and radioed in the 1969 Burn area in the spring of 1983. Most of the calves were killed within the first month since calves over a month old can generally outrun most predators. The 55% calf mortality rate was caused primarily by black bear (70%), with contributions from brown bear (6%), wolves (6%), unknown predators (6%), and accidents or abandonment (12%). Even with this fairly high rate of predation, the refuge moose population continues to increase. To everyone's surprise, predation rates and causes were almost identical to those documented in the 1947 Burn several years ago. A record twinning rate of almost 70% was recorded in the 1969 Burn last year and shows what excellent moose habitat can do to reproductive rates.

i. Hidden Lake Studies - Investigators: Alaska Department of Fish & Game, F.R.E.D. Division.

On June 22 and 23, 1.1 million sockeye fingerlings, taken from Hidden Lake and raised in the Trail Lakes Hatchery, were released back into Hidden Lake. Fifteen thousand were fin-clipped for later identification. Over 11,300 adult sockeye returned to spawn in Hidden Lake which was slightly higher than average. The record red salmon smolt out-migration was established at 235,000 and was due to natural

reproduction although some of the adults responsible were planted fish. Next year, for the first time, the number of returning adults should be enhanced through past stocking.

In late September and early October, 6 sockeye egg takes were conducted by seining and 1.9 million eggs were taken. These eggs will be raised at the Trail Lakes Hatchery and released back into the Hidden Lake system.

j. Creel Census - Investigators: Alaska Department of Fish and Game, Sport Fish Division.

The Sport Fish Division conducted a creel census on the upper Kenai River from the Moose River to Skilak Lake, a portion of which is inside the refuge. King salmon fishing accounted for 530 fish taking in 18,500 man-days of effort. Three-thousand five-hundred silver salmon were taken during 11,000 man-days of effort.

The Russian River early run resulted in 8,360 red salmon caught in 18,500 man-days of effort. Escapement of the early run was 21,000 fish. The late run was a bust, as the predicted escapement never occurred and the sport season was closed early by emergency order. Only 16,000 reds were harvested in 13,330 man-days of effort for an escapement of 34,000 fish. Commercial fishing, though, hit an all time harvest of over 3 million red salmon in Cook Inlet.

k. Tustumena Lake Hatchery - Investigators: Alaska Department of Fish and Game, F.R.E.D. Division.

F.R.E.D. Division continues to take eggs and experimentally stock Tustumena Lake. Ten million red salmon eggs, taken from Bear Creek and ten million taken from Glacier Creek, both tributaries into Tustumena Lake, were raised to fingerling size in the Crooked Creek Hatchery. Seventeen million fingerling red salmon were stocked back into their streams. Another two million of these fingerlings were stocked in Leisure Lake, south of Homer, to develop a terminal fishery. The project worked well with 85,000 adults harvested in 1983 from a previous effort.

l. Sonar Counting of Red and King Salmon - Investigators: Alaska Department of Fish and Game, Commercial Fish Division.

Adult red and king salmon, returning to Tustumena Lake, were counted on the Kasilof River by sonar counters at the highway bridge. An estimated 210,000 red and 6,000 king salmon are believed to have returned to spawn in the Upper Kasilof River or Tustumena Lake.

m. Fisheries Investigation of the tributaries of the Lower Kenai River - Investigators: George Elliott, Jim Finn, and Mike Johnson, Special Studies, U.S. Fish and Wildlife Service.

Work on Beaver Creek, Slikok Creek, and Soldotna Creek, which are the major tributaries of the lower Kenai River, continued in 1983. Surveys were conducted on fish populations, season fish distribution, and mapping wetlands along these creeks. Beaver Creek appears to be an important spawning and rearing habitat for resident salmon and trout, as well as for fish from the Kenai River and Beaver Lake. The extensive wetland system around the upper creek contributes greatly to its water flow and high invertebrate productivity. Beaver Creek appears to be a very important rearing area to silver salmon from the Kenai River. Slikok Creek is mainly a spawning area for kings and silvers while Soldotna Creek is important to a limited silver run. Other fish located include sockeye, Dolly varden, stickleback, sculpin, and round whitefish.

n. Chisik and Duck Island Biological Studies - Investigators: D. Kafka, G. Muhlberg, and M. Portner, Kenai National Wildlife Refuge.

A project, designed to obtain baseline data on wildlife populations on Chisik and Duck Islands, was initiated in 1983 under an agreement with the Alaska Maritime NWR. Biological Technicians Gay Muhlberg, Donna Kafka, and Mary Portner conducted surveys on seabirds, waterfowl, passerine birds, raptors, and small mammals between June 1 and August 12. Data collection on seabirds, primarily black-legged kittiwakes, was emphasized.

Few, if any, kittiwakes were produced on the islands during 1983. None of the 90 nests, in 5 numbered plots, produced young on the east side of the island (Table 2), and less than 10 eggs were observed in 115 nests repeatedly observed in the main colony south of the cannery. Seven of these eggs were apparently taken by ravens. The kittiwakes were apparently on the island as early as 9 May, when the cannery personnel arrived. Few active nests were observed on 1 June when the investigators arrived, only a few eggs were present by 18 June, and by 27 August, only about 200 kittiwakes were left on the island. An estimated 20,000 kittiwakes were present during the summer. This apparent reproductive failure was probably related to increased water temperatures and decreased availability of the kittiwakes' primary food, the sea lance. Similar years of poor productivity have occurred during 1970, 1971, and 1978, and appear related to the impacts of El Nino in the southern Pacific Ocean.

Table 2. 1983 black-legged kittiwakes - Results of nest study plots.

Plot #	No. of nests/ plot	No. of nests with eggs	No. of eggs/ nest	No. hatched
1	3	1	1	0
2	22	1	1	0
3	16	0	0	0
4	39	0	0	0
Total 5	90	2	2	0

Few of these black-legged kittiwakes successfully nested on Chisik Island in 1983. The reproductive failure was probably a result of decreased food supply and warm sea temperatures associated with El Nino. Deeper diving puffins appeared to have a normal reproductive year. (Staff Photo)

Deep feeding seabirds, such as horned puffins, appeared to have an average productive year. About 5,000 and 300 puffins were estimated to be nesting on Duck and Chisik Island, respectively.

Duck Island off the shore of Chisik Island. Duck Island supports colonies of nesting kittiwakes, puffins, and murres. Bio. Tech. Gay Muhlberg, in Zodiac, observing seabirds on the east side of Chisik Island. (Staff Photo)

About 75 pairs of eiders nested on the islands during 1983, but the majority of the nests on Chisik Island were apparently destroyed by man. The extremely low nesting and hatching success (.06%) of the nests along prime nesting habitat north of the cannery was attributed to an apparent common practice of taking the duck eggs for human consumption (Table 3).

Table 3. Nesting and hatching success of eiders on Chisik and Duck Islands, 1983.

Dates / Nest #	6/8	6/9	6/18	6/21	6/24	6/27	7/5	7/15
1	3	E	*	*	*	*	A	A
2	2	E	*	E	*	*	A	A
3		3	H	4H	H	H	H	3 sacs
4	1	E	*	*	*	A	A	A
5	3	1	E	*	E	A	A	A
6			D	*	*	A	A	A
7			3	E	*	A	A	A
8			3D	*	OH	A	A	A
9			D	D	D	A	A	A
10			4D	4	5H	4H	E	A
11			2D	ND	*	A	A	A
12			4D	3H	3D,H	3H	3H	E
13				1	*	E	A	A
14					5D,H	E	A	A
15					3D,H	E	A	A
16					3D,H	E	A	A
18						5,H	E	A

17 nest - 1 successful = .0588 nest success
48 eggs (45 destroyed) = .0625 hatching success
3 eggs hatched from one successful nest.

A = abandoned
D = destroyed
E = empty nest
H = hatched eggs

The most common passerine birds inhabiting the dense alder thickets on the islands were hermit thrushes, Wilson's warblers, yellow warblers, and yellow-crowned sparrows in order of decreasing abundance. A peregrine falcon nest was located in the upper cliffs on the north side of the island and 3 falcons, including possible 1 young-of-the-year were observed feeding later on the southeast side of Chisik Island.

Bio. Tech. Gay Muhlberg spent the summer observing seabirds and other wildlife on Chisik Island, one of the Alaska Maritime NWR's islands cooperatively managed with the Kenai NWR. Volcanic Mt. Illiamna is in the background. (Staff Photo)

Three captures of marten in live-traps, set on Chisik Island, verified previous reports that marten were commonly observed on the island, despite the scarcity of coniferous trees. Small mammal trapping revealed red-backed vole numbers equivalent to, or exceeding, red-backed vole numbers on the Kenai NWR during 1983.

Bio. Tech. Mary Portner lowering captured marten to base of cliff on Chisik Island. Marten appear to be common on the island despite a scarcity of trees. The island is covered primarily with alders. (Staff Photo)

Observations of human activity around the islands were also recorded. Helicopter use of the cannery's dock created the greatest disturbance to nearby kittiwakes. Cannery personnel associated with commercial fishing arrived on 9 May and departed 14 August. Only one family remains as caretakers of the cannery throughout the winter.

E. ADMINISTRATION

1. Personnel

During 1983, the Kenai NWR had a staff of 12 permanent full time employees, two permanent part-time, 16 summer seasonals, 18 YCC enrollees, and 26 volunteers. The staff increased significantly since 1982 with the addition of six summer seasonals and the utilization of 27 volunteers (Table 4). The permanent staff increased by two positions since last year. The increase was the establishment of a Fire Management Officer and a PPT Maintenance Helper. The PPT maintenance helper position was established as a taper position (a 3 year appointment with benefits) because OPM did not have a register available at the WG-05 level. Bob Campbell was hiried to fill this position on June 20, 1983.

Table 4. Staff Breakdown from FY 1978 to FY 1983.

	Permanent			Temporary	Volunteers
	Full-Time & Career	Seasonal	Part-Time		
FY78	9 FT	3 CS	0	8	0
FY79	10 FT	3 CS	1	9	0
FY80	10 FT*	4 CS	1	4**	0
FY81	10 FT*	4 CS	1	4**	1
FY82	12 FT	0 CS	1	10**	12
FY83	13 FT	0 CS	2	16	27

* (1 FT vacant due to lack of funds)
** (1 Temp. janitor vacant due to lack of funds)

Our seasonal staff dramatically increased from 1982, due to the many vacancies in the permanent staff. We were able to hire 4 biological technicians, 6 park technicians, 3 laborers, and 3 YCC staff. This increase in seasonal staff added an enormous load on our two remaining office staff members, Accounting Technician Leslie Blaylock and Clerk/Typist Pat Fencl.

Admininistrative Officer Gene Heath retired April 22, 1983, after 32 years with Refuges. In September, Leslie Blaylock was promoted to the Admin. Officer position, which underwent a downgrade and name change, from a GS-09 Admin. Officer to a GS-07 Budget Assistant.

Ben Chio was promoted to the Facilities Manager on April 17, 1983 from the Equipment & Facilities Mechanic.

On July 11, 1983, Cindy Sanders was hired as a clerk/typist, which helped relieve some of the burden on the office staff.

2. Youth Programs

The 1983 Youth Conservation Corps (YCC) budget was $28,693.00. This money was earmarked for enrollee and staff salaries, as well as any supplies necessary for program support. Total appraised value of work accomplished, if performed by a small crew of GS Park Technicians (computations available), would be $147,995.64.

The YCC staff included Director Daniel Henry (GS-7) and one GS-5 crew leader, Lori Landstrom. A problem arose a week before orientation when another crew leader resigned to accept a position in Montana. This occurred at a crucial planning stage. The director was forced to divide time between preparing the enrollee's summer and combing through a hundred names on various registers. Finding someone with youth supervisory experience was not only frustrating, but consumed a tremendous amount of time. Volunteer John Mueller assumed the responsibilities of a crew leader, despite the fact that his 94 rating precluded him from hiring considerations.

Recruitment for the 1983 program focused on hiring youth primarily from the Kenai-Soldotna area. One enrollee was also selected from Sterling, as was one from Anchorage. Encouragement for certain students to sign up came from many local teachers and counselors who have worked with and/or supported YCC for a number of years. Recreation Planners Mike Boylan and Rick Johnston visited the high schools to present a slide show from the 1982 program. The film "Hard Work, Good Times" was shown to some groups. Many of the applicants had been encouraged by previous enrollees to sign up.

Applicants were randomly selected by refuge staff shortly after the high school visits in March and April. A few workers were chosen from the alternates' list following interviews by telephone and in person. Once selected, the prospective enrollees were sent a packet of materials, including an introductory letter, tentative schedule, equipment list, medical examination form, and other necessary forms for employment.

June 13 was the first day of work for most of the enrollees. The staff organized a week-long orientation to acquaint the group with our expectations regarding work behavior, social interaction, and related areas. Most of the training provided a balance between necessary "hard" and "soft" skills. The hard skills included use of tools, safety awareness, canoeing, first aid, and a wide variety of camping techniques. This instruction was supplemented with "hands on" experience. As a measure for judging general working skills and tool awareness, the group divided up into 3 crews to break ground for a new interpretive trail. Crew leaders observed closely for team compatibility, attitude toward hard work, and knowledge of tools.

Along with specific work-oriented tasks, the group participated in many activities designed to heighten an awareness of soft skills. Some of the areas involved understanding group decision-making processes, interpersonal feedback, conflict management, values clarification, public speaking, and listening techniques.

The week of orientation included paperwork and general office procedures. The staff also provided a number of films, slide shows, activities, and discussions related to significant issues on the Kenai NWR. Much of this information fueled later field discussions regarding topics such as human impacts on the refuge, wildlife management, wilderness ethics, oil and gas development, and the function of the refuge system in Alaska. Enrollees were given journals to record thoughts and feelings during the week.

The YCC work schedule was organized around three 10-day tours with a 5-day orientation at the beginning and a 5-day spike camp at the end. Two of the 10-day tours were in the field and one tour involved work projects at the Kenai Headquarters/Visitor Center. The longer, residential-type spike camp system cut down on "dead time" used up in the daily travel of a non-residential camp. For most of the summer, this unused work time would have amounted to 3-4 hours each day if crews had been driven to project sites daily. This cost, not to mention gas, vehicle maintenance, and staff time, far outweighs the average of $6.80 spent daily to feed each enrollee during a spike camp.

Another important benefit from the spike camp was the group dynamics that resulted from living together. A field camp arrangement demands a great amount of cooperation from all members of a group. All enrollees share cooking responsibilities as well as other maintenance. This responsibility bound members more closely together. The effect of group living can be demonstrated by comparing the attitudes of the enrollees during spike camps and while commuting from home. While accomplishing work around the Headquarters, most enrollees expressed strong feelings about wanting to be back out in the field. Their work habits seemed to deteriorate at times during the spike in town. Back in the field, however, the group regained its usually cheerful, positive outlook.

The first 10-day session focused on installing new signs on the refuge's two major public use areas, Skilak Loop Road and Swanson River Road. Some 40 signs were installed with brushing and clearing of roadsides accompanying the project.

While one crew installed signs, other crews engaged in campground and trail maintenance including removal of deadfalls and litter, installing fire grates, and repairing picnic tables and outhouses. All hiking trails were thoroughly brushed and corduroy installed along with water bars. Crews rotated projects every few days to provide variety. Miscellaneous projects included tree planting, removing de facto trails and spurs, and removing 25 WWII oil drums from an abandoned military installation on the refuge.

Subsequent sessions included repairing a dozen canoe portages, collecting trash, constructing a half-mile environmental education trail (The "KEEN EYE TRAIL") at the Visitor Center, building a raptor holding pen, repairing the float plane dock, repairing public use cabins, and removing remains of ancient trespass cabins.

While not technically a formal part of YCC 1983 (enrollees were paid for 40 hours of work), the staff felt environmental awareness should be integrated into the daily spike camp schedule. Effort was made to generate daily lunch discussions on topics ranging from native land allotments and the impact of tourism to interpersonal relationships and conflict management. The park technician staff helped tremendously by taking enrollees on interpretive walks, owl calling sessions, and leading group building exercises. Organized workshop-discussions covered areas such as salmon cycles, Senator Stevens' hunting bill, and McDonalds' food packaging.

Organized field trips provided a valuable supplement to the YCC work experience. Excursions included visits to the Swanson River Oil Fields, Exit Glacier, and the Moose Pens.

Some worked harder than others in YCC'83 but by summer's end, the 18 enrollees had done more than their share. (Staff Photo)

4. Volunteers

By the end of 1983, Kenai had used 27 volunteers who contributed over 5,000 hours of service this year ranging from carpentry to YCC supervision to automotive repair.

Since Alaska is a mecca for travelers, Kenai receives numerous unsolicited offers of volunteer help. In recent years, the refuge used a few college students from Outside for checking canoe trails, hiking trails, etc.

Volunteers contributed significantly to all phases of the Kenai program in 1983, including building a porch on the Skilak Visitor Station. (Staff Photo)

In 1983, the emphasis of the volunteer program changed from volunteers from Outside to local persons. At the same time, a policy governing the categories of volunteers was formally adopted.

The availability of the refuge's new four bedroom dormitory, which is mainly used summers by seasonals, enabled us to provide housing for non-local volunteers. Since these volunteers come from Outside, we were authorized to place them in travel status and give them $10 per day per diem, a common practice by other agencies in Alaska.

Since some volunteers would be eligible for housing and a food allowance whereas others would not, our volunteer policy had to justify this double-
standard. To do so, we created two categories of volunteers. "Seasonals" were those who agreed to sign a minimum of one month's contract. In exchange for $10/day and lodging, these seasonal volunteers were required to contribute 40 hours a week.

The other category consists of "Occasional" volunteers or local persons who contribute a minimum of 16 hours a month for no housing or remuneration. These occasional volunteers did, however, receive: a) complementary membership in Alaska Natural History Association with 15% discount on books, posters, and other merchandise; b) uniform provided; c) complementary Kenai NWR T-shirt; d) Certificate of

Appreciation from Kenai NWR and Department of Interior; e) free admission to refuge Community Schools' courses; f) a variety of awards for various numbers of hours contributed.

Each year, a local volunteer will be selected as "Volunteer of the Year" and his/her name engraved on a permanent plaque to be prominently displayed in the Visitor Center.

Since "Seasonal" volunteers were, in effect, on travel status, their vouchers were not submitted until they had completed their first month. Although this meant they had to wait at least six weeks to receive their first per diem check and they received a check a month thereafter, there were no complaints. This arrangement discouraged volunteers from breaking their contract. All eight seasonal volunteers fulfilled the terms of their agreement. Since seasonal volunteers were living in refuge housing, we accepted only the highest caliber people for these positions.

By year's end, we had attracted volunteers such as: A retired married couple of Ph.D. biologists with college teaching experience who conducted summer field studies; an educated and experienced automotive and diesel engine mechanic who rehabilitated half of the refuge's aging fleet of vehicles; a retired commercial fishermen with volunteer service awards from the Forest Service who hosted visitor center programs and conducted daily campground maintenance and repair; two hardy Australian youths who worked as tireless laborers and rough carpenters; and two graduate-level biologists, with experience with the Forest Service as well as FWS, who conducted fall and winter field studies. And even Washington, D. C. contributed to the success of Kenai's volunteer program as Thomas Hester, sone of FWS Deputy Director F. Eugene Hester, did yeoman duty as a volunteer from mid-January through mid-April.

From the local population, we attracted such persons as: Two nuns who worked at the visitor center; a retired businesswoman who contributed two days a week doing typing, filing, and other clerical duties; a number of local community college instructors and students who assumed complete responsibility for maintaining refuge cross-country ski trail; a local businesswoman who contributed two days a week doing bookkeeping and biology data recording; and a local commercial artist who designed a leaflet on -- what else -- volunteering!

Add to these, the numerous one-time contributions like the local radio announcer who narrated a slide-tape program, the local carpenters who built a porch on our Visitor Information Cabin, and the local psychologist who spent a week of his vacation assisting with backcountry patrol and you'll see that the volunteer program for 1983 was an unqualified success!!

The growing popularity of the visitor center and the absence of a permanent Park Technician as well as inadequate staff to maintain weekend hours led to a recruitment drive for volunteers specifically interested in working weekends as Visitor Information Persons (VIP's). A dozen people attended our December meeting and, as the new year began, the visitor center's busy weekend operation was conducted by teams of local volunteers made up of teachers, nurses, a policeman, and others.

Table 5. Kenai NWR Volunteers, 1983.

Local (Occasional) Volunteers:

	Name	Position	Duty Dates
1.	Suzanne Bush	Visitor Center/Bio. Aide	6/16-12/31
2.	Joan Barina	Visitor Center	6/16-12/31
3.	Joyce Ross	Visitor Center	6/16-12/31
4.	Viola Morrison	Clerical Assistant	5/23-12/31
5.	Gene Heath	Administrative Asst	4/25-05/06
6.	Elmer DeWitt	Recreation Aide	4/16-9/15
7.	Dick Vargas	Laborer	3/25-12/31
8.	Marvin Breece	Recreation/Bio. Aide	8/1-11/30
9.	Richard Nault	Recreation Aide	7/10-7/17
10.	Cliff Donegan	Carpenter	8/10
11.	Kathy Sarns	Artist	10/1-12/31
12.	Gary Freburg	Recreation Aide	10/1-12/31
13.	Alan Boraas	Recreation Aide	10/1-12/31
14.	Chris English	Recreation Aide	10/1-12/31
15.	Steve Fanning	Recreation Aide	10/1-12/31

Visiting (Seasonal) Volunteers:

16.	Jim Farrar	Recreation (Laborer)	6/10-9/15
17.	Ben Benson	Recreation (Visitor Center)	3/6-10/1
18.	John Mueller	YCC	6/1-8/10
19.	Rey Gibson	Mechanic	5/1-12/31
20.	Dr. Gwen Perkins	Biological Aide	6/12-7/7
21.	Dr. Carroll Perkins	Biological Aide	6/12-7/7
22.	Richard MacAvinchey	Biological Aide	10/1-12/31
23.	Ellen Kord	Biological Aide	10/1-12/31
24.	Simon Fountain	Laborer	10/1-10/31
25.	Kym Turner	Laborer	10/1-10/31
26.	Annie Castele	Visitor Center	1/15-3/15
27.	Tom Hester	Recreation (Visitor Center)	1/20-4/15

5. Funding

Table 6 displays Kenai's funding and manpower status from FY 1978 through FY 1983.

Table 6. Kenai National Wildlife Refuge funds and manpower patterns - FY 1978 through 1983.

FISCAL YEAR	1978	1979	1980	1981	1982	1983
YACC Camp	N/A	N/A	2-10	5-22	0	0
PFT Manpower	9	9	9	9	12*	12
PPT Manpower		1	1	1	1	2
Career Seasonal	3	3	4	4	0	0
Temporary	4	6	5	3	5	16
Intermittent	3	1	2	0	0	0
Volunteers	0	0	0	1	12	26
YCC Staff	7	5	0	0	2	2
YCC Enrollees	30	20	0	0	13	18
MB	43,000	61,000	71,000	92,000	145,000	290,000
MNB	250,000	310,000	296,000	297,000	334,000	439,000
I&R	180,600	192,400	191,000	190,000	190,000	241,000
Exp. for Sales	32,000	32,000	37,000	49,000	55,000	54,000
Subtotal	505,600	545,700	595,000	628,000	724,000	1,024,000
I&R-Fee Area	N/A	11,750	7,500	7,300	7,300	0
BLHP	1,300,000	0	75,000	1,494,000	0	0
I&R Fee Area Rehab	0	0	0	0	52,700	0
ARRM	0	0	0	0	0	40,000

*Conversion of 2 Career Season to PFT.

Station funding increased significantly this year and greatly assisted priority programs of facility and equipment maintenance. ARRM funds were used to replace four water wells at key recreational facilities. Interpretation and Recreation O&M funding remained nearly constand compared to the past several years. To maintain current Station I&R facilities and public services at Station standards will require an addition $300,000 in I&R maintenance funds for the Station. Recreational facilities and some I&R programs will continue to deline with current I&R funding levels.

Migratory Birds and Mammals and Non-Migratory Birds funding increases this past year have provided the essential funds to upgrade key items of equipment and facilities to support these programs.

With the new Visitor Center operational, the Visitor Contact Station along the Sterling Highway reactivated, and maintenance of recreational and other refuge facilities at Service standards, this station requires, as a minimum, a $1,200,000 yearly base budget and $300,000 in maintenance funds.

6. Safety

Safety meetings were held on a monthly basis with each staff member presenting a topic of their choice. A wide range of topics, ranging from frost bite, emergency flight bag inventory, safe vehicle fueling, Rabies symptoms and treatment to proper lifting techniques were discussed during each safety meeting.

Washington Office Safety Coordinator Art Cammerona and Admin. Staff Assistant-Program Coordinator Mike Cocchiolo, along with Ginny Hyatt, R.O. Safety Officer, visited the refuge. While visiting campgrounds on the Swanson River Road, a rock struck the oil pan of their vehicle rendering it immobile. While Ginny started a warming fire (Arctic Survival), the driver radioed for help. Mike and Art were thinking perhaps that Washington D. C. was not really all that bad. Approximately 45 minutes later all were rescued by the Refuge Manager.

With Ginny Hyatt, R.O. Safety Officer, heading the training, Kenai NWR again held a one week orientation for seasonal employees May 16-20 including defensive driving, first aid, and CPR training. This training proves valuable not only for the seasonals but as a refresher for staff.

Ginny Hyatt visited Kenai NWR on four occasions. Most visits involved safety inspections on the shop/storage areas and headquarters facilities.

There were 4 reported aircraft accidents/incidents on the refuge in 1983. The first occurred when an aircraft crashed near Point Possession; the second was fuel mismanagement resulting in a forced landing in a bog east of Rabbitfoot Lake; the third aircraft went down in Chickaloon Flats area; and the fourth was a fuel mixture control broke and the plane nose dived into Skilak Lake.

Another accident occured when a canoe, with two occupants was flipped over due to high winds on Hidden Lake. The two occupants were rescued by other fishermen.

A Kenai NWR Biological Technician, Donna Kafka, working on Tuxedni NWR, sustained 2 crushed fingers on her right hand when she fell while marking Puffin burrows on Duck Island.

One person drowned in Trapper Joe Lake.

7. Technical Assistance

During spring, refuge volunteer Ben Benson represented Kenai NWR at the Sterling Elementary School Science Fair. A retired commercial fisherman and world traveler whose exploits have taken him around the world, Benson and his heavy Newfoundland accent were the hit of the event.

Refuge Manager Bob Delaney played an active role on the Kenai River Task Force throughout 1983, representing the refuge's interests in advocating a motorboat closure on the upper portion of the river.

Supervisory ORP Boylan served on the Soldotna Community Schools Task Force with responsibilities for identifying community resources of potential value to the program. Boylan also represented the refuge in coordinating the installation of a permanent exhibit at the City of Kenai's new terminal. The exhibit features 30 professionally-mounted color prints varying from 8"x10" to 60"x48" and occupies the western wing of the terminal. The exhibit was a joint project between FWS and National Park Service. Facilities Manager Ben Chio used his carpentry skills to install the photos and titles in a professional manner that was praised by Airport visitors, including Governor Bill Sheffield.

Refuge Officers Boylan, Hedrick, and Johnston and Special Agent Soroka participated in several meetings of the Kenai Peninsula Interagency Law Enforcement Task Force during 1983 to promote better coordination of LE efforts between FWS, Alaska State Troopers, Fish and Wildlife Protection, and Alaska State Parks.

PARM Hedrick served throughout the year as team leader of the Kenai Peninsula Interagency Fire Team which initiated a fire management planning effort this year.

Assistant Refuge Manager and Pilot Richey provided aerial assistance to the Forest Service this summer by using refuge aircraft to conduct aerial surveys of spruce bark beetle killed trees. Similar assistance has been provided since 1974.

ORP Johnston provided technical assistance to the Regional Wilderness Management Planning Team which was unveiled in late 1983. A PH.D. candidate at Colorado State University, Patrick Reed, provided technical assistance to Kenai NWR through the draft of his dissertation , the Kenai Wilderness Administration Guide. It is hoped this document will provide long-range policy and state-of-the-art guidance for administering wilderness areas on Kenai NWR as well as other areas in Alaska. Reed began his project as a refuge volunteer.

In May, PARM Hedrick and SA Soroka met with Kenai Fjords National Park staff to explain refuge regulations and policies and coordinate management of our common boundary.

RM Delaney and ARM Richey, provided technical assistance to the Kenai Peninsula Borough and various city/village officials throughout the year concerning the location of a proposed special waste site.

Refuge Biologist Bailey provided technical support to writers and photographers from National Geographic for their upcoming book Wildlands for Wildlife on the National Wildlife Refuge System as well as an article on trumpeter swans that will appear in the magazine.

RM Delaney assisted Jeff Kratske, an Arizona State University graduate student in landscape architecture, in designing a study plan pertaining to management strategies for the Upper Kenai River.

PARM Hedrick, biologists Bailey and Bangs provided significant input throughout the year to an interagency brown bear management planning team comprised of representatives from FWS, Forest Service, and ADF&G.

OPR's Boylan and Johnston worked with writer Mary Ford during early 1983 to produce a tourist newspaper entitled "Alaska's Incomparable Kenai Peninsula--An All-season Guide." The tabloid was published in the spring and is a comprehensive guide to recreational opportunities on the refuge and a valuable reference tool for our visitors. The project, funded entirely by the Borough, was so successful it will be produced again in 1984.

F. HABITAT MANAGEMENT

2. Wetlands

Refuge biologist Ted Bailey coordinated the digitizing of National Wetlands Inventory Maps for the Kenai C-3 quadrangle with Jon Hall, N.W.I. coordinator. This was a prototype map to display to refuge staff the capabilities of the ADP(IRM) system. Samples of products produced included maps, and tables summarizing acreages of various wetland types. After the refuge's computer system is received, wetlands on additional quadrangles will be digitized with non-wilderness areas subject to development on the refuge the first priority.

3. Forests

Commercial timber cutting by Roger Habighorst (SUP 02-82) was completed in the spring of 1983.

No other commercial timber sales were active during 1983. Permits may be issued for commercial timber sales in 1984, after the Kenai Comprehensive Conservation Plan is completed. The amount of forest available for harvest will vary between 501,000 to 44,000 acres depending upon the alternative selected for implementation.

One commercial Christmas tree permit (SUP 51-83) was issued in 1983 at 80¢ per tree. About two hundred trees were cut along the Mystery Creek access road. Most local residents cut their own trees, for which there is no permit required on the refuge.

As electric rates rise and the local population swells, firewood cutting has become more popular. With the increase in permits and paperwork a potential problem, the refuge in 1983 began offering permits for each of the two woodcutting seasons-September 21 through April 1, and June 1 to August 30 - instead of permits for only one month. Five hundred ninety four permits were issued in 1983.

The woodcut areas are only closed during breakup and moose season. One new woodcut area was opening on Funny River Road and the area north of Finger Lakes Road was closed to cutting in 1983.

The local demand for firewood has mushroomed and has made this "seat of the pants" timber harvest program a more time consuming and questionable effort. If forest management is to occur at a higher level in the future, personnel and money should be dedicated for the effort.

9. Fire Management

This was the year we were to find out how well our new suppression agency (Alaska Division of Forestry) worked. In 1982, the Bureau of Land Management had signed a cooperative agreement with the Alaska Department of Natural Resources, Division of Forestry, to allow the State to do the wildfire suppression on all Department of Interior lands (refuges, parks, and BLM) in the southern half of Alaska. BLM took the north half of the State.

Cooperation from the Division of Forestry was outstanding and the fire season went without a hitch. A total of 12 fires were suppressed on the refuge, burning a total of 1.252 acres. All fires were though to be man-caused.

This was also the year of fire planning on the Kenai Peninsula. The Alaska National Interest Lands Conservation Act (ANILCA) of 1980 created the Alaska Land Use Council (ALUC). The ALUC recognized the need to provide direction on deciding where, when, and how wildfires would be suppressed on all lands in Alaska. The ALUC created the Alaska Interagency Fire Management Council (AIFMC) and left them with the following charge:

> Identify and seek solutions to specific and common fire management problems on an interagency basis, and to develop and initiate an interagency approach to the total fire management program and organization in Alaska. The primary objective is to provide guidance in revising fire protection standards to effect cost savings by developing a long-range fire management program.

With this goal in mind, the planning began!!!

Alaska was divided into several different planning areas, the Kenai Peninsula being one of them. The Kenai Interagency Fire Management Planning Team was formed in March 1983, and consisted of representatives from the Bureau of Land Management, U.S. Fish and Wildlife Service, National Park Service, U.S. Forest Service, Alaska Department of Fish & Game, Alaska Department of Natural Resources, Bureau of IIndian Affairs, and the Kenai Peninsula Borough. Mike Hedrick was appointed Team Leader for the effort.

By December 1983, a draft plan was ready for public review and would be finalized in April 1984, and implemented in the 1984 fire season. The plan basically assigns one of four different suppression options to an area of land: 1) Critical - assigned where human life and property are at stake; 2) Full - all private land and Federal, State, or Borough land that is adjacent to private land or has other values warranting aggressive fire suppression; 3) Modified - areas where fire is suppressed only during the critical fire season. Indirect attack will often be used and the smallest possible acreage burned is not a suppression goal; 4) Limited - areas where wildfire is only monitored and not suppressed.

The refuge portion of this draft plan has approximately 1% of the refuge in critical, 17% in full, 39% in modified, and 43% in the limited suppression category.

12. Wilderness and Special Areas

Refuge wilderness intern and volunteer Pat Reed finalized a draft of the Kenai Wilderness Administration Guide in November 1982. The lengthy document has been under review throughout the year and a contract awarded to Colorado State University and Mr. Reed to finalize the guide. Though still in draft form, the guide has provided useful information concerning day to day questions of wilderness management.

The draft Management Guide is a comprehensive refuge-level interpretation, synthesis, and description of Congressional legislation, Department of the Interior regulation, and FWS policy applicable to units of the National Wilderness Preservation System administered by the FWS in Alaska. As such, the draft document may serve as a working set of management directions for the Kenai NWR in its administration of the Kenai Wilderness.

The aim of an integrated management guide is to further the purposes for which the Kenai Wilderness was established by "interpreting" the legislation, regulations, and policies affecting the Kenai Wilderness in order to facilitate the (1) appropriate, (2) consistent, and (3) expeditious implementations of such directions. The draft Management Guide does not conflict with FWS wilderness policy, but rather expands and clarifies wilderness management direction and employs widely accepted current wilderness management principles and concepts not previously used.

Besides addressing a greater number of issues in wilderness administration than current FWS guidelines, the Management Guide provides 1) more detail in the issues and 2) a legislative and legal background for an issue position. Consequently, it is hoped that it will serve as a complete source of wilderness administration guidance in the sense that it provides not only the "bottom line" on what specific practices are acceptable but also why they are acceptable or not.

The research and guidance adopted and described in the draft Kenai Wilderness Administrative Guide were developed and intended solely for the administration of the Kenai Wilderness. Although the majority of both the general and specific policies in the draft are applicable to the other FWS administrated wildernesses in Alaska, certain specific policies may be unique to the Kenai NWR and the Kenai Wilderness.

General topics such as wilderness character, natural diversity of wildlife populations, allowable management practices within wilderness, and research are throughly addressed. General concepts such as "wilderness character" are clarified by describing identifiable characteristics of the wilderness resource to be managed.

It addresses specific physical, biological, and social management concerns for such topics as air quality, watershed management, wildland fire regions, pest and disease control, visual resources, and backcountry visitor management.

Access provisions such as airplane, snowmobile, motorboats, and management use of helicopters are analyzed in detail and their interrelationship and effect on overall wilderness character is thoroughly explored.

At the termination of Mr. Reed's internship in November 1982, a first draft of the Wilderness Administrative Guide was complete; however, considerable review, analysis, and redrafting remained to be completed. Portions of the document that were coordinated with the congressionally mandated Kenai NWR Comprehensive Conservation Plan (CCP) needed review to reflect changes in format of the more recent drafts of the Kenai CCP. The final product should reflect additional academic and FWS input and be corrected subsequent to critical review.

The draft Kenai Wilderness Administrative Guide is an important first step for the Fish and Wildlife Service in Alaska, and it is hoped it can be used as an aid to the management of other wilderness units in the State. Further research and expansion of the document will no doubt be necessary to address situations such as subsistence not found on the Kenai.

In August, a one year contract was awarded by the U. S. Fish and Wildlife Service to Patrick Reed and Doctor Glen Haas, of Colorado State University in August 1983, to further develop the draft Kenai Wilderness Administration Guide. A portion of the contract directed further research and expansion into concerns of other Alaskan refuges such as subsistence, grazing, and mining access.

Finalizing this wilderness Administration Guide will provide needed direction for Kenai NWR and possibly represents a bench mark in wilderness management in Alaska.

For many of the same reasons that Kenai initiated work on the Kenai Wilderness Administration Guide in 1982, a regional task force on wilderness management was formed in fall of 1982. Rick Johnston of the Kenai staff and other refuge employees will be formulating direction for a regional wilderness management policy. It is particularly fortuitous that this regional task force has formed while the Kenai Wilderness Guide is being formulated as parallel efforts should enhance the final product(s).

Due primarily to a full time seasonal backcountry technician an updated status inventory of backcountry trails was accomplished in 1983 as well as trail signing, trail clearing, and maintenance. Data on backcountry areas was also gathered during visits to off-trail areas within Kenai Wilderness.

G. WILDLIFE

1. Wildlife Diversity

A few scattered reports, mainly from trappers, suggest there may be a few marten on the eastern boundary of the refuge between Skilak River and Russian River. The marten is probably the rarest mammal on the refuge and action should be taken by the Service to insure its survival on the refuge. To protect marten the refuge should prohibit the trapping of marten on the refuge, establish sanctuaries (no trapping) areas where marten are still likely to occur in small isolated populations, and reintroduce marten in other areas of the refuge where marten habitat is available.

Two red fox were seen in the Caribou Hills region of the refuge by ADF&G biologist Dave Holdermann. This is the only area on the refuge where red fox are periodically seen every 2-5 years. Similar actions should be taken to protect the few remaining red fox on the refuge.

Little is also known about the status of the wolverine on the refuge. One opportunity to learn how large an area wolverines require on the refuge was short-lived when a wolverine, radiocollared when captured in a lynx set, was killed by another trapper 5 days later. Wolverine appear restricted to areas on the refuge where human access is difficult and a study in Montana suggests they are highly vulnerable to trapping.

2. Endangered and/or Threatened Species

Several field trips into peregrine falcon nesting areas, by volunteers Drs. Carroll and Gwen Perkins, Mississippi State University, revealed uses of the Tustumena Glacier area by a falcon during the nesting period between June 14-22 but the location of the nest site and subspecific identification of the falcon was not practical. No sign of falcons was recorded during a similar field trip between June 28-July 6 at the Skilak River area. An intensive aerial survey of potential nesting cliffs in the upper Killey River area on June 7, failed to reveal any indication of nesting peregrine falcons.

3. Waterfowl

Twenty-six pairs of trumpeter swans successfully produced broods from at least 34 nests during 1983 (Table 7). Eighty cygnets in 24 broods averaged 3.3 cygnets/brood during the early brood survey in July. The late brood survey in September revealed 72 cygnets in 20 broods for an average of 3.6 cygnets/brood. Compared to 1982, there were more confirmed nests, cygnets produced, and successful nests in 1983. Overall average brood size for 1983 was also slightly higher (3.6) than in 1982 (3.3).

Table 7. Locations of trumpeter swan nests and numbers of cygnets observed on the Kenai Peninsula, 1983.

Nest Location	Cygnets	Nest Location	Cygnets
Donkey Lake	5	Moose Lake Outlet	4
Elephant Lake	4	N Scenic Lk Outlet	0
Beaver Lake	0	Scenic Lk Outlet	0
Finger Lakes SE	3	Camp Island Lake	4
W. Tony's Lake	3	Bear Lake	0
Bishop Creek	4	Moose River	5
Grey Cliff	3	NE Bedlam Lake	0
W. Daniel's Lake	3	Grebe Lake	2
Hook Lake	4	Swan Creek	4
SW Lark Lake	1	Brown's Lake	4
Diamond Lake	2	Bay Lakes	3
Dipper Lake	1	Pollard's Lake	4
Phalarope Lake	5	Fox River Slough	0
Kuguyuk Lake	4	Windy Lake	4
NW Two Island Lake	0	Killey River Slough	3
Lonesome Lake	5	Fox Lake	6
NW Lonesome Lake	0	Beaver Pnd S of Tustumena	3

Fifteen cygnets were fitted with radio transmitters from 8 different broods during 1983 and three additional cygnets were neck and leg banded (Table 8). Extensive movements of several broods were documented prior to migration. Some cygnets were apparently not mature enough to migrate and died as lakes and streams froze over; one was shot by a hunter at Portage Glacier, one located in Cordova, two north of Yakutat, and one in Washington State.

Refuge Manager Bob Delaney and Biologist Ed Bangs banding trumpeter swan on Phalarope Lake.
(Staff Photo)

Refuge Manager Bob Delaney releases a banded trumpeter swan cygnet on Donkey Lake.
(Staff Photo)

Table 8. Trumpeter swan cygnets banded on the Kenai National Wildlife Refuge, Alaska, August - September, 1983.

Banding Location on KNWR	Date	Sex	Neck & Tarsus Band #	USFWS Band # (619)	Radio Frequency (164)
Beaver Lake	8/16/83	M	35UR	-01185	.4905
Donkey Lake	8/17/83	F	36UR	-01186	--
Donkey Lake	8/17/83	F	37UR	-01187	.701
Donkey Lake	8/17/83	M	38UR	-01188	.595
Phalarope Lake	8/18/83	M	39UR	-01189	.650
Hook Lake	8/18/83	F	40UR	-01190	.613
Fox Lake	8/19/83	M	41UR	-01191	.5805
Fox Lake	8/19/83	F	42UR	-01192	.440
Kugiak Lake	8/24/83	F	43UR	-01193	--
Kugiak Lake	8/24/83	M	44UR	-01194	--
Windy Lake	8/26/83	F	45UR	-01195	.601
Windy Lake	9/15/83	F	46UR	-01196	.595
Grebe Lake	9/15/83	F	47UR	-01197	.632
Grebe Lake	9/15/83	M	48UR	-01198	.681
Beaver Lake	8/16/93	F	97VA	-21697	.450
Moose Lake	8/17/83	M	98VA	-21698	.471
Phalarope Lake	8/18/83	M	99VA	-21699	.466
Hook Lake	8/18/83	F	00VA	-21700	.517

The snow geese arrived on the Kenai River Flats a week earlier in 1983 (10 April) than 1982 (17 April). Peak numbers (3,000+) were seen on 22 April, and numbers of snow and Canada geese decreased through early May. Sandhill cranes did not arrive until 25 April and were still present in early May. The value of this area to migrating waterfowl cannot be overemphasized (Table 9). The construction of a proposed small boat harbor in the Kenai River would probably seriously impact waterfowl using this area, especially the wetlands northwest of the Kenai River bridge.

Table 9. Waterfowl observed on Kenai River Flats during the spring (4 April - 6 May) of 1983.

	Estimated numbers					
Date	Snow Geese	Canada Geese	White-fronted Geese	Mallards	Pintails	Sandhill Cranes
4/18/83	1204	283	20	30	106	---
4/22/83	3150	124	--	50	150	---
4/25/83	300	50	--	--	100	47
4/27/83	92	22	--	--	---	122
4/29/83	----	4	--	--	---	105
5/04/83	25	100	--	--	800	---
5/06/83	41	46	--	--	240	84

5. Shorebirds, Gulls, Terns, and Allied Species

Cormorants were present on the nesting colony in Skilak Lake as early as 2 May, when 11 were observed. Marine bird biologists John Trapp and Dave Nysewander, from Anchorage, surveyed and photographed the gull colonies in June and banded 295 gull chicks on 20-21 July. Banded gulls were observed feeding on dead salmon at the Russian River confluence in August, one was seen 3-4 weeks after banding, feeding at an Anchorage dump, and another was found in College Fjord on Prince William Sound. The improved sightings occurred because the gulls were banded with large colored (blue and yellow) bands on the right leg in addition to the standard metal USFWS bands on the left leg.

6. Raptors

Forty-one nests of bald eagles were located in 1983 with 33 active (80%) (Table 10). This compares to 33 nests located in 1982, 82% of which were active. The increase in total numbers of nests observed (24%) and active nests (22%) in 1983, was due to increased efficiency in locating new, but previously existing, nests rather than an increase in number of eagles nesting on the Peninsula.

A productivity survey on 18-19 July 1983, revealed 31 eaglets in 20 nests (1.6 eaglets/successful nest or 1.0 eaglet/active nest), but the survey may have been too late to account for all birds before they fledged. Nests, discovered in new locations, include Coyote Lake, Skilak Glacier, Harvey Lake/Killey River, Nikolai Creek, Clearwater Slough, and Bear Creek.

Surveys of overwintering bald eagles were initiated by boat and aircraft late in 1983, along the Kenai River. The preliminary data suggest eagle use of the river increases from October through December, more eagles use the Upper Kenai River as winter progresses, and the ratio of juveniles to adults varies along different sections of the river. It

appears that during the 1983-84 winter, a minimum of 200-300 bald eagles used the Kenai River as a wintering area. A proposal to attach radio transmitters to bald eagles along the river was submitted during 1983. Objectives were to document movements along the river, locate any roosts used by wintering bald eagles, and determine the origin of a sample of eagles using the river.

Two juvenile bald eagles feeding on spawned-out silver salmon along the Kenai River. Over 200 bald eagles used tne Kenai River during the 1983-84 winter. (Staff Photo)

Refuge biological volunteers Richard McAvinchey and Ellen Kord floating down the Kenai River during a winter bald eagle survey. (Staff Photo)

Table 10. Bald eagle nesting locations and productivity on the Kenai Peninsula, 1983.

Area	Inactive Nests	Active Nests	Eaglets
Afonasi Lake		x	2
Bear Creek		x	2 (new nest)
Beaver Lake		x	
Big Indian Creek	x		0 (1 Adult)
Birch Hill Coastal		x	1 (? imm flying)
Bishop Creek Outlet		x	0
Bradley River Outlet		x	2
Camp Island	x		0
Campfire Lake	x		0
Camper's Lake		x	0
Daniel's Lake	x		
Upper Fox River		x	0
Gavia Lake		x	1
Otter Creek		x	2
Gene Lake		x	0 (1 Adult)
Kenai R. (FR Powerline)		x	2
Kenai R. (College Island)		x	
Kenai R. (Near R.R.)		x	3
Killey River (Lower)		x	2
Killey River (Upper)		x	1
Loon/Clam Lakes		x	0
Mink Lake		x	0
Moose Lake		x	0
Moosehorn Lake	x		0
Moose River (Lowest)	x		
Moose River (Main Fork)	b		x 2
Moose River (Main Fork) spruce tree	a	x	0
Moose River (West Fork)		x	2
Pincher Creek Outlet		x	1 (? imm flying)
Russian River		x	1
Sheep Creek		x	1
Skilak Inlet		x	0
Sucker Lake		x	2
Suneva Lake		x	
Swan Lake		x	1
Torpedo Lake		x	1
Clearwater Slough		x	0
Coyote Lake		x	1
Skilak Glacier		x	0
Harvey Lake/Killey River		x	1
Nikolai Creek		x	0

Surveys flown: 9 May 83, 12 May 83
18 July 83, 19 July 83

Biological Technician Mary Portner exercises an injured goshawk that was shot on the refuge along the Skilak Loop Road. Raptors, injured in traps and by hunters, are turned into the refuge for rehabilitation. (Staff Photo)

7. Other Migratory Birds

A study grid was established at the site of the proposed Funny River Oil Well to document passerine birds using the area (Table 11). Located in a reburn spruce and mixed mature forest, this plot indicated the following passerines were most common in order of declining abundance: dark-eyed junco, yellow-rumped warbler, and gray jay. The plot will be surveyed during the same time period in 1984. An oil rig and pad is now situated in the middle of the grid.

Table 11. International Breeding Bird Census - Funny River Oilpad proposed site, June 20 - July 8, 1983.

Species	Total # Contacts
Dark eyed junco	187
Yellow rumped warbler	153
Gray jay	102
Swainson's thrush	45
Tree swallow	42
Boreal chickadee	39
Common redpoll	37
Ruby crowned kinglet	33
Spruce grouse	20
Black capped chickadee	10
Black poll warbler	4
Unid. woodpecker	4
White crowned sparrow	2
Red-tailed hawk (Harlan's)	2
Unidentified	1
Total # bird contacts	681
Total # Species	14

A breeding bird survey was conducted by Ted Bailey, Mary Portner, and John Malloy on 17 June 1983, on the same route (Swanson River and Swan Lake Roads) as 1982. Results of the survey, as shown in Table 12, indicate the most common birds on the refuge along that route are Swainson's thrush (91), alder flycatchers (64), yellow-rumped warbler (62), dark-eyed juncos (37), and white-crowned sparrows (33).

Table 12. Birds recorded during the breeding bird survey on 17 June 1983. This is a 25-mile route on the refuge's Swanson River and Swan Lake Roads.

Common Loon	6	Gray-cheeked thrush	2
Red-tailed hawk	2	Swainson's thrush	91
Sandhill crane	3	American Robin	8
Greater yellowlegs	6	Varied thrush	2
Common snipe	5	Unidentified thrush	4
Arctic tern	1	Orange-crowned warbler	16
Great horned owl	1	Yellow warbler	9
Unidentified woodpecker	8	Yellow-rumped warbler	62
Olive-sided flycatcher	9	Blackpoll warbler	10
Western wood pewee	1	Northern waterthrush	16
Alder flycatcher	64	Savannah sparrow	12
Unidentified flycatcher	1	Song sparrow	8
Tree sparrow	1	White-crowned sparrow	33
Gray jay	9	Dark-eyed junco	37
Black-capped chickadee	2	Common redpoll	11
Ruby-crowned kinglet	15	Unidentified birds	1
		TOTAL	456

8. Game Mammals

a. Moose -

Moose composition counts were conducted by the refuge in the 1969 Burn and in the Skilak Loop areas (Table 13). The ADF&G counted moose in the 15B east trophy area and south of the Caribou Hills. Generally, data reflect the low number of bulls north of the Kenai River and the record harvest in 1983. The weather was excellent throughout most of the season and hunter effort was high. Composition data also indicate that calf production and survival was relatively high due to improved range conditions in some areas and mild winter weather. The continued increase in hunting effort has severely skewed the sex ratio and older bulls are rare over much of the northern refuge. A limited antlerless moose hunt, proposed by the staff, was held in the 1969 Burn. Thirty tags were issued and twenty eight cows taken. A winter density count was not conducted in 1983.

Table 13. Fall Moose Composition Counts, 1983.

Area	Date	Sample Size	Count Time	Calves/ 100 Cows	Twins/100 Producing cows	Bulls/ 100 cows
15C Caribou Hills	11/11&12	374	6.5	23	15	29
15A 1969 Burn	11/17&18	595	8.3	47	12.4	14
15A Skilak Lp	12/19	54	1.3	27	0.0	5
15B East Tustumena Lk.	11/16	178	2.8	12	10.0	64

b. Caribou - The number of caribou in the lowland herd is similar to past years (Table 14). Calf production seems good as usual and survival seemed to be up in 1983. Only 1 calf survived the summer of 1981. The number of bulls in the herd appears to be slowly recovering from the limited hunt in 1981 which took 4 bulls. The hunt has always been opposed by the refuge and supported by the ADF&G. Last season the game board voted not to have the hunt due to direct conflicts with viewing opportunities. A hunt to shoot 3 bulls is proposed for 1984.

The upland caribou herd continues to show good growth and recruitment. The herd provides an excellent hunting opportunity although a difficult one that usually involves a 10-15 mile hike. A proposal to increase the number of hunting permits in the upland herd to 200 from 150 was supported by the refuge. The ADF&G management goal is to keep the herd below 300 animals until range work can determine the carry-capacity of this herd's alpine winter habitat.

Table 14. Caribou survey data collected by ADF&G, 1983.

Area	Date	Bulls/ 100 Cows	Calves/ 100 Cows	Sample Size
Upland Herd	11/03/83	39	40	276
Lowland Herd	06/ /83	39	47	71

c. Dall's Sheep and Mountain Goat - Dall's sheep and mountain goat survey were conducted in July 1983 by the ADF&G (Tables 15 and 16). These data indicate the continued recovery of these ungulates. Restricted goat hunting and more favorable winter weather has resulted in an increasing goat population. Goats are now harvested in an early lottery permit hunt and a late registration hunt. The number of permits issued is 5% of the goats counted in each of several hunt areas.

Table 15. Dall's sheep counts conducted by ADF&G, 1983.

Area	Legal	Rams sublegal	Un	Ewes	Lambs	Un	Total
853	Not Counted						
855	5	3	0	28	17	0	53
856	20	49	0	233	79	0	381
857	2	14	0	32	15	0	63
Total	27	66	0	293	111	0	497

Table 16. Mountain goat counts by ADF&G, 1983.

Count Area	Adult	Kid	Observer	Count Time	Date
855	21	7	Spraker	1.5	7/19/83
856	12	4	Spraker	3.8	7/18/83
854	81	35	Holdermann	2.7	7/20/83
860	67	19	Holdermann	2.5	7/22/83

Dall's sheep population continued to increase particularly in the Green Lake area (856). But while 27 legal rams were counted on the refuge, the Peninsula-wide harvest (most of which are taken on the refuge) was 25.

Although a legal ram is now 7/8 curl instead of 3/4 curl, most rams still do not appear to survive past their first season as legal game.

d. Brown Bear - Brown bear populations on the refuge remained unsurveyed in 1983. A management study plan was developed in the spring of 1983 for field work in 1984. However, delays in the internal review process and ADF&G opposition to work by the refuge on resident game resulted in no field work being conducted in 1983. Brown bear management problems on the Kenai Peninsula are similar to those in the Yellowstone ecosystem since both have about 300 brown bears, approximately 5,000 sq. miles of potential bear habitat, an island-like situation, and increasing human activity such as mining, timber harvest, grazing, oil and gas development, and increasing backcountry recreational use. Currently an interagency team, representing the USFWS, USFS, and ADF&G, is developing a comprehensive strategy to build a base data regarding brown bear on the Kenai Peninsula. Hopefully, this team will recommend implementing a field study of basic brown bear movements and distribution to start in 1984.

e. Black bear - ADF&G research biologist, Dr. Chuck Schwartz, continues his research on black bears. Estimates of bear density are nearly 1 bear per square mile and among the highest reported in North

America. Recent food habits work also indicates that Kenai bears appear more carnivorous than black bear elsewhere as they commonly consume moose, hares, birds, and eggs. Devil's club and cranberry berries appear to be the most important food items. Bear baiting occurred on the refuge in 1983 under an ADF&G permit. While Kenai black bears can certainly withstand additional harvest, baiting did result in some unremoved platforms and is of concern to the staff.

f. Wolf - In the winter of 1982-83, 26 wolves from 6 packs (4 that had lice) were treated with Ivermectin, in a joint FWS and ADF&G project. Twenty one of these wolves were radio collared to facilitate future monitoring. During the treatment of dog biting lice (Tricodectes canis) valuable information was gathered regarding the effect of the louse on wolf condition and the impacts of harvest on the wolf population. So far, the high harvest in GMU15A (the refuge north of the Kenai River) does not seem to have greatly altered general pack location, but has resulted in a lot of overlap among packs (pack boundaries less distinct). The harvest has been high enough to reduce overwinter wolf density about 70% and slowly reduced refuge-wide wolf numbers even while the moose population expands.

In addition to treatment of lice, some strange observations occurred while monitoring wolves. On one flight, wolves were thought to be associated (traveling) with 1-2 domestic dogs near the Soldotna City Dump. Another observation was that black wolves appeared to be increasingly rare compared to gray wolves. A wildlife monograph on Kenai wolves, by Rolf Peterson, Jim Woolington, and Ted Bailey, was accepted for publication and should be available this summer. One wolf pup, darted 3 times in 2 months died, probably due to breakup of the pack and being literally "studied to death." The "rush them" method of biological study used to treat the wolf lice problem resulted in redarting 7 wolves, and a considerable duplication of effort. Hopefully the situation will not repeat itself in 1984.

g. Beaver - An aerial survey of beaver lodges was conducted in October 1983 (Table 17). The two canoe routes and a large portion of the 1969 Burn were surveyed. Data indicate more inactive than active lodges and a scarcity of beaver within 2 miles of roads or heavily used trails and on lakes large enough to land aircraft. The refuge beaver population, which was nearly wiped out by the 1964 earthquake, seems to be limited compared to pre-1964 levels and to the amount of available habitat. Many lodges are only active for a year or two. Over-trapping is partially suspect since a 1978 survey in the Swan Lake canoe route indicated 92% of the lodges were being trapped. Beaver are second only to moose in being the species of wildlife most inquired about for viewing and photography. The absence of beaver along the only nationally designated recreational trails in Alaska is probably due to trapping and raises valid questions regarding equitible apportionment of refuge resources to a spectrum of user groups.

Table 17. Beaver Lodge Survey, 1983.

Area	Date	Observers	Time	Active Lodges	Inactive Lodges
Swan Lk Canoe Route	10/6	Bailey/Portner/Richey	1.5 hrs.	12	14
South Region 1969 Burn	10/6	Bailey/Portner/Richey	0.7 hrs	5	5
North Region 1969 Burn	10/28	Bangs/Richey	1.0 hrs	1	3
Swanson R. Canoe Route	10/12	Bailey/Richey	2.2 hrs	25	32
			TOTALS	43	54

h. Furbearers - Most refuge furbearer populations continue to be monitored by mandatory furbearer harvest reports returned by trappers on the refuge. Requests for copies of the 1982-83 and 1983-84 mandatory State furbearer harvest sealing forms continue to be ignored by the local ADF&G biologist, so this information is not available. These data Table 18 and Table 19 indicate higher numbers of trappers and higher catches of some furbearers. The coyote harvest was the highest recorded and reflects on the abundant snowshoe hare population. Lynx harvest was also up partially due to higher hare populations, but primarily due to a few individuals searching out the few remaining remote, previously lightly trapped areas of lynx habitat. Lynx are absent from large areas of the refuge where suitable habitat exists. Despite the occurrence of lice on wolves (nearly worthless pelts), the second highest harvest occurred in the 1982-83 season. A typical refuge wolf "pack" usually consists of a couple of adults and their pups, and liberal regulations continue to control populations. The only furbearers for which relatively detailed information is available, lynx, wolf, beaver, indicates depressed populations and limited distribution. Everything seems okay for coyotes and furbearers for which no data exists. Ignorance is bliss. The total worth of the refuge furbearer harvest for 1982-83 season was estimated at $28,500. Trapping is almost strictly a hobby in this area which means trapping continues almost independent of fur pieces and furbearer numbers. It seems strange that refuge furbearers such as wolves (80 individuals) undergo a 7 month hunting season, 5 month trapping season using aircraft, snowmobile, traps, and snares, while the moose population (6,000+) is harvested in a 20-day bull-only fall hunt, where aircraft use and access are limited.

The trapping season for marten runs 3 months as does fox season, even though only 4 marten and as few fox have been captured on the refuge the past twenty years and no information exists on population size for the Kenai Peninsula since neither fur is required to be sealed or reported.

During the 1982-83 trapping season 17 wolf, 21 lynx, 4 coyote, and 3 marten carcasses were purchased and examined by refuge staff. General condition, parasite loads, reproductive status, age, and food habits information was collected. The carcass program is voluntary and compliance has been good so far. This information has indicated the presence of hydatid cysts in wolves and dog biting lice do not generally effect wolf condition.

Table 18. Total reported land furbearer harvest and average per permit holder on the Kenai National Wildlife Refuge (Moose Range), 1960-1983.

		Land furberaer reported harvest									
		Lynx		Coyote		Wolverine		Weasel		Wolf	
Season	Total permits	Total	Mean per permit holder	Total	Mean per permit holder	Total	Mean per permit holder	Total	Mean per permit holder	Total	Mean per permit holder
1960-61	16	13	0.6	15	0.9	1	0.1	1	0.1	--	---
1061-62	24	23	1.6	30	1.2	4	0.2	13	0.5	--	---
1962-63	28	28	1.0	27	1.0	2	0.1	0	0	--	---
1963-64	33	28	0.8	39	1.2	1	0.1	6	0.2	--	---
1964-65	17	24	1.4	11	0.6	6	0.3	10	0.6	--	---
1965-66	16	17	1.1	16	1.0	4	0.2	2	0.1	--	---
1966-67	25	7	0.3	5	0.2	4	0.2	35	1.4	--	---
1967-68	---	---	---	--	---	--	---	---	---	--	---
1968-69	22	18	0.8	44	2.0	1	0.1	81	3.7	--	---
1969-70	53	62	1.2	23	0.4	3	0.1	35	0.7	--	---
1970-71	59	67	1.1	30	0.5	10	0.2	79	1.3	--	---
1971-72	61	181	3.0	13	0.2	14	0.2	35	0.6	--	---
1972-73	65	146	2.2	51	0.8	8	0.1	4	0.1	1	0.1
1973-74	81	245	3.0	58	0.7	7	0.1	149	1.8	0	0
1974-75	52	162	3.1	24	0.5	10	0.2	68	1.3	0	0
1975-76	70	113	1.6	32	0.5	6	0.1	16	0.2	1	0.1
1976-77	86	53	0.6	25	0.3	6	0.1	10	0.1	2	0.1
1977-78	86	43	0.5	34	0.4	4	0.1	14	0.2	8	0.1
1978-79	96	36	0.4	44	0.5	3	0.1	7	0.1	32	0.3
1979-80	104	12	0.1	64	0.6	3	0.1	58	0.6	19	0.2
1980-81	102	2	0.1	38	0.4	0	0	14	0.14	16	0.16
1981-82	104	17	0.2	66	0.6	4	0.1	70	0.7	44	0.4
1982-83	122	47	0.4	80	0.6	2	0.1	43	0.3	39	0.3

Table 19. Total reported aquatic furbearer harvest and average per permit holder on the Kenai National Wildlife Refuge (Moose Range), 1960-1983.

		Aquatic furbearer reprorted harvest							
		Beaver		Otter		Muskrat		Mink	
Season	Total permits	Total	Mean per permit holder	Total	Mean per permit holder	Total	Mean per permit holder	Total	Mean per permit holder
1960-61	16	145	9.1	16	1.0	2	0.1	42	2.6
1961-62	24	79	3.3	19	0.8	0	0	69	2.9
1962-63	28	109	3.9	19	0.7	2	0.1	66	2.4
1963-64	33	150	4.5	26	0.8	0	0	83	2.5
1964-65	17	6	0.3	3	0.2	0	0	15	0.9
1965-66	16	17	1.1	4	0.2	0	0	13	0.8
1966-67	25	22	0.9	9	0.4	0	0	45	1.8
1967-68	---	---	---	--	---	---	---	---	---
1968-69	22	14	0.6	10	0.4	207	9.4	64	2.9
1969-70	53	33	0.6	32	0.6	75	1.4	82	1.5
1970-71	59	25	0.4	9	0.1	29	0.5	60	1.0
1971-72	61	23	0.4	8	0.1	18	0.3	9	0.1
1972-73	65	76	1.2	24	0.4	111	1.7	48	0.7
1973-74	81	40	0.5	26	0.3	334	4.1	160	2.0
1974-75	52	6	0.1	8	0.1	21	0.4	33	0.6
1975-76	70	34	0.5	13	0.2	82	1.2	25	0.4
1976-77	86	24	0.3	7	0.1	8	0.1	39	0.4
1977-78	86	19	0.2	9	0.1	140	1.6	33	0.4
1978-79	96	22	0.2	6	0.1	73	0.8	25	0.3
1979-80	104	83	0.8	17	0.1	127	1.1	57	0.5
1980-81	102	82	0.8	30	0.3	191	1.9	111	1.1
1981-82	104	61	0.6	26	0.2	183	1.8	119	1.1
1982-83	122	93	0.8	18	0.1	227	1.8	202	1.6

10. Other Resident Wildlife

Small mammal trapping was conducted near Willow Lake and a proposed drilling site off of Funny River Road in September 1983 (Tables 20 and 21). Catch rates were the lowest recorded since 1974 when T. Fuller reported a catch rate of 0.002 red-backed bole captures and 0.004 masked shrew captures per 100 trap nights in lowland boreal forest types. It is interesting that the snowshoe hare population crashed during the winter of 1973-74 and Fuller commented that local residents reported voles more common in the summer of 1973. The hare population on the refuge is again near the crash phase and vole populations again appear to be relatively low to past years. Any cause-effect relationships such as competition, increased predation, and disease of parasites can only be speculated at this point.

Table 20. The results of small mammal trapping conducted on the Kenai NWR, 1983.

Study Area	Date	Red-back Voles/ 100 Trap Nights	Masked Shrews/ 100 Trap Nights	Catch/100 Trap Nights
Willow Lake/ Mature Crushed	9/19-23	5.2	6.9	12.2
Willow Lake/ Mature/Uncrushed	9/19-23	2.2	6.4	8.6
Willow Lake/ Black Spruce/ Uncrushed	9/26-30	0.8	4.4	5.3
Willow Lake/ Black Spruce/ Crushed	9/26-30	0.8	0.6	1.4
Willow Lake/ Black Spruce/ Uncrushed	9/26-30	0.6	2.8	3.3
Funny River/ Mature Forest	9/20-24	0.6	0.3	5.3
Totals		1.7	3.6	5.3

Total trap nights/area - 360
Total trap night effort - 2,160
No other species captured in 1983.

Table 21. Average September-October small mammal trapping success on the Kenai NWR, 1977-1983.

Year	Effort (Trap Nights)	Red-back voles/ 100 Trap Nights	Masked shrews/ 100 Trap Nights	Other/ 100 TN	Total/ 100 TN
1977	2880	4.9	5.6	1.2	11.7
1978	4320	12.6	1.8	0.4	14.8
1979	1440	10.8	4.0	1.9	16.8
1980	1080	7.2	1.3	0.6	9.2
1981	1800	12.3	3.9	0.3	16.5
1982	540	4.2	4.1	0.4	8.7
1983	2160	1.7	3.6	0.0	5.3

11. Fisheries Resources

The bulk of the Kenai Fishery Resources Station's work in 1983 was associated with the Kenai National Wildlife Refuge. This year's work on the refuge concentrated on the Kenai Refuge Remote and Roadside Lake Study, the Tustumena Lake Sockeye Salmon Study, and the Kenai National Wildlife Refuge Comprehensive Conservation Plan. Comprehensive planning is discussed in other sections of this report.

Remote and Roadside Lake Study Kenai National Wildlife Refuge (NWR)

The objective of this study is to evaluate the recreational fishery potential of refuge lakes through inventory and survey of fish, water quality, physical, and wildlife values.

A total of 18 lakes were surveyed between June 1 and October 5, 1983, employing a three-phased investigational approach. Fish sampling comprised the first phase with gill nets and minnow traps used to measure fish relative abundance; seining and electrofishing were used for collecting additional fish data. The second limnological phase compared lake water quality parameters affecting fish health such as dissolved oxygen, water temperature, pH, alkalinity, hardness, conductivity, and phosphorus. The third phase consisted of documenting aquatic vegetation components and wildlife use.

Sport fish captured consisted mostly of rainbow trout with a lessor number of Dolly Varden, Arctic char, coho, and sockeye salmon. Forage species included longnose sucker, threespine stickleback, and slimy sculpin. Interpretation of fish abundance data indicated lakes ranged from excellent sport fisheries to a total lack of sport fish. Lake water productivity was low to extremely low which is typical of subarctic areas. Several lakes were found to have active beaver colonies and trumpeter swan populations. Study results will provide the refuge with information to aid in management of fish and wildlife resources.

Jim Friedersdorff and Wally Jakubas of the Kenai Fishery Resources Station lead the field work. Additional assistance was provided by Ken Chalk and Jack Dean, Regional Office Fishery Resources; Mike Johnston, Special Studies,; and Ted Bailey and Bob Delaney, Kenai NWR staff.

Fishery Biologist Jim Friedersdorff enumerating sticklebacks captured in a minnow trap during one of the lowland lake surveys conducted by the Fisheries Assistance Branch on the Kenai NWR.
(Staff Photo)

Tustumena Lake Sockeye Salmon Study

The objective of this study is to determine which sockeye salmon fry stocking levels in Tustumena Lake provide maximum survival without detrimental impact to natural fish stocks. Nine component study elements are being conducted to accomplish the objective. The U.S. Fish and Wildlife Service is primarily responsible for accomplishing hydroacoustic surveys which determine juvenile sockeye population levels and fish distribution in the lake, plus funding research to chemically mark stocked sockeye fry. The Alaska Department of Fish and Game (ADF&G)) raises and stocks the hatchery sockeye fry, plus conducting ground truth sockeye trawling, stock separation, in migration adult sonar counts, out migration sockeye smolt enumeration, spawning ground surveys, and lake limnology work.

In 1983, a record level 210,000 adult sockeye returned to the Kasilof River-Tustumena Lake system while 17 million sockeye fry were stocked in the lake. Three hydroacoustic surveys were performed in July, August, and September. The September hydroacoustic estimate indicated a sockeye population of 24.7 million juveniles, plus an additional 0.8 million other species. This is the largest population of sockeye recorded in

the three-year study and is believed to result from the record adult spawning escapement and large stocking allotment. Sockeye were fairly evenly distirbuted both horizontally and vertically in September with slightly higher densities in the eastern end of the lake. Larry Van Ray, Kenai Fishery Resources Station; Richard Thorne and Gary Thomas, Fishery Research Institute, University of Washington contractors; and ADF&G Biologists cooperatively worked to complete the hydroacoustic work.

During three years of laboratory and hatchery experimentation, a method of biologically marking 100% of the stocked sockeye fry with the antibiotic exytetracycline injested through feed has been perfected. However, the time required to form a permanent flourescent mark in the fish bony structure was longer than practical for current hatchery management practices. Therefore, the technique will not be used. Finclipping fry for population extimates of hatchery fish survival will be used in lieu of the chemical procedure. Phil McKay, Kenai Fishery Resources, worked with ADF&G personnel in the State limnology laboratory to evaluate the oxytetracycline procedure.

14. Scientific Collections

This year resulted in a record number of birds and mammals being handled by refuge staff (Table 22). The lynx, hare, small mammals, swan, eagle, and raptor rehabilitation programs resulted in increased field work, scientific knowledge, and public awareness of refuge programs.

Table 22. Report of accomplishments under 1983 State of Alaska Collecting Permit 83-50.

Species	Date	Activity	Age	Sex	Weight	Status	Area
Lynx	11/22/82	Radiocollared	Ad	M	22 lbs	dead 12/83	Swanson Lake
Lynx	12/14/82	"	Kit	F	15 lbs	dead 12/83	Mystery Cr
Lynx	01/26/83	"	Kit	M	11 lbs	dead 02/83	Mystery Cr
Lynx	01/20/83	"	Kit	M	16 lbs	dead 11/83	Mystery Cr
Lynx	02/10/83	"	Ad	F	21 lbs	dead 11/83	Bear Cr
Lynx	02/10/83	"	Kit	M	15.5 lbs	dead 03/83	Bear Cr
Lynx	02/17/83	"	Ad	F	20 lbs	alive	Swanson R
Lynx	03/06/83	"	Kit	F	15 lbs	dead 03/83	Mystery Cr
Lynx	03/16/83	"	Kit	F	12 lbs	dead 04/83	Mystery Cr
Lynx	11/19/83	"	Ad	F	22 lbs	alive	Mystery Cr
Lynx	12/31/83	"	Ad	M	22 lbs	dead 02/84	Mystery Cr
Wolverine	12/17/83	"	Ad	F	23 lbs	dead 12/83	Mystery Cr
Wolves	06/08/83	Collected from den with ADF&G	4Pups	2M 2F	------ ------	Alaska Zoo	2-Elephant Lk 2-Skilak Lk
Snowshoe hare	06/10/83	Eartagged	103 Funny R 35 Forest Lk				Forest Lk/Funny R
Shrews/Voles	09/10/83	Snaptrapped	37 red-backed voles 77 shrews			all dead	Willow Lk
Trumpeter Swan	08/16/83	Visual band & Radio Tag	Cyg	F	18.5 lbs	alive	Beaver Lk
Trumpeter Swan	08/17/83	"	Cyg	M	19.0 lbs	alive	Moose Lk
Trumpeter Swan	08/18/83	"	Cyg	M	15.5 lbs	alive	Phalarope Lk
Trumpeter Swan	08/18/83	"	Cyg	F	13.0 lbs	alive	Hook Lk
Trumpeter Swan	08/16/83		Cyg	M	21.5 lbs	dead	Beaver Lk
Trumpeter Swan	08/17/83	Visual Bands	Cyg	F	09.0 lbs	alive	Donkey Lk
Trumpeter Swan	08/17/83	Visual bands & Radio Tag	Cyg	F	09.0 lbs	dead	Donkey Lk
Trumpeter Swan	08/17/83	"	Cyg	M	13.0 lbs	dead	Donkey Lk
Trumpeter Swan	08/18/83	"	Cyg	M	14-3/4 lbs	alive	Phalarope Lk
Trumpeter Swan	08/18/83	"	Cyg	F	17.5 lbs	alive	Hook Lk
Trumpeter Swan	08/19/83	"	Cyg	M	15.0 lbs	alive	Fox Lk
Trumpeter Swan	08/19/83	"	Cyg	F	16.5 lbs	alive	Fox Lk
Trumpeter Swan	08/24/83	Visual Bands	Cyg	F	10.0 lbs	alive	Kuguyuk Lk
Trumpeter Swan	08/24/83	"	Cyg	M	13.0 lbs	alive	Kuguyuk Lk
Trumpeter Swan	08/26/83	Visual bands & radio tags	Cyg	F	13.0 lbs	dead	Windy Lk
Trumpeter Swan	09/15/83	"	Cyg	F	18.0 lbs	dead	Windy Lk
Trumpeter Swan	09/15/83	"	Cyg	F	15.0 lbs	dead	Grebe Lk
Trumpeter Swan	09/15/83	"	Cyg	M	17.0 lbs	dead	Grebe Lk
Bald Eagles	Jan-Jul/83	Law Enforcement Cases	8 Imm 1 Ad	---	--------	Collected dead (Law Enforcement-Sent to Nat'l Wildlife Health Lab	Kenai NWR
Bald Eagle	02/25/83	Radiocollared & banded after rehab.	Ad	---	--------	Rehabed. & Released	Kenai NWR
Tundra Swan	Unknown-Collected prior to 1983	Collected Dead	Ad	---	--------	dead-Sent to Nat'l Wildlife Health Lab	----------
Great-horned Owl	11/83	Law Enforcement, Collected Dead	2 Ad	---	--------	dead	Kenai NWR
Common Loon	06/03/83	Rehabilitated	1 Ad	---	--------	dead	Kenai Riv
Parasitic jaeger	05/23/83	Rehabilitated, partially amputated wing	1 Ad	---	--------	In residence at AK Zoo	Swanson R Oilfield
Northern shrike	09/83	Hit window-dead	Ad	---	--------	dead	Sterling, AK
Northern harrier	06/25/83	Law Enforcement, Collected Dead	Ad	F	--------	dead	Kenai NWR
Common raven	01/83	Collected injured, later died	Ad	---	--------	dead	Kenai NWR

H. PUBLIC USE

1. General

1983 was a year that the promise of Kenai became a reality. With its proximity to Anchorage, the rapid growth of the surrounding Kenai-Soldotna area, and the abundance of recreation opportunities on the refuge, Kenai has been referred to as "Anchorage's playground." It is also regarded as the flagship of Alaska's fleet of 16 national wildlife refuges and the litmus test for FWS policies on people management.

Prior to 1983, the flagship was listing badly and in need of repair. Lack of policy, chronic staff shortages, and poorly maintained facilities made it difficult to stay on course.

With the installation of permanent exhibits in late 1982, the refuge headquarters assumed its rightful dual role as a Headquarters/Visitor Center. Interpretation and environmental education efforts gained momentum and by year's end the Headquarters/Visitor Center had experienced a 10-fold increase in visitation and earned the refuge a new constituency. Visitor Center registration (and only 50% of our visitors register) shows we hosted visitors from 43 states, 21 foreign countries, and 36 villages and cities in Alaska.

The Kenai Headquarters also became a Visitor Center in 1983 as over 20,000 persons participated in expanded public use programs. (Staff Photo)

The visitor center was not the only public use facility to come on line in 1983 as a one-room log cabin near the refuge's northern boundary also hosted 6,500 persons in its limited Memorial Day - Labor Day season.

While the most impressive gains were seen in newly-initiated interpretive and environmental education programs, the recreation program also took positive strides. New signs refuge-wide enhanced all campgrounds and access areas as did pre-season maintenance.

New highway signs enabled over 20,000 persons to find our Visitor Center in 1983. . . (Staff Photo)

Facilities at the Russian River (RR) Campground, probably the world's busiest fishing hole, were freshly painted and cleaned in time for the hordes of over 30,000 salmon fishermen that visit RR during its 6-week season. And while RR was the usual drain on our seasonal staff, we made it through another year. As has been done for the past 25 years, we proposed again in 1983 that RR be considered as a concession but, by year's end, no action had been taken.

Long overdue backcountry maintenance and repair was accomplished due mainly to the efforts of a good backcountry ranger and a well-organized YCC camp. Portages were rehabilitated and signs installed on miles of canoe trails, trespass cabins removed, public cabins rehabilitated, hiking trails brushed and inventoried, and a cabin inventory initiated as a prelude to a reservation system.

Winter recreation took on added meaning in 1983 as re-designed cross-country ski trails, coupled with excessive snowfall, lured ever-increasing numbers of skiers to try the groomed trails starting at the visitor center.

Much of the progress made in people management in 1983 was due to a growing volunteer program. By year's end, the refuge had a roster of 27 local volunteers providing valuable carpentry, clerical, photography, wildlife, labor, visitor information, vehicle maintenance, and other services.

As 1983 drew to a close, finishing touches were put on the Comprehensive Conservation Plan (KCCP). Public hearings were scheduled for early 1984 and special interest groups were girding for the fight. Kenai NWR serves as a microcosm for Alaska. Established in 1941, it reflects over 40 years of use, abuse, changing values, and growth. The Kenai Peninsula and the twin cities of Kenai-Soldotna mirror the growth of Anchorage at a rate exceeding 15% annually. Growth is evident in the economic "indicator species" that bloomed in the area in 1983 alone -- a McDonalds, Arby's, Sizzler Steak House, Safeway, and three shopping centers. Combine local growth, Anchorage growth, and rising tourism and the Kenai faces infinite demand upon ins finite resources. The Kenai Plan, whien finalized, will give us the tools to make changes. How well we use these tools will reflect our ability as managers...

It's not quite this bad, but as the smallest community in Alaska to have a McDonald's, Soldotna's growth of over 15% annually means increased people and pressure for Kenai. (Staff Photo)

2. Outdoor Classrooms - Students

Over 1,500 students participated in the environmental education program at the visitor center in 1983. Although there are 25 schools in the district, only 10 are within a 60-mile drive. During our first year, all 10 schools sent classes to the refuge and the 1,500 students represent 25% of the student population.

A pre-visit orientation was required of each teacher before bringing their class. A number of schools decided to combine the orientation session with their staff meeting. Orientations lasted from 3:30 PM to 5:00 PM and were held twice-monthly February through May.

Supervisor OPR Mike Boylan created three quizzes pertaining to the visitor center's wildlife exhibits for grades 3-6, 7-9, and high school, respectively. Each quiz was reviewed by a panel of local teachers prior to issuance. Upon their arrival at the center, students were issued clipboards, pencils, and quizzes by their teachers. After an introductory slide program, students answered their quizzes as they walked through the exhibit hall.

Over 2,000 students used the Visitor Center as an auxiliary classroom in 1983 with quizzes provided to accompany the exhibits. (Staff Photo)

The quizzes proved very effective in directing students through the exhibit area. Not only did the quiz format require students to read each exhibit, but it kept noise to a minimum. The quizzes took roughly an hour to complete, after which they were exchanged and graded in the auditorium.

While the quizzes and exhibits were very popular with students and teachers during the spring of 1983, they only provided enough for about a two-hour visit that was all indoors. To enable a class to get outside the visitor center, an environmental education trail was constructed by YCC during the summer. The half-mile trail features numbered stops corresponding to questions in an accompanying leaflet. Students continue to use the clipboards and pencils provided earlier to complete their trail guide outside. The "KEEN EYE TRAIL" was revealed to teachers during workshops in fall, 1983. Based on their response, it will be the most popular part of the visit and an ideal complement to the visitor center. School groups can now plan to spend a full day at the center and concepts learned from the exhibits will be reinforced by questions from their trail guide.

The environmental education program was enhanced by the addition of an EE trail built by YCC.
(Staff Photo)

The final component of the refuge's environmental education program is the Swanson River EE Camp, a site that includes six cabins capable of sleeping 24 persons, and a small pavilion building. The EE Camp's size limits its use by many schools who must "fill the bus" to afford a field trip.

Even so, the EE Camp received increased use in 1983, with some 250 students spending at least one night at the remote site. Future plans call for enlarging the capacity to enable more school and youth groups to use it as well as appealing to more adult groups.

3. Outdoor Classrooms - Teachers

As mentioned in section 2, the major EE effort for teachers was the orientation requirement prior to bringing a class for a visit. The orientation requirement was universally accepted by teachers who appreciated the planning and organization that preceded these sessions.

At each hour-and-a-half orientation, teachers were taken through the visitor center in the same manner as they would lead their students at a later date. After a preliminary slide program, teachers finished the appropriate quiz for their grade level. After completing the quiz, answers were checked against the correct answers. Their corrected quiz became the teacher's to use in correcting students' quizzes during the class visit.

Following the quiz, each participant was given a teacher's packet complete with quiz masters, lists of A-V materials, lists of EE reference works in the library, one of each refuge leaflet, a classroom poster (left over from Alaska Wildlife Week), and a reservation form.

Orientations were held twice monthly, February through May. Total attendance at 8 sessions was 150 teachers. Another 40 teachers attended the district's day-long in-service in October. A special one-day in-service, using "Project Wild" materials brought 12 Anchorage teachers to the refuge later in the month.

The success and enthusiasm with which the EE program was graded by teachers in 1983 was surpassed only by the prospects of 1984. An EE trail, expansion of the EE camp, and a growing constituency of students and teachers makes the sky the limit!

6. Interpretive Exhibits/Demonstrations

With the installation of permanent interpretive exhibits in October, 1982, the refuge's visitor center was complete . . . well, almost. Three of the dioramas could not be completed until a snowshoe hare, weasel, and hoary marmot were obtained. By the end of the year, the weasel and marmot were still missing. The lack of a weasel in a trumpeter swan exhibit isn't so noticeable. But how long must we tell visitors the marmot is "hibernating"???

Beside incomplete exhibits, the electronic gadgetry of two major exhibits became a source of irritation. An earphone exhibit, called the "Sounds of the Kenai," was not designed to withstand the heavy use it received and by mid-year a chronic short had developed that left the public holding a silent earphone.

Likewise, a video tape player and monitor with capacity for 20 programs only offered two for most of the year. And both of these short tapes concerned fisheries research and were more suitable for a fisheries programmatic than the general public. Between electronic exhibits that don't work and those that are incomplete, the visitor center still has a way to go before it's finished.

Despite these problems, the visitor center served us well in its first year of operation. Open 7 days a week, the center became one of two attractions in town (the other being a recently completed sports arena).

The exhibits proved interesting for the general public covering topics such as habitat, predator-prey relationships, adaptations, and refuges in Alaska. In addition to being well-received by the general public, the exhibits easily adapted to their role as an environmental education tool through the addition of quiz sheets for various grade levels.

Kenai's Visitor Center's exhibits were enjoyed by over 20,000 in 1983. (Staff Photos)

Early in the year, Audiovisual Production Officer Bob Olendorff spent a day filming an introduction to the visitor center, narrated by ORP Boylan. Olendorff also filmed some interesting footage of the release of two tagged wolves that had been captured and treated with an experimental drug to cure a louse problem. That footage will become a future program on our visitor center television.

The refuge cooperated with the National Park Service installing a permanent exhibit in the west wing of the newly remodeled Kenai Airport. The exhibit features 30 professionally-mounted color photos of Lake Clark, Kenai Fjords National Parks, as well as Kenai NWR, with the legend "Alaska is America at its best...and the Kenai offers the best of Alaska." An automated slide program will complete the exhibit area, which was provided to the agencies at no cost by the City.

Maintenance Helper Bob Campbell stained letters to be installed at Kenai Airport display.(Staff Photo)

Facilities Manager Ben Chio (on ladder) and Bob Campbell put finishing touches on Kenai Airport exhibit. (Staff Photo)

7. Other Interpretive Programs

In 1983, all interpretive programs were held at the Kenai NWR visitor center. Interpretive programming fell into three categories: 1) Weekend wildlife film series; 2) Summer naturalist programs; and 3) Community Schools (adult education) programs.

The weekend wildlife film series began in January and continued throughout the year. By year's end, some 6,500 persons had seen wildlife films at the visitor center. Our weekend high was 425 persons, with a one-day record of 280 visitors watching a film on polar bears in March. And the auditorium only seats 30 people! All films were obtained free-of-charge from the Alaska State Film Library and other sources. Each film was introduced and background information provided by a volunteer, seasonal, or staff person as well as concluding remarks. The film series was an ideal means of introducing the community to its newest attraction and succeeded in getting locals to return with visitors during summer months.

Also during the summer, our evening naturalist programs proved a popular attraction. For 16 weekends, the visitor center hosted a different program each Friday and Saturday evening from July through August. Topics included marine mammals, bears, moose, birds of prey, and other wildlife-oriented topics (Table 23).

Table 23. Summer Naturalist Programs, 1983, Kenai NWR Visitor Center

Date	Program	Date	Program
July 8	"Native Uses of Plants"	July 9	"The Bear Facts"
July 15	"Ferns and Feathers"	July 16	"The Art of Animal Trickery"
July 22	"Attracting Nature to your Yard"	July 23	"Mysteries of the Bug"
July 29	"Monarch of the Kenai--Alaskan Moose"	July 30	"Who Named the Lupin? Who Named the Rose?"
Aug 5	"Wild Berries and Wildlife"	Aug 6	"Elusive Mushrooms & Moses"
Aug 12	"Salmon Song and Other Native Legends"	Aug 13	"Marine Mammals of Cook Inlet"
Aug 19	"Birds of Prey"	Aug 20	"Lakes of the Kenai"
Aug 26	"The Last Great Race"	Aug 27	"Endangered Species: Last Chance on Earth"

The final element of our interpretive programming came through the refuge involvement in the Soldotna Community Schools or adult education program. By year's end, refuge staff conducted 16 courses ranging from general ecology and wildlife photography to a canoe trip (Table 24). For the most part, these courses proved extremely popular and by aligning ourselves with the proven Community Schools program enabled us to reach yet another new constituency.

Table 24. Community Schools Courses, 1983 Schedule.

Dates	Course Title
4/21	Introduction to Kenai Recreation Areas
4/28	Waterfowl Workshop: Ducks on the Wing
5/3-5/7	Wildlife Ecology of the Kenai
5/5	Introduction to Birds of the Kenai
7/21	Endangered Species
7/27	Minimum Impact Camping
8/2	Wildlife Photography
8/10	A Night on Bald Eagles
8/18	Birds and Their Songs
8/22	Waterfowl Workshop: Ducks on the Wing
8/11&8/25	Kenai River: Lifeline of the Peninsula (class & raft trip)
8/3&8/5&8/7	Canoes and Campfires (class and canoe trip)
10/17-10/24	Hunter Safety Course
10/18	Waterfowl Workshop: Ducks on the Wing
12/7	The Wolf on the Kenai
12/14	A Night on Bald Eagles

8. Hunting

Hunter effort was up in 1983, due to excellent weather during the summer and fall. Harvest was the same or slightly higher than last year for most species although the moose harvest is excepted to be up significantly (Table 25).

Table 25. Sport hunting harvest on the Kenai Peninsula, 1982 and 1983.

Species	Total 1982	Total 1983
Dall's sheep	23	25
Mountain Goat	88	104
Caribou	29	28
Moose (GMU15B East)	23	29
Moose (GMU15)	--	486
Black Bear (GMU15)	--	63
Brown Bear (GMU15)	5	6
Brown Bear (GMU7)	--	1

Local population increased and improved road access to Anchorage has resulted in increased sport hunting pressure on nearly all game and furbearer species. Currently, all caribou and mountain goat, and some moose hunting, on the Peninsula is on a strict lottery permit basis. Dall's sheep hunting has also become more restrictive in the past 3 years, as only 7/8 curl and larger rams are now harvested. The low moose bull/cow ratio and lower moose populations on much of the Peninsula has resulted in reduced seasons and access restrictions. Although the Alaskan myth of nearly unlimited wildlife populations and huge harvestable surpluses was first dispelled on the Kenai in the 1890's, it is still a popular concept. However, the realities of the situation mean more people, more pressure on wildlife, and by necessity, more restrictive hunting regulations.

Observers were placed at Green Lake for the first week of the Dall's sheep season. One case of apparent wanton waste was turned over to the State Protection Officers, but a conviction could not be made. Hunter effort during the first week of the season was low, but picked up later in the season.

The moose check stations were operated on Swanson River Road, Mystery Creek Road, Skilak Loop, and Marathon Road (Table 26). Effort and success was highest in the 1969 burn north of Swanson River Road and Marathon Road. The Skilak Loop Road check station was only operated 2 days then shut down. Hunter effort was low and only 6 moose were known to have been taken during the entire 20 day season. Road access is so great in the area that few bulls are available for harvest and most people hunt elsewhere.

Table 26. Moose check station data for part of the 1983 moose season north of the Kenai River on the Kenai NWR.

Success/ Area	Dates	#Hunter /days	#Moose Harvested	%Yearling Bulls	%Bulls over 3 yr	hunter day
Skilak Lp. Rd.	9/1-2	279	6	66%	0%	2.1%
Marathon Rd.	9/3-6, 9/10-11	331	8	62.5%	12.5%	2.4%
Mystery Ck. Rd.	9/1-11	1001	14	57%	14%	1.4%
Swanson Riv Rd.	9/1-11, 9/16-18	2104	92(83 bulls) (9 cows)	58%	17%	4.4%

The snowshoe hare population is still quite high as was hunter effort. Hunting hares with beagles was impossible and some hunters are tired of going after them at all. It is hard to believe but hunting can be so good that it loses its appeal. New recipes for cooking hares would be appreciated.

A happy moose hunter with a 66+ inch bull moose taken from the refuge's trophy bull moose permit area between Skilak and Tustumena Lakes.
(Staff Photo)

9. Fishing

Fishing activity takes place year round at numerous locations on Kenai NWR and within a wide range of management situations. According to a State-wide harvest report for 1982, that became available during 1983, Kenai Peninsula fresh water sport fisheries supported 404,431 man-days of effort. Including the Russian River, the Kenai River off-and-on-refuge lands provided approximately 16% of the State-wide fishing effort. Refuge Fisheries provided significant portions of the total Alaska effort, Hidden Lake (.3%); Swan Lake and Swanson River Canoe Route lakes and rivers (.4%); and Russian River alone 1.7%. The survey estimates that 7.2% of all Kenai Peninsula fishing days take place on the Kenai NWR. A large amount of the total Kenai Peninsula fishing effort, which is 37% of the State-wide total, involves a large number of fish that spawn and are reared on Kenai NWR.

The Russian River is Alaska's busiest "fishing hole" with over 70,000 man-days of fishing activity during a 6-week season! (Staff Photo)

The following chart shows various Peninsula sport fisheries which occur all or in part on refuge lands.

Table 27. Kenai Peninsula Freshwater Sport Fisheries

	Days fished	% occurring on KNWR
Kenai River - (Soldotna Bridge to Moose River)	49,372	7%
Kenai River - (Moose River to Skilak Outlet)	39,170	15%
Kenai River - (Skilak Inlet to Kenai Lake)	24,242	
Russian River	70,372	70%
Kasilof River	13,238	5%
Other Rivers	10,338	15%
Hidden Lake	6,278	100%
Canoe Lake System	6,329	100%
Other Lakes	16,241	50%
FRESHWATER TOTAL	404,431	

Russian River fishing, probably the most popular and concentrated fishery in Alaska, occurs partially on Kenai NWR. The following tables illustrate 1963-83 use figures and vital statistics.

Table 28. Estimated sockeye salmon harvest, effort and success rates on Russian River, 1963-1982.

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**
1982	34,500	10,300	44,820	51,480	0.261	6/11-8/04
1983	8,360	16,000	24,360	31,890	.117	6/08-8/09
1963-82 Mean	11,140	11,961	21,598	29,487	0.177	

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

** Census period was not continuous during these years do to negligible fishing effort after completion of the early run and prior to arrival of late run.

Table 29. Differences between weekday and weekend day fishing pressure and rates of success at Russian River, 1964-1983.

Year	Mean Angler Counts		Catch/Hour		Mean Hours Fished	
	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
1982	256.0	423.4	0.210	0.144	4.3	4.5
1983	205.1	307.6	0.208	0.151	4.6	4.6
1964-1982 Mean	125.2	200.3	0.199	0.150	4.4	4.8

Fishing effort in the upper Kenai River continued its upward trend despite spring closures. The Alaska Department of Fish and Game (in response to increased harvest in this area) continued to protect spawning stocks via closures. The Kenai River, from the Moose River confluence to Kenai (excluding Skilak Lake), was closed from April 29 to June 14.

According to most informed observations, as well as formal human use studies such as The Alaska Recreation Survey, fishing seems to be the single most influential summer recreation activity at the majority of refuge settings. Peak use in most refuge activities is coordinated with peak salmon runs. Activity during 1983 followed this trend.

Year round fishing activity continues to be a unique and important activity at several locations. Ice fishing at roadside lakes along the Swanson River Road, Swan Lake Road, Sterling Highway, and Skilak Lake Road provides the most outstanding ice fishing opportunities found in Southcentral Alaska. Winter ice fishing activity is general low density day use with participants primarily from local communities.

Late fall, winter, and early spring open water fishing opportunities are also quite popular among southcentral Alaska anglers. The Kenai River remains open water most of the year thus providing 9-11 months open water opportunities. The Kenai River below Skilak Lake is the primary fall, winter, and spring use area for Rainbow Trout, Dolly Varden Char, and Silver Salmon.

Awareness of the value as well as increasing vulnerability of the Kenai NWR significant fisheries has prompted several recent efforts to properly manage this valuable resource. In recent years and in 1983 an increasing number of proposals have been adopted to reduce seasons and bag limits, initiate studies and protect spawning fish. A Kenai River Task Force which included refuge staff addressed several sport fisheries issues on the refuge. Jim Friedersdorff of the Kenai Fisheries Station initiated field work aimed at evaluating fisheries stocks and aquatic habitation in roadside and high use remote lakes.

Fishing opportunities were significantly enhanced during 1983 by a leaflet entitled Recreational Opportunities on the Kenai Peninsula, produced by Alaska State Parks in cooperation with the refuge.

10. Trapping

The free, unlimited, nearly unregulated trapping program in effect continues to haunt the refuge staff and sound furbearer management. A record number of trappers (122) were issued refuge trapping permits during the 1982-83 season. The refuge also had a record number of complaints regarding conflicts between trappers, conflicts between trappers and other users, stolen traps and fur, and incidental catches of non-target species, particularly moose.

Last year's harvest of mink (202) and coyote (80) were the highest recorded, catches of beaver (93), wolf (39) and muskrat (227) were also high compared to most years. Two marten were captured in 1983, the first such captures in 20 years. Unfortunately, the survey data indicates that the increased harvest was at the expense of furbearer numbers and primarily due to increased trapper effort. It is currently believed that refuge lynx, wolf, marten, fox and beaver populations are depressed primarily due to either past or present liberal harvest regulations. Recommendations for corrective measures offered for the past 5 years have all but been ignored by the ADF&G, although the normal Nov. 10-April 1 trapping season was reduced by 15 days for reasons of pelt primeness for the 1983-84 season.

The absence of detailed information on most of the refuge's other furbearer populations has made full assessment of trapping impacts difficult. Refuge staff have attempted to utilize trappers to assist in radio collaring furbearers to gain more information. Trapper education, user segregation, and shortened trapping seasons may be forthcoming to address the human and resource management problems resulting from intensive levels of recreational trapping on the refuge.

11. Wildlife/Wildlands Observation

Typical of many Federal and State land management areas, many refuge visits are multi-purpose in nature. As noted in the 1982 annual narrative, 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 30).

Table 30. Annual Traffic Volumes and Daily Averages, 1982

Annual Traffic Volumes (1982)	Average Daily Traffic	Annual
Sterling Highway (Approx. Watson Lk)	1,500	532,750
Sterling Highway (2 Mi. west of Russian River)	1,840	687,000
Sterling Highway-L. Skilak Campground.	130	44,800
L. Skilak-Upper Skilak	105	37,500
U. Skilak-Hidden Lk Road	105	37,500
Hidden Lk Rd-Junc. /Sterling H.	105	37,500
Hidden Lake Road	70	24,725
Lower Skilak Campground Road	55	18,750
Upper Skilak Campground Road	55	18,750
Swanson River (Refuge Boundary)	185	64,875
Ski Hill Road	40	13,775
Funny River Road	450	93,000
Tustumena Campground Road	115	23,725

Note: The above includes vehicles traveling both directions.

An estimated 10 to 20 percent of persons traveling the Sterling Highway and Funny River Road participate in wildlife or wildlands observation. For persons travelling other refuge roads, participation is 100%.

In an effort to increase wildlife/wildland observation, the Kenai Comprehensive Conservation Plan (KCCP) identified two areas of the refuge for wildife viewing. The area immediately surrounding the Headquarters Lake Visitor Center and the Skilak Lake Recreation Area (between Skilak Lake and the Sterling Highway). Managing those areas for maximum wildlife viewing opportunities was addressed in all options within the draft KCCP. Eliminating big game hunting and trapping on-site, interpretation and facility-design considerations are included within the Plan.

12. Other Wildlife-Oriented Recreation

1983 saw major improvements made in the refuge's cross-country ski program. Although the refuge had several miles of established trails, they had not been maintained or re-routed since the headquarters-residences-shop complex was constructed. As a result, trails were generally narrow, had sharp turns (they had been designed for older, slower wooden skis) and passed through major facilities.

Volunteers from the local community college were solicited to help re-design and maintain the new trail system. Beginning in October, four volunteers regularly devoted their weekends to clearing, cutting, and widening trails. By December, sufficient snow had fallen that a track was set using the college's track setter, pulled by refuge snowmobile.

The x-c ski trails were re-routed to begin at refuge headquarters/visitor center, providing a warming area 7 days a week as well as bathrooms, a chance to see a film and parking for 40 vehicles. The combination of good snow, good trails, and a young community with a passion for x-c skiing had resulted in a daily turnout of skiers with capacity crowds on the weekends. The possibility of sighting moose and bald eagles on the 10 miles of trail made them very popular. By year's end, improved trails and the public's interest in skiing made this extremely compatible winter activity a major recreation program and provided the refuge with yet another new constituency.

Re-designed, groomed x-c ski trails attracted a growing number of visitors pursuing this highly compatible form of winter recreation. (Staff Photo)

With the formation of a chapter of the National Audubon Society on the Peninsula in 1983, organized birding and wildlife observation took on added emphasis in the local community.

The Kenai Peninsula Audubon Society's first Christmas Bird Count, held Saturday, December 18, attracted 14 participants who saw 356 individual birds of 14 species. The Audubon Chapter began in September and their activity calendar for the 1983-84 year included cross-country ski trips, backpacking trips, day hikes, bird walks, and other wildlife-oriented recreational activities on the refuge. The presence of these organized activities are a welcome addition to the hunting/fishing/trapping forms of recreation that have prevailed for so long on Kenai.

As documented in recreation planning documents, a large portion of visitation on Kenai NWR involves water-oriented or water-related outdoor recreation activities. Many portions of the refuge are accessible only by floatplane, canoe, or power boat. Most campgrounds and/or access sites are associated with a river or lake.

Within the context of the draft Kenai NWR Comprehensive Plan various water-oriented recreational activities are being evaluated and in at least three cases changes are being contemplated.

Several access sites and campgrounds have formal boat ramps, constructed of aircraft landing mesh. Several boat ramps are in need of repair and several were repaired during 1983.

Most southcentral Alaska recreation surveys show that water-based activities are of high priority to Alaskans. Refuge management has acknowledged this high interest in water-related activities, even during winter months, when waterways are used as routes to winter activities via walking, skiing, dog mushing, snowmobile, and ski plane use.

Riparian areas, lakes, and rivers are often the most important habitats for wildlife. Emphasis has been placed in the draft Kenai Comprehensive Plan on mitigating negative impacts of popular recreational use in these areas.

A review of popular aircraft landing lakes during 1982 set in motion regulations that will restrict use during swan nesting. Examples of related efforts include an eagle nesting island which was posted "No Camping" on Gavia Lake within the canoe system.

Because of the tremendous increase in motorboating, outgoing Governor Jay Hammond appointed a Task Force in late 1982 to study and hopefully resolve wildlife and fishing habitat, boater use, erosion, and social conflicts on the Kenai River. The Kenai River, the most popular boating and fishing river in the State, has experienced many overcrowding problems. Several portions of the Kenai River are within the refuge, and Refuge Manager Bob Delaney participated on the Task Force through 1983. Several meetings were held during 1983, and topics proposed

solutions to problems, included motorboat horsepower restrictions, fishing restrictions, speed limits, increased law enforcement and public safety efforts, float only areas, and segregation of user groups. The Kenai River Task Force's final report was released in 1983 and is the cornerstone of pending legislation establishing the Kenai River a a State special use area to be managed by the Division of Parks.

Refuge visitors and resources received increased protection on busy weekends within the Swan Lake and Swanson River Canoe routes. Refuge staff coordinated much needed trail maintenance within the Swanson River Canoe route. As of August 1983, Swan Lake and Swanson River Canoe route portages are completely signed with appropriate recreation symbol signs and the trail maintenance situation is the best since the early 1970's. Trail and cabin condition report forms were developed by the seasonal backcountry employee and will be used to track maintenance needs. (See appendix). Maintenance and signing was accomplished on Funny River Horse Trail, Swanson River Canoe Trail, Swan Lake Canoe Trail, Hidden Creek Trail, Kenai River Trail, Fuller Lakes Trail, Skilak Lookout Trail, Headquarters Ski trails, and Seven Lakes Trail.

Trash removal, cabin rehabilitation, and cabin clean-up were accomplished at backcountry locations. A trespass cabin on Tustumena Lake was removed in August. The Fingers Lakes cabin used by groups and individuals was redesigned with four new bunks and a new "outhouse" in August.

Considerable time was spent during 1983 investigating Native Allotment claims in Kenai Wilderness and several other refuge locations. In general, interviews, affidavits, and research indicate a less than professional job of reviewing Native Allotment claims by the Bureau of Land Management. Two cases, IBLA 8228 and 8234, went before the Interior Board of Land Appeals in September, 1983 and precedent-setting decisions were rendered setting aside BLM's approval of the claims and reprimanding BLM for their handling of the cases. Continued vigilance will be required considering the push with BLM to resolve hundreds of Native Allotment claims within Alaska.

The Chugach National Forest conducted hearings and received comments on the possibility of allowing mining operations and access into the Russian River valley. The Refuge boundary and Kenai wilderness boundary bisects the valley at midstream of the Russian River.

RM Bob Delaney and other staff commented negatively on the proposal both in writing and during an oral hearing in an appeal filed by local sportsmen's groups and the Sierra Club. Refuge staff felt the wilderness character of the shared Russian River valley and its nationally significant salmon runs was too much to risk to allow development of the proposed mine. At year's end, Forest Service Chief Max Peterson had temporarily halted the operation until further tests could be conducted.

Visitor use days during 1983 totalled 20,040 on the Swan Lake and Swanson River Canoe routes. The canoe routes are within Kenai Wilderness and remain a very popular canoeing, fishing, and wildland opportunity. A volunteer backcountry registration booklet was utilized during the year, as well as group size limitations.

A backcountry ranger patrolled the canoe system June through September. Portage maintenance, public contact, trailhead information dispersal, visitor education concerning sensitive wildlife areas, and campsite data gathering were emphasized.

13. Camping

Emphasis continued during 1983 on upgrading and streamlining services at developed facilities that support camping. Four new water wells and hand pumps were drilled and installed at Tustumena, Skilak Visitor Center, Dolly Varden Campground, and Engineer Lake access area. In support of improved camping, as well as minimizing impacts, all present facilities were evaluated for interpretive potential and information needs. New identifying signs were installed at all Kenai NWR camping facilities.

The apparent reason for providing developed campsites is visitor convenience and opportunity, but in fact the refuge views campgrounds as a way to confine and manage recreational impacts. Most research shows that the majority of impacts associated with a recreational visit occur in and around the campsite. Providing restrooms, safe drinking water, campsite pads, fire grates, garbage containers, public safety patrols, and refuge information are important components of wildlife and visitor protection. Efforts to improve all of the above continued during 1983. Major focal points in the future will be the Skilak Loop area and its many facilities which are sorely in need of redesign.

Similar to most refuge campgrounds and access areas, Skilak Loop facilities are utilized on a year round basis providing additional recreation opportunities but receiving a proportional amount of "wear and tear". Winter months are particularly vandalism prone.

The Russian River access area received high priority as did Hidden Lake and other developed facilities along Skilak Lake Road. Russian River continued to operate under the direction of the Interim Management Plan for Russian River. Although a move to contract Russian River as a concession contract was initiated at the field level in 1983, by year's end the RO had taken no action. Two Park Technicians, supplemented by permanent law enforcement staff and volunteers, accomplished maintenance and public contact needs. Programs such as the litter incentive program, zoned camping areas, fee collection booth, and self-guided interpretive exhibits continued. High peak day use and congestion continue as in previous years.

Interpretive exhibits depicting the life-cycle of the red salmon and the history of the Russian River are important facilities at this busy fishing/camping area. (Staff Photo)

Entrance road traffic counters recorded 9,256 vehicles entering the Russian River facility with an average occupancy of 2.8 persons per vehicle, or 25,917 individuals. Many of these persons did not fish, but were attracted to the area for short sightseeing, people watching visits. Also, many individuals were family members of fishermen. Several thousand persons received refuge, camping, and fishing information. Recreational use fees collected were $7,319.00 as compared to $7,884.00 during 1982.

15. Off-road Vehicles

The only off-road vehicles authorized on Kenai NWR are snowmobiles in designated areas. The winter of 1983 produced good snow conditions and the season closed in April. Snowmobiles are utilized to gain access for trapping, ice fishing, and other refuge activities. Areas of particularly high use include frozen waterways, seismic lines, and alpine areas of the Caribou Hills. Surveys during 1983 revealed snowmobile use in the Caribou Hills could far exceed even previously high estimates. Options for future open and closed areas received extensive review during Kenai's draft comprehensive planning effort. Certain options outlined could reduce areas currently designated for snowmobile use.

The illegal use of 3-wheeled vehicles with balloon tires has increased tremendously during 1982 and 1983. Reasons for this include favorable snow conditions, they're cheaper than snowmobiles, and increased marketing. As last year several citations were issued to persons illegally using these off-road vehicles.

Ice fishing, utilizing licensed vehicles to drive via frozen lakes to an ice fishing "hot spot", received discussion during 1982. Large numbers of people utilize Hidden and Engineer Lakes, although such use has been technically illegal. Regulations were proposed during 1982 which would legalize driving on Hidden, Engineer, Kelly and Petersen Lakes by highway licensed vehicles for ice purposes. Current refuge policy is to allow such use. Ice fishermen must enter and exit the lake via the existing boat ramps. Other popular ice fishing lakes, such as Skilak, Dolly Varden, Rainbow, Lower Ohmer, and Watson, remain off limits due to safety, wildlife, or other reasons.

Recreation Planner Johnston accompanied two Division of Lands employees into the Caribou Hills where he observed extensive trespass cabin development adjacent to refuge lands. Cabins are used as a staging area for recreational snowmobile use. Several hundred recreational snowmobilers were observed above treeline in the Caribou Hills on a single weekday.

17. Law Enforcement

As in the past, law enforcement efforts on Kenai NWR lands involve a cooperative and concurrent effort of refuge staff, Alaska Department of Public Safety officers and Division of Law Enforcement agents.

Through the cooperative efforts of Alaska Fish and Wildlife Protection officers, Kenai's three professional staff with LE authority as well as Special Agent Soroka have been successful in responding to all complaints received. Weekend LE patrols once initiated in January and continued throughout the year. As a result we have seen increased public contact and increased compliance with refuge regulations. Including seasonal employees without LE commissions approximately 4,000 hours of vehicle, aircraft, and foot patrols was conducted.

Although efforts have been adequate, lack of a full-time single-purpose enforcement person impacts the refuge the greatest in the areas of special use permit compliance, time-consuming remote operations, investigations, and night patrols. A full-time LE person could possibly double the cases being made.

A significant handicap in LE operations is the lack of a pilot with LE authority or visa versa. LE persons for patrol or other investigation purposes must be ferried by others to accomplish tasks. Hopefully, this will be remedied with the addition of a Fire Management Officer/Pilot with LE authority, hired at the end of 1983.

Cooperation with the Alaska Fish and Wildlife Protection is excellent with considerable communication between both agencies. A recent State policy of de-emphasizing "plain clothes operations" has caused, however, a dramatic decrease in State officers' ability to make cases on the refuge. In some cases, increased plain clothes operations by Soroka and refuge officers has been needed to fulfill this necessary law enforcement function.

The ability to accomplish remote patrol has been greatly enhanced by new equipment such as snowmobiles, and a river boat. This has resulted in increased presence in Caribou Hills, Skilak Lake, Tustumena Lake, the Kenai, River, and other remote refuge locations.

An interagency effort was initiated to increase boat patrols on the Kenai River during 1983. Refuge LE staff contributed significantly to this "team effort" with several weekend patrols above and below Skilak Lake. To present a united policy very few Coast Guard regulation violation notices were issued. Patrols were primarily for increased visibility.

Including 1983, the following table (Table 31) shows cases that have been made during the previous six years by refuge officers. Illegal recreational use of refuge lands is considered to be much higher than resolved cases would indicate. Illegal fish and snowmobile use, for example, would probably have to be estimated in the thousands.

While theoretically a "means" for "traditional" recreation such as ice fishing, hunting, and trapping, snowmobiles have become a recreation "end" in themselves, providing access to virtually every portion of the refuge. Illegal snowmobile use is extensive. (Staff Photo)

Table 31. Violations on the Kenai National Wildlife Refuge for years 1978, 1979, 1980, 1981, 1982, and 1983.

Violation	'78	'79	'80	'81	'82	'83
Snagging of fish	--	--	--	27	24	26
Fishing in closed water	--	--	--	13	4	13
Overlimit of fish	--	--	--	3	3	6
Fishing without a license	6	3	6	12	4	1
Other fishing violations	--	--	--	--	--	7
Snowmobiling in prohibited area	1	1	0	0	4	6
Motor bike in prohibited area	0	1	0	0	0	0
Motor boat in prohibited area	1	1	0	0	0	0
Driving vehicle in prohibited area/ORV Use	16	3	11	7	10	9
Parking in No Parking Zone	0	21	15	19	13	2
Dropping objects from airplane	0	1	0	0	0	0
Landing aircraft in prohibited area	0	4	4	1	4	6
Shooting fireworks/selling	1	1	0	0	1	4
Violation of State game regulations	4	1	1	3	0	1
Migratory Bird hunting violations	--	--	--	--	--	10
Littering	1	0	0	5	0	3
Illegal camp/boats/cabin	3	0	9	3	1	0
Unauthorized advertising	0	0	1	0	0	0
Illegal wood cutting/cutting green trees	0	0	3	3	4	5
Speeding	0	0	0	1	0	5
Reckless operation of machine	0	0	0	1	0	0
Unattended fire	0	0	0	1	0	0
Interference with employee	0	0	0	1	0	0
Destruction of Gov't property	0	0	0	0	1	0
Failure to comply with refuge SUP	0	0	0	0	1	2
Violation of Coast Guard Regulations	--	--	--	--	--	5
Totals	33	37	50	100	74	111

Consistent with 1982, areas of increased concern involved illegal wood cutting, illegal use of off-road vehicles such as 3-wheelers, new SUP commercial operations, and preventing construction of trespass cabins.

In support of violation prevention and public safety, several news releases were sent to radio stations and newspapers. The refuge leaflet also contains detailed regulation information designed to prevent inadvertent violations. Seasonal park technicians continued to contribute significantly to preventive LE efforts by patrolling in uniform, answering questions, and reporting violations. We have been able to attract qualified seasonal personnel with extensive LE training and experience. It is regretable that FWS, unlike the NPS and Forest Service, cannot provide any degree of LE authority to these people even though they often have more training than our staff officers. Seasonal employees were given a comprehensive review of the refuge LE program and their authority (or lack of) concerning refuge violations. Topics covered included refuge regulations, 50 CFR, search and rescue, emergency operations,

and cooperation with other agencies. The backcountry patrolman was previously a commissioned National Park Service officer and his training contributed to professional contacts while he was on patrol.

Several new signs posting closed areas were installed during 1983. Signs posted were in compliance with the FWS sign manual and refuge sign plan. A new poster summarizing refuge regulations was developed and printed during 1983. The poster was displayed at all campgrounds, trailheads, and access points.

Draft of special regulations governing public uses to supplement 50 CFR and interim ANILCA regulations were completed in 1982, but delays left the refuge with no current regulations by the end of 1983. A recent ruling by the U.S. Attorney's office regarding section 1010 as it related to two aircraft landing cases on Kenai have left some question concerning the legality of Kenai's existing closures.

Nuisance and social infractions within busy recreation areas continue to make up a significant number of overall "violations" on Kenai NWR. Continued weekend patrols and increased uniformed employee visibility are intended to address these problems.

Hunter check stations again contributed to monitoring of recreational use during hunting season. All licenses and harvest tags were checked during the operation of the stations. As in previous years increased contact with the public contributed to timely responses to violation reports and salvaging at least three illegally killed cow moose.

Sheep hunter observer camps were operated at Twin, Iceburg, and Green Lakes during the August Dall's sheep season. Information concerning hunters and sheep harvest was conducted in addition to preventive law enforcement duties.

18. Cooperating Associations

The best reflection of the growing public awareness and support of the Visitor Center's interpretation and recreation efforts can be seen in the dramatic increase in our Alaska Natural History Association sales.

From sales of roughly $800 in 1981 and 1982, respectively, ANHA receipts soared to over $10,000 in FY 1983, an increase of over 1000%. For calendar year 1983, ANHA sales exceeded $12,200.

Reasons for the increase were numerous: New highway signs providing greater visibility; installation of exhibits; weekend operation of the Visitor Center; opening the Skilak Information Cabin (which accounted for $2,500 in sales in 100 days); improved marketing and display of merchandise, among others.

Kenai's cooperating association outlet's sales jumped from $859 in 1982 to over $10,000 in 1983. (Staff Photo)

By year's end, the refuge offered 25 different publications, three slide sets, two types of note cards, one poster, and a Kenai t-shirt emblazoned with the "Living Landscape" logo that greets visitors to the exhibit area. Each T-shirt bears an interpretive card with information on the refuge. T-shirts are sold only at the Visitor Center or Visitor Information Cabin.

The refuge's skyrocketing sales earned Kenai a Certificate of Achievement from ANHA for greatest sales increase. But while the added income is nice (the refuge will receive some $4,000) what's more important is that sales indicate our visitors had a sufficiently worthwhile experience that they were willing to spend an average of 50 cents each to purchase a book or other remembrance.

While it will be difficult to equal or surpass 1983's sales increase, Kenai looks to innovative ways of using its ANHA outlet. Future plans call for production of a Kenai NWR poster, greater inventory including the new book by National Geographic, Wildlands for Wildlife, which features Kenai, and the Wolves of Kenai NWR by Rolf Peterson to be published in early 1984. An outings series including horseback and canoe trips and a lecture series featuring naturalist writers, photographers, and artists is also planned, the latter in cooperation with the local Community College and Audubon Society.

19. Concessions

Kenai NWR has no concession at present. In 1983, a request was sent to CGS to examine the feasibility of converting the Russian River ferry and parking area from a Special Use Permit (SUP) to a concession contract.

For the past 25 years, the Russian River ferry has operated on a SUP. Present fee is $500, but the permittee earns an estimated $50,000. The "ferry" (actually an old barge) is privately-owned but operated on refuge land. The parking area for nearly 200 vehicles with a small walk-in camping area is operated by FWS. It earns $7,500 annually in parking fees but requires a minimum of two full-time seasonals in addition to maintenance contracts for pumping outhouses, collecting garbage, plus other preventive law enforcement duties. The possibility of a concession operation at Russian River has been suggested for 25 years, but never implemented. At the close of 1983, there was still no indication things would be different in 1984. . .

All commercial recreational activities on Kenai NWR increased dramatically in 1983. Several additional SUP's including one for a 120-mile foot-race across the refuge were issued. All permit files were reviewed and updated for "compatability", updated SUP checklists, location maps, and permittee operations changes as of May 1, 1983.

The dramatic increase in refuge SUP requests will require close scrutiny by refuge staff to insure commercial recreational activities will not conflict with general public use or wildlife. Also SUP provisions such as fees need to be evaluated.

New provisions in several SUP for guides utilizing motorized watercraft in the upper Kenai River terminates such use as of 1984.

During 1983, 37 outdoor organized or commercial operations were under SUP, 3 permits for commercial use by groups in the canoe system, 7 permits for 24 fly-in tent camps, 10 permits for guiding on the Kenai River and other boating operations, 1 permit for operation of the Russian River Ferry, 9 permits for guiding/outfitting, 5 for non-consumptive hiking, sightseeing or backcountry trips, and 2 for organized races or special events on refuge lands.

I. EQUIPMENT AND FACILITIES

1. New Construction

During 1983, new construction consisted of completing the new maintenance/storage center, residence, and bunkhouse, and improving our present facilities such as campgrounds and roadways.

In early January, R.O. Engineer Rudy Berus and CGS Contract Officer Burt Humphrey made the final inspection of our new refuge maintenance shop and storage facility. Refuge maintenance staff spent the winter months moving maintenance tools and equipment from the old Kenai shop to our new one located in Soldotna.

The new shop is a welcome addition to our total refuge program. Its location in Soldotna contributes to a much better maintenance management operation, especially in regards to planning and scheduling vehicle and facilities maintenance. The location of equipment means being able to respond to unexpected or emergency situations in a timely manner.

The shop is the hub of our maintenance operations. We now have a full time Facilities Manager to coordinate the overall preventive maintenance, cyclical maintenance and seasonal programs.

The vehicle parking area, storage pad and access roads leading to the maintenance center, bunkhouse, residence, and float plane area were all paved. This eliminated a dust problem and enhanced the headquarters/maintenance complex.

Road paving - road leading to float plane docking and refueling area. (Staff Photo)

A new chain link fence, with gates, was installed around the maintenance/ storage facilities providing a more secure area for the refuges' vehicles and heavy equipment.

The refuge shop and maintenance area were fenced-in during 1983, providing greater security for vehicles and equipment. (Staff Photo)

Rain gutters and down spouts were installed on the Headquarters/Visitor Center, bunkhouse, and residence. This will eliminate water running off the roofs and splashing on the buildings, discoloring and deteriorating the cedar siding.

The YCC and refuge maintenance staff teamed up to install new signs throughout the refuge. This was a major undertaking as sign frames had to be fabricated from rough sawn spruce, bolted together, and given two coats of stain. The rock and masonary work on the two remaining major entrance signs was completed and the wood frames stained.

Four new water wells were drilled to provide potable water at Dolly Varden and Engineer Lake campgrounds and at the Visitor Contact Station.

A 40' x 50' insulated storage building was ordered to provide additional heated storage space for refuge equipment near the new shop building.

We have received 24 new fabricated bulletin boards to be installed in campgrounds and waysides during summer of 1984.

The Schooner Bend bunkhouse facility, a joint project with the U.S. Forest Service consisting of moble homes for seasonal housing, is 85% complete. All utilities (water, electric, and sewer) were buried underground. Septic tanks and a leeching field were installed. Remaining work consists of landscaping and fabricating an entrance gate.

2. Rehabilitation

Tustumena and Lower Skiliak Lakes campground boat ramps were revamped, the old aircraft landing mat will be replaced in FY 84 with concrete plank boat ramps. The concrete planks were ordered and delivered to the job sites during the winter.

Spring break-up produced hazardous erosion conditions in campgrounds and on roads. Bringing these facilities back to safe standard requires nearly all of May and June every year. Erosion from flooding of the Kenai River is slowly eating away the road leading into Jim's Landing campground, some 125 yards of gravel were hauled-in to make the road driveable.

3. Major Maintenance

Road grading and maintenance of Swan Lake Road and the entrance roads to the campgrounds is a continuous job. This year a hydro-ax was used on these roads to remove brush and tree growth to increase visibility for vehicular traffic.

Hydro-ax in action removing alder along Swanson River Road. (Staff Photo)

Sign maintenance and repair is a never ending task. The vast proportion of our sign maintenance is due to vandalism--people willfully shooting them for whatever reason. About 60% of our newly installed refuge signs have been used for target practice, with 15% requiring major repair, and 5% damaged beyond repair.

Vehicle/equipment maintenance and repair is always a struggle. However, due to the commitment of a highly qualified volunteer mechanic (Rey Gibson) our vehicles, boats, and equipment were kept in running order throughout the year. We plan to alleviate such annoyances through a preventive maintenance program.

The refuge Headquarters/Visitor Center was recaulked and given three coats of stain.

The water system and water reserve tank were drained and completely cleaned. The purpose of this was to attempt to remove the iron bacteria from the system. However, it was only successful for a short period of time. We are seeking other alternatives in order to improve the condition of our water.

Over 80 picnic tables were repaired and painted by two of our volunteers.

Significant time was also spent in 1983 on the continual placement or replacement of wooden posts, rock and other "natural" barriers in an attempt to keep off-road vehicles from going where they don't belong.

The aircraft refueling system was repaired by replacing the underground pipe with a high pressure hose, allowing more flexibility during freezing and thawing conditions. The fuel house was also raised to a higher position.

With the influx of more people, steadily increasing public use, and greater demands placed upon our recreation facilities, the requirements in regards to cleanliness, litter, vandalism, and preventive maintenance repair was a major task for all refuge staff. A maintenance schedule for all refuge facilities and equipment has been developed but is not fully implemented.

4. Equipment Utilization & Replacement

Through planning and the combined effort of the maintenance staff of 3 seasonal laborers, a new permanent part-time maintenance helper, a heavy equipment operator, a facilities mechanic (who was promoted to Facilities Manager), and from 2-4 volunteers we managed to maintain our fleet of 29 vehicles, 2 backhoes, a grader, a D-8 cat dozer, a JD-450 crawler, a fork lift, a 24' boston Whaler, a 16' Alumacraft, 3 snow machines, and 10 canoes. We have implemented a preventive maintenance (P.M.) program for all vehicles and equipment, but it will take two years to implement it.

In 1983 the refuge placed various outdated and worn-out tools on a public sale list including chain saws, lawn mowers, hand power tools, stoves and refrigerators, and miscellaneous items. They were sold by sealed bid and removed from the refuge.

Replacement equipment added this year consists of 2 new lawn mowers, 3 weed trimmers, 4 new chain saws, and 1 new snow machine.

5. Communication System

Installation of our TCI high frequency radio tower was completed by our maintenance staff and Ron Rhodehamel, R.O. Engineering.

The raising of our new Radio Tower. (Staff Photo)

Eight new TAD waterproof hand-held radios were purchased for use especially when staff are out on the canoe system or on the rivers.

6. Energy Conservation

The major cause of our increased energy consumption in electricity and natural gas was the utilization of the new shop, bunkhouse, and the 3-bedroom family quarters. These facilities, even though energy efficient, are larger and have many new conveniences unavailable in the old Kenai facilities. Another cause of increased energy was the opening of the headquarter's large visitor center on weekends and until 7:00pm nightly during the summer months for the visiting public. Field staff quarters in Cooper Landing was also used this year which increased electricity consumption. As shown on the following table electricity and natural gas increased by 24.3% and 17.1%, respectively:

Table 31. Energy use comparisons.

Product	Unit of Measure	Consumption FY82	Consumption FY83	Comparison/FY83 %Inc.	Comparison/FY83 %Dec.
Electricity	KWH	110,844	137,830	24.3	
Natural Gas	100 Cu. Ft.	17,620	20,625	17.1	
Vehicle Gas	Gallon	11,398	10,104		11.4
Aviation Gas	Gallon	3,439	5,088	47.9	
Propane	Gallon	668	209		68.7
Diesel Fuel	Gallon	316	751	137.7	

During the past year we have been negotiating with the Kenai Native Association for transfer of our old Headquarters/residence/shop facility in Kenai. The transfer did not take place so, we continued to use the two residences for our increased staff. The old headquarters was used during the summer by a Special Studies team from the Regional Office.

Our consumption of gasoline decreased by 11.4% due to having all of the vehicles in Soldotna, rather than 10 miles away at Kenai. The new field staff quarters in Cooper Landing reduced daily driving by approximately 100 miles each day for refuge vehicles traveling to Russian River area.

Propane use decreased since we no longer used the Kenai bunkhouse, the only building that uses propane for cooking and heating. Diesel increased 137.7% over last year because of hydroax work done on the Swanson River Road, where brush had grown too close to the roads and constituted a driving hazard. Diesel use was still down from 1981 by 14.7%.

J. OTHER ITEMS

1. Cooperative Programs

Two graduate students, under the supervision of Jim Reynolds of the Fish and Wildlife Cooperative Unit at the University of Alaska, Fairbanks, worked on Upper and Lower Jean Lakes during the summer. The students were testing various types of sampling methods to estimate fish populations in the lakes. A weir, operated on Jean Creek, documented 3,038 sockeye entering the lower lake. The work should continue through 1984.

In 1983, the refuge gave ADF&G two of its three LaTourneau tree crushers for $20,000 in a competitive bid. The estimated replacement cost of the three machines is about $1 million. The FWS abandoned the tree crushing program because it was too expensive and of questionable value to wildlife. The ADF&G received a special appropriation from the legislature of $100,000 to run the crushers during the winter of

1983-84. Habitat work was scheduled for areas on the refuge to the dismay of staff who had thought they had seen the last of the machines. Local conservation groups were also upset and court action seemed possible. Nevertheless the refuge EA for habitat manipulation was amended, an archeological survey conducted, a special use permit issued, and the crushers began work six days later on December 19. Crushing has been going slowly due to mechanical breakdowns but so far the work looks acceptible with many snags and small stands left along the crushed areas. The crushed areas are scheduled for burning in the spring of 1984. The costs are estimated at $100,000 operating cost for 2,500 acres crushed, which translates to a minimum estimated cost of $1,500 per moose in the hunter's bag over a 20-year period. It will be interesting to see if the State will continue to fund a program based upon such a benefit/cost ratio.

2. Items of Interest

Distinguished visitors who made official visits to Kenai NWR in 1983 included:

From the Regional Office:

Jan Riffe	Ass't Regional Director Refuges & Wildlife
Norm Olson	Planning Team Leader
Rudy Berus	Chief, Engineering
Fred Nolke	Chief, Budget & Ginance
Don Lindberg	Budget Analyst
Bob Olendorff	Audio-visual Products Officer
Ginny Hyatt	Safety Officer
Keith Schreiner	Regional Director
Gail Baker	Ascertainment Biologist
Larry Calvert	Refuge Supervisor-South, Refuges
Gloria Vitolo	YCC Coordinator
Rich Barcelona	Outdoor Recreation Planner
Joe Mazzoni	Chief, Program Support & Staff Services
Wilbur "Skip" Ladd	Asst Regional Director (Wildlife)

From FWS - Washington, D. C.

Robert Gilmore	Refuges	June 5
Joy Davis	PAO	September 21
Bill Savannah	PAO	September 21
Norma Higgins	Youth Programs	July 28-29
John Eadie	Refuges	July 14-15

Others:

Dave Cline	Nat'l Audubon Society Reg. V-Pres, (AK) 4/27; 8/3; 11/8; 12/14	
Walt Pomeroy	Nat'l Audubon Society Reg. V-Pres, (East) 8/23	
Noel Grove	Nat'l Geographic Soc.	7/11-14
Barbara Payne	Nat'l Geographic Soc.	7/11-14
Toby Cogill	Defenders of Wildlife	5/25
Alan Smith	Defenders of Wildlife	5/25
Cathy Rezabeck	AK Natural History Assn	6/27
The "99's" (Women Pilots Organization)		
Don Knowles	Congressional Budget Ofc, Washington, D. C. 8/13	
Honorable U.S. Sen. Frank Murkowski (R-AK)		8/24
FAA Representatives	11/30	
Phyllis Scheinberg	Ofc of Mgmt & Budget	6/5
Steven Karfran	Nat'l Geographic Photographer	5/15-6/15
Art Wolfe	Nat'l Geographic Photographer	5/15-6/15
Richard Hensel	National Wildlife Refuge Association 7/20	

3. Credits

Refuge Manager Bob Delaney contributed sections on Funding, Highlights, Historical, Climatic Conditions, Cooperative Programs, Other Items, and Feedback sections.

Principal Assistant Refuge Manager Mike Hedrick initiated this report, made staff assignments, wrote the Fire Management section, and contributed to the Equipment and Facilities section, as well as editing the report.

Assistant Refuge Manager Bob Richey wrote the Land Acquisition section including all information pertaining to oil and gas exploration.

Supervisory Outdoor Recreation Planner Mike Boylan shared the Public Use section as well as writing on Youth and Volunteers Programs, Technical Assistance, Credits, and editing the report.

Recreation Planner Rick Johnston shared the Public Use section as well as writing the Wilderness section.

Biologists Ted Bailey and Ed Bangs wrote the Planning and Habitat Management sections as well as the Wildlife section with assistance from Biolgical Technician Mary Portner, who wrote on passerine birds.

Facilities Manager Ben Chio wrote the Equipment and Facilities section as well as the Safety section.

Budget Assistant Leslie Blaylock contributed to the Administration section.

Word Processor Pat Fencl completed the entire manuscript (several times) and served as editor to the editors.

K. FEEDBACK

This year has been an interesting one for Kenai. The end is in sight (hopefully) on land use planning required by ANILCA and we just might get to implement a plan in 1984. This will solve some problems and create more. It will provide management direction, alleviating that problem, but probably heighten the existing adversary relationship with ADF&G. Resident game refuges are unique in the respect that service policies on state management of resident game on refuges were founded on situations involving waterfowl refuges where resident wildlife was a secondary purpose of the refuge. Thus population management was more easily handled by state fish and game agencies. However, where resident wildlife is the primary purpose of the refuge, the service has direct population management responsibilities. Often, to fulfill the refuge purposes requires a population management strategy different from that pursued by the State on adjacent lands. Resident game populations are generally managed to provide maximum harvest by consumptive users consistent with maintaining the population. This strategy does not do the job on resident game refuges where enabling legislation requires more varied uses of resident wildlife. But as long as we follow the present policies regarding state control over resident wildlife on resident game refuges, the purposes of the refuge are not going to be achieved and the relationships between these refuges and state fish and game agencies is not going to improve.

L. APPENDIX

1. Publications

Recent Publications of the Kenai National Wildlife Refuge.

Bailey, T.N. and A.W. Franzmann. 1983. Mortality of resident versus introduced moose in a confined population. J. Wildl. Manage. 47(2):520-523.

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. 47(1):25-30.

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.

Bailey, T.N. and E.E. Bangs. 1983. The significance of natural sanctuaries in maintaining lynx population levels on the Kenai National Wildlife Refuge, Alaska. Abstracts. 3rd Northern Furbearer Conf. March 22-23, Fairbanks, Alaska.

Bangs, E.E. and T.N. Bailey. 1983. Recreational trapping on the Kenai National Wildlife Refuge. Abstracts. 3rd Northern Furbearer Conf. March 22-23, Fairbanks, Alaska.

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

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