

KENAI NATIONAL WILDLIFE REFUGE  
Soldotna, Alaska

ANNUAL NARRATIVE REPORT  
Calendar Year 1988

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

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REVIEW AND APPROVALS

KENAI NATIONAL WILDLIFE REFUGE

Soldotna, Alaska



ANNUAL NARRATIVE REPORT

Calendar Year 1988

Refuge Manager

Date

Refuge Supervisor Review

Date

Regional Office Approval

Date



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## INTRODUCTION

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 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 the Alaska National Interest Lands Conservation Act, 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. 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 refuge is divided into two generalized physiographic types, a mountainous region and a forested lowland. Elevations on the refuge range from 150 feet in the lowlands to over 6600 feet in the Kenai Mountains. Treeline is at 1800 feet and among the peaks lie the Harding Ice Field which thrusts numerous glacial fingers out from the mountains. The glaciers, mountains, lakes, alpine tundra and receding foothills are extremely scenic.

The vegetation of the refuge may be subdivided into three major classes: 1) humid coastal forests dominated by Sitka spruce (Picea sitchensis); 2) interior forests of white and black spruce (Picea glauca, P. mariana) with a mixture of birch (Betula papyrifera); and 3) mountain tundra, including glaciers and snowfields.

Forests cover 39% of the refuge. Swampy forests of black spruce alternate with peatbogs and grassy mires while white spruce forests are distributed in the drier areas and in the foothills and mountains. They are often intermixed with or include, deciduous trees such as white birch, especially in old burns and cut-over areas. Aspen (Populus tremuloides) is also found with white spruce and birch. Lowland shrub (alder and willow) covers 9% of the refuge.

Mountain tundra covers about 11% of the refuge. Of this class, about 87% is dwarf shrub and lichen tundra and 13% is tall shrub (alder and willow) thickets usually associated with tundra.

Water and associated wetlands cover 13% and snow, ice and glaciers cover the remainder of the refuge.

The Kenai River, the largest river system on the peninsula drains about 2,148 square miles (5,563 km<sup>2</sup>). About 54% of the watershed is on the refuge, 37% in the Chugach National Forest, and the remainder on private lands. Ten major tributaries feed the Kenai River System: Beaver Creek, Slikok River, Soldotna Creek, Funny River, Moose River, Killey River, Skilak River, Russian River, Cooper Creek, and Juneau Creek.

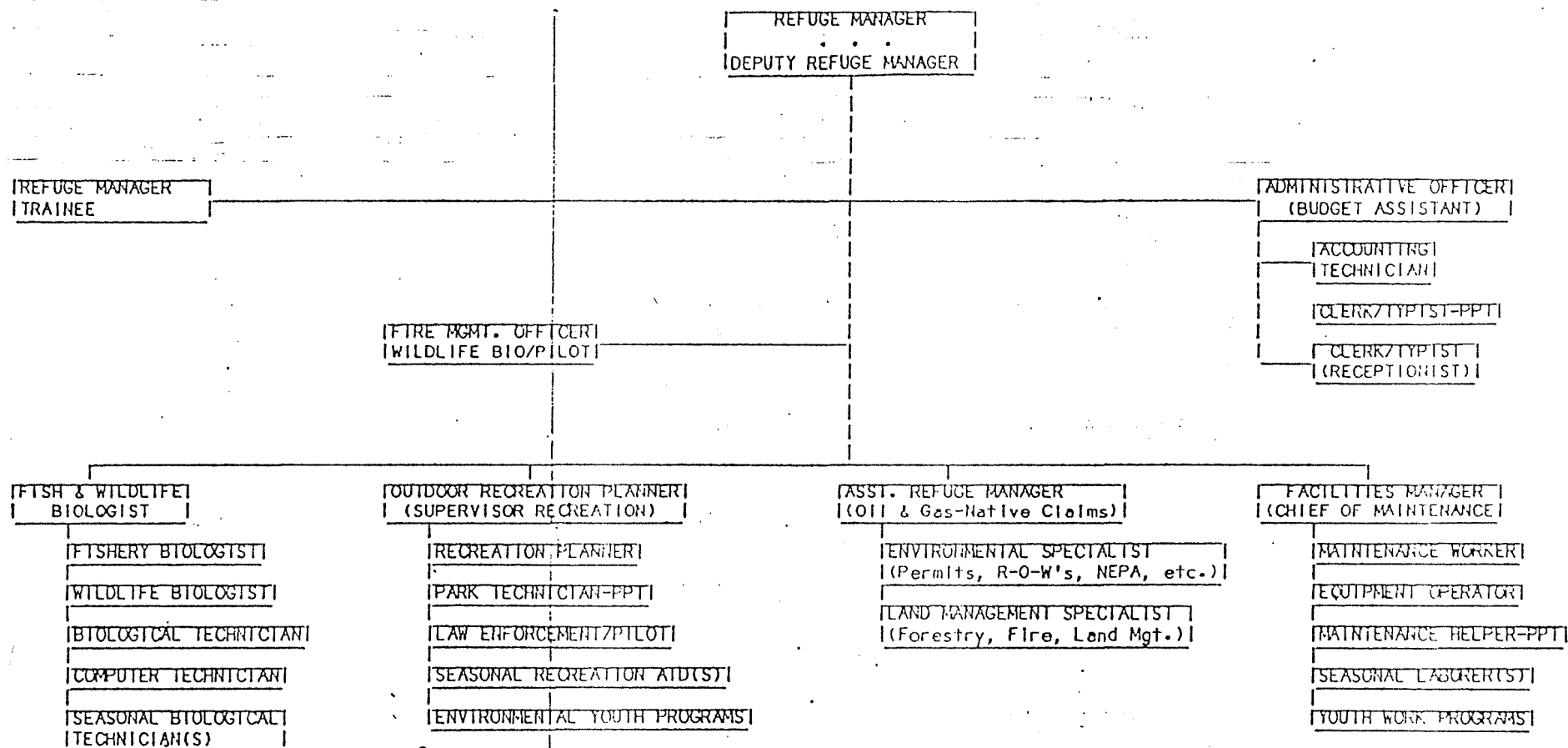
Other refuge river and stream systems flowing westward into the Cook Inlet include Kasilof River (which drains Tustumena Lake), Deep Creek, and the Swanson, Fox, Ninilchik, and Chickaloon rivers.

There are thousands of lakes on the Kenai Peninsula. Nearly all of them are on the refuge. The largest are two glacial lakes, Tustumena Lake (74,000 acres or 31,000 ha), and Skilak Lake (25,000 acres or 10,000 ha). More than 4,500 smaller lakes dot the refuge mostly in the Moose, Swanson, and Chickaloon River drainages.

At least 199 species of amphibians, birds, and mammals use the wildlife habitats on the refuge. None of these species are known to be threatened or endangered. Significant populations of brown and black bear, sheep, goat, wolves, bald eagles, trumpeter swans, caribou, moose, loons, four species of salmon and a wide variety of furbearers occur on the refuge.

May 10, 1984

KENAI NATIONAL WILDLIFE REFUGE  
ORGANIZATION CHART



APPROVED BY:

Robert L. Delong  
Refuge Manager

5/10/84  
Date

James P. Munn  
Asst. Regional Director (AWR)

1/8/85  
Date

Sam R. Colvert  
Refuge Supervisor South (RF)

1/3/85  
Date

David D. Peterson  
Regional Director

1/3/85  
Date

INTRODUCTION

TABLE OF CONTENTS

A.	<u>HIGHLIGHTS</u>	1
B.	<u>CLIMATIC CONDITIONS</u>	2
C.	<u>LAND ACQUISITION</u>	
1.	Fee Title . . . . .	6
2.	Easements . . . . .	8
3.	Other . . . . .	10
D.	<u>PLANNING</u>	
1.	Master Plan . . . . .	11
2.	Management Plans . . . . .	13
3.	Public Participation . . . . .	17
4.	Compliance with Environmental and Cultural Resource Mandates .	19
5.	Research and Investigations . . . . .	20
6.	Other . . . . .	26
E.	<u>ADMINISTRATION</u>	
1.	Personnel . . . . .	27
2.	Youth Programs . . . . .	33
3.	Other Manpower Programs . . . . .	33
4.	Volunteer Services . . . . .	33
5.	Funding . . . . .	36
6.	Safety . . . . .	38
7.	Technical Assistance . . . . .	42
8.	Other Items . . . . .	42
F.	<u>HABITAT MANAGEMENT</u>	
1.	General . . . . .	43
2.	Wetlands . . . . .	43
3.	Forests . . . . .	43
4.	Croplands . . . . .	45
5.	Grassland . . . . .	45
6.	Other Habitats . . . . .	45
7.	Grazing . . . . .	45
8.	Haying . . . . .	45
9.	Fire Management . . . . .	45
10.	Pest Control . . . . .	55
11.	Water Rights . . . . .	55
12.	Wilderness and Special Areas . . . . .	56
13.	WPA Easement Monitoring . . . . .	59

G. WILDLIFE

1.	Wildlife Diversity . . . . .	60
2.	Endangered and/or Threatened Species . . . . .	60
3.	Waterfowl . . . . .	60
4.	Marsh and Water Birds . . . . .	61
5.	Shorebirds, Gulls, Terns, and Allied Species . . . . .	61
6.	Raptors . . . . .	61
7.	Other Migratory Birds . . . . .	65
8.	Game Mammals . . . . .	68
9.	Marine Mammals . . . . .	74
10.	Other Resident Wildlife . . . . .	74
11.	Fisheries Resources . . . . .	76
12.	Wildlife Propagation and Stocking . . . . .	76
13.	Surplus Animal Disposal . . . . .	76
14.	Scientific Collections . . . . .	76
15.	Animal Control . . . . .	76
16.	Marking and Banding . . . . .	76
17.	Disease Prevention. . . . .	79
18.	Injured Wildlife . . . . .	79

H. PUBLIC USE

1.	General . . . . .	80
2.	Outdoor Classrooms - Students . . . . .	83
3.	Outdoor Classrooms - Teachers . . . . .	84
4.	Interpretive Foot Trails . . . . .	86
5.	Interpretive Tour Trails. . . . .	87
6.	Interpretive Exhibits/Demonstrations . . . . .	87
7.	Other Interpretive Programs . . . . .	88
8.	Hunting . . . . .	89
9.	Fishing . . . . .	94
10.	Trapping . . . . .	102
11.	Wildlife Observation . . . . .	105
12.	Other Wildlife-Oriented Recreation . . . . .	107
13.	Camping . . . . .	109
14.	Picnicking . . . . .	113
15.	Off-Road Vehicles . . . . .	113
16.	Other Non-Wildlife Oriented Recreation . . . . .	114
17.	Law Enforcement . . . . .	114
18.	Cooperating Associations . . . . .	127
19.	Concessions/Commercial Operations/SUP . . . . .	128

I. EQUIPMENT AND FACILITIES

1.	New Construction . . . . .	132
2.	Rehabilitation . . . . .	135
3.	Major Maintenance . . . . .	140
4.	Equipment Utilization and Replacement . . . . .	142
5.	Communications Systems . . . . .	145
6.	Computer Systems . . . . .	145
7.	Energy Conservation . . . . .	146
8.	Other . . . . .	147

J. OTHER ITEMS Page

1.	Cooperative Programs . . . . .	150
2.	Other Economic Uses . . . . .	150
3.	Items of Interest . . . . .	162
4.	Credits . . . . .	164

K. FEEDBACK 165

L. APPENDIX 166



A. HIGHLIGHTS

- Nineteen-eighty-eight was a year of many personnel changes.
- Two fatalities occurred on the Refuge.
- Funny River Prescribed Burn escapes and declared a wildfire.
- Supplemental Environmental Impact Statement for Kenai Wilderness Proposal completed.
- Skilak Wildlife Recreation Area contracts awarded.
- Kenai Furbearer Management Plan sparks controversy.
- Moose hunting violations increased dramatically in 1988.
- Major clean up operation of an oil spill in the Beaver Creek Field began by Marathon Oil Company.
- PCB remediation project at Swanson River Oilfield continue.
- Disposal efforts of forgotten 55-gallon drums stored for years at Skilak Guard Station initiated.

## B. CLIMATIC CONDITIONS

The relatively mild weather we enjoyed with the passing of the old year continued into January. Low temperatures dipped below zero for a few nights but most lows were in the teens. Highs were usually in the 20's with a couple of days in the low 30's. Snow accumulation at the office had settled to nine inches.

The month of February saw what appeared to be an attempt to break winter's grip. Temperatures fluctuated from below zero to 40 above, and frequent snow and rain showers, crossing Peninsula lowlands, were accompanied by gusting winds as system lows passed through. On February 17, a snowstorm deposited more than two inches, only to be followed by clear skies and gusty winds pushing the month's high to 41°F on the next day. Nearly 24 hours of wind on February 21, with gusts to 40 knots, ushered in temperatures -12°F. which was the low for this period. Temperatures of 34-38°F. were recorded during the balance of this month, with occasional rain showers. Surface frost in the lowlands was recorded between four and twelve inches, under less than two feet of snow cover.

Table 1. Monthly temperatures (extremes) and precipitation data\*

	Temperature (°F)				Precipitation (in.)			
	Low		High		Total		Snow	
	1987	1988	1987	1988	1987	1988	1987	1988
January	-23	-19	42	39	1.63	0.22	18.1	2.9
February	-1	-12	40	41	0.29	0.25	1.8	6.0
March	-9	10	45	41	0.12	1.06	trace	8.7
April	20	12	52	53	0.77	0.84	2.8	trace
May	27	25	60	60	0.94	1.60	0.0	0.0
June	35	32	68	69	1.42	1.43	0.0	0.0
July	43	37	77	70	1.81	0.35	0.0	0.0
August	32	40	76	70	0.54	3.21	0.0	0.0
September	21	24	59	60	2.94	1.94	0.0	0.0
October	8	12	53	51	1.70	2.74	trace	**trace
November	3	-8	40	38	1.53	1.15	18.7	**20.0
December	-21	-10	39	41	1.69	0.95	19.0	**21.0

Totals 15.38 15.74 60.4 58.6

\*Reported by the Federal Aviation Administration, Kenai Airport.

\*\*Estimated figures.

March saw the continuation of mild weather without any below-zero temperatures whatsoever. Highs were generally in the mid to upper 20's with an occasional day in the high 30's. Total snow depths, dependent on elevation, varied from 0-60 inches, and most lakes still had 18-24 inches of ice. Although April consisted of predominantly cloudy weather, temperatures were somewhat higher than in March - the high was recorded at 53°F.

May was sunny and warm, except for occasional showers - a welcome contrast to the cloudiness of April. Refuge aircraft were converted to floats during mid-month as refuge lakes were open in early May. Headquarters Lake was ice-free on May 4, several days earlier than average. Much to everyone's delight, May's pleasant weather continued into June. Clear and sunny skies in Southeastern Alaska made June, 1988, one of the nicest months in recent years. Although temperatures were relatively high - in the low 70's - and precipitation low, fire danger remained relatively low during June.

Unbelievable! With the coming of July, three successive months of pleasant weather were "in the making". Generally, July consisted of fairly long periods (three to four days) of warmth and sunshine, interspersed by cloudy and occasionally rainy conditions. At one point, however, we endured a three-day stretch of clouds, fog, and drizzle. Again this month, fire danger was relatively low. Overall, pleasant conditions were thoroughly enjoyed, and an order was submitted for more of the same in August. Unfortunately, August retreated back into a more "normal" weather pattern - wet and mild, in contrast to the sunny, warm days of June and July. Highs were in the "60's" and lows in the "50's", and precipitation was recorded on 17 days during the month. The subpar weather seemed to be a reminder that we can't take anything, including good weather, for granted.

After the "August experience", September came as a welcome change. Blue skies and warm weather were a common occurrence - a far cry from the 4D (dreary, damp, disgusting, and depressing) September we had last year. Twenty rain-free days prevailed, with a total precipitation (1.94 inches) 1.39 inches below the monthly average. Peak wind was recorded at 32 knots on September 28. It appears that our order, requesting favorable conditions for the month of August, was finally granted in September.

Although October was less pleasant than we would have preferred, it did produce some very nice stretches - thirteen sunny days - of weather. Precipitation was 0.53 inches above normal, at 2.74 inches, and peak winds were recorded at 28 knots on October 28 and 29. The high temperature was 51°F., occurring on October 7, whereas the low of 12°F. occurred on October 15.



The Kenai River, as seen from the Kenai River Trail, during "just another" beautiful September day. JEF

November started pleasantly (the high of 38°F. occurred on the first), but winter appeared to be here to stay when the temperature dipped to a low of -8°F. on November 25. Total precipitation, at 0.96 inches, was 0.46 inches below the monthly average; however, estimated snowfall, at 20 inches, was 1.3 inches higher than recorded in 1987. Thirty-five-knot winds were recorded on November 20.

December proved to be another snowy month. Snowfall, again, exceeded 20 inches; an estimated 21 inches of snow fell, as compared to 19 inches in 1987. The temperature ranged from 40°F. on December 11, to -10°F. on December 23, and peak wind was recorded at 33 knots on December 8.

In conclusion, seven months in 1988 received less precipitation than 1987, however, because August was so wet (3.21 inches), total precipitation (15.74 inches) was still 2.3 percent higher than 1987 (Table 1). Total snowfall (58.6 inches) was approximately 3. percent lower than in 1987.





The Kenai National Wildlife Refuge Headquarters sign during summer... JEF



...and winter.

JEF



C. LAND ACQUISITION

1. Fee Title

a. Alaska Native Claims Settlement Act

(1) Kenai Native Association, Incorporated

Congressman Don Young introduced a legislation (House Bill 4656) on behalf of the Kenai Native Association. "To provide for settlement of the land rights of the Kenai Natives Association, Incorporated, (Association) under section 14(h)(3) of the Alaska Native Claims Settlement Act, by providing for and authorizing grants and exchanges of lands and interests between such corporation and the United States, and for other purposes."

During December 1983, a proposed land exchange was submitted by the Association. Although negotiations between the Association and Service continued for several months, a final exchange agreement was not developed. The Association withdrew from further negotiations, by letter, dated April 24, 1984. House Bill 4656 was the result of a 1988 Association legislative proposal merely resurrecting the December 1983 "Agreement in Principle" that the Region and Association did not finalize, and substituted legislation for the negotiations that the Association had withdrawn from.

The Fish and Wildlife Service is opposed to this exchange because, as written, it is not in the best interest of the United States. In the proposed exchange the Association would have received approximately 20 times the value the Service received. Also, the old Kenai Headquarters site - a facility with continued need in support of Service programs - was included in the proposal.

(2) Salamatof Native Association, Incorporated

Still pending is an exchange agreement developed in 1985 between the Salamatof Native Association and the Service, whereby, the Service provides sand and gravel resources to Salamatof in return for nondevelopment easements along the Kenai River. On December 27, 1986, the Service was authorized to proceed with the completion of this exchange. Since then, ground surveys have been conducted and documented on maps. However, the nondevelopment easement boundary has not been marked to allow for a visual identification and, therefore, provides the Service no enforcement capability.

(3) Tyonek Native Corporation, Incorporated - Nothing to report.

(4) Point Possession, Incorporated - Nothing to report.

(5) Cook Inlet Region, Incorporated

Final easements and waterway recommendations under 17(b) of the Alaska Native Claims Settlement Act, within Cook Inlet Region's 14(h)(1) land selections at Russian River, were received in a Bureau of Land Management decision document, dated March 21, 1988. The public easements to be reserved included the ten-acre Kenai/Russian River Campground site, the 25-foot-wide easement on the bed of the Kenai River, parallel to the entire waterfront, the one-acre sites on both the right and left banks of the Kenai River for use as ferry landing sites, the 25-foot-wide trails providing access to reach public lands beyond the conveyance, and the 60-foot-wide access road to the campground. However, should it be determined that these particular lands are held by appropriation, or the bed of the river is not being conveyed, those easements, so associated, would not be reserved (or needed).

In addition, a Bureau of Land Management amendment, dated April 26, 1988, to the Final Easements for Cook Inlet Region, were changed to document the mean high water (ordinary high water) mark as being the outer edge or riverside boundary of the trail easements.

A Bureau of Indian Affairs field crew-leader notified the refuge of pending ground investigations beginning in May, within the 14(h)(1) selection at Russian River. In November, we were notified the Bureau of Indian Affairs had certified additional lands within the Russian River selection area and now included, for the first time, refuge lands north of the Kenai River encompassing not only portions of the River, but the vehicle parking and campground area as well.

Under the recently enacted Alaska Submerged Lands Act, it is our understanding the bed of the Russian River will not be conveyed pursuant to the authority of Section 14(h)(1) of the Alaska Native Claims Settlement Act. Instead, the bed of the river will be owned by the Cook Inlet Regional Corporation, via riparian rights, as a non-navigable, meanderable waterbody, without chargeability to the Corporation.

Cook Inlet Region wished to include the surface and subsurface estate of lands acquired near the Tustumena Lake outlet, under the Terms and Conditions Document of 1976 (Public Law 94-204), for trade under the proposed land exchange in the Arctic National Wildlife Refuge. Interim Conveyance Document Number 1379, dated April 6, 1988, conveyed these lands to the Cook Inlet Region.

b. Native Allotments

Legal briefs continue to be exchanged in the Alec Dolchok Native Allotment Case (AA-8272). A hearing on this case was expected to be conducted during 1988 but was delayed.

Past Kenai Native Association President George Miller Jr. visited the office July 20, to discuss a possible land exchange near Stormy Lake for his interest in the conveyed 80-acre native allotment at Olson Lake within the Andy Simons Unit of the Kenai Wilderness. Mr. Miller said he would provide us with a written request, however, that request has not been received.

## 2. Easements

State archaeologists continued their seasonal testing, evaluation and limited collection at archaeological sites near mile post 55.2 of the Sterling Highway. The area of concern is related to the State Department of Transportation's proposed alternate highway route along the bluff and north of the Kenai River, section mile 37-60. The refuge portion of this proposed route, is in designated wilderness, and will require Congressional action to permit the construction of this public highway.

Early this year, Homer Electric Association employees, using mostly tracked vehicular equipment, utilized the cleared 115kV Fritz Creek (Homer) to Soldotna Transmission Line right-of-way and adjacent



Clearing began March 1986 adjacent the Refuge Headquarters Complex in support of the new Fritz Creek-to-Soldotna 115kV right-of-way.

RR

maintenance access routes to survey structure locations and install powerline pole facilities. Crews completed pole structure placement under winter conditions and powerline stringing during the summer. Some orange, white, and yellow aerial markers were installed on line sections crossing the Funny River Road near the Soldotna airport.



The installation of pole structures and wire stringing for the Fritz Creek-to-Soldotna 115kV power transmission facility were completed on refuge lands in August 1988. RR

A ground survey of the newly constructed Fritz Creek to Soldotna 115kV power transmission line was conducted on November 29 by Assistant Refuge Manager Richey, with Homer Electric Association representatives and their prime contractor Gilbert/Commonwealth. Other than additional barrier needs and posting to help prevent unauthorized vehicle entry along the right-of-way, the final inspection was found satisfactory under the refuge clearing and construction stipulations for this project.

3. Other

a. Inholders

A memorandum was sent to the Bureau of Land Management following their earlier request for us to identify any problems impacting the refuge should they commence a public sale of 1.99 acres, the balance of public lands at Burnt Island. Our concerns rest with the increased management demands and impacts, authorizing additional private land owners and their guests access through the refuge to property outside the Kenai National Wildlife Refuge. Today, only one five-acre tract has been conveyed on this seven-acre island.

Negotiations took place and ultimately broke down regarding the Fish and Wildlife Service's purchase of subdivided tracts within the Bear Creek inholding block on Tustumena Lake. The Region 7 Realty Office was unable to negotiate a reasonable price from owner Art Thompson. The inability to purchase the subdivided properties resulted in several parcels being sold to private persons during late 1988.

b. Old Refuge Headquarters

Cook Inlet Region, Incorporated, notified the Service of its desire to acquire the old refuge headquarters site when the Service had no further use for those facilities. Stephen Griles, Assistant Secretary for Lands and Water, signed a Memorandum of Understanding with Cook Inlet Region, on April 11, 1986. Section three of this document refers to Exhibit A, listing the old headquarters site as potential excess property, no valid State selections, and appropriate for Cook Inlet Region selection pool placement upon excess. Under the terms of this memorandum, Cook Inlet Region will be entitled to have the old headquarters site placed into its pool land when this agency ceases to use the site.



## D. PLANNING

### 1. Master Plan

The Kenai National Wildlife Refuge Comprehensive Conservation Plan called for the Skilak Wildlife Recreation Area to be the major wildlife viewing area on the refuge. The refuge took steps to restrict hunting and trapping within the area via refuge regulations and state hunting changes. A trapping closure took effect in 1985, and the Alaska Board of Game closed the area to most hunting. The area remained open during fall and winter months for small game hunting with bow and arrow.



Initial phases of implementing the Kenai Comprehensive Conservation Plan called for closing the Skilak Recreation Area to hunting and trapping.

RKJ

In late 1985, the refuge awarded a planning contract to Land Design North, Incorporated, of Anchorage, to provide a conceptual plan for campgrounds and interpretive media within the proposed Skilak Wildlife Recreation Area. Contractors visited the refuge during 1986, and interviewed staff and local professionals.

After several reviews, the finalized concept and plan was submitted to the refuge in December 1986. The plan called for major new construction,

facility reconstruction, Skilak Road reconstruction, trail development, new access roads, and major management reorganization.

The Land Design North, Incorporated, plan was revised during 1988, and two additional contracts were on-going during the year 1988. One contract enlisted an architectural and engineering firm to prepare site design and contract bids for certain identified facilities, and the second contract called for development of detailed interpretive media for the area. The architectural and engineering contract was awarded at the end of 1987 and negotiations continued with several potential interpretive contractors during early 1988. The interpretive contract was awarded on October 20.

(See appendix 1 and 2 for a complete copy of the Skilak Wildlife Recreation Area maps and charts).

Although associated entirely with the wildlife viewing area concept for the Skilak area, the first contract involved primarily, architectural and engineering work for sites identified as priorities. Priority sites included Hidden Lake Campground, Upper Skilak Campground, and realignment of the east and west intersections of the Sterling Highway and Skilak Road. Numerous surveys, meetings, and partial work submittals took place during 1988 as well as associated analysis, survey, and design work by Region 7 engineers. By year's end, detailed blue prints for Hidden Lake Campground, Upper Skilak Lake Campground, two highway intersections, dump stations and several other facilities were completed. Also, by year's end an actual construction contract (approximately two million dollars worth) was awarded to still a fourth contractor (M-B Construction) for construction of Hidden Lake facilities, paving of the Hidden Lake Road and campground, dump station construction, and realignment work associated with Skilak Lake Road intersections with the Sterling Highway. Overall, hundreds of hours of staff time were required for the various projects.

Even as field architectural and engineering work began early in 1988, reevaluation of the overall Skilak Wildlife Recreation Area Plan was conducted while writing the environmental assessment for the project. The environmental assessment became the vehicle by which the consultant firm plan was reexamined and overall direction for the project provided. Essentially, high-priority consensus areas such as Hidden Lake became the facilities concentrated on by the architectural and engineering firms.

Associated with the Skilak project, proposals were solicited and a contract awarded to an Austin, Texas, firm to plan interpretive concepts and exhibits, and prepare camera-ready graphics for various sites throughout the Skilak Wildlife Recreation Area. Locations were to be taken from suggestions within the Skilak Wildlife Recreation Master Plan and subsequent revisions outlined within the Skilak Wildlife Recreation Area Environmental Assessment. The contract was prepared and awarded by the Region 7 staff and was a separate but integrated phase within the overall Skilak project.

The Austin, Texas, consulting firm of Fuller, Dyal and Stamper visited the refuge the week of June 6-10 to gather data for the Skilak Wildlife Recreation Area Interpretive Planning Project. Regional office staffers Olson and Patterson accompanied the team from Austin, Texas, as they visited prospective sites within the Skilak area. The team met with refuge staff on June 6, 1988. Outdoor Recreation Planner Johnston met with the planners at several on-site locations and provided an orientation flight to the team leader.

In July, refuge staff, including Daniel Doshier, Mike Hedrick, Rick Johnston, and Candace Ward, assisted interpretive contractors from Fuller, Dyal and Stamper with field work and data collection for the Skilak Wildlife Recreation Area. Ward and Johnston compiled staff comments in a 15-page critique on Fuller, Dyal and Stamper's interpretive proposals.

The interpretive consultant firm made their original presentation in July and after receiving staff comments, made a second presentation in early September. The firm, Fuller, Dyal and Stamper, presented draft representations of proposed interpretive panels for wayside pull-off areas, trailheads and campgrounds. After suggesting a number of significant alterations in the draft texts and panel lay-outs, the refuge staff developed mock-up interpretive panels and a final list of site specific panel topic suggestions to help the firm understand the type of interpretive panels used for the public. The interpretive and recreation staff worked diligently to meet the review-period deadline of September 23. By mid-fall, it became very apparent that what the Kenai staff had hoped would be "State of the Art" help on developing interpretive themes and exhibits for the Skilak project, was failing as the firm was struggling in several ways (particularly subject text development) to meet the expectations for the contract.

What started out as a comprehensive interpretive project evolved into a simple sign and exhibit project. By year's end, refuge staff support (approximately 300 hours) had reached unacceptable levels for the struggling project and although Service expectations had been lowered, the Austin firm was having difficulties meeting those minimal standards (see exhibit section for a draft subject list of proposed exhibits for the Skilak Wildlife Recreation Area).

## 2. Management Plans

Refuge staff met with Regional Office Planners Norm Olson and Sue Mathews regarding the Public Use Management Planning for the Kenai National Wildlife Refuge.

Strategies for developing a Public Use Management Plan were discussed and public involvement strategies and requirements were discussed.

Work on developing a Commercial Outfitter/Guide Management Plan began during late 1988. All necessary literature reviews were completed and documents compiled. The plan will be finalized during 1989.

Several aspects of the Skilak Wildlife Recreation Area Master Plan prepared by a private consultant, contained draft management direction and strategies for implementing overall goals for the Skilak Wildlife Recreation Area. Although revised in several ways by an Environmental Assessment of the plan finalized in July, the plan provided management options and guidance for the highest-use portion of the Kenai National Wildlife Refuge.

Kenai National Wildlife Refuge Furbearer Management Plan:

The Kenai Refuge Furbearer Management Plan is an outgrowth of the Final Kenai National Wildlife Refuge (Refuge) Comprehensive Conservation Plan. That plan called for development of a more detailed management plan to address specific public comments regarding furbearer management changes on the refuge. The Furbearer Management Plan is intended to provide specific guidance for the management of furbearers and their uses, including trapping.

In August 1987, the U.S. Fish and Wildlife Service (Service) prepared a draft Furbearer Management Plan for the Kenai Refuge guided by the Kenai Refuge Comprehensive Conservation Plan and Service policy. Public comments on the draft management plan revealed major differences among various interest groups about how furbearers should be managed on the refuge. Because of the importance of furbearers as a wildlife resource and the local and national interest in their management and use, the Service determined under the provisions of the National Environmental Policy Act that an environmental assessment should be prepared.

In an attempt to resolve differences among interest groups on the draft plan, and, at the same time, ensure that the wildlife resource would be properly managed within Service authorities, the Service sponsored a "charrette". This is a problem-solving process in which representatives of the essential publics participate in a highly intense effort to reach agreement on an overall plan. Proceedings of the charrette were recorded and a report was made available to the public. The charrette produced recommendations to be considered. These recommendations, along with public comments received on the draft plan, were used to develop the alternatives considered in the draft environmental assessment.

The draft environmental assessment was distributed to over 700 individuals and organizations on January 8, 1988. Comments were accepted until February 26, 1988. Over 1,100 letters of comment were received. In preparing a final environmental assessment, comments received on the draft assessment were considered and modifications were made where appropriate.

In accordance with an interagency Memorandum of Understanding between the Service and the Alaska Department of Fish and Game, the Service, in March 1988, made proposals to the Alaska Board of Game for their consideration in developing regulations for Kenai furbearers. The board of Game adopted regulations that were generally consistent with the recommendations of the charrette. These differ somewhat from those recommended by the Service and reflected in the preferred alternative shown in the final environmental assessment. For example, the Board of Game chose to have trapping season of November 10 to February 28 for wolves, wolverines, coyotes, and foxes, whereas the Service recommended a season of November 10, to February 15.

Given the relatively small differences in season dates between the Service and Board of Game and the fact that a harvest quota system will be used to manage wolves (therefore rendering season dates less important), the Service believes that the Board of Game regulations should be implemented and evaluated before making a determination about their effectiveness. The Service will evaluate the effectiveness of the regulations passed by the Board of Game in meeting the objectives, of the Kenai Refuge Comprehensive Conservation Plan and the Furbearer Management Plan. Should the regulations not adequately meet the objectives, the Service will reconsider the more restrictive measures for the Kenai Refuge as expressed in the environmental assessment preferred action and will request the Board of Game to address this matter again.

Those aspects of furbearer management that were not addressed by the Board of Game, yet are a part of the Furbearer Management Plan environmental assessment, will be implemented as stated in the preferred action. One exception will be the modification of the three-day trap check requirement for the accessible areas of the refuge to a four-day trap check requirement beginning with the 1988-89 season. A second exception will affect the trapper orientation program which will not begin until the 1989-90 season due to development time required.

A summary of the furbearer changes made on the refuge during the 1988-89 season include:

1. Marten trapping was closed in the area between Russian River and the Skilak River, south of the Kenai River; marten pelts will be sealed on the entire Kenai Peninsula; trappers will be requested to turn in marten carcasses to the Alaska Department of Fish and Game; require trappers taking marten elsewhere on the refuge to turn in the carcasses; in both cases the refuge would pay \$10.00 per carcasses regardless of where the marten was captured.
2. Wolverine season was shortened 15 days and closed on February 28, throughout the refuge (The refuge recommended a February 15 closure to protect denning females); Wolverine season was closed completely for up to three years in Game Management Unit 15A; a wolverine study is to be initiated on the Kenai peninsula; the Service and Alaska Department of Fish and Game is paying \$50 per female and \$25 per male carcass.



3. The wolf season was shortened refuge-wide from March 15 to February 28 (the refuge recommended a February 15 closure date for greater protection of breeding females); all wolves taken in Game Management Unit 15A must be sealed by Alaska Department of Fish and Game within five days of taking; manage wolves by a quota system in Game Management Unit 15A to maintain a post-season population of 25 to 35 wolves; the hunter bag limit of wolves was reduced from four to one per hunter per year.
4. The taking of red fox by firearms is prohibited throughout the refuge; trappers can only take one fox per trapper per year; the fox trapping season was actually extended from January 31 to February 28 to be comparable to coyote and wolf trapping seasons. A requirement to seal all fox taken on the Kenai Peninsula was not pursued by Alaska Department of Fish and Game; a recommended three-year study of red fox was not initiated because of refuge budget constraints.
5. The coyote season was shortened from March 15 to February 28; the bag limit on coyotes for hunters was removed. (The refuge recommended a February 15 closure date).
6. Only one set per beaver lodge is allowed in the Game Management Unit 15A portion of the refuge by permit, only one beaver per lodge is allowed to be removed from the Swan Lake Canoe Route region of the refuge; only one beaver per lodge is requested to be removed by trappers throughout the remainder of the Game Management Unit 15A portion of the refuge; trappers must leave a vertical pole marking each lodge trapped, a cooperative study of beaver is to begin in 1989 on the refuge.
7. The closing date on river otter was changed from March 31 to January 31, a shortening of 59 days. This became effective for the 1988-89 season.
8. The muskrat season was shortened from a June 10 closing date to a May 15 closing date.
9. Traps have to be checked at least once every four days in Game Management Unit 15A and Game Management Unit 15B(west) portions of the refuge. A seven day trap check requirement applies to the remainder of the refuge.
10. An approved trapper education program will be mandatory for all refuge trappers prior to the 1989-90 season.
11. Land-and-shoot trapping is prohibited for all refuge furbearers except coyotes which can be taken same day airborne 1/4 mile from the airplane using predator calls.

### 3. Public Participation

The public was involved in several aspects of both formal and informal decision making and information sharing during 1988. Manager Doshier and Deputy Manager Hedrick met with dozens of persons on various refuge management issues during 1988. Other refuge staff fielded hundreds of telephone inquiries and received input from a variety of the public on numerous issues. Other more formal meetings and hearings took place through 1988 and varied from Environmental Assessment and Environmental Impact Statement hearings to toxic waste cleanup informational meetings.

Regional Planner Norm Olson and Outdoor Recreation Planner Johnston conducted several informational meetings for persons interested in the Skilak Wildlife Recreation Area Environmental Assessment. Persons or organizations briefed, included the Alaska Department of Fish and Game, Alaska State Parks, the Borough Mayor and his staff, and Jim Butler, representing the Congressional Office.

Outdoor Recreation Planner Johnston and Wildlife Biologist Bangs attended a five-day training course in Anchorage from March 29-April 1 on Citizen Participation.

A public meeting on the Skilak Wildlife Recreation Area Environmental Assessment was held on May 25 in Soldotna (two people attended) and May 26 in Anchorage (one person attended). Public comment was also solicited for 45 days. Written comments received were few.

Refuge Manager Doshier gave a presentation to the Kenai Chamber of Commerce at a noon luncheon April 20, regarding the development plans for the Skilak Wildlife Recreation Area.

A public meeting regarding the PCB cleanup operations was held June 2, with presentations by ARCO and Ogden Environmental Services, Incorporated, ARCO's contractors responsible for the cleanup, to discuss past work and proposed future operations. Ogden provided an informative presentation of their Circulating Bed Combustion Unit. Concerns registered were recorded from the thirty-five persons attending.

The final supplemental Environmental Impact Statement for the Kenai National Wildlife Refuge wilderness review was released for public review and comment during June.

On July 6, a public meeting was conducted in Anchorage by Bill Knauer, Bob Seemel, and Gail Baker concerning the Kenai Refuge Wilderness proposal.

Refuge staff attended almost every Kenai Peninsula Trapper's Association meeting keeping trappers well informed regarding the status of the Furbearer Management Plan and related special operational plans.

Attending trapping meetings by refuge staff, while proposing curtailment in the trapping season was a lot like being a "goalie for a dart "team"! Their bravery was commendable.

The Citizens' Advisory Commission on Federal Areas requested no further action be taken on Kenai National Wildlife Refuge wilderness additions. The State of Alaska expressed concerns about recommending wilderness designation for a one-mile wide corridor along an existing natural gas pipeline right-of-way in the Chickaloon Flats area. The State is currently studying the feasibility of an electrical transmission intertie between the Kenai Peninsula and Anchorage, utilizing this same alignment. The Service chose not to remove the corridor from its wilderness recommendation for the Kenai Refuge. Regional Director Steiglitz reasoned that, Title XI of the Alaska Lands Act includes provisions for allowing transportation and utility systems to cross designated wilderness and that there are other potentially feasible alignments for the intertie which could be utilized.

The draft Environmental Assessment for the Kenai National Wildlife Refuge Furbearer Management Plan was made available for public review on January 8, 1988. The comment period closed on February 26, 1988. A total of 1,101 letters were received during the formal comment period. All correspondence received is on file at the Refuge Office in Soldotna. Of these written comments, one was from a member of congress, one was from a state agency, one was from a Native group, twelve were from organizations, and the remaining 1,086 were from individuals.

The Service studied all of the comments it received in response to the draft document. A response was prepared for five general categories which received significant comment. These responses follow:

1) Large numbers of comments were received supporting Alternative D which proposed to close the Refuge to trapping. The Service, after consideration of these comments, rejected this alternative and reaffirmed Alternative B with several modifications as the final course of action. If properly conducted, trapping is recognized as an appropriate recreational activity and management tool on wildlife refuges by the Service. The Service believes Alternative B as modified, provides the proper balance of trapping recreation, effective management of furbearer populations, promotes ethical, practical and humane trapping practices while minimizing impacts on other refuge activities.

2) Several commenters expressed the opinion that the refuge trapping program and problems associated with this activity, both real and perceived, could be reduced in part by a structured trapper orientation program. The Service agreed and has modified Alternative B to reflect this change. The Service believes trapper orientation to be a cornerstone in maintaining trapping as a viable and desirable activity on the refuge in the future. It further offers the opportunity for the Service to work with trappers and the Alaska Department of Fish and Game in a positive endeavor to improve the refuge trapping program.

3) Significant numbers of commenters addressed the interval in which traps should be checked. The majority of these commenters felt that traps should be checked every 24 hours in accessible areas of the refuge and every three days or less in the more remote areas of the refuge. Other comments expressed the opinion that particular devices such as conibear traps or drowning sets, need only have a seven-day trap check requirement. Some comments advanced the opinion that the present seven-day trap check requirement should be retained refuge-wide for the convenience of trappers and because of the impracticality of checking more often in remote areas of the refuge. After consideration of all these comments, the Service changed the trap check requirement as proposed in Alternative B to every four days with the modification to allow a seven day trap check for those devices such as conibear traps or drowning sets over the entire refuge. The Service policy is to inspect traps as often as practical for humane reasons and to reduce adverse impacts on non-target species. Therefore in the accessible portions of the refuge [Game Management Unit 15A and 15B (West)] the Service will require that traps be checked every four while the remainder of the refuge will require traps checked even seven days. As access improves throughout the refuge in the future, trap check requirements will be reviewed and shortened as practicable.

4) Several commenters offered input on the Service's proposal to close the trapping season on furbearer species such as wolverine, wolf, coyote, fox, etc. on February 15 as opposed to February 28 or January 31. The proposal to close trapping on February 15 is particularly important in relation to wolverine. Historical harvest data indicated wolverine populations throughout Southcentral Alaska declined substantially since the early 1970's. Areas with rapid human development had the greatest declines. Wolverine population declines throughout Europe, Canada, Alaska, and the continental United States were believed caused by excessive human exploitation. Humans appear to be the primary predator on wolverine, accounting for nearly all the documented mortality of tagged study animals in North America. As wolverine became scarce the remaining animals were typically found in rugged mountains or other areas inaccessible to humans. Wolverine habitat is believed to be primarily dependent on the presence of ungulate carrion rather than its inaccessibility to humans.

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

A final supplemental Environmental Impact Statement for the wilderness proposal of the Final Kenai Comprehensive Conservation Plan/Environmental Impact Statement/Wilderness Revision was released in September 1988.

The final statement was prepared pursuant to Section 3(d) of the wilderness Act of 1964, Section 1317, of the Alaska National Interest Lands Conservation Act of 1980 and Section 102(2)(c) of the National Environmental Policy Act of 1969. The final statement analyzes the potential impacts of five alternative wilderness proposals for the Kenai National Wildlife Refuge

As required by law, a formal wilderness record was kept regarding the wilderness review and supplemental final Environmental Impact Statement and the formal record was forwarded along with the Environmental Impact Statement.

Recreation Planner Johnston attended a training session on the Archeological Resources Protection Act, October 17-21, in Anchorage. The comprehensive course was sponsored by the National Park Service in Alaska and conducted by instructors from the Federal Law Enforcement Training Center. The course was informative and valuable for both archaeologists and law enforcement personnel and was designed to help federal land managers meet their cultural resources protection mandates.

State archeologists continued their testing, evaluation and limited collection at archeological sites of interest at mile post 55.2 of the Sterling Highway. The area of concern is related to the State Department of Transportation's proposed alternate route along the bluff and north of the Kenai River, section mile 37-60. The limited refuge portion of their route is, however, in designated wilderness. Removal of a small portion of the Kenai Wilderness for a highway realignment would have to be approved by congress.

An Environmental Assessment was prepared for the Skilak Wildlife Recreation Area development proposals as required by the National Environmental Policy Act of 1969. The assessment included three alternatives for proposed Skilak Area developments. The Skilak Environmental Assessment was finalized during July 1988.

An environmental assessment was also prepared for implementation of the Kenai National Wildlife Refuge Furbearer Management Plan pursuant to the guidelines of the National Environmental Policy Act of 1964. The Furbearer Environmental Assessment was finalized on October 20, 1988.

## 5. Research and Investigations

### a. Brown Bear Biology and Management on the Kenai Peninsula.

Investigators: U.S. Fish and Wildlife Service, Alaska Department of Fish and Game, U.S. Forest Service West Virginia State University (Graduate Student M. Jacobs, Principle Investigator)

An Interagency Brown Bear Study Team comprised of the U.S. Fish and Wildlife Service, Alaska Department of Fish and Game and the U.S. Forest Service was founded in 1984 to obtain information on brown bears. Data collection methods included capture and monitoring of radio-equipped brown bears, aerial and ground surveys of areas used by bears and an analysis of brown bear harvest data. Michael Jacobs was contracted to summarize and evaluate this information and make management recommendations.

Graduate student Michael J. Jacobs, West Virginia University, Morgantown, West Virginia completed a draft of his Master's of Science thesis on brown bear ecology and management on the Kenai National Wildlife Refuge and Kenai Peninsula. A summary of the thesis entitled: An Initial Population Analysis and Management Strategy for Kenai Peninsula Brown Bears follows:

Fifteen adult brown bears were captured and tagged between 1984 and 1987, eight of which (5 females, 3 males) were fitted with transmitter collars. Of 100 locations between July 1 and October 1, 1984-87, 73 percent were on or near salmon streams. Home range of male brown bears averaged  $949.6 \text{ km}^2$  ( $738.2\text{--}1290.4 \text{ km}^2$ ) and those of female's averaged  $401.2 \text{ km}^2$  ( $24.8\text{--}1264.3 \text{ km}^2$ ). Males entered dens late in October through November and emerged in early April. Females usually entered dens at the same time but emerged later in mid-April. Average number of days in dens for males and females, respectively, was 144 and 168 days. No density estimate for bears was possible but a "best guess" ranged from 150-250 bears on the Kenai Peninsula or 1 bear per  $34\text{--}57 \text{ km}^2$ . Average observed litter sizes of 53 sows with offspring were 1.7, 1.9, and 2.0 cubs, yearlings, and subadults per female. Increasing litter size was attributed to visual sighting bias with small cubs most difficult to see. Twenty-six salmon streams were surveyed with an average of 3.8 observed bears/stream. Staple foods in the spring were grasses, sedges and horsetails, first available in avalanche chutes and wet areas. Winter-killed moose and moose calves were also eaten by brown bears in the spring.

Brown bear mortalities by humans have been increasing over the past 27 years, averaging 6.4 bears/year for 1961-69, 7.5 bears/year from 1970-78, and 13.2 bears/year from 1979-1987. During the past 22 years, 79 percent of all harvested bears were taken during the moose season. Sex ratios of legally-harvested bears has been increasing in favor of females (0.9 males/1.0 females during 1979-87) which is often indicative of an overexploited population. Three of 15 tagged bears were shot in three years. Population model estimates suggest human harvest should not be exceeding 12-17 bears/year if the population is 150-250 bears. Current harvest (1979-87) has, therefore, been exceeding or is near maximum recommended harvest rates for maintaining a stable population.

Recommendations to maintain brown bears on the Kenai Peninsula, especially the refuge since it supports most of the Peninsula's brown bears, include classifying and protecting essential habitat for brown bears and reducing harvest rates. One harvest change strategy currently, before the Board of Game is to shorten the overlap between the fall brown bear and moose seasons from 20 to 5 days. This should reduce harvest and perhaps the number of female bears shot each year if approved by the Board of Game.

b. Population Status and Habitat and Special Requirements of Marten on the Kenai National Wildlife Refuge. Investigators: U.S. Fish and Wildlife Service (T.N. Bailey, E.E. Bangs, W.W. Larned, M.F. Portner, T.V. Schumacher).

Fiscal Year 1988 was the final year of field work for the refuge marten study. Continued effort will focus on data analysis. Radio-collaring efforts ceased in April with no new marten captured in the primary study area at Surprise Creek. The two remaining collared marten's transmitters were no longer functioning by July. Scat collection and a limited small mammal trapping effort continued through August when all field work ended.

A total of 271 known age scats were collected during the two year study. A random sample of at least 35 scats from each three-month season was selected for analysis. Twenty-two different food items were found and preliminary results confirm that small mammals, primarily red-backed voles, were the most important component of the Kenai marten diet throughout all seasons. Snowshoe hares and red squirrels were significant early and late winter food sources, respectively. Berries, mainly mountain ash and crowberry, comprised over 60 percent of the diet during the fall season, with mountain ash berries utilized well into February.

Collection of radio location data ended with the demise of the last two collars in late June. These data will be analyzed for home range sizes, spatial distributions, and seasonal altitude variations using the refuge's Data General 10SP geographic information system. Preliminary results suggest that Kenai marten home range sizes are similar to those reported by Buskirk (1983) for Upper Susitna Basin, Alaska, marten.



Radio-collared marten in the Surprise Creek study area.  
TVS

Volumes of data from the extensive marten habitat surveys conducted during Summer 1987 were analyzed using the refuge's Wang Personnel Computer and Lotus 1-2-3 software. To date, statistical tests on the 117 components measured show little difference between habitats currently supporting marten and a potential reintroduction site near Big Indian Creek.

There appears to be a strong relationship between areas with consistently deep snow cover and marten distribution on the Kenai Peninsula. Thermal cover provided by snow may be an important factor limiting marten distribution on the Kenai Peninsula, which lies at the transition zone between coastal and interior marten habitat. Snow depth data from the Surprise Creek study area and Soil Conservation Service snow data from the Kenai Peninsula are currently being analyzed to test the validity of this hypothesis.

Results of the Kenai National Wildlife Refuge marten study will be summarized and a final report written by April 30, 1989. Information from the study may be presented at the Fifth Northern Furbearer Conference at Whitehorse, Yukon Territory, in April, and will be submitted to the Journal of Wildlife Management for publication.

c. Lynx Investigations on the Kenai National Wildlife Refuge.

Michael B. Kesterson, graduate student from the University of Alaska, Fairbanks completed his Master of Science Thesis on lynx on the refuge in the summer of 1988. An abstract of the thesis and manuscript which is being submitted to the Journal of Wildlife Management follows:

LYNX HOME RANGE AND SPATIAL ORGANIZATION IN RELATION TO  
POPULATION DENSITY AND PREY ABUNDANCE

MICHAEL B. KESTERSON, Alaska Cooperative Wildlife Research Unit.

Abstract: Food habits, home range and spatial organization of lynx (Lynx canadensis) were studied in relation to lynx and snowshoe hare (Lepus americanus) densities on the Kenai National Wildlife Refuge (KNWR), Alaska from September 1984-May 1987. Twenty-nine lynx were captured a total of 40 times in 3 study areas on the KNWR. Size of seasonal home ranges varied from 1.0-477.9 km<sup>2</sup> (n = 1232 relocations). Seasonal home ranges of female lynx were smallest in summer ( $\bar{x}$  = 9.4 km<sup>2</sup>) and became progressively larger through spring ( $\bar{x}$  = 51.6 km<sup>2</sup>) ( $P < 0.001$ ). Seasonal home ranges of males ( $\bar{x}$  = 93.0 km<sup>2</sup>) averaged more than twice those of females ( $\bar{x}$  = 43.8 km<sup>2</sup>) ( $P < 0.001$ ). Concurrent with declining snowshoe hare abundance and a 4-fold increase in population density of lynx, home range size of resident lynx in the lowland study area declined suggesting that lynx may adjust home range size proximally in relation to population density as well as prey abundance. Spatial organization of lynx appears similar to that reported for other North American felids. Residents occupied home ranges that were intrasexually exclusive. Males shared their larger ranges with 1-3 adjacent females. Home ranges of transient lynx overlapped widely with those of adults of both sexes.





Biological Volunteer Leigh Tutterow holds an immobilized, radio-collared lynx (April 16, 1988). WS

Lynx Population Dynamics, Habitat Use, and Interactions with Coyotes during a Snowshoe Hare Low on the Kenai National Wildlife Refuge.

Investigators: U.S. Fish and Wildlife Service and University of Alaska, Fairbanks (W. Staples, T.N. Bailey, E.E. Bangs, T.V. Schumacher, M.F. Portner, W.W. Larned, E. Weiss, L. Tutterow and Ian Martan).

Small mammal trap transects were set 18-21 October to determine relative same mammal availability to coyote and lynx in the lowland study area.

Table 2. The results of 120 trap nights for small mammals in seven major vegetation types on refuge (18-21 October 1988).

Vegetation	Captures per 100 trap nights by species			
	C.rutilus	M.oeconomus	S.borealis	S.cinereus
1947 burn/birch/spruce	61.7	0.0	0.0	7.5
Mature birch/spruce	43.3	2.5	0.0	2.2
Black spruce	41.6	0.0	0.0	3.3
Crushed birch/spruce	20.8	0.8	0.0	4.2
Alder	18.3	0.0	0.0	4.2
Bog	7.5	1.7	0.0	0.0
Graminoid	1.7	3.3	0.8	2.5

Red-backed vole numbers were high for the second consecutive year. Comparatively low red-backed vole densities were determined by E. Bangs in 1977 with capture success per 100 trap nights of 6.1 for 1947 burn birch/spruce, 7.1 for mature birch/spruce and 3.1 for black spruce vegetation types. Visual observations and snow tracking data suggest that ermine and porcupine numbers are also high this year. Snowtracking since October confirms the initial results of the summer 1988 snowshoe hare census. Hare sign is scarce in the lowland study area this winter.

Trapping efforts during the spring and summer of 1988 resulted in 15 lynx and 17 coyote captures. Two individual lynx were captured twice and one lynx processed had a functional radio collar. This previously-collared lynx and ten uncollared lynx were fitted with new radio transmitters and successfully released. Eleven coyotes were also radio-collared and released.

Sex ratios of lynx and coyotes did not differ significantly. Of 13 lynx handled, five were male and eight were female. Five of the 13 lynx were yearlings as of spring 1988. Of 17 coyotes trapped, eight were males and nine were females.



Close-up of recaptured male lynx in the Swan Lake Canoe System lynx study area

TNB



Since the conclusion of M.B. Kesterson's portion of the refuge lynx study in August of 1987, 15 lynx in the lowland study area have been located a total of 506 times. Nine collared lynx residing in benchland habitat have been located a total of 121 times during this period. As of January 1989, ten lowland lynx and five benchland lynx remain on the refuge with functioning radio collars.

Coyotes appear to range farther than lynx and have been more difficult to locate. Ten coyotes with functional transmitters have been located a total of 146 times since April 1988.

Food habits data has been collected on Kenai peninsula lynx and coyotes since January of 1988. One hundred and twenty seven lynx scats and 187 coyote scats have been secured for analysis. Kill sites have been examined and numerous food habits related sightings have also been recorded. To date, 15 coyote and 21 lynx food habits visual observations have been collected.

Analysis of scat specimens and relocations of collared animals will commence in the summer of 1989.



M.B. Kesterson obtains measurements on an immobilized female lynx in the Swan Lake Canoe System lynx study area.

TNB

6. Other - Nothing to report.



E. ADMINISTRATION

1. Personnel



Management:

Bob Richey (3), Bill Larned (4), Robert Winkelman (19),  
Mike Hedrick (2), Daniel Doshier (1).

JEF





Administration:

Deanne Nelson (18), Brenda Wise\*, Vivian McCain (14),  
Brenda Marsters (17). Missing: Patricia Fenc1 (16),  
Jerry Lee Hare (15). JEF

\*Travel Clerk, entered on duty on 2/12/89.



Biology:

Ted Bailey (8), Ian Martin\*, Elizabeth Jozwiak (10),  
Winthrop Staples (22), Tom Schumacher (21),  
Missing: Ed Wiess (25). JEF

\*Volunteer.





Maintenance:

Dick Kivi (12), Jim Frates (11), Al O'Guinn (13). JEF



Public Use:

Richard Johnston (6), Cheryl Simpson (5),  
Candace Ward (7).

JEF

Table 3. Listing of permanent personnel for the Kenai National Wildlife Refuge, 1988.

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1.	Daniel W. Doshier	Refuge Manager	GM-14	PFT	EOD 5/27/86
2.	Michael B. Hedrick	Deputy Refuge Manager	GS-12	PFT	EOD 5/13/82
3.	Robert A. Richey	Assistant Refuge Manager Oil & Gas (Pilot)	GS-12	PFT	EOD 5/27/64
4.	William W. Larned	Fire Management Officer (Pilot)	GS-12	PFT	EOD 8/21/83
5.	Cheryl L. Simpson	Supervisory Recreation Planner	GS-11	PFT	EOD 07/17/88
6.	Richard K. Johnston	Recreation Planner	GS-09	PFT	EOD 12/31/78
7.	Candace D. Ward	Park Ranger	GS-07	PFT	EOD 5/29/84
8.	Theodore N. Bailey	Fish & Wildlife Biologist	GS-11	PFT	EOD 9/12/77
9.	Edward E. Bangs	Wildlife Biologist	GS-09	PFT	Trnsfrd. 07/01/88
10.	Elizabeth A. Jozwiak	Biological Technician	GS-07	PFT	EOD 08/28/88
11.	James E. Frates	Facility Manager	GS-11	PFT	EOD 1/30/77
12.	Richard D. Kivi	Equipment Operator	WG-10	PFT	EOD 10/31/74
13.	Elvin "Al" O'Guinn	Maintenance Mechanic	WG-10	PFT	EOD 3/13/84
14.	Vivian J. McCain	Budget Assistant	GS-07	PFT	EOD 02/03/88
15.	Jeri Lee Hare	Accounting Technician	GS-05	PFT	Resigned 08/26/88
16.	Patricia A. Fenc1	Refuge Clerk	GS-04	PFT	Resigned 04/29/88
17.	Brenda E. Marsters	Refuge Clerk	GS-04	PFT	EOD 06/21/87
18.	Deanne K. Nelson	Travel Clerk	GS-04	PFT	EOD 1/5/86
19.	Robert B. Winkelman	Refuge Manager Trainee	GS-05	PFT	EOD 06/22/88

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Table 4. Listing of the temporary personnel for the Kenai National Wildlife Refuge, 1988.

				<u>EOD</u>	<u>TERMINATED</u>
20.	Mary F. Portner	Biological Tech.	GS-05	04/29/85	Resigned 06/24/88
21.	Thomas Schumacher	Biological Tech.	GS-05	06/30/86	
22.	Winthrop Staples III	Biological Tech.	GS-05	02/14/88	
23.	William P. Eickhoff	Park Ranger	GS-05	02/16/88	Resigned 04/10/88
24.	John R. Gahr	Park Ranger	GS-05	05/08/88	09/24/88
25.	Edward W. Weiss	Park Ranger	GS-05	05/08/88	09/24/88
26.	Ronald A. Levy	Park Ranger	GS-05	04/26/88	09/24/88
27.	Gay A. Green	Park Ranger	GS-05	05/17/88	Intermit
28.	Paul A. Zallek	Park Ranger	GS-06	06/24/88	Intermit
29.	Gregory M. Lewis	Park Ranger	GS-05	05/08/88	09/24/88
30.	Karen K. Kelly	Clerk Typist	GS-03	08/02/88	12/03/88
31.	James Farrar	Laborer	WG-03	05/08/88	Resigned 06/01/88
32.	Robert P. Campbell	Laborer	WG-03	06/02/88	12/03/88
33.	Albert "Bud" Marrs	Laborer	WG-03	04/24/88	Intermit
34.	Joey Koch	Laborer	WG-03	04/24/88	12/03/88
35.	Donna M. Bartman	Laborer	WG-03	05/10/88	Intermit

a. Permanent Personnel

The year 1988 was a year of personnel changes.

Budget Assistant Vivian McCain arrived February 3 to replace Leslie Blaylock.

Pat Fencil, our longtime clerk, resigned in April to join her husband in retirement. Shock was felt throughout the staff as Pat had been with the refuge ten years and was aware of all the secret hiding places, and how to locate things the rest of us could not. By mid-June, Brenda Marsters was converted from seasonal clerk/typist to refuge clerk.

In June, Bob Winkelman arrived from the Innoko National Wildlife Refuge to fill the refuge manager trainee position. Bob completed his final semester of course work at the University of Alaska, Fairbanks, in May. Upon completion of his independent study project, he will receive a B.S. degree in wildlife management.

Wildlife Biologist Edward Bangs accepted a position with Endangered Species in Helena Montana, in July. Ed was with the refuge many years, and started as a volunteer. By year's end, Andre Loranger from the Nowitna National Wildlife Refuge was selected to replace Ed.



In August, Cheryl Branagan/Simpson arrived from Great Meadows National Wildlife Refuge in Sudbury, Massachusetts, to fill the vacant supervisory outdoor recreation planner position created with Mike Boylan's transfer to the Aleutian Islands Unit of the Alaska Maritime National Wildlife Refuge.

Also in August, Accounting Technician Jeri Lee Hare decided it was time to leave Alaska and return to Idaho. Needless to say, it was very busy during the year-end close-out without Jeri Lee. Fortunately (but after a long wait), the position was filled when Travel Clerk Deanne Nelson was selected for the accounting technician position in October.

In September, Elizabeth Jozwiak arrived to fill the GS-07 biological technician position. Previously, Elizabeth was stationed at Terminal Island, California, where she was employed by National Marine Fisheries as a wildlife biologist. Welcome to the staff Elizabeth!

At year's end, the travel clerk position, left vacant with Deanne Nelson's promotion to accounting technician, was still unfilled.

Table 5. Staff Breakdown from Fiscal Year 1984 to Fiscal Year 1988.

Year	Permanent		Vacant as of 12/31	Temporary	Volunteers
	Full-Time	Part-Time			
FY84	13	3	1	14	25
FY85	13	2	2	10	43
FY86	16	0	1	13	28
FY87	16	0	1	13	30
FY88	18	0	2	18	19

b. Temporary Personnel

In February, Biological Volunteer Winnthrop Staples converted to temporary biological technician. Seasonal Park Ranger Bill Eickhoff arrived and participated in the annual recurrent Law Enforcement training only to resign April 9, to accept a full-time position in the Lower Forty-eight.

Mary Portner returned to work in March after completing a semester of graduate courses at the University of Minnesota during the fall semester. In June, Mary left Kenai to attend graduate school at the University of Maine where she will be working on a marten project.

By the end of May, six park rangers, four laborers, and a biological technician were on the staff. In addition, seven Student Conservation Association volunteers arrived to help with the summer recreationists - a job which is far from being a small task.

Biological Volunteers Eric Berlow, Jeff Manning and Ed McGowan assisted with various on-going field projects.

Full-time equivalents for Kenai this year was 22, while utilization was 23.26.

Table 6. Temporary Positions

	1984	1985	1986	1987	1988
Biological Aids & Technicians	3	1	2	3	5
Laborers	4	3	4	4	5
Park Rangers	4	3	5	5	7
YACC/YCC Staff	3	3	2	0	0
Clerk/Typist	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>1</u>
TOTAL	14	10	13	13	18

## 2. Youth Programs

In 1988, Kenai National Wildlife Refuge did not sponsor a Youth Conservation Corp program. Since the national disbanding of the program in 1981, Kenai National Wildlife Refuge continued to sponsor a program through 1986 with the assistance of the Alaska Regional Office. In 1987 and 1988, Kenai National Wildlife Refuge was faced with funding problems, and therefore, elected not to have a Youth Conservation Corp program. A refuge program review conducted in 1987, recommended further sponsorship and funding for a youth program at Kenai National Wildlife Refuge. In 1989, the refuge is planning on reinstituting the program on a modest basis with funding for two positions. Hopefully, this renewed commitment to the program promises hope of future expansion.

## 3. Other Manpower Programs - Nothing to report.

## 4. Volunteer Services

Kenai's volunteer program, which involves 84 people and thousands of hours, is comprised of four components: local volunteers, seasonal volunteers, Student Conservation Association, and local service group constituents.

### a. Local Volunteers

Local volunteers are viewed as a vital component of the refuge program, since: 1) they are volunteers in the strict sense of the word, and 2) they provide an invaluable link to the local communities where anti-government feeling has often been the rule.

Kenai maintains a cadre of a dozen local volunteers, who meet the 12 hours per month minimum requirement by working alternating weekends in the refuge visitor center. They contribute by hosting interpretive programs such as wildlife films and providing wildlife and refuge information to visitors. If it were not for these volunteers, not only would the visitor center's weekend and summer hours be reduced, but refuge projects and field patrols would likewise be reduced as park rangers' time would be solely devoted to operating the visitor center. Local volunteers significantly contributed to the high level of public service given to approximately 28,000 people who visited the refuge visitor center in 1988.

In return for their efforts, local volunteers receive the following awards: 1) membership in the Alaska Natural History Association and a 15 percent discount on books, cards, posters, and other sales items sold at outlets throughout Alaska, 2) awards based on hours of service which include Kenai National Wildlife Refuge T-shirts, refuge posters, refuge wildlife pins, wildlife books, and airplane trips over the refuge, and 3) specialized volunteer awards and certificates.

b. Seasonal Volunteers

Seasonal volunteers commit to at least three months of continuous 40 hour per week service. Generally, these volunteers come from the volunteer recruitment program coordinated by Bill Knauer at the Alaska Regional Office. Seasonal volunteers receive \$450 per month for food and essentials, and free housing.

By year's end in 1988, 12 local volunteers had contributed 1,300 hours of volunteer service. Our 12 seasonal volunteers contributed 2,700 hours of service. In total, these individuals contributed the equivalent of approximately two full-time staff members' work 1988.

c. Student Conservation Association

The Student Conservation Association program is an important component of the refuge's public use and biology programs. Due to high quality applicants and ease of recruitment, the refuge has made consistent use of this program. Student Conservation Association interns are not "volunteers" in the strictest sense of the word, since they receive a food and travel allowance. In the course of their duties, they donate many hours above their required work hours. They complete a variety of operational tasks while learning about resource agency careers. Several Student Conservation Association volunteers have been individual student interns where they complete a special project for the refuge as part of a preplanned academic requirement. Since working with the program in 1985, we have consistently had high caliber interns, who accomplish quality work.



Student Conservation Association volunteers participate in numerous projects during 1988, including this garbage and waste removal from Kenai Wilderness.

RKJ

In 1988, seven Student Conservation Association interns collectively contributed over 3,680 hours towards refuge projects, including: visitor center and visitor contact station operation, wildlife education programs, public information programs, trail brushing and rerouting, patrol of foot and canoe trails, litter pick-up and maintenance projects, moose hunter check station operation, biological data collecting, and wildlife live-trapping and radio collaring.

d. Local Service Groups

During the summer of 1988, several Boy Scout troops and Kiwanis Club members from Anchorage and the Kenai Peninsula volunteered for work projects associated with the canoe trails and public use cabins. Several groups visited the refuge visitor center for training in minimum impact camping and bear safety prior to beginning their service projects in the backcountry. Scouts on the Swanson River and Swan Lake Canoe Systems donated 360 volunteer hours gathering litter and restoring campsite clean-up. The Anchorage Kiwanis contributed 240 volunteer hours maintaining and renovating the Vogel Lake public use cabin.



It seems everyone wants to be a refuge volunteer! In this case, an enthusiastic moose wants to volunteer to trim those shaggy office plants. RKJ

## 5. Funding

Table 7. Kenai National Wildlife Refuge position patterns, Fiscal Year 1984 through 1988.

Personnel	Fiscal Year				
	1984	1985	1986	1987	1988
FTE's (Person years)	21.5	21.5	20.8	25.0	22.0
PFI Positions filled	13.0	13.0	16.0	16.0	18.0
Vacant PFT 12/31**	8.0	8.0	7.0	7.0	2.0
PPT Positions filled	3.0	2.0	0.0	0.0	0.0
Vacant PPT 12/31**	0.0	1.0	1.0	0.0	2.0
Temporary	10.0	7.0	11.0	13.0	14.0
Temporary Intermittent	1.0	0.0	0.0	0.0	4.0
YCC Staff Positions	3.0	3.0	2.0	2.0	0.0
Vacant YCC Staff	1.0	0.0	0.0	0.0	0.0
YCC Enrollees	20.0	15.0	12.0	0.0	0.0
Volunteers	25.0	43.0	28.0	30.0	19.0

\*\*Vacancies from Organization Chart.



Table 8. Kenai National Wildlife Refuge funds, Fiscal Year 1984 through 1988.

	Fiscal Year				
	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>
Operating and Maintenance Funds (Thousands of Dollars):					
Wildlife Funds	928	863	953	1,087	1,324
Fisheries	10	30	0	0	0
Expenses for Sales	62	62	59	82	82
Small ARMM*	<u>0</u>	<u>130</u>	<u>169</u>	<u>130</u>	<u>0</u>
Subtotal	<u>1,000</u>	<u>1,085</u>	<u>1,181</u>	<u>1,279</u>	<u>1,406</u>
Specific Project Funds (Thousands of Dollars):					
YCC Funds	35	27	28	0	0
I&R-Fee Area	0	0	0	0	0
Fee Area Rehabilitation	0	0	0	0	0
Large ARMM*	264	225	50	0	71
Refuge Resource Problem	0	150	20	75	50
Refuge Resource Problem	0	40	10	0	42
Skilak Wildlife	0	0	0	0	0
Recreation Area	<u>0</u>	<u>0</u>	<u>362</u>	<u>1,500**</u>	<u>697**</u>
Subtotal	<u>299</u>	<u>442</u>	<u>470</u>	<u>1,575</u>	<u>860</u>
Total	<u>1,299</u>	<u>1,527</u>	<u>1,651</u>	<u>2,854</u>	<u>2,266</u>

\*Accelerated Refuge Maintenance Management

\*\*No Year Money

Large Accelerated Refuge Maintenance Management funds of \$91,000 were used for the sign program, for cabin and campground rehabilitation/maintenance, and for replacement of the forklift.

Refuge Resource Project funds of \$50,000 were used for monitoring PCB cleanup efforts, and collecting water, sediment and selected fish samples from drill-mud reserve pits in the Swanson River and Beaver Creek Units. Forty-two thousand dollars was used for resource/visitor protection and conducting baseline inventories and studies.

Once again, Youth Conservation Corp funds were unavailable and the program was suspended.

We were able to purchase an eighteen-foot Boston Whaler, three personal computers and one-half of the Hydro-Ax. The cost of the Hydro-Ax was shared with fire management.

The \$696,500 for the Skilak Wildlife Recreational Area was a Congressional add-on for visitor services and implementation of the Kenai Comprehensive Conservation Plan. It will be used to enhance wildlife viewing and interpretation, plus major rehabilitation of existing campgrounds.

## 6. Safety

Considering the level, dynamics and diversity of public use on the refuge in 1988, the year would have to be classified as a "relatively safe" one for the visiting public and an exceptionally safe one for refuge staff.



Refuge Biologist Ed Bangs conducts a firearms safety course for seasonal refuge staff. Always a willing participant in refuge safety programs, his contribution to refuge staff went well beyond his assigned biological duties.

RR

The caseload of accidents/incidents again ran the entire spectrum from aircraft accidents to broken eyeglasses from a "flying sinker". The refuge has occasionally been accused of being a "lousy" host; however, the accusation was extended in the literal sense last summer when one of our

"Tustumena transients" claimed he was infested with lice while a "guest" at an old cabin on Fox Creek. We're still not sure if it was the cabin or the "guest" who got the "lousiest" deal.

Two fatalities occurred on the refuge in 1988 - one by drowning, the other resulting from an automobile accident. Also, on November 2, refuge staff assisted in the retrieval of the body of an adult male - The victim of a drowning accident at the Russian River Ferry in 1987.

On July 10, two local men in their early 20's attempted a run through the Kenai River Canyon in a twelve foot aluminum skiff with a ten-horsepower motor. Apparently, the occupant in the bow panicked when entering the first stage of rapids and tossed the anchor overboard. The skiff was immediately pulled underwater. Both occupants, clad only in tee shirts and blue jeans (no life jackets) were swept into the cold and fast moving current. One of the young men made it to shore several hundred yards downstream where he was attended to by nearby fishermen. The other man became the subject of an exhaustive search effort by refuge enforcement personnel as well as search and rescue personnel from several other state and local agencies including family members and the military from Elmendorf Air Force Base. The body of 22-year-old Spencer Reeder from Soldotna was finally located on August 2.



The beautiful but dangerous Kenai River Canyon claimed the life of a young Soldotna man - the only drowning recorded on the refuge in 1988.

JEF



A one-vehicle accident on the Skilak Loop Road on August 26 claimed the life of a 27-year-old Soldotna woman. The car, traveling at a high rate of speed, missed a curve along the Lake Omer overlook on Skilak Loop, became airborne for several hundred feet and burned on impact. Alaska State Troopers withheld identity of the victim for several days pending positive identification from dental records. Refuge staff assisted state troopers and a local towing firm in extracting the body and vehicle. Circumstances surrounding the accident are still under investigation by the Alaska State Troopers, however, it was thought to be a suicide.

The often "friendly skies" over the Kenai were a little less "friendly" for at least four pilots and their passengers during 1988.

On April 23, a Cessna 337 attempted an emergency landing in the Swanson River Oil Field, clipped a tree and missed his intended landing target - an oil field access road. The plane was extensively damaged but neither pilot nor passenger were injured.



This Cessna 337 was one of four aircraft accidents occurring on the refuge in 1988. The owner/pilot and instructor attempted a forced landing within the Swanson River Oil Field after running out of fuel on a flight from Kenai to Eagle River. The two occupants were shaken but otherwise uninjured. RR

On June 28, an Anchorage pilot, while flying from Homer to Anchorage, attempted to turn back after encountering poor visibility enroute. The plane "pancaked in" after striking alder bushes in the Caribou Hills. One of the two passengers received a severe head injury.

During mid-September, a Cessna 185 on floats flipped during an attempted landing on the Chickaloon Flats area. No injuries occurred, however, only a portion of the plane was salvaged - the tidal action and unforgiving silt beds of Upper Cook Inlet retained the rest.

It appeared, for awhile, that we wouldn't have to write our annual "plane falls through ice" story. However, on December 6, a local Super Cub pilot with a passenger attempted a landing on Hidden Lake. Both pilot and passenger got out before the fuselage became submerged, with only the wings keeping it from becoming another Hidden Lake casualty. The plane was later removed.

While refuge aircraft regulations do not specifically address the subject of pilot competence (or lack thereof) their development and implementation has probably contributed to lowering accident rates over the years. For example, in 1968, the refuge recorded 13 aircraft accidents with six fatalities. Many of these were related to operating out of marginal yet authorized airstrips. While the eventual closure of these strips ignited the wrath of the very vocal bush flying community, we probably did what they would never have done for themselves - make a concerted effort to maximize the safety factor.

Considering the size of the Kenai staff and the multitude of potentially dangerous situations many became involved in throughout the year, 1988, while not perfect, leads us to believe that collectively, the staff exhibits an excellent attitude towards safety. A bear encounter, bee sting, dog bite and back strain were about the most serious incidents to report. Only one, a back strain, was recorded as a lost time accident.

Approximately 40 licensed drivers amassed a total of nearly 190,000 miles without a serious incident.

Considerable effort has been expended over the past two years in developing an effective interagency search and rescue team in response to emergency situations. Through a series of meetings and joint training exercises in 1987 and 1988, the refuge, in conjunction with Central Emergency Services, State Troopers, State Forestry and Alaska State Parks, has made vast improvements in Search and Rescue coordination, communications and cooperation. Refuge personnel participated in several Search and Rescue operations for lost or overdue hunters, hikers and boaters. On June 4, a seriously injured hiker on Skyline Trail was medi-vaced to a local hospital - an excellent example of our ability to respond to and successfully complete a difficult rescue mission in a remote area. This effort was coordinated by refuge Recreation Planner Rick Johnston.



Because of a complex scheduling arrangement of refuge personnel, not all were able to attend each monthly safety meeting, however, through the course of the year all had the chance to participate. Monthly topics ranged from hypothermia dangers, aircraft safety, personal health and safety, winter driving, boating safety, and safety in the workplace.

The refuge staff would like to thank the Regional Safety Officer and staff for their continued support in helping us work, play and fly safely.

This station has now completed 225 days without a lost time accident.

7. Technical Assistance - Nothing to report.

8. Other Items - Nothing to report.

F. HABITAT MANAGEMENT

1. General - Nothing to report.
2. Wetlands - Nothing to report.
3. Forests

Commercial timber harvest has been de-emphasized on the Kenai National Wildlife Refuge as a habitat management technique, in favor of prescribed fire and managed wildfire, for the following reasons:

- a. Commercial timber stands on the Kenai National Wildlife Refuge are spotty, with generally low quality and volumes.
- b. Lack of road access to otherwise suitable stands precludes their exploitation.
- c. Timber access roads, skid trails, and other scars are persistent in the boreal forest, and are not biologically or visually compatible with other refuge management objectives.
- d. Local demand for timber products is low, especially with the currently-depressed Alaskan economy, and the limited capability of timber operators makes harvesting significant acreages a process requiring many years to complete.
- e. Timber harvest removes a significant portion of the soil nutrients in a nutrient-poor environment such as the Kenai, which may have long-term impacts on forage production and palatability.

For these reasons, timber harvesting on the Kenai National Wildlife Refuge is used primarily where safety or other special considerations precludes the use of fire.

This year a small harvest was proposed to remove approximately 1300 cords of birch and 450 cords of spruce firewood in conjunction with a 410-acre prescribed burn for habitat improvement in the Swan Lake Road vicinity. The sale was cruised in the fall and advertised in December. In spite of a strong local demand for commercial firewood, only one serious inquiry was received, probably due to perceived difficulty of access to the trees. As of December 31, an inspection tour of the site had not been made by the interested party because of inclement weather and road conditions. If the sale does not go through, the alternate plan is to burn the area, wood and all, in late summer of 1989 or 1990.

Public firewood areas serve the dual functions of low-cost habitat enhancement/fuel management and a source of heating fuel for local people. The Funny River Road cutting area was opened again with a \$20 fee charged for up to five measured cords of firewood per family for

personal use. This year the opening was delayed until November 9 due to soft road and ground conditions in the cutting area. Unfortunately, the snow came thick and fast soon thereafter, discouraging wood-cutters from investing in a permit. At year's end, only 50 permits had been issued, compared with 184 in 1987 and 600 in 1986.

A prescribed burn was conducted in the Funny River Road firewood area this year to dispose of 320 acres of slash accumulations resulting from ten years of cutting. This burn is described in detail in §F 9 (Fire Management) of this report.

Refuge lands were opened as usual for free personal-use Christmas tree cutting, and the 1947-burn spruce regrowth on Mystery Creek Road was available for commercial Christmas tree harvest at a permit fee of \$1 per tree. A grand total of two permits were issued for 20 trees each this December. Heavy snow cover discouraged other would-be tree peddlers as it did last year, when not a single permit was sold.

There has been a limited but persistent demand by Peninsula residents for fire-killed spruce poles for fences and other domestic uses, which we have accommodated by issuing free permits for pole cutting at a gravel pit access road near Mystery Creek Road turnoff on the Sterling Highway. This year, since we determined the supply there to be nearly exhausted, we began issuing permits for the Mystery Creek Road in conjunction with the seasonal opening of the road for the hunting season. Poles are in abundance there from the 1947-burn, and there appeared to be no conflict between hunters and the five people who obtained pole permits this year.

The State's three LeTourneau Tree Crushers have not been used for habitat work on the refuge since 1986, although, since that time, the Alaska Department of Fish and Game has kept one machine operating to rehabilitate several hundred acres per year inside the enclosures at the Moose Research Center.

Revegetation responses of prescribed burns from 1984 (Skilak Loop I), 1986 (Lily Lake I and II) and 1987 (Skilak Loop II) were monitored in early August by Fire Management Officer/Pilot Larned and Biological Technician Templeton. Permanent plots were established in each unit for annual photos and Daubenmire plot sampling. Revegetation seems to be following different patterns in the various burns, depending on site characteristics and burn severity. The 1984 and 1986 burns were light to moderate with very little exposure of mineral soil, but vigorous sprouting response from whatever hardwood rootstocks were left intact; primarily aspen, willow, and rose, with very spotty and feeble sprouting from birch stumps. The 1987 burn, however, was a moderate to severe burn with an estimated 50 percent of the mineral soil exposed in the previously-crushed portions. Vegetative reproduction observed this first year of monitoring consisted mainly of sparse willows, rose, and raspberry, with very little aspen or birch in spite of their pre-fire

abundance. Birch seedlings, however, were distributed uniformly and densely throughout the unit wherever mineral soil had been exposed. Hopefully there will be a good survival rate on these young trees, providing abundant forage for moose and hares in years to come.

Fire Management Officer/Pilot Larned and Region 2 Pilot John Winship used a service twin-engine Partenavia aircraft and a sophisticated 9" X 9" aerial camera to complete aerial photography coverage of the north half of the refuge. A clear two-day period in early August provided a good window for this task, and Larned annotated and indexed all 565 frames in early October. The photos should provide excellent up-to-date coverage of this rapidly-changing portion of the refuge.

4. Croplands - Nothing to report.
5. Grasslands - Nothing to report.
6. Other Habitats - Nothing to report.
7. Grazing - Nothing to report.
8. Haying - Nothing to report.
9. Fire Management

Since 1982, the Alaska Division of Forestry has provided fire protection for the refuge and surrounding lands under cooperative agreement with the Bureau of Land Management's Alaska Fire Service. Detection of fires is rapid due to the relatively high population and aircraft density, and suppression of fires, both on and off the refuge, is accomplished quickly and effectively using helitack and engine crews.

The 1988 fire season began in May with above-normal temperatures but high fuel moistures due to the unusually heavy snow cover. Late May saw a brief period with relative humidities in the high 20's to low 40's, but, otherwise, the summer was warm and pleasant but unusually humid with daily minimum relative humidities generally in the 50's and 60's. This condition, coupled with light winds and periodic rains, added up to another in a succession of boring fire seasons. The Division of Forestry recorded only one day with a "High" fire danger rating, and made only 41 runs during the season, compared to the average of 67. Wildfires responded to on refuge lands included only three, beginning on May 26, with a 350-acre prescribed fire "overachievement" which will be covered later in this section. On July 23 a neglected campfire on Skilak Lookout Trail was extinguished after it began to smolder in the surrounding duff, and, on August 19, an auto accident on Skilak Lake Road caused a fire which involved a 30-foot circle of wildland fuels before being extinguished by State Forestry. All three of these fires were in areas designated for Full Suppression under the Kenai Peninsula Interagency Fire Plan.



A deep and severe burn, the 1987 Skilak Loop II burn showed sparse sprout-growth in August, but abundant birch seedlings in the exposed mineral soil.

WL



A June visit to the Skilak Loop moose exclosure dramatically shows the effect of heavy browsing on willow growth following a fire.

WL

This year, we again hired a seasonal biological technician for the fire program. Mark Templeton came to us with a varied background and proved to be a tremendous asset. A tireless and eager worker, his many academic and mechanical talents allowed us to make a lot of progress with the fire cache and equipment, prescribed fire, and fire effects monitoring. Mark attacked each task with an open and creative mind, usually coming up with a new and more efficient method or design in the process.



Biological Technician Templeton spent early August monitoring vegetation response in recent prescribed burns such as the 1984 Skilak Loop I burn.

WL

Our 1988 fire management activities began with revision of the plan for the 330-acre Funny River Road firewood area slash disposal burn, and application to the Alaska Department of Environmental Conservation for an open burning permit. A coordination meeting was held with State and Federal cooperators for this project and the Willow Lake burn which was another project that had been on the "back burner" for a couple of years. In late winter, Larned attended two fire courses; "HP71B Fire Behavior Computer" and a workshop on Compressed Air Foam Systems, which gave us access to two very valuable kinds of fire-management technology. At that time we hired our Fire Technician (Templeton) and scheduled work for him for the season.

In mid-May, the refuge hosted a Fish and Wildlife Service Basic Fire Management course, with Larned acting as coordinator and service chief. This involved a good deal of preparation, as the course included field training and demonstrations with fire equipment, step-testing, and a



practical field exercise consisting of planning and conducting a prescribed burn. The course went extremely well except that a half-inch of "partly cloudy" fell on the day of the proposed burn, which made it a theoretical exercise rather than a practical one.

In the latter part of May, Larned and Templeton moved the Satellite-linked Remote Automatic Weather Station from Skilak Loop Road to a new site at Mystery Creek Road, and continued preparations for the Funny River Burn. Larned, the refuge's "Primary Pyromaniac", left on May 23 for his scheduled five-day commitment as a member of a waterfowl survey team doing a study on the Yukon Flats National Wildlife Refuge. Meanwhile, the Funny River Burn Area came into burning "prescription" and, as per earlier instructions, Biological Technician Templeton called the interagency burn team, including the agency representative, Regional Fire Coordinator M.G. (Red) Sheldon, into action.

In the early afternoon of Wednesday, May 25, all equipment was in place, personnel were assembled and briefed, and ignition was begun by drip torch on the first of two burn blocks. This 100-acre unit burned well and by 1840 firing was completed, with the crew working to extinguish minor spotfires over the control line until 2030. At this point, Refuge Manager Doshier conferred with the burn crew, and primarily because of a prediction of rain for the following day and the confidence gained with the first block, the decision was made to burn as much of the second block as possible that night. An amendment to this effect was written to the burn plan, as it originally specified burning the two blocks on separate days, and after the first block was under control and residual smoke was minimal.

Firing was started on the second block at 2100, but was halted after 30 minutes because of spotting and excessive fire intensity. After the crew effectively dealt with the spotfires, the lighting operation was continued but more slowly and using fewer torch-men. The operation went satisfactorily and was completed by 2300, whereupon the area was patrolled for spots for one more hour.

On Thursday morning, the burn boss flew over the fire and determined that all was fairly quiet but that two large patches of unburned fuel remained in the second block. On this day, instead of raining as predicted, an early morning overcast broke up into scattered fair-weather cumulus clouds, and the day became dry (minimum relative humidity of 27 percent) and windy (minimum seven miles per hour with gusts to 24 miles per hour). At 1300 the decision was made to try to burn out the unburned fuel patches, and this was attempted, but suddenly the wind increased from the east, boosting the fire intensity and starting a run into an adjacent mature black spruce stand. A helicopter flight was made to assess the situation, and meanwhile major spotting occurred across a fireline to the east. Holding crews had only partial success dealing with the spots as they spread rapidly in the dry grass and slash. The

escape was declared a wildfire at 1640 and additional helicopters, air tankers, and fire crews were ordered to control it. At 1800 the aircraft began to arrive, and soon we had a small air show going, with three helicopters using water buckets, one large retardant aircraft that dropped one retardant load, and one light fixed-wing water-bomber making repeated water drops. Emergency Fire Fighter's and "hotshot" crews arrived between midnight and 0800 the next morning.



Active groundfire working its way through the old slash and grass on the second day of the Funny River burn. WW

Fortunately, by about 2030, the erratic winds had diminished and the relative humidity had increased a little, so the fire dropped down out of the crowns and became more manageable as a ground fire. Several refuge personnel, State Forestry firefighters and five Forest Service people from Chugach National Forest worked through the night, then were joined the next day by five 20-man crews from Big Lake, Copper River, and Fairbanks. Early on Friday, May 27, project Burn Boss Glen Anderson from the Bureau of Indian Affairs took over as Incident Commander until the ordered class II overhead team arrived. During this day the fire grew very little in size but there were frequent flareups within the perimeter. The crews were able to deal effectively with these, with occasional assistance from the helicopters with buckets. The afternoon weather consisted of light northwest winds, maximum air temperature of 62°, and minimum relative humidity of 42 percent.





Black spruce "torches" readily even with  
a low, creeping groundfire. WW

The Overhead Team assumed command at 1500 that afternoon, with Fred Bethune (State Forestry) as Incident Commander. From there on, there was very little excitement as firelines were completed under increasing clouds and humidity. On Saturday, May 28, a total of 0.75 inches of rain soaked the area, and the fire was called contained that day at 1800. From there on it was a matter of several days of mop-up under the direction of Vean Noble from the local State Forestry office, with State Forestry turning over the fire to the refuge on June 1 for continued patrol and mop-up.





The brief run the fire made through a patch of mature black spruce gave us a look at extreme fire behavior typical of interior fires. RR



While the Funny River Fire did put up an impressive smoke column, favorable winds kept smoke problems from becoming a major issue in this incident. RR



The final fire size was 650 acres, of which 300 acres were intentional, with the remaining 350 acres falling into the overachievement category. All of the acreage was on the refuge, and all beneficial or at least neutral in effects. The Press treated us well, and the only negative public reaction we were aware of was a few comments about a small amount of smoke in Soldotna on May 26.

The incident provided excellent experience for all involved, a good early-season shake-down for the fire crews and our equipment, and a little more useful data on Kenai Peninsula fuels and fire behavior. A later inspection of the area revealed that nowhere did the fire burn deeply - not even where whole stands of black spruce were incinerated, and by mid-summer, a lush growth of grass, forbs, and hardwood sprout-growth had covered most of the area. This seems to be typical of spring burns in this area, as much moisture is retained in the forest floor until at least early July.



The Funny River Prescribed Burn burned uniformly through the grass and slash on the surface, but did not penetrate into the duff layer.

RL





Aerial view of the Funny River Prescribed Burn. The black area in the center is the part that burned out of prescription. WL



Bluejoint grass and fireweed grew abundantly within two weeks after the burn - evidence of a shallow burn. WL





By August, grass and forb growth hid all traces of the surface fire. WL

During the summer, plans and preparations were made for a second prescribed fire; a 1135-acre burn in standing 1947-burn regrowth adjacent to the Mystery Creek Road. Unfortunately, though, a busy fire season in both the Alaskan interior and the lower 48 left us without adequate burning and contingency resources, and conditions were so humid we never attained our burning prescription. Another burn plan gets filed for next year.

On August 24, Fire Management Officer Larned received a fire assignment as a helicopter module crewmember on the Fayette Fire in Pinedale, Wyoming, and was on his way the next morning. For the next few days his crew was "bumped" from fire to fire until they ended up on the Trail Creek Fire in the Caribou National Forest in southeastern Idaho. There they remained for 23 days, providing air support for firefighting crews on the 7000-acre fire, and returning to Alaska on September 21. The assignment was Bill's first on a large project fire, and provided him a great deal of valuable experience as well as a first hand look at the drought and fires of 1988.

Larned had one more trip "outside" in 1988; to Merritt Island National Wildlife Refuge in Florida for an aerial ignition workshop in early November. He and 20 others were trained on the Premo Mark III aerial ignition device dispenser and the helitorch, then the following Monday Bill assisted the refuge in conducting a 3000-acre prescribed burn. He found the helitorch fuel mixing system the refuge has developed extremely efficient and plans to use it on the Kenai in the future.

#### 10. Pest Control

There was little, if any, increase noted this year in the 55,000 acres of mature white spruce infested by spruce beetles, although there are still trees dying within that acreage, and, occasionally, young and otherwise apparently healthy trees have succumbed. We are told by the forest insect experts that this is an indication of very dense beetle populations, as only large numbers of beetles can successfully attack and kill a young vigorous tree. While there has been some pressure from the local community, the Alaska Resource Development Council, and the Forest Service to "do something" about the infestation, or at least to salvage the dead trees, the refuge has allowed it to pretty much run its course as it would any other periodic natural phenomenon. It is occurring mostly in congressionally designated wilderness and in extremely inaccessible country, which severely limits our salvage options anyhow, and the enormous scale of the infestation makes it totally unrealistic to consider any kind of control measures.

We have, however, attempted to protect refuge visitors and facilities from fire and blow-down hazards from the dead trees. Three refuge campgrounds - Jim's Landing, Upper Skilak, and Russian River - are within the beetle "infestation", and in January two local timber operators began removing dead and dying "hazard trees" from the first two of these. By the end of January, 185 trees had been removed from Jim's Landing, which completed that facility. Upper Skilak was more of a problem, as there were more trees and the access road was frequently impassable due to heavy snow and ice in the winter, and road washouts during breakup. The latter project was finally completed in early May, with 650 trees salvaged. Both operators did satisfactory work, with no significant damage to healthy trees or campground facilities. The Russian River Campground project involved only about 80 trees, so we solicited applications from local charity organizations to use the wood for a firewood fund-raiser sale. A church group came up with the best qualifications to be able to do the job to our satisfaction, and the work is scheduled to begin in early January, 1989.

#### 11. Water Rights - Nothing to report.



## 12. Wilderness and Special Areas

One-million-three-hundred-fifty-thousand acres of the Kenai National Wildlife Refuge were designated as wilderness by the Alaska National Interest Lands Conservation Act (Alaska Lands Act). The remaining 620,000 acres of federal land within the Kenai Refuge were reviewed as part of the comprehensive conservation planning process to determine their suitability for designation as wilderness. As a result of this process, an additional 380,500 acres of federal land within the refuge were determined to qualify for wilderness designation.

However, based on other planning considerations, only 195,500 acres were recommended for inclusion in the National Wilderness Preservation System by the Service. This acreage included 175,840 acres in the Chickaloon Flats/Two Indians area (northeast part of the refuge) and 19,660 acres near the outlet of Tustumena Lake (west central part of refuge). For the remaining 185,000 acres of refuge lands which qualified for wilderness designation, it was determined that other management considerations and uses were more important thus these lands were not recommended for wilderness to allow needed management flexibility.



Aerial photo of Chickaloon Flats at mean high tide with the Two Indian Area in the distant background. These areas of the refuge were recommended as wilderness in the final supplemental wilderness recommendation. RKJ

In September, a Final Supplemental Environment Impact Statement was released for the 195,500 acres recommended in the Comprehensive Conservation Plan. Regional Director Stieglitz signed a record of decision concerning the 195,500 acres on October 20, 1988.

In the final wilderness proposal the Department eliminated approximately 19,660 acres near the outlet of Tustumena Lake and an unspecified number of acres forming a one-mile-wide corridor along the existing Alaska Gas Company Utility Corridor within the 175,840-acre chickaloon/Two Indian Creek proposal.

A consideration in favor of habitat protection within the altered wilderness proposal, was that the existing land management category for those lands eliminated (moderate management) would be changed to the more protective minimal management category.

Using helicopter support, a U.S. Geological Survey team under permit, collected geochemical samples from streams, rivers, and glacial talus south of Sheep Creek/Dinglestadt Glacier on and off the refuge, Kachemak State Park, and Kenai Fjords National Park lands. The effort was conducted under the Alaska Mineral Resource Assessment Program, Section 1010, Alaska National Interest Lands Conservation Act. The collection team made several helicopter landings within Kenai Wilderness.

This year was the second full year of regulatory protection for areas within Kenai Wilderness closed to aircraft, snowmobile and motorboat access as decided by the Kenai Comprehensive Conservation Plan. Compliance with access regulations within Kenai Wilderness was very good.

The program to allow private land owners within wilderness off-road vehicle access through Kenai Wilderness continued during 1988 with fewer incidents of vegetation damage, primarily due to good snow cover during the year. Refuge officers observed evidence of off-road-vehicle use beyond the Bear Creek inholding and on snow-free beach in violation of the permit. It is not known whether the unauthorized within the wilderness was a permittee. At the end of 1988, at least one refuge inholder was denied off-road-vehicle access when he requested it, due to a lack of adequate snow cover. Other traditional methods of access such as boat, foot and aircraft were suggested to the inholder until adequate snowcover developed.

Negotiations took place and ultimately broke down regarding the U.S. Fish and Wildlife Service's purchase of subdivided tracts within the Bear Creek Inholding block on Tustumena Lake. The Region 7 Realty Office was unable to negotiate a reasonable price from subdivider Art Thompson. The inability to purchase the subdivided properties resulted in several parcels being sold to private persons during late 1983.



Refuge and wilderness boundary signs placed in the Caribou Hills by refuge staff during late 1987, appeared to have helped alleviate off-road-vehicle use that had been developing in recent years. It also helped reduce unauthorized pre-season snowmobile activity.

Work on several trails within Kenai Wilderness occurred during 1988, including maintenance conducted on Fuller Lakes Trail, Skyline Trail, Swan Lake and Swanson River Canoe Trails, and the Funny River Horse Trail. The refuge commented against a proposal by Cooper Landing miner Red Smith to build a road and remove "limestone" mineral samples from an area adjacent the Kenai Wilderness boundary within the Russian River Valley. The refuge commented negatively on a similar proposal in 1983. It is unlikely that the miner could "prove up" on the site under mineral entry laws, however, the proposed mineral exploration road and activity had potentially negative effects on refuge wildlife, water quality, and wilderness values.



Wilderness trail heads have been upgraded with information and maps which clearly depict the Kenai Wilderness boundary refuge regulations and information about wilderness.

RKJ





The Cottonwood Creek In-holding within the Kenai Wilderness changed owners during 1988. Chip Marinella purchased the property from Gary and Chris Titus and plans to establish a wilderness lodge. RKJ

13. Waterfowl Production Area Easement Monitoring - Nothing to report.

G. WILDLIFE1. Wildlife Diversity - Nothing new to report for 1988.2. Endangered and/or Threatened Species

No known endangered or threatened species were observed on the refuge during 1988.

3. Waterfowl

No systematic surveys of waterfowl, other than for trumpeter swan and wintering waterfowl along the Kenai River, were conducted on the refuge because of relatively low productivity for waterfowl. Waterfowl observed along the Kenai River during winter bald eagle surveys are shown in Tables 9 and 10. There was an unusual sighting of three trumpeter swans (two adults, one cygnet) at the outlet of Skilak Lake during the February 1988 eagle survey. Apparently the same birds were seen there two months before, during the December 1987 survey, so they may have wintered in southcentral Alaska.

Table 9. Waterfowl observed on the Upper Kenai River during bald eagle surveys: Kenai Lake Outlet to Jim's Landing, 1988.

<u>Date</u>	<u>Species</u>				
	<u>Goldeneye</u>	<u>Merganser</u>	<u>Mallard</u>	<u>Bufflehead</u>	<u>Harlequin</u>
01/14/88	108	114	16	0	0
02/10/88	311	96	106	0	0
03/16/88	56	70	14	0	0
11/16/88	123	24	97	0	0
12/13/88	160	34	31	1	3

Table 10. Waterfowl observed on the Kenai River during Bald Eagle surveys: Skilak Lake Outlet to Bing's Landing, 1988.

<u>Date</u>	<u>Species</u>					<u>Trumpeter Swan</u>	<u>Common Loon</u>
	<u>Goldeneye</u>	<u>Merganser</u>	<u>Mallard</u>	<u>Bufflehead</u>			
01/15/88	383	130	0	0		0	0
02/11/88	627	51	165	3		3	0
03/17/88	479	78	55	0		0	1
11/17/88	385	8	126	0		0	2
12/14/88	649	50	118	0		1	0

4. Marsh and Water Birds - Nothing to report.
5. Shorebirds, Gulls, Terns, and Allied Species - Nothing to report.
6. Raptors

Two new bald eagle nests were discovered on the refuge during 1988, bringing the total number of active nests surveyed to 35 (24 on refuge, 11 off refuge). In addition, adult eagles were seen near six more nests, but failed to produce young. Twenty-two nests (13 on refuge, nine off refuge) produced 31 eaglets (18 on refuge, 13 off refuge) for a mean of 0.94 eaglets per active nest rechecked during the productivity survey (Two nests active during the nesting survey could not be located during the productivity survey). This was a decrease of 0.71 eaglets per nest (43 percent) from 1987. The reasons for and significance of this reduction in eagle productivity are unclear, but may be related to silver salmon spawning runs. Table 11 summarizes the results of 1988 bald eagle nesting and productivity surveys.

Table 11. Bald eagle nesting locations, nesting eagles (17 May 88) and production (28 July, 1-2 August 1988) on the Kenai National Wildlife Refuge, 1988.

TERRITORY LOCATION	Nest Survey		Productivity Survey	
	Status	Checked	Nests	Eaglets
<u>NORTH OF KENAI RIVER (Game Management Unit 15A):</u>				
A. <u>ON REFUGE</u>				
I. <u>OUTSIDE WILDERNESS</u>				
Torpedo Lake	A	1	1	2
Blizzard Lake on Skilak Lake	DL	0	0	NC
Afonasi Lake	A	1	1	0
East Fork Moose River (N. Pipeline Rd.)	I	1	0	NC
Moose River near East Fork	I	1	1	0
West Fork Moose River	A	1	1	2
Coyote Lake	A	1	1	1
Pipeline Road/Noname Creek	A	1	1	0
Pincher Creek	A	1	1	0
Beaver Lake	I	2	1	0
N. Beaver Lake (3 miles)	DL	0	0	DL
Mink Creek Lake area	DL	0	0	DL
Campfire Lake	A	2	2	1
<u>Chickadee Lake</u>	ANB	1	1	0
Chickaloon Inholdings	DL	0	1	0
<u>Quake Lake (N.E. Shore)</u>	A	1	0	NC
Little Indian Creek	I	1	0	NC

## II. INSIDE WILDERNESS

Jim's Landing	A	1	1	1
Camp Island Lake	A	2	2	0
Loon Lake	I	2	2	0
Clam Lake/Moosehorn Lake Ridge (east)	ANB	1	1	0
Swan Lake	ANB	1	1	0
Rock Lake	A	1	1	0
Moose Lake	A	1	0	NC
Bear Lake	I	2	2	0
NE Moose Lake	I	1	0	NC
Chickaloon River/Grouse Lake	A	1	1	1
Chickaloon River/Moose Pasture Lake	DL	0	0	NC
Bedlam Creek Bluff	A	1	1	2
King Lake	DL	0	0	NC
Gene Lake	A	1	3	0
Sucker Lake	A	1	1	0
Camper's Lake	ANB	1	1	0

### B. OFF REFUGE

Kenai River near Gwin's Lodge	A	1	1	1
Juneau Creek	A	1	1	1
Moose Point Lake (Birch Hill) area	A	1	1	0
Otter Creek Outlet	A	1	1	2
Stormy Lake	I	1	0	NC
Bishop Creek Outlet	I	3	3	0
"Drained" (Near Suneva) Lake Area	A	1	1	2
Daniel's Lake	A	2	1	2
Kenai River Above Bing's Landing	A	1	1	1

## BETWEEN KENAI RIVER/SKILAK LAKE AND KASILOF RIVER/TUSTUMENA LAKE:

### A. ON REFUGE

#### I. OUTSIDE WILDERNESS

Headquarters Lake	I	1	0	NC
Funny River	I	1	0	NC
Killey River (Lower-North)	A	1	1	0

#### II. INSIDE WILDERNESS

Killey River (Lower-South)	I	3	4	0
Upper Killey River/Harvey Lake	A	1	1	0
Skilak Lake Inlet	ANB	2	2	0
Skilak Glacial Flats	A	1	1	2
Russian River Burn	I	1	0	NC
Bear Creek	A	1	1	1
Killey River Headwaters	A	1	1	1

B. OFF REFUGE

Kenai River (Salamatof Native Land)	I	2	2	0
Kenai River (North of Brown's Lake)	I	1	0	DL
Russian River	I	1	0	NC
Beaver Creek Outlet/Kenai River	A	1	1	2
Lower Kenai River (above bridge)	ANB	1	0	NC
Lower Kenai River (Island by college)	I	1	1	0
Kasilof River near bridge	A	1	1	1
Coho Road Gaswell Area	NC		0	NC
Kalifornsky Beach Road	A		0	NC
Quartz Creek	A	1	1	0

SOUTH OF KASILOF RIVER/TUSTUMENA LAKE:A. ON REFUGE

Nikolai Creek	A	1	1	1
Upper Fox River	A	1	1	1
Lower Fox River/Clearwater Slough	A	1	1	2

B. OFF REFUGE

Sheep Creek/Fox River	I	3	2	0
Bradley River Outlet	A	1	1	1
Lower Deep Creek	NS	0	0	NC
Anchor River By Road	NS	0	0	NC

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Key: New nest located for first time in 1988 is underlined.

A = active; I = inactive; NC = not checked; DL = searched/not located; ANB = adult nearby; NS = did not search.

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Bald eagle surveys were conducted monthly by boat along the Upper and Lower Kenai River during winter-spring and fall-winter months, 1988. Total eagle numbers remained similar to 1987, but the proportion of juvenile birds sighted increased by ten percent (Table 12). Visual observations in November and December indicated that spawning silver salmon were more numerous than during the past two winters. These spawned-out fish are the main food source for eagles wintering along the Kenai River.





A group of bald eagles along the Lower Kenai River during a mid-winter boat survey.

TVS

Jean Keen of Homer, who feeds eagles waste from fish processing plants on the Homer Spit, has reported as many as 279 individual bald eagles at her feeding station at one time. Eagle numbers at this feeding station have increased dramatically over the past several years, and it is unknown if this artificial food source is attracting eagles away from the natural wintering area along the Kenai River, 70 miles to the north.

Table 12. Ages of bald eagles observed during boat surveys along the Kenai River during winter-spring and fall-winter months, 1988.

Survey Dates	River Route Number								
	1			2			Total		
	Ad	Juv	Unid	Ad	Juv	Unid	Ad	Juv	Comb
01/14&15/88	55	22	1	137	32	0	192	54	1
02/10&11/88	79	20	1	142	31	3	221	51	4
03/16&17/88	25	7	0	38	1	2	63	17	2
11/16&17/88	23	11	0	30	35	0	53	46	0
12/13&14/88	29	7		109	15	0	138	22	0

1. Kenai Lake to Jim's Landing.
2. Lower Skilak Lake Campground to Bing's Landing.

## 7. Other Migratory Birds

### a. Alaska Breeding Bird Survey

The Alaska Breeding Bird Survey was conducted along two routes in 1988.

The Seven Lakes Route was surveyed on June 14 by Biological Technician Mary Portner and Fish and Wildlife Biologist Ted Bailey. Results of the survey as shown below indicate the most commonly observed birds were the Swainson's Thrush (60), Myrtle Warbler (36), Gray-cheeked Thrush (24) and White-crowned Sparrow (24). A total of 288 birds of 28 species were observed along this route.

The Alaska Breeding Bird Survey on the Swan Lake Route was completed on June 10 by Mary Portner. The most commonly encountered birds included Swainson's Thrush (80), Slate-colored Junco (49), and Alder Flycatcher (43). A total of 395 birds of 30 species were observed.

Table 13. Birds recorded on the Swan Lake Route, Alaska Breeding Bird Survey June, 1988.

Species	#	Species	#	Species	#
Common Loon	11	Sandhill Crane	1	Greater Yellowlegs	6
Common Snipe	2	Mew Gull	2	Three-toed Woodpecker	1
Olive-sided Flycatcher	10	Western Wood-Pee wee	2	Alder Flycatcher	43
Tree Swallow	4	Gray Jay	11	Common Raven	1
Golden-crowned Kinglet	3	Ruby-crowned Kinglet	23	Gray-cheeked Thrush	5
Swainson's Thrush	80	Varied Thrush	11	American Robin	6
Orange-crowned Warbler	19	Yellow Warbler	4	Myrtle Warbler	37
Blackpoll Warbler	11	Wilson's Warbler	1	N. Waterthrush	18
Savannah Sparrow	1	Song Sparrow	1	Wht.-crowned Sparrow	10
Slate-colored Junco	49	Pine Grosbeak	2	Common Redpoll	20

Table 14. Birds recorded on the Seven Lakes Route, Alaska Breeding Bird Survey, June, 1988.

Species	#	Species	#	Species	#
Greater Yellowlegs	3	Common Snipe	1	Herring Gull	1
Olive-sided Flycatcher	3	Western Wood-Pee wee	4	Alder Flycatcher	3
Tree Swallow	8	Gray Jay	15	Ruby-crowned Kinglet	19
Gray-cheeked Thrush	24	Swainson's Thrush	60	Hermit Thrush	2
Varied Thrush	11	American Robin	9	Orange-crested Warbler	1
Yellow Warbler	1	Myrtle Warbler	36	Townsend's Warbler	4
Blackpoll Warbler	8	N. Waterthrush	4	Amer. Tree Sparrow	1
Savannah Sparrow	2	Song Sparrow	2	White-crowned Sparrow	24
Slate-colored Junco	17	Pine Grosbeak	6	Common Redpoll	16
Pine Siskin	3				

b. Trumpeter Swans

Trumpeter Swan nesting surveys revealed 45 nesting attempts (39 were on the refuge) on and adjacent to the to Kenai Peninsula.

Table 15. Trumpeter swan nesting locations and productivity on and adjacent to the Kenai National Wildlife Refuge, 1988.

Location	Wilderness	Territory	Nested	Late	
				Cygnets	Adults
North of	Inside	Angler Lake	X	0	0
Kenai R.	"	Bedlam/Trigger	X	0	0
(Inside	"	Camp Island	X	1	2
Refuge)	"	Chickaloon Oxbow	X	1	2
	"	Diamond Lake	X	0	0
	"	Dipper Lake	X	0	0
	"	Grebe Lake	X	2	2
	"	Greycliff Lake	X	3	2
	"	Moose Lake (West)	X	0	0
	"	Moose Lake	X	3	2
	"	Moose R (L)	X	6	2
	"	Moose R (U)	X	2	2
	"	Mystery Creek	X	3	2
	"	Scenic (NE)	X	3	2
	"	Scenic Creek	X	0	0
	"	Scenic Lake	X	4	2
	"	Warbler Lake	X	2	2
Subtotal			17	30	22

Nesting survey = May 17, 23, 24, 1988; June 2, 3, 1988.

No early brood survey conducted.

Late brood survey = July 28, 1988; August 1, 2, 1988.

Table 16. Trumpeter swan nesting locations and productivity on and adjacent the Kenai National Wildlife Refuge, 1988.

Location	Wilderness	Territory	Nested	Late	
				Cygnets	Adults
North of	Outside	Beaver Lake	X	2	2
Kenai R.	"	Curlew Lake	X	6	2
	"	Donkey Lake	X	0	0
(Inside	"	Doroshin	X	0	0
refuge)	"	Finger Lakes	X	0	0
	"	Hook Lake	X	3	2
	"	Krein/Grus Lake	X	0	0
	"	Mink Lake/Creek	X	7	2
	"	Quill Lake	X	1	2
	"	Savka/Cow Lakes	X	2	2
	"	Scaup Lake/Bogs	X	4	2
	"	Seven Egg Creek	X	0	0
	"	Swan/Campfire Lake	X	0	0
	"	Torpedo Lake	X	0	0
	"	Trapper Joe Lake	X	4	2
	"	Two Island Lake	X	4	2
Subtotal			16	33	18
GRAND TOTAL			33	63	40



Table 17. Trumpeter swan nesting locations and productivity on and adjacent to the Kenai National Wildlife Refuge, 1988.

Location	Wilderness	Territory	Nested	Late	
				Cygnets	Adults
North of Kenai R.	Outside	Bishop Creek	X	0	0
	"	Tony's Lake	X	4	2
(Outside refuge)	"	Timberlost Lake	X	5	2
	"	Suneva Lake	X	0	0
	"	Suneva Lake (Bog)	X	0	0
Subtotal			5	9	4
South of Kenai R.	Inside	Fox Lake	X	2	2
	"	Fox River	X	3	2
(Inside refuge)	"	Harvey/Killey	X	4	2
	"	Tea/Brown's	X	0	2
	"	Tustumena Pond (S)	X	3	2
Subtotal			5	12	10
South of Kenai R.	Outside	Bay Lakes Bogs	X	2	2
(Inside Refuge)					
Subtotal			1	2	2
TOTAL			11	23	16
South of Kenai R.	Outside	Caribou Lake	X	4	2
(Outside Refuge)					
Subtotal			1	4	2
GRAND TOTAL			12	27	18

## 8. Game Mammals

### a. Moose

No winter moose census was conducted during 1988, however, moose composition counts were carried out by refuge staff, in cooperation with the Alaska Department of Fish and Game (Table 18). The observed

post-hunting 1988 season bull-cow ratio of 17.7 bulls:100 cows was up 6.5 percent over 1987 (16.6 bulls:100 cows), and nearly 300 percent over 1986 (6 bulls:100 cows). Moose hunting antler restrictions, in effect for the second year, have been credited for this increase.

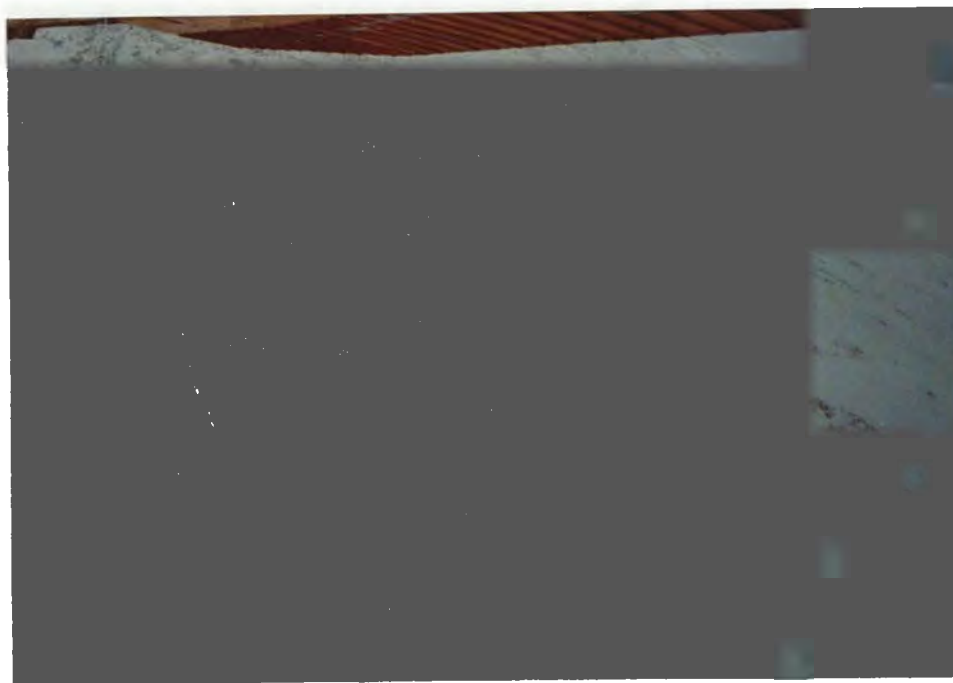
Although the winter of 1987-88 brought some of the deepest snow in recent years, the cow-calf ratio of 45 calves:100 cows and twinning rate of 13.9 twin calves:100 producing cows were among the highest on record. This may be the benefit of habitat enhancement and/or an increasing bull-cow ratio.

Table 18. Moose composition counts, Kenai National Wildlife Refuge, 1988.

Area	Date	Bulls (Legal)			Cows			Lone Calf	Total
		Yrlg	L50"	50"+	W/O Calf	W/1 Calf	W/2 Calves		
15A-02	11/18/88	16(11)	36(2)	2(2)	200	128	22	1	577
	11/19/88								
15A-03	11/28/88	0(0)	1(0)	0(0)	13	19	1	0	55
15A-05	11/18/88	12(12)	23(1)	0(0)	105	63	10	0	297
15A-06	?	8(?)	2(?)	7(7)	26	9	2	0	67
	11/17/88								
15A-09	11/28/88	6(?)	6(0)	0(0)	49	15	2	0	97
15A-10	11/28/88	4(4)	3(0)	0(0)	36	7	2	0	63
Total		46	71	9(9)	429	241	39	1	1156

b. Caribou

Three caribou herds on the Kenai Peninsula were surveyed at various times during 1988 (Table 19). The mountain herd did not appear to significantly increase over 1987 numbers and only 150 either-sex hunting permits were issued by the Alaska Department of Fish and Game (250 permits were issued in 1987). Numbers in the lowland herd appeared to be stable or slowly increasing and the Alaska Department of Fish and Game issued three bull caribou hunting permits for this herd. Caribou in the benchland herd continue to do well two years after the transplant from the Nelchina Basin was completed. The herd now numbers at least 120 animals in four groups. During summer 1988, Master of Science degree candidate Carlos Paez, University of Wisconsin at Madison, began work to determine composition and characteristics of the alpine lichen, winter range used by the transplanted caribou. This study should provide valuable baseline habitat information for future caribou management on the Kenai Peninsula.



Introduced caribou on alpine winter range in the  
Skilak/Tustumena benchland

TNB

Table 19. Caribou surveys on the Kenai Peninsula, 1988.

	<u>Date</u>	<u>Agency</u>	<u>Bulls</u>	<u>Cows</u>	<u>Calves</u>	<u>Total</u>
Mountain Herd	06/01/88	ADF&G	77 Adults		30	107
	10/21/88	ADF&G	64	175	41	280
37 Bulls:100 Cows 23 Calves:100 Cows						
Lowland Herd	06/17/88	ADF&G	102 Adults		13	115
Benchland Herd	06/24/88	USFWS	85 Adults		31	116

\*Incomplete aerial survey.

c. Dall's Sheep

Limited aerial surveys of Dall's sheep and mountain goats on the Kenai Peninsula were conducted by the Alaska Department of Fish and Game during the summer of 1988 (Tables 20 and 21). The status of sheep and goat populations is not well documented, but it is believed both are slowly expanding. However, the number of mature rams in this heavily-hunted area remains abnormally low. For this reason, the refuge will propose to the Alaska Board of Game that horn size of legal rams be increased from 7/8 to full curl.

Table 20. Dall's sheep surveys on the Kenai Peninsula, 1988.

<u>Count Area</u>	<u>Date</u>	<u>Count Time (min.)</u>	<u>Legal Rams</u>	<u>Sub-Legal Rams</u>	<u>Ewes</u>	<u>Lambs</u>	<u>Unid.</u>	<u>Total</u>
857	08/04/88	150	6	23	80	21	0	130

Table 21. Mountain goat surveys on the Kenai Peninsula, 1988.

<u>Count Area</u>	<u>Date</u>	<u>Count Time (min.)</u>	<u>Adults</u>	<u>Kids</u>	<u>Total</u>	<u>Kids Per 100 Adults</u>	<u>Percent Kids</u>
837*	07/29/88	15	27	8	35	30.0	23%
854	07/29/88	90	60	14	74	23.0	19%
852	08/04/88	150	35	8	43	23.0	19%
Total		255	122	30	152	24.6	20%

\*Incomplete survey: only Southern portion flown.

d. WolvesNorthern Refuge

Seven wolves from three separate packs in the northern refuge were captured during 1988 and fitted with radio transmitter collars for census purposes. Three wolves each were collared in the Point Possession and Skilak Packs and one from the Elephant Lake Pack. Five were caught during summer trapping and two (Point Possession) by darting from a helicopter (Table 22).





Close-up of wolf captured for radio-collaring and census purposes along the gas pipeline road.

TVS

Based on visual observations and radio locations of these packs it was known that in the early 1988-89 winter there were at least 35 wolves in the Point Possession, Skilak Lake and Elephant Lake Packs. There was a degree of confusion over the possible presence of another wolf pack in the Sunken Island Lake Area because these wolves were sighted in the Elephant Lake Pack territory on days when the Elephant Lake Pack was not visually counted. It was also known that the Elephant Lake pack was split during that period. Later captures (January 1989) revealed four wolves were in the Bear Lake Pack Area. Using a 15 percent addition to account for loners and pairs, a population of 45 wolves was estimated to occur in the Game Management Unit 15A portion of the refuge west of the Mystery Creek/pipeline Road in the fall of 1988 (Table 22).





Part of the Elephant Lake Wolf Pack crosses an open bog  
in the northern part of the refuge. TVS

#### Remainder on Refuge

Little is known about the number of packs or wolves per pack in the remainder of the refuge. It is assumed that pack configuration is similar to that reported at the end of the wolf research project in 1981, or about three packs in the central (Game Management Unit 15B) portion of the refuge and two to three packs on the southern portion (Game Management Unit 15C) of the refuge.

Table 22. Population of wolves in northern region of refuge during 1988-89 winter, west of Mystery Creek/Pipeline Road.

<u>Pack</u>	<u>Observed Number of Wolves</u>	<u>Date of Observation of Maximum Numbers</u>
Elephant Lake	11	11/18/88
Point Possession	10	11/30/88
Skilak Lake	14 <sup>1</sup>	11/28/88
Bear Lake	<u>4</u>	01/25/88
Sub-Total	39 <sup>2</sup>	
Loners and Pairs (15% x 39)	<u>6</u>	
Total	45	

<sup>1</sup> Ten wolves seen near moose kill including four radio-collared wolves, four additional wolves seen later (100m) by Alaska Department of Fish and Game on same day.

<sup>2</sup> Does not include seven wolves seen by Alaska Department of Fish and Game because their pack affiliation was unknown.

Table 23. Wolves captured on the Kenai National Wildlife Refuge 1988.

<u>Pack</u>	<u>Sex</u>	<u>Age</u>	<u>Weight</u>	<u>Date of Capture</u>	<u>R/L Ear Tags</u>
Point Possession	F	Pup	57 lbs.	02/18/88	None/43
Point Possession	M	Pup	84 lbs.	02/18/88	033/038
Point Possession	M	Adult	84 lbs.	04/29/88	819/813
Skilak Lake	M	Yearl.	97 lbs.	06/26/88	856/824
Skilak Lake	F	Adult	69 lbs.	06/26/88	866/867
Skilak Lake	F	Adult	78 lbs.	08/03/88	817/831
Elephant Lake	F	Adult	80 lbs.	07/01/88	837/836

9. Marine Mammals - Nothing to report.

10. Other Resident Wildlife

The snowshoe hare population within the 1947 burn habitat was monitored for the sixth continuous year as part of the concurrent lynx study and the fact that snowshoe hares are the principal prey of many raptors and medium-sized mammalian predators on the refuge. Snowshoe hare also have a significant impact on vegetation also preferred by moose. Two Student Conservation Association volunteers, Susan Lindahl and Sandra Ribbe trapped, marked, and released snowshoe hare in three permanent study grids, counted hare pellets, and measured browsing pressures of hares on woody vegetation during the summer of 1988.





Student Conservation Association Biological Volunteers  
Susan Lindahl (left) and Sandra Ribbe check location of  
a radio-collared snowshoe hare in the Funny River Road  
permanent snowshoe hare grid. TNB

The results of the live-capture/pellet counting programs indicated that snowshoe hares in the 1947 burn continue to decline according to the following criteria: number of individual captured in the grids, total captures and average number of pellets per square meter in the grids (Table 24).

Table 24. Capture success and pellet densities in three permanent snowshoe hare grids: 1947 burn habitat on the Kenai National Wildlife Refuge, 1983-1988.

Year	Swanson Road Grid				Funny River Road Grid				Campfire Lake Grid			
	Indiv.		Total	Pellets	Indiv.		Total	Pellets	Indiv.		Total	Pellets
	Ad	Juv			Ad	Juv			Ad	Juv		
1983	23	11	64	65	27	76	232	60				
1984	34	20	85	51	47	79	216	35				
1985	30	10	113	52	49	25	159	44				
1986	23	8	95	28	19	15	115	20	19	13	93	53
1987	10	2	31	14	16	15	63	9	13	11	77	20
1988	4	5	11	11	2	2	5	7	5	7	39	10



## 11. Fisheries Resource

The number of sockeye passing the sonar counter in the Lower Kenai River was 1,022,000 in 1988. Of these, the number of sockeye returning to the Russian River System was 202,610. Of the Russian River return, 30,360 sockeye were estimated to have stayed below the Russian River Falls and the balance (172,250) moved above the falls or were caught by sportfishermen. The first (early) return of sockeye into the Russian River was 110,230, and of these 50,820 were harvested and 50,410 escaped to spawn. The second (later) return of sockeye into the Russian River was 62,000, of which 19,540 were harvested and 42,480 escaped to spawn.

In addition to the 202,610 sockeye returning to the Russian River, an estimated 50,900 adults returned to the Hidden Creek and lake system. About 80 percent of these (40,720) were hatchery reared and the remainder (10,180) wild stock. A total of 6,085,307 hatchery-reared fry were stocked into Hidden Lake in 1988 and the number of eggs to be taken in 1989 is uncertain. It was estimated by Alaska Department of Fish and Game that Hidden Lake could decompose 30,000-40,000 salmon carcasses without significantly influencing the lake's water quality.

In the Kasilof/Tustumena Lake System 203,900 adult sockeye were estimated to have passed by the sonar counter in the lower river this summer and 981,000 were harvested in the Cook Inlet before reaching the Kasilof River. Of these, 460,400 were estimated to be hatchery-reared fish. A total of 6,272,000 sockeye fry were released into Tustumena Lake in 1988. The fisheries Research Division of the Service will begin research into the Tustumena Lake salmon fisheries in 1989.

12. Wildlife Propaganda and Stocking - Nothing to report.

13. Surplus Animal Disposal - Nothing to report.

14. Scientific Collections - Nothing to report.

15. Animal Control - Nothing to report.

16. Marking and Banding

Mammals and birds ear-tagged, radiocollared, or leg banded during 1988 on the Kenai National Wildlife Refuge are shown in Tables 23 and 24. This information was sent to the Migratory Bird Banding laboratory, U.S. Fish and Wildlife Service, Division of Law Enforcement and Alaska Department of Fish and Game as a condition of the refuge collecting permit.

Table 25. Report of animals/birds taken under Federal Fish and Wildlife permit #692350 and State of Alaska permit #88-80.

Species	Date	Activity	Age	Sex	Weight	Status	Area
Wolf	02/18/88	Radiocollared	Pup	F	57.0 lbs	Released	Chickaloon Flats
Wolf	02/18/88	"	Pup	M	84.0 lbs	"	Chickaloon Flats
Wolf	04/29/88	"	A	M	84.0 lbs	"	Nest Lake
Wolf	06/26/88	"	SA	M	97.0 lbs	"	South Pipeline Road
Wolf	06/26/88	"	A	F	69.0 lbs	"	South Pipeline Road
Wolf	07/01/88	"	A	F	80.0 lbs	"	Swanson River Oil Field
Wolf	08/03/88	"	A	F	78.0 lbs	"	Mystery Creek Road
Coyote	04/28/88	Radiocollared	A	M	23.0 lbs	Released	Swan Lake Road
Coyote	04/28/88	Caught in Trap	A	M	30.0 lbs	Dead	Swan Lake Road
Coyote	04/30/88	Radiocollared	SA	F	17.0 lbs	Released	Swan Lake Road
Coyote	04/30/88	Radiocollared	SA	F	18.0 lbs	"	Swan Lake Road
Coyote	05/03/88	Radiocollared	A	F	25.0 lbs	"	Arrow Lake
Coyote	05/23/88	Radiocollared	A	M	24.0 lbs	"	Jigsaw Lake
Coyote	06/03/88	Radiocollared	A	F	25.0 lbs	"	Jigsaw Lake
Coyote	06/17/88	Radiocollared	A	M	28.0 lbs	"	North Oilfield
Coyote	06/25/88	Radiocollared	A	F	23.0 lbs	"	North Oilfield
Coyote	06/29/88	Eartagged	SA	M	24.0 lbs	"	North Oilfield
Coyote	07/02/88	Radiocollared	A	F	22.0 lbs	"	Mystery Creek Road
Coyote	07/09/88	Radiocollared	SA	F	23.0 lbs	"	Mystery Creek Road
Coyote	07/12/88	Eartagged	SA	F	20.0 lbs	"	Mystery Creek Road
Coyote	07/15/88	Eartagged	SA	M	20.0 lbs	"	Swanson Rvr Oil Field
Coyote	08/04/88	Radiocollared	A	F	28.0 lbs	"	Grebe Lake
Coyote	08/15/88	Caught in Trap	Pup	F	11.0 lbs	Dead	Grebe Lake
Coyote	08/22/88	Eartagged	SA	M	26.0 lbs	Released	North Pipeline Road
Lynx	03/16/88	Radiocollared	A	M	27.0 lbs	Released	Arrow Lake
Lynx	03/24/88	"	A	F	22.2 lbs	"	Campfire Lake
Lynx	03/24/88	"	SA	M	17.2 lbs	"	Campfire Lake
Lynx	03/24/88	"	A	F	18.0 lbs	"	Arrow Lake
Lynx	04/03/88	"	A	F	21.0 lbs	"	Weed Lake
Lynx	04/08/88	"	A	M	28.0 lbs	"	Swan Lake Road
Lynx	04/09/88	"	A	F	23.5 lbs	Release/Died	Arrow Lake
Lynx	04/16/88	Recapture	A	F	24.0 lbs	Released	Portage Lake
Lynx	05/03/88	Radiocollared	SA	M	15.5 lbs	"	Campfire Lake
Lynx	05/18/88	Recapture	A	M	30.0 lbs	"	Portage Lake
Lynx	05/19/88	Radiocollared	A	M	26.0 lbs	"	Drakes/Skookum Lake
Lynx	06/01/88	"	SA	F	13.8 lbs	"	Campfire Lake
Lynx	06/29/88	"	SA	F	16.0 lbs	"	Mystery Creek Road
Lynx	07/25/88	Recapture	A	F	22.0 lbs	"	Antler Lake
Lynx	08/25/88	Caught in Trap	SA	F	20.0 lbs	Died	North Pipeline Road
Black Bear	07/13/88	Eartagged	A	F	est. 150 lbs	Released	Swanson River Oil Fld.
Black Bear	07/16/88	Eartagged	A	F	est. 130 lbs	"	Swanson River Oil Fld.
Black Bear	08/15/88	Eartagged	A	F	est. 155 lbs	"	North Pipeline Road
Black Bear	08/20/88	Caught in Trap	-	-	---	"	North Pipeline Road
Black Bear	08/22/88	Caught in Trap	-	M	---	"	North Pipeline Road
Black Bear	08/22/88	Eartagged	-	M	est. 110 lbs	"	North Pipeline Road
Moose	02/18/88	Eartagged	A	F	---	Released	Wonder Lake
Moose	03/02/88	Eartagged	SA	M	---	"	South Brown's Lake
Porcupine	07/20/88	Caught in Trap	-	-	10 lbs	Released	North Pipeline Road

Table 26. (Continued) Report of animals/birds taken under Federal Fish and Wildlife permit #692350 and State of Alaska permit #88-80.

Species	Date	Activity	Age	Sex	Wt.	#	Status	Area
Snowshoe Hares	07/13-26/88	Live Trapped	-	-	-	2	Radiocollared/Released	Campfire Lake
						9	Eartagged/Released	
						1	Dead	
Snowshoe Hares	06/15-28/88	Live Trapped	-	-	-	1	Radiocollared/Released	Swanson River Rd
						5	Eartagged/Released	
						3	Dead	
Snowshoe Hares	08/10-23/88	Live Trapped	-	-	-	2	Radiocollared/Released	Funny River Rd
						1	Eartagged/Released	
						1	Dead	
						25	Total Snowshoe Hares	
Small Mammals RD/	10/19-21/88	Snaptrapped	-	-	-	234	Red-Backed Voles	Swanson River
						10	Tundra Voles	Swan Lake Road
						29	Masked Shrews	
						1	Bog Lemming	
Red Squirrels	07/14-28/88	Caught in Trap	-	-	-	10	Released	Campfire Lake
						1	Dead	
Red Squirrels	06/15-19/88	Caught in Trap	-	-	-	2	Released	Swanson River Rd
						2	Dead	
Red Squirrels	08/10-20/88	Caught in Trap	-	-	-	3	Released	Funny River Rd
						2	Dead	
						20	Total Red Squirrels	

The following species are stored in the Kenai National Wildlife Refuge freezer (found dead).

Bald Eagle	03/14/88	Found hung in tree by radio harness	4.5	F	--	Dead	Eagle Rock
Great Horned Owl	04/15/88	Road Kill	AD	--	--	"	Funny River Road
Lynx	06/08/88	Road Kill	AD	M	--	"	Sterling Highway
2 Snowshoe Hares & 1 Squirrel	06/08/88	Caught in traps	--	--	--	"	Swanson River Road
Gray Jay	10/19/88	Caught in trap	--	--	--	"	Swanson River Road
Scoter	10/23/88	Found emaciated	--	--	--	"	Kasilof River
Grouse	10/31/88	Road kill	--	--	--	"	Swanson River Road
Great Horned Owl	11/07/88	Road Kill	--	--	--	"	K. Beach Road, Soldotna
Moose Head	11/15/88	Road Kill	SA	F	--	"	Swanson River Road

17. Disease Prevention

Blood serum samples from wolves (56) and coyote (3) from the refuge were sent to the Wildlife Disease Health Laboratory in Madison, Wisconsin to test for the exposure to parvovirus and other canine diseases. These included samples from 1976-1988. Results are not expected until 1989.

18. Injured Wildlife

In 1988, twenty-eight animals of sixteen species were brought into the refuge for rehabilitation. This was an increase over last year's total of 17 animals of twelve species.

Rehabilitated wildlife included 27 birds and one lynx which sustained a broken leg from a wolf trap. Of the 27 birds turned into the refuge, 13 suffered wing injuries; five of which were the result of gunshot wounds.

Great Horned Owls (four) and Northern Goshawks (three) were the most commonly injured. Two bald eagles were rehabilitated, banded and released this year. All wildlife was either successfully released, sent to a zoo or breeding facility or humanely euthanized.



An immature bald eagle recovering in the Refuge's rehabilitation pen.

TVS



## H. PUBLIC USE

### 1. General

Visitor use of the Kenai National Wildlife Refuge during 1988 involved the historical range of both consumptive and non-consumptive recreational pursuits in a variety of settings, ranging from the remote ridges of the Kenai mountains to the comfort of the Headquarters Visitor Center in Soldotna.

Certain activities such as fishing the Kenai or Russian Rivers, big game hunting, viewing a wildlife film at the Visitor Center, or canoeing the Swan Lake Canoe Trail System, have become institutions in southcentral Alaska. Maintaining the opportunity and character of these and other outdoor recreation activities, while continuing to protect associated wildlife and fisheries values, were the primary tasks during 1988.



Refuge employee Candace Ward provides trail information to a refuge visitor. Refuge information was provided to thousands of visitors during 1988, both in person and via correspondence.

RKJ



A major portion of the public use staff effort in 1988 was also to provide planning support and technical expertise for three separate phases of the on-going Skilak Wildlife Recreation Area development project. Perhaps seventy percent of existing refuge campgrounds, wayside access areas, day trails, and roadside recreation opportunities were directly or indirectly involved in the facility and program evaluations associated with Skilak Wildlife Recreation Area planning.



A trailhead and access trail to Upper Ohmer Lake is one of many facilities which would be upgraded as part of the Skilak Wildlife Recreation Area project. RKJ

A draft Skilak Wildlife Recreation Area Master Plan was completed in late 1986 by a private consulting firm, Land Design North of Anchorage. While the plan went a long way toward launching the concept of the Skilak Wildlife Recreation Area, an Environmental Assessment which was required in 1988 for the project.

Two other phases of the project were also underway during 1988. A contract was awarded for architectural drawing and engineering consultation for initial facility rehabilitation. Region 7 engineering and planning staff were involved in certain phases of design and survey



work with refuge staff providing technical assistance. At year's end, with winter winds nipping at their heels, Region 7 Engineers, Regional Planner Norm Olson and various refuge staff completed several surveying projects involving roadsite facilities.

A contract was also awarded for the development of an overall interpretive theme for the Skilak Wildlife Recreation Area, and the design for various exhibits for individual facilities.

A slightly increased seasonal public use staff, along with Student Conservation Association Volunteers, carried out the majority of day-to-day operational tasks, while permanent staff split duties between Skilak planning and contract support, and refuge operations. While several aspects of the Skilak Wildlife Recreation Area planning identified new physical facilities and visitor opportunities, the direction of the revised plan and focus of the overall program was to rehabilitate and enhance existing facilities and on-going programs.



A young visitor enjoys a sunny summer day on the Upper Kenai River while trying to catch a trophy rainbow trout.

RKJ

Overall refuge visitation was slightly increased from 1987, although certain activities, such as refuge trapping, fly-in tent camping, small game hunting and backcountry canoeing appeared to decrease in 1988.



Sportfishing, as is the historical pattern, was a major source of refuge visitation and slightly increased during 1988. Overall refuge visitation was estimated at 399,360 visits.

## 2. Outdoor Classrooms - Students

Approximately 2,450 students participated in the refuge's environmental education program in 1988. While fall use increased over 1987, April and May continued to be the busiest months. All available spaces for May field trips were booked by the third week in April. The environmental education program experienced an overall increase of 550 students (up 22 percent from 1987). Despite a continuing lack of funding for school field trips, teachers and parents persevered by organizing car pools and conducting fund raisers to provide transportation to the refuge for field trips.

A typical field trip to the Visitor Center runs from 9 a.m. to noon. Students begin with an introductory wildlife film or videotape selected from the refuge's extensive film library. After the film, students explore the exhibit area with questionnaires associated with the various exhibits. The questionnaires focus on concepts such as adaptations, interdependence, communities, and succession. There are four levels of quizzes for grades K/1, 2/3, 4/6, and above. Visitor center activities are followed by lunch at nearby Headquarters Lake. Students then hike the 1/2 mile "Keen-eye" Trail and answer questions from an accompanying leaflet.



Elementary school students answer wildlife quiz questions while participating in a school field trip to the Kenai National Wildlife Refuge Visitor Center. Students glean information from exhibits in order to answer questions.

CW



In 1988, two hundred and fifty youth utilized the refuge's Outdoor Education Center (located off Swan Lake Road adjacent to the Swanson River and Swan Lake Canoe Systems). The center provides an attractive outdoor site for school field trips and youth group retreats. Simple facilities provide the basics, allowing teachers and youth leaders the opportunity to conduct environmental education field activities with the added bonus of six cabins and a "commons" room for overnight use, free-of-charge.

Boyd Shaffer, Kenai Peninsula College instructor, hosted a spring semester course, "Mammals of Alaska and the World", each Friday from 9:00 a.m. to noon in the Visitor Center auditorium. This collaboration between the refuge and Kenai Peninsula College enables college students to benefit from viewing our excellent wildlife film/video library. In addition, it saves the instructor the headaches of arranging for well maintained audiovisual equipment. The refuge education program benefits not only from expanding to reach a new audience of college level students, but, as a side benefit, many of our outstanding community volunteers have come from the ranks of this particular course.

### 3. Outdoor Classrooms - Teachers

In 1988, sixty-four new teachers were introduced to the refuge's environmental education program, through teacher-orientation sessions and environmental education courses. Orientation sessions were scheduled for fall and spring when teachers showed the greatest interest in scheduling field trips. During a 1 1/2-hour orientation, teachers experience an abbreviated version of a sample class field trip, and also learn about the refuge's purposes and commitment to environmental education. Credit environmental education courses were scheduled for April and November, months that are convenient for teachers as well as refuge staff.

Over the past five years, 297 teachers (42 percent of the total number of peninsula teachers) have attended a teacher orientation session or an environmental education credit course. Teachers bring classes from as far away as Tyonek, Seldovia, and Anchorage. However, 85 percent of the classes participating in the refuge environmental education program come from the local communities of Kasilof, Kenai, Nikiski, Soldotna, and Sterling.

In January, 1988, Park Ranger Candace Ward established a refuge internship program with Kenai Peninsula College. Two interns, Jodie Murrell and Linda Story (both refuge volunteers), received in-depth information about the refuge's programs and operations, and, in turn, contributed to Visitor Center operations and environmental education programs for college credit.



Two Kenai Peninsula School District teachers participate in an orientation session at the Refuge Visitor Center. Over the past five years, 297 teachers have attended the Visitor Center teacher-orientation sessions.

CW



Local teachers participate in a Project Wild credit course at the Refuge Visitor Center.

CW

In April and November, Park Ranger Ward, assisted by Interns Murrell and Story, and Volunteers Sara Hepner and Teresa Danielson, hosted 1/2-unit environmental education college courses. Twenty-six teachers and resource agency personnel attended the April course, Aquatic Environmental Education Curricula, which emphasized Project Wild Aquatic and Alaska Sea/River Week environmental education curricula. In November, 21 teachers and youth leaders participated in a Project Wild credit course.

In May and September, Park Ranger Ward, assisted by Volunteer Story, prepared instructional units for teachers and youth leaders on moose and birds, two topics frequently of interest to educators and youth. The units contain activities from environmental education curricula, and resource lists for films, videos, and books.

In October, Ward led a workshop, "Wildlife of Alaska's Tundra" for the Kenai Peninsula Borough Teacher In-Service. Fifteen teachers attended the half-day session, participating in a variety of hands-on activities and receiving free Alaska Wildlife Week tundra units for their grade levels.

#### 4. Interpretive Foot Trails

The 1988 Annual Work Plan Advice called for completion of a new alternative loop on the Keen-eye Trail with an associated spur to Headquarters Lake. Outdoor Recreation Planner Johnston laid out the new loop and spur, and seasonal staff and Student Conservation Association volunteers completed the initial trail work. Student Conservation Association volunteers, assisted by Park Ranger Levy, also cleared and resurfaced extensive portions of the existing Keen-eye Trail interpretive loop.

Final plans and building materials for the Keen-eye spur (boardwalk) and associated observation deck were received from engineering in late summer. Refuge laborers prefabricated the observation deck, disassembled it, and then reassembled it on the shore of Headquarters Lake during autumn. The deck was completed by Laborers Marrs and Bartman, who are commended for a job well done while working in less than ideal climatic conditions. The 200-foot boardwalk spur, and the benches and hand railings for the deck are scheduled for completion next spring. The new section of the Keen-eye Trail will provide access to Headquarters Lake and an opportunity for nature hikers to explore the shoreline ecology of the lake.

In conjunction with the interpretive plan phases of the Skilak project, refuge staff examined several potential interpretive trails during 1988. Several were associated with existing facilities, while others would be new developments as part of the Skilak Wildlife Recreation Area project.



Interpretive trails were planned for Marsh Lake crushed area (two trails), Pack Lake, Hidden Lake, and Kenai River Trail (north). In conjunction with the plan, several hiking trails would display more wildlife information at the trailhead and potentially at some trailside locations.

5. Interpretive Tour Trails - Nothing to report.

6. Interpretive Exhibits/Demonstrations

In January, Homer artist Joann Popham, completed a new mural exhibit in the Visitor Center. Entitled, "How Do You Measure Up to Alaskan Wildlife?", the mural covers both sides of the restroom hallway (a dead space we've been trying to liven up for years). The exhibit features life-sized silhouettes of Alaskan wildlife that children of all ages can physically measure themselves against. Wildlife tracks cover the walls at various heights so children can compare their hand-sizes to them. Funding for this exhibit was provided by the Jim Rider Memorial Fund of the Alaska Natural History Association.

During October, in anticipation of ski season, Seasonal Rangers Zallek and Green, and Outdoor Recreation Planner Johnston installed a bulletin board at the head of the Visitor Center Ski Trail system. They created informational displays for the board, and updated and refined the ski trail map for public distribution.



A refuge visitor explores a "hands on" display at the Refuge Visitor Center.

CW





A refuge visitor listens to a raven's call in the "Sounds of the Kenai" exhibit at the Refuge Visitor Center.

CW

#### 7. Other Interpretive Programs

The year-round weekend wildlife film series continued to be one of our most popular programs, attracting 6,900 people in 1988. Adding ten new titles to our film/video collection improved the quality of the series. Local media and radio stations offered excellent free public service advertising for the program.

During summer, 2,860 people watched the refuge video, "Wild Refuge: Fortune and Future of the Kenai". Our audience increased 30 percent (660 people) over last summer.

Local groups continue to increase their use of the Visitor Center for wildlife-oriented meetings and programs because of the variety of audiovisual media available. These groups include Kenai Peninsula Audubon Society, Kenai Peninsula Community College, Alaska Bowhunters, scouts, campfire youths, 4-H clubs, summer youth camps, church youth groups, seniors organizations, mental health services, tour groups, and day care programs.

In addition to seasonal employee and Student Conservation Association intern training, refuge staff conducted a variety of interpretive and educational programs requiring in-depth preparation. These included assisting in the April "Snow Goose Watch", and providing slide show presentations for local chambers of commerce, Kenai Peninsula College courses, Alaska Bowhunter safety courses, Chugach National Forest seasonal training sessions, and Smithsonian tours.

### 8. Hunting

Hunting, particularly for big game, continued to be a very popular activity on refuge lands during 1988 (Table 27). Waterfowl and small game hunting appeared to be below historical levels, probably attributed to the low in the snowshoe hare cycle and overall depressed duck populations.

Table 27. Big game harvest on the Kenai Peninsula, 1988.

Game Management Unit					
Species	15A	15B	15C	7	Total Harvest
Brown Bear	<u>2</u>	<u>2</u>	<u>9</u>	<u>1</u>	<u>15</u>
Sport Harvest = 14 bears (6 male, 8 female)					
Defense of Life and Property = 1 bear (female)					
Black Bear		GMU 15=98		GMU 7=55	153
Upland Caribou				25	25 <sup>a</sup>
Lowland Caribou	3				3 <sup>b</sup>
Dall's Sheep					38 <sup>c</sup>
Mountain Goats					136 <sup>d</sup>
Moose	10 bow season	31 (east) <sup>e</sup>			
	133 rifle season				
	41 (west)	144		44	407 <sup>f</sup>

- a. One-hundred-fifty permits issued, 17 percent hunter success rate.  
 b. Three permits issued, 100 percent hunter success rate.  
 c. Game Management Unit harvest data unavailable.  
 d. Most mountain goats are killed in Game Management Unit 7.  
 e. Incomplete harvest data.  
 f. Does not include 279 road-killed moose and at least 27 illegally shot moose.



Waterfowl hunting occurred primarily on Chickaloon Flats and at the outlet of Skilak Lake. Although hare populations were generally low, occasional die-hard hunters with beagles still managed a few good hunts. Spruce grouse populations appeared to be increasing and hunting was reported good in the early morning hours during late August, September, and October. Spruce grouse hunters seemed to be primarily road hunters, with only incidental take at other than roadside locations.

Willow ptarmigan hunting was generally light except for localized places in the Caribou Hills. A handfull of hardy hunters with pointing dogs hiked into several mountain valleys and reported excellent hunting with relatively large coveys. Although little is known about hunting pressure in the Caribou Hills, some reports indicate significant hunting pressure, supplied by snowmobile access.

Moose hunters are by far the most abundant hunters on the refuge. The road, river and trail access in the Swanson River drainage, combined with the excellent habitat within the 1969 burn, make the eastern portion of Game Management Unit 15A very popular. Antler restrictions on the hunting of bull moose were continued for the second consecutive year. Regulations require that legal bulls must have a spike or fork on one side, or a 50-inch antler spread or three brow tines on one side.

Compliance with the antler restrictions was relatively poor during 1988 due to hunter error/behavior. Records of the Alaska Department of Fish and Wildlife Protection showed that warnings or citations were issued to 27 moose hunters for take of bull moose with illegal antler sizes within Game Management Units 15 and 7. Several of the cases involved obviously illegal bull moose while others were "close calls". At this time, it is not known how many of the 27 moose were taken on the refuge, however, it is believed that the majority of the incidents occurred within our boundaries.

Most of the errors involved mistaking fork-antlered bull moose for those with three or more points or palmation, or mistaking two brow tines for three on older moose. At year's end, the U.S. Fish and Wildlife Service and the Alaska Department of Fish and Game submitted a joint proposal to the Board of Game to increase the antler restrictions from three to four brow tines to prevent illegal take of older moose. The board rejected the measure in favor of increased hunter education. Refuge staff will be assisting in getting the word out about legal antler sizes next season. Photographs depicting legal and illegal antlers will be incorporated into an informational display.

A new pre-general-season archery hunt was conducted for the second year in Game Management Unit 15A with a noticeable increase in hunter interest. The five-day season (August 25-29), saw over a 100 percent increase in hunting pressure, however, only a few more moose were harvested. The known bow-hunter harvest increased from eight to ten moose this year.

Refuge staff, with help from the Kenai Fisheries Research Unit, operated two moose hunter check stations, each for five days, during bow season (August 25-29). Four check stations were operated for a total of 46 check station days during rifle season (September 1-20). Operation of the Swanson River Road and Swanson River Weir check stations accounted for 86 percent of this effort. Hunter effort and success at the Marathon Road and Mystery Creek Road locations was very low.

Table 28. Summary of moose hunter check stations operated on the Kenai National Wildlife Refuge, 1988.

Check Station	No. Days Operated	No. Hrs Operated	No. Vehicles Contacted	No. Moose Bulls	Checked Cows	No. Black Bears Checked
Bow Season:						
Swanson River Road	5	72	496	3	0	0
Swanson River Weir	<u>3</u>	<u>17</u>	<u>30</u>	<u>4</u>	<u>0</u>	<u>0</u>
Total	8	89	526	7	0	0
Rifle Season:						
Swanson River Road	18	208	1479	29	0	0
Mystery Creek Road	4	18	59	0	0	0
Marathon Rd	4	49	144	1	0	0
Swanson River Weir	<u>20</u>	<u>320</u>	<u>134</u>	<u>6</u>	<u>0</u>	<u>0</u>
Total	46	595	1816	36	0	0
Grand Total	54	684	2342	43	0	0

\*At least four checked moose were illegal under current regulations.

Although this was the tenth year of operating hunter check stations on the refuge, it was the first year a check station was utilized along the Swanson River itself. It was also the first time a check station was operated in a non-roadside location. As in the past, information distribution, regulatory compliance, and data gathering were the objectives of the check stations. The Swanson River fishery weir, which was manned 24 hours per day, served as a hunter/recreationist check station during the season. The station provided the first 100 percent accumulative data on use of the Swanson River ever recorded.

Hunter effort appeared to have increased this year, based on data gathered at the check stations (the increased figures may simply be due to a doubling of check station days over 1987). An increase of 244 percent in hunter effort and a decrease of 32 percent in hunter success was recorded for the bow season. Overall hunter effort for 1988 was up 69 percent, while hunter success dropped 38 percent from 1987.

Forty-three bull moose were checked at refuge stations, an increase of two (five percent) over the 1987 total. Seven (16 percent) bulls were taken in the large moose category (three brow tines on one side or better than a 50-inch antler spread), and four (57 percent) of those were illegal or questionably legal. Several cow moose were also found shot and, in at least two cases, wasted. It is not known whether the unauthorized cow moose shootings were somehow linked to the new antler restrictions. Several cow moose have been mistakenly shot every year.

The Game Management Unit 15B (east) trophy moose hunt attracted 100 permit holders. At least 31 trophy moose were harvested and reported to state biologists. A new refuge moose meat transporter reported tending hunters who took ten moose out of the Moose Creek Trail area. Other refuge transporters reported serving approximately ten other successful hunters out of the Bear Creek Trail/drainage area and the "Hansen" horse trail area.

During 1988, fifteen brown bears were harvested on the Kenai Peninsula; an increase of 25 percent over 1987. Unfortunately, nine (60 percent) of the harvested bears were females. The high proportion of females in the harvest over the last several years could indicate a serious trend for a population with perhaps as few as 150 individuals. Eliminating or reducing the fall brown bear season, which coincides with the moose season, could help reduce the take of female bears.

Bear baiting permits were issued from April 15 through June 30. During 1988, thirty-nine black bear baiting permits were issued to 70 individuals. Baiting was permitted within the same areas and time-frames as in 1986 and 1987. Also, as in previous years, several unauthorized platform stations and garbage were located within areas closed to baiting. Approximately 40 staff-hours were utilized cleaning up unauthorized stations near refuge campgrounds.





An unauthorized bear baiting station was discovered at a refuge campground in this photo. The unauthorized station posed a safety hazard to refuge visitors as well as an unsightly mess for the unlucky officer who cleaned it up. BR

The Alaska Department of Fish and Game passed new bear baiting regulations that will go into affect on July 1, 1988. These regulations will establish an April 15-June 15 season and require registration of bait stations. It's interesting that this system is very similar to the one initiated in 1984 by the Kenai National Wildlife Refuge.

In addition to unauthorized bear baiting stations, there has also been a proliferation of moose observation stands left in trees by moose hunters the last several years. One hunter in the Caribou Hills established over nine unauthorized hunting platforms. Several dozen unauthorized stands also exist in areas adjacent to Funny River Road and Skilak Lake.

During 1988, Alaska Department of Fish and Game issued three permits for the harvest of bull caribou from the lowland herd. This was the first hunt on this herd since 1984. The three hunters who drew permits reported a 100 percent success rate, which was not surprising, as many of these animals had become quite approachable while being viewed by tourists during the past four summers.

The refuge continues to monitor Dall's sheep hunting on Round Mountain, where the Cooper Landing closed area boundary is difficult to distinguish. Although refuge observers were located in the area during the 1988 opening of sheep hunting, no problems occurred. Overall hunting pressure was significantly lower during 1988, probably due to fewer legal rams being available.

Another walk-in sheep hunting area experienced significant hunter effort in 1988. By early September, reports indicated that approximately eight sheep had been taken in the Kenai Mountains within the Upper Tustumena Lake area. The Emma Lake cabin log noted that several sheep came from the Indian Creek Watershed, however, most walk-in effort appeared to be concentrated southeast of Tustumena Lake.

For the third consecutive year, reports were received regarding cases of wanton waste in the Truuli Glacier area southeast of Tustumena Glacier. The edible meat of at least three rams was reportedly left behind in the field, after the animals were caped and decapitated. The area will be more closely monitored during the 1989 season.

On October 4 and 5, Refuge Manager Doshier and Deputy Refuge Manager Hedrick attended a state-wide sheep manager's meeting hosted by the Alaska Department of Fish and Game. Dall's sheep management across the state was reviewed and various options were discussed. The Refuge attendees expressed the desire to improve sheep management on the refuge, which hosts about 80 percent of the entire Kenai Peninsula sheep population. A proposal to increase the legal size for Dall's sheep rams to full curl is supported by the local advisory board, knowledgeable hunters, and refuge management.

Generally, refuge access regulations and restrictions, including those pertinent to snowmobiles, aircraft, and motorboats, appear to be receiving excellent compliance associated with hunting. Several incidents occurred, and notices of violations were issued to off-road-vehicle users in the Chickaloon Flats associated with waterfowl hunting.

Low flying aircraft associated with hunting is a continuing problem in several portions of the refuge. During some windless evenings, while moose hunting in Game Management Unit 15A, one is seldom out of "earshot" of circling aircraft. State regulations prohibit the use of aircraft in any way to assist a moose hunter during the first ten days of the season, but monitoring compliance of this particular regulation is very difficult.

## 9. Fishing

"Fish on!" was once again the battle cry echoing from the ever popular Kenai/Russian River confluence to the "secret" lake high in the southern Kenai Mountains. Sport fishermen seemed to be getting up earlier in the



morning and fishing later in the year in order to get the most out of refuge fishing opportunities.

As in previous years, the Board of Fisheries accepted general public proposals to further restrict harvest on rainbow trout. In late 1988, the Board of Fisheries adapted measures to restrict all harvest of rainbow trout less than 20 inches in length on the Upper Kenai River between Skilak and Kenai Lakes. The measure essentially makes the Upper Kenai River a trophy Rainbow trout zone, topping several subsequent years of increasingly restrictive take of rainbow trout.



Two proud anglers show off trophy rainbow trout caught while on a guided float trip on the Upper Kenai River. Increasingly restrictive trout regulations will insure the continuation of such large rainbows in the Upper Kenai River.

NO

The Board of Fisheries also adapted an artificial-lure-only regulation for the Kenai River below Skilak Lake posted until July 10 or until King Salmon escapement of 8,000 can be projected. The new regulation, adapted primarily for King Salmon, also affects anglers of trout and other species, essentially extending the spring and early summer gear restrictions to mid-summer.



The more conservative regulations seem to be accepted by most local fishermen, with only a few grumbles from summer visitors. With existing restrictions, such as prohibited fishing with bait, and with the new restrictions, the shore-fishing majority will harvest relatively few Rainbow trout.

Slightly reversing the trend of more protective regulations for trout in the Kenai River System, the Board of Fisheries modified an artificial-lures-only regulation to omit Skilak Lake. Anglers may once again fish from shore for lake trout and other species with baited lures within Skilak Lake. The refuge did not oppose this liberalization of a recently-enacted state regulation.



The Kenai River's inlet to Skilak Lake is a very popular early season open-water fishery. In this April photo Skilak Lake just recently became ice-free. RKJ

The Kenai River experienced the second strongest Sockeye salmon run ever, according to historical records. The high number of second-run sockeye in the Kenai River, resulted in large concentrations of salmon in the Kenai River, particularly at the outlet of Skilak Lake. Catching salmon legally in the slow-moving water below Skilak Lake was almost impossible. Anglers snagging fish was the rule rather than the exception. Catching illegal snaggers proved nearly impossible with



fishing boats anchored 1/4-mile offshore on Skilak Lake and at the Kenai River outlet. Mainstream fishing below and above Skilak Lake was very good and anglers found several places to drift coho flies. The relatively clear waters flowing out of Skilak Lake also enhanced fly fishing for sockeyes.

Late season trout and silver fishing occurred in October and November. Fishing was particularly good where the Upper Kenai River flows into Skilak Lake, and anglers were active until December.



Drift dories have become an increasingly popular method of fishing on refuge portions of the Kenai River. The rowing dories, popularized on Washington and Oregon rivers, have become the watercraft of choice for many anglers fishing on the Kenai River.

RKJ

Table 29. Kenai Peninsula Freshwater Sport Fisheries, 1987.

	Days fished		Est. % occurring on KNWR
	(non-guided)	(guided)	
Kenai River: (Soldotna Bridge to Moose River)	58,169	8,638	7%
Kenai River: (Moose River to Skilak Outlet)	39,190	1,938	15%
Kenai River: (Skilak Inlet to Kenai Lake)	38,303	1,724	70%
Russian River	115,150		70%
Kasilof River	112,703		5%
Swanson River	7,353		90%
Other Rivers	5,965		20%
Hidden Lake	12,532		100%
Canoe Lake System	12,333		100%
Moose River	1,200		90%
Other Lakes	9,952		50%

The above statistics represent survey data for 1987, and were published in 1988\*.

\*See Alaska Statewide Harvest Report, 1987, for species breakdown.

The Russian River exhibited a long and heavy first run of red salmon. On June 25, ferry records showed that 1,495 people crossed the river to fish. The traditionally-closed confluence sanctuary was opened by emergency order at noon on June 22, due to the strong run. The second or late run of sockeye was below the magnitude of the early run and its long-term average, despite the fact that total Kenai River escapement this year was the second highest on record (0.9 million), second only to 1987's 1.4 million.

The early Russian River sport sockeye harvest was 50,820 from approximately 46,597 man-days of effort. The late run harvest was 19,540 with 25,426 man-days of effort. Alaska Department of Fish and Game creel census reports showed that fish caught per hour of effort was .273 for the early run, and .206 for the late run. The harvest, angler effort and success ratio per hour fished, were down from the all-time records of the previous year, but were historically very high. Overall effort was the second highest since record-keeping began in 1963, and fish caught per hour was third highest.



Generally, the 1988 figures reflect a continuation of recent years' data which show increased run size as well as angler success.

Table 30. Estimated Sockeye salmon harvest, effort and success rates on Russian River, 1963-1988.

Year	Harvest			Total Effort (Man-Days)	Catch Per Hour	Census Period
	Early Run	Late Run	Total			
1963	3,670	1,390	5,060	7,880	0.190	06/08-08/15
1964	3,550	2,450	6,000	5,330	0.321	06/08-08/16
1965	10,030	2,160	12,190	9,720	0.265	06/15-08/15
1966	14,950	7,290	22,240	18,280	0.242	06/15-08/15
1967	7,240	5,720	12,960	16,960	0.141	06/10-08/15
1968	6,920	5,820	12,740	17,280	0.134	06/10-08/15
1969	5,870	1,150	7,020	14,930	0.094	06/07-08/15
1970	5,750	600	6,350	10,700	0.124	06/11-08/15*
1971	2,810	10,730	13,540	15,120	0.192	06/17-08/30*
1972	5,040	16,050	21,090	25,700	0.195	06/17-08/21
1973	6,740	8,930	15,670	30,690	0.102	06/08-08/19*
1974	6,440	8,500	14,940	21,120	0.131	06/08-07/30*
1975	1,400	8,390	9,790	16,510	0.140	06/14-08/13*
1976	3,380	13,700	17,080	26,310	0.163	06/12-08/23*
1977	20,400	27,440	47,840	69,510	0.168	06/18-08/17
1978	37,720	24,530	62,250	69,860	0.203	06/07-08/09
1979	8,400	26,830	35,230	55,000	0.136	06/09-08/20*
1980	27,220	33,490	60,710	56,330	0.245	06/13-08/20
1981	10,770	23,720	34,440	51,030	0.156	06/09-08/20
1982	34,500	10,300	44,820	51,480	0.261	06/11-08/04**
1983	8,360	16,000	24,360	31,890	0.117	06/08-08/09**
1984	35,880	21,970	57,850	49,550	0.238	06/04-08/19**
1985	12,300	58,410	77,710	50,770	0.286	06/13-08/16**
1986	35,099	30,813	66,012	51,400	0.240	06/14-08/20**
1987	154,189	40,575	194,790	115,150	0.431	06/08-08/20
1988	50,820	19,540	70,356	72,023	0.250	06/13-08/09*

\*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 due to negligible fishing effort after completion of the early run and prior to arrival of late run.

Other anadromous salmon sportfishing on the refuge was somewhat less dramatic than the record sockeye catch, however, king and silver salmon provided considerable opportunity. The Kenai River effort for king salmon on refuge lands is primarily below Skilak Lake for three miles and/or along a two-mile stretch of the river between Sterling and Soldotna.

Kenai Fisheries conducted fisheries research within the Swanson River drainage. A large portion of each study was aimed at identifying sportfishing timing, effort and harvest. A weir was installed on the Swanson River approximately 1/2 mile up from Captain Cook Park. Nearly 100 percent of all canoeists utilizing the lower Swanson River were interviewed near the end of their trip when they encountered the weir. The weir was in operation from May 21, 1988, through September 23, 1988. A total of 825 canoeists were contacted; of these, 48 percent or 402 canoeists reported fishing during their trip for a total of 1,008 fishing hours. They reported catching 3,904 rainbow trout and releasing 3,501. They also reported catching 140 coho salmon and releasing 56 of those caught.

Based on the preliminary statistics, it appears fishing is an incidental activity to the overall canoe trip on the lower Swanson River, which would parallel previous outdoor recreation studies of refuge backcountry canoeists. The data also shows that anglers are catching and releasing the majority of fish caught.

Fisheries researchers also identified a significant site for shoreline sportfishing just inside refuge lands, upstream from Captain Cook State Recreation Area. Researchers interviewed 933 shoreline fishermen, who reported fishing 2,305 hours. Researchers were unable to interview all shoreline fishermen and estimated the overall contact at less than 50 percent. They also estimated that approximately 70 percent of the shoreline interviews took place inside the refuge. Shoreline fishermen caught and kept 1,135 Coho salmon and 614 Rainbow trout, releasing 485 of the trout and very few salmon. Shoreline fishing occurred primarily on the lower river, with highest use occurring from mid-August to mid-September. Canoe fishing was more evenly distributed, but increased in conjunction with late-August and early-September hunting trips.

A total of 23,514 Coho salmon were counted at the Swanson River Weir with a peak occurring on August 22. One thousand five hundred and forty-two sockeye were counted at the weir with peaks occurring June 25 and August 5. Passage of other salmon was relatively incidental with only a few king salmon and perhaps 100 pink salmon recorded.

A second study was conducted by Mary Shiffer of the University of Alaska in cooperation with the U.S. Fish and Wildlife Service Kenai Fisheries Project. The goal of the study was to develop and recommend methods for reliable, cost-effective estimation of harvest and effort by anglers on the lakes within the Swan Lake and Swanson River Canoe Trails located within the Swanson River Watershed. Methods to accomplish the study included field and exit interviews with anglers at trailheads, interviews at vehicle checkpoints, boat counts, aerial counts of canoeists, and examination of trail registers. Refuge staff provided a portion of the aerial survey support for the project and refuge Student Conservation Association volunteers assisted with angler interviews and creel censusing.



An early-morning fog rising off the waters of Canoe Lake in the Swan Lake Canoe System provides an almost magical setting for two refuge fishermen. RKJ

Several of the preliminary findings are available and generally confirm common knowledge regarding visitor and sportfishing activities within the lowland lake canoe trails. The formal results of the study should be available during 1989. Generally, overall effort and harvest is light with many areas receiving no significant use or harvest. Certain popular lake routes within the Swan Lake System received significant use on peak weekends but effort and harvest was still relatively light.

A new "snagging" fishery developed at the Hidden Lake boat ramp where hatchery-reared salmon returned to the point they were released as fry. Virtually all of the salmon caught at the boat ramp were snagged. Several citations and warnings were issued. Steps have been taken to ensure that future release-sites will be away from the boat ramp area so that "sport fishermen" are not tempted to disturb spawning salmon.

Ice fishing effort was significant at Hidden, Engineer, Kelly, Petersen, Watson, Nest, Willow, Canoe, Grebe and several other Swanson River roadside lakes. Hidden Lake received about 30 to 40 fishing visits per day during the late winter months, while other lakes averaged 10 to 15 visits.



Overflow conditions and thin ice made late autumn and early winter fishing difficult on the larger lakes, such as Engineer and Hidden Lakes. The smaller lakes accommodated weekend fishermen by mid-November.

#### 10. Trapping

Eighty-three permits were issued for the 1987-88 furbearer trapping season, a drop of 31 percent over 1986-87. At least 39 (47 percent) of the permit holders actually trapped and reported their harvest to the refuge as stipulated in the permit. Numbers of furbearers taken and overall trapper success rates were down for all species except wolverine, as was the case in 1986-87 (Table 31).

Deep snow, the closure of lynx season all over Southcentral Alaska, and generally low furbearer numbers were probably responsible for low trapper effort and success. Also, permit restrictions which generally prohibit easy roadside trapping have decreased trapper effort. Refuge trappers can no longer run a 20-mile trapline without leaving their highway vehicles for more than a few steps. The natural decline in the snowshoe hare population coupled with previous heavy trapping pressure has reduced many furbearer populations. Though the actual Refuge Furbearer Management Plan remains a draft, an environmental assessment on this subject was completed in 1988. It is hoped that guidelines set forth in these documents will enable over-exploited furbearer populations to recover and hold harvest rates at maintainable levels for all refuge furbearers.

Refuge regulations prohibiting trapping near visitor facilities and public roads have led to a decline in conflicts between trappers and winter recreationists. The overall decrease in trapping activity has resulted in fewer public complaints regarding carelessly set traps and other related issues.

Traps and associated gear were seized during the trapping season and several warnings and notices of violation were issued. Seven unmarked traps and snares were found within the Skilak Wildlife Recreation Area. Four snares were found unmarked within the closed zone near Swanson River Campground.

Non-target species caught during the winter included several moose and at least one bald eagle. The eagle was captured in a site exposed bait set in violation of the trapper's permit. Several traps were seized, the trapper's permit was revoked and the trapper paid the eagle's veterinary bills in order to avoid a criminal prosecution.

State protection officers successfully prosecuted two trappers from a Russian village located on Kachemak Bay for trapping beaver out of season. The individuals were non-permitted and had illegal gear.

Table 31. Total reported land furbearer harvest and average per permit holder on the Kenai National Wildlife Refuge (Moose Range), 1960-1987.

Season	Total permits	Land furbearer reported harvest									
		Lynx		Coyote		Wolverine		Weasel		Wolf	
		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	--	---
1961-62	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
1983-84	114	* 38	0.3	87	0.8	2	0.1	29	0.2	30	0.3
1984-85	107	* 31	0.3	107	1.0	2	0.1	17	0.2	38	0.3
1985-86	114	* 23	0.2	110	1.0	4	0.1	3	0.1	33	0.3
1986-87	109	* 33	0.2	43	0.4	5	0.1	2	0.1	17	0.2
1987-88	83	2	0.02	41	0.5	7	0.08	2	0.02	12	0.14

\*Includes lynx radiocollared and released for study.

Table 32. Total reported aquatic furbearer harvest and average per permit holder on the Kenai National Wildlife Refuge (Moose Range), 1960-87.

Season	Total permits	Aquatic furbearer reported harvest							
		Beaver		Otter		Muskrat		Mink	
		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
1983-84	114	43	0.4	18	0.2	39	0.4	268	2.3
1984-85	107	103	1.0	20	0.2	121	1.1	392	3.7
1985-86	114	86	0.8	24	0.2	209	1.8	322	2.7
1986-87	109	55	0.5	21	0.2	85	0.8	88	0.8
1987-88	83	50	0.60	11	0.13	14	0.17	44	0.53

\*\*At least 39 of 83 permit holders actually trapped.



Of twelve refuge trappers or traplines checked, nine violated the conditions of their permit, trapped without a permit, or violated other refuge regulations..

#### 11. Wildlife Observation

Greyline tours brought tour groups to visit the refuge four days each week throughout the summer. The groups' activities included rafting the Kenai River Canyon, wildlife viewing, and visiting the Refuge Visitor Center.



A Greyline Tours group makes a rest stop at Jim's Landing before rafting through the Kenai River Canyon. Rafter reported seeing a lot of refuge wildlife while participating in guided trips during 1988. RL

In May, two long-range viewing scopes were installed at the Russian River Access Area. Throughout the summer, visitors enjoyed a closer view of Dall's sheep on nearby mountains, moose in nearby wetland areas, and eagles along the Kenai River. Due to the extreme popularity of the scopes, several additional ones may be installed at other locations.

Hiking trails are one of the most effective ways for visitors to observe wildlife. In August, Student Conservation Association Intern Gayle Short prepared a new hiking trail booklet while assigned to the visitor center. The attractive new booklet is a tremendous improvement over the previously distributed trail information flyer. Short received a special honorarium from the Alaska Natural History Association for her outstanding volunteer contribution.



Passing motorists often see wildlife along the Sterling Highway. Wildlife will become increasingly more visible as populations respond to new harvest restrictions.

RL

Student Conservation Association Intern Doug Harrington examined potential routes up Hideout Mountain as part of his student internship through Central Washington State University. Harrington completed a trail development feasibility report which will greatly assist staff in evaluating the project. Harrington reported detailed wildland and wildlife observation opportunities along several alternative routes.

Student Conservation Association volunteers completed several projects during June including trail clearing and brushing on Fuller Lakes, Skyline, Kenai River, Hidden Lake, and Seven Lakes trails and portage repair on the Swan Lake and Swanson River Canoe Route.





Hunting and trapping was closed on several sections of land adjacent to the Refuge Visitor Center. Visitors have been increasingly able to view moose and other wildlife while visiting the area. RKJ

## 12. Other Wildlife-Oriented Recreation

Water-based outdoor recreational opportunities attract visitors to the Kenai National Wildlife Refuge. The majority of refuge activities, from hunting to sportfishing, involve watercraft and waterfront facilities. Current refuge facilities are inadequate to accommodate the congestion and parking demands associated with water-based recreation. Upper Skilak Campground, Lower Skilak Campground, Jim's Landing and Hidden Lake Campground all have parking and flow-pattern problems. These facilities have been identified as top priorities within the Skilak Planning Project, and are slated for redesign.

Non-motorized boating opportunities established in recent seasons on the Kenai River appear to be receiving excellent compliance from the public. Refuge staff conducted regular boat patrols during 1988. Top quality inflatable rafts enable staff to patrol non-motorized sections of the Kenai River safely.

"No Wake" zones established for watercraft on most of the smaller refuge roadside lakes have also received excellent compliance. These lakes offer great (peaceful) boating experiences.





Preventing uncontrolled motorized watercraft use on small roadside lakes has enhanced visitor experiences and has prevented disturbance to waterfowl and shorebirds at several popular shoreline lakes. RL

Compliance with ten-horsepower or less boating restrictions on the Killey, Fox, Moose, Swanson and other refuge rivers is still undergoing evaluation, however, no major problems were identified during 1988. Canoeists within the Swan Lake and Swanson River Canoe Routes were required to register during 1988. Sportfishermen surveys revealed that compliance of the registration requirement was generally poor.

An estimated 22,090 visitor-days, by 4,418 visitors, were expended within the Swan Lake and Swanson River Canoe Routes. Ten thousand one hundred and sixty-one visitor-days were expended on the Swan Lake/Moose River System and 11,924 visitor-days were expended on the Swanson Lakes/Swanson River System. Of those visitors who utilized the Swanson River System, 3,288 visitor-days occurred on the lower Swanson River as recorded by a fisheries weir survey on the lower Swanson River. Two studies conducted by the Kenai Fisheries office provided data which is perhaps the most accurate reflection of actual use in recent years. The new studies, as well as historical data, show that canoe trail users are primarily persons who participate in multiple refuge wildland activities and who generally participate in camping, fishing, wildlife viewing, canoeing and hunting during their backcountry trip.

Refuge cross-country ski trails at the Headquarters complex were very popular throughout winter and early fall of 1988. Refuge trails were groomed with a track setter, however, several skiers pioneered their own trails on Headquarters Lake and in the vicinity of the Visitor Center. Skiers reported seeing a substantial number of moose, and other wildlife sign throughout the ski season. Cross-country skiing on other refuge trails, including those within the Skilak Wildlife Recreation Area and within the Swan Lake and Swanson River Canoe Routes, remains mostly incidental and light.

A new informational bulletin board was installed at the head of the Visitor Center Ski Trails, along with a leaflet dispenser. A new ski trail leaflet and map was developed for the 1988-89 season.

An estimated 2,500 visitor-days occurred in association with the groomed ski trails during 1988.

### 13. Camping

An estimated 71,680 overnight visits occurred within refuge campgrounds or access areas during 1988. An additional 47,000 overnight stays occurred at dispersed non-developed and backcountry settings.

Laborers Marrs and Bartman cleaned and upgraded the campground facilities along Swanson River/Swan Lake Road and Skilak Loop Road prior to the Memorial Day weekend. They constructed a new outhouse at Engineer Lake, and re-roofed the toilet and completed other minor facility repairs at Lower Ohmer Campground. New fire grates and picnic tables were installed at the Russian River Campground, along with two permanently mounted telescopes.

Solid waste disposal was contracted out at all refuge campgrounds from mid-May through December with a "pack-it-out" program in effect during the winter months. Toilet pumping was also contracted out, as in previous years.

Sign work included installation of an entrance sign at Hidden Lake Campground, placement of several "No Parking" signs and repair of various other facility signs.

Other campground maintenance consisted of routine litter pickup, campsite cleaning, and barrier replacement. All outhouses in the Skilak Wildlife Recreation Area and in the Russian River facility received a fresh coat of paint. In late fall, seasonal Park Rangers Green and Zallek conducted comprehensive campground inspections and compiled maintenance project lists for all the campground facilities. These detailed lists will aid in the preparation of facilities for the 1989 season.



Work on Skilak Loop Road included a cooperative effort with the state to repair the access road into Upper Skilak Campground which was damaged during spring runoff of Lower Ohmer Creek. Additional gravel was dumped and spread to provide increased erosion protection to the Lower Skilak boat ramp.



The Upper Skilak Lake Campground access road received extensive damage when the snow-melt caused Lower Ohmer Creek to flood its banks. RKJ





Road and campground pull-outs within the Upper Skilak Campground received significant damage as a result of Lower Ohmer Creek flooding. The new design work for the Upper Skilak Campground would prevent such flood damage in the future. RKJ

Foster Construction Company of Soldotna was awarded the bid to haul 2,000 cubic yards of gravel to the Watson, Kelly and Petersen Roads, and Egumen Lake Wayside. Equipment Operator Kivi spread the gravel using our 130 Caterpillar grader. Kivi also worked along the Skilak Loop Road, pulling the ditches and blading the main road, as well as access roads, into the upper and lower landings, Hidden Lake, and Jim's Landing Campground.

In conjunction with overall planning for the Skilak Wildlife Recreation Area, overnight facilities received the most extensive planning review since their original construction. The existing 80 overnight sites for access areas and campgrounds within Skilak Wildlife Recreation Area along the Sterling Highway will be increased to 154. In addition, existing sites will be redesigned and modernized.

Also, according to the Skilak project plan, boat trailer parking for day-use and overnight use will increase from 28 to 125, primarily at Upper Skilak, Lower Skilak, Jim's Landing, Hidden Lake, Engineer Lake, Kelly Lake, and Petersen Campgrounds. Several new trailheads, interpretive pull-outs and campgrounds will also be constructed with standardized vehicle capacity. Large motor homes will find the new facilities at Hidden Lake and other locations quite accommodating.



Upper Skilak Lake Campground and Hidden Lake Campground received extensive survey and site planning work during 1988. A construction contract was awarded for Hidden Lake Campground. When complete, the Hidden Lake facility will be one of the most elaborate and modernized campground facilities associated with public lands in Alaska (Refer to appendix 1 and 2 for a detailed depiction of future campground facility plans).

Consistent with the Alaska Department of Environmental Conservation guidelines for new campgrounds, recreational vehicle dump stations were designed at several locations along Skilak Road. Maintenance expenses for the planned new facilities will probably increase significantly from the current program.



Young refuge visitors participate in the refuge's litter incentive program at the Kenai/Russian River facility. Helpers pick up litter and receive educational prizes.

RL

Two hazard tree-removal projects (Jim's Landing and Upper Skilak Lake) were completed within refuge campgrounds during early 1988, and a third project (Russian/Kenai River access area) was near completion at year's end. The spruce bark-beetle infestation has caused an extensive die-off of mature spruce trees in many refuge campgrounds. Hazard tree removal will continue to be an annual project. Approximately 500 trees were removed from Upper Skilak Campground, 150 trees at Jim's Landing and 90 at Kenai/Russian River during 1988. The hazard tree removals were carried out by permittees who successfully competed for the salvage timber by submitting proposals.

A contracted concessioner operated the Kenai/Russian River Access Area for the third consecutive year, managing the campground and collecting fees. The facility accommodated 11,008 vehicles during the 1988 summer season generating \$42,137 in user fees. Fees remained constant at \$4 per vehicle and \$5 for large motor homes. Contract solicitation for the Kenai/Russian River access area was being prepared at the close of 1988. Initial input suggested that the Kenai River Ferry Special Use Permit, and campground management and associated upkeep would all be consolidated into a single contract.

#### 14. Picnicking

The refuge installed fire grates and new picnic tables at several refuge facilities during 1988.

Planning for the Skilak Wildlife Recreation Area established day-use as an integral component of visitor services and facilities at new/or modified campgrounds and access areas. Picnic shelters and barbecue structures were incorporated in the drawings for both Upper Skilak Campground (1) and Hidden Lake Campground (2). Also, day-use parking within the Skilak Wildlife Recreation Area is projected to increase from 17 to 65 sites.

#### 15. Off Road Vehicles

The 1988 snowmobile season opened December 1, 1987, and remained open through April 22, 1988, as the snow level was adequate to protect underlying vegetation. The winter of 1988 marked the second winter that snowmobiling was prohibited within the Headquarters Ski Trail area, Swan Lake/Swanson River Canoe Routes and at various other refuge locations. It was also the second year for snowmobile closures within the Skilak Wildlife Recreation Area with the exclusion of designated large lakes. Overall compliance with the regulated closures was good, except for incidents of pre-season use on the Moose River and within the Caribou Hills and Swan Lake Canoe Routes. A detailed brochure outlining snowmobile regulations was available to visitors.

The 1988-89 snowmobile season opened December 2, with above-average snow depths. Snowmobile use was generally confined to well-packed routes. Most activity occurred along the Moose River, in open muskeg areas north



of the city of Kenai, in the Caribou Hills, in the vicinity of Mystery Creek Road, Hidden Lake and Skilak Lake, and along several seismic trails.

Unauthorized use of three-wheelers occurred at various locations despite prohibitive signs within the refuge and along the boundaries. Four duck hunters were issued notices of violation for unauthorized all-terrain vehicle use on the Chickaloon Flats during the 1988 waterfowl season. Two teenagers were issued notices of violation for unauthorized three-wheeler use inside the refuge boundary near Fox River.

Isolated incidents of unauthorized all-terrain vehicle use occurred at Trophy Lake, the Alaska Gas Pipeline corridor, Moose River (after freeze-up), Fox River and the Caribou Hills. Unauthorized use associated with the access permits for Bear Creek in-holders reoccurred during 1988, however no apprehensions were made.

16. Other Non-Wildlife Oriented Recreation - Nothing to report.

17. Law Enforcement



Seasonal Refuge Officer Gay Muhlberg prepares to distribute seized sockeye salmon to local charities and public institutions after successful prosecutions and evidence forfeiture in the Federal Magistrate's Court.

TB



Kenai National Wildlife Refuge had five commissioned officers among the permanent staff and four seasonal officers during 1988. With the supervisory outdoor recreation planner position vacant for most of the year, Seasonal Refuge Officers Eickhoff, Zallek, Green and Weiss participated in an increased portion of the law enforcement case load. Refuge officers conducted approximately 1,800 patrol hours during 1988 with approximately 550 of those patrol hours accrued during September.

Three new seasonal law enforcement officers were commissioned in 1988. Each officer received 32 hours of on-site training, in addition to the basic prerequisites for commissioned status. The three officers bolstered our ability to assist the public and other law enforcement agencies during the busy season. Refuge incident reports revealed that day-to-day public assists and minor cases were handled adequately during 1988, however, cases involving extended investigations on routine notices of violation received less than adequate attention. This was attributed to Officer Johnston's role as acting supervisory outdoor recreation planner and key spokesman in the Skilak planning project, along with the absence of a special agent working routinely on the refuge.



A Piper Super Cub takes off from an unauthorized landing area on Chickaloon Flats after being warned by a refuge officer. RKJ



Illegal aircraft landings on the Chickaloon persisted during 1988. Closure signs were vandalized and stolen, as they have been in the past. Despite numerous violations of the aircraft access regulations, no notices of violation were issued during 1988 on the Chickaloon. Difficulty of access, out-of-date Federal Aviation Administration owner registration decals, and inconsistencies in enforcement policy accounted for the lack of notices of violation.

This year was the second full year of regulatory protection for areas within Kenai Wilderness closed to aircraft, snowmobile and motorboat access as decided by the Kenai Comprehensive Conservation Plan. Compliance with access regulations within Kenai Wilderness was very good.



Numerous aircraft continued to make unauthorized landings at mile 6.5 of the Chickaloon River. A scuffed area can be seen on the left side of the river parallel to the wide bend. A private refuge inholding in the foreground also received numerous unauthorized landings despite a clearly identifiable restriction X.

RKJ

Unauthorized parking along the Sterling Highway near the Kenai/Russian River access, identified as a serious safety consideration in 1987, improved markedly during 1988. Installing signs prior to the busy season and regular patrols of the area salvaged the situation. Although most incidents were handled through compliance and verbal warnings during 1988, a significant number of notices of violation were issued and incidents recorded (see Tables 31 and 32).



Significant cases or incidents during 1988 were as follows:

1. Refuge staff participated in serving search warrants and seizing equipment used in illegal hunts on behalf of the Division of Law Enforcement during the annual Law Enforcement Refresher Training.
2. Several traplines were visited during January and several trappers were advised concerning compliance with the refuge trapping permit. Several traps were seized and one trapper's permit was suspended for 1987-88, for injuring a bald eagle as a result of violating refuge permit stipulations.
3. On June 26, 1988, State Park Ranger Walter Ward cited new refuge in-holder Chip Marinella for unauthorized construction of a breakwater in Skilak Lake. Ward cited Marinella under Alaska Department of Fish and Game statutes for disturbing an anadromous salmon lake without an appropriate permit. Refuge officers assisted and did not cite Marinella under refuge statutes due to the pending state case. Marinella restored the lakeshore.

Refuge staffers Doshier and Johnston met with State Park Superintendent William Garry and Chief Park Ranger Walter Ward on June 27 regarding the Marinella case. Several issues were discussed regarding the Kenai River Special Management Area. Of particular interest was Alaska State Parks requiring a permit for use of Skilak Lake. Alaska State Parks continues to maintain that the State of Alaska owns Skilak Lake and is requiring refuge users to obtain a State Park Permit.

4. Several aerial patrols were conducted during the early sheep season and camps were checked at most of the high mountain lakes open to aircraft. Compliance with regulated lake closures appeared to be good during the sheep hunt. No incidents of illegal landing were noted. At least three unsolved incidents of wanton waste of sheep meat occurred in the Truuli Glacier area. State and refuge officers were unable to determine the violators.

5. On January 5, a complaint was received that an individual residing in the village at the east end of Kachemak Bay was setting beaver traps out-of-season and was also utilizing an all-terrain vehicle on refuge lands. State Protection Officer Mike Krusick issued violation notices to Anton and Zahary Rutov for trapping out-of-season and failure to secure a trapping license. Refuge officers issued violation notices for unauthorized all-terrain vehicle use. Although neither party had obtained a refuge trapping permit, no citations were issued for trapping without a permit. Both men were denied post-incident requests for trapping permits in conformance with the refuge suspension policy.

6. Refuge and/or state officers investigated approximately 20 incidents of illegal take of big game and other wildlife during September. This included nearly a dozen violations of cow moose restrictions, sub-legal bull moose harvest, and other state big game regulations. Several incidents of wanton waste occurred involving moose. Other incidents during hunting season involved unauthorized take of migratory birds, including the shooting of a trumpeter swan on Harvey Lake, in the eastern portion of Game Management Unit 15B.

7. On September 8, Deputy Refuge Manager Hedrick met with Fish and Wildlife Protection officers to discuss enforcement policy and strategy in light of the unexpected increase in illegal moose violations. Most of the cases involved hunters being especially "creative" in finding three antler points on a brow palm on bulls in the 36-40 inch spread category. Time will tell whether there was a percentage increase in illegal kill or whether the factors of substantially more hunters and more bull moose in the 2.5 and 3.5 age class produced the situation.

8. Refuge trapper William West was issued a notice of violation and his trapping permit was suspended during November for unauthorized snowmobile use associated with trapping. Mr. West was a repeat offender of access and trapping regulations. Previous offenses were documented but handled via warnings.

9. Two unauthorized ice-house structures were discovered on Hidden Lake on February 23, and their owners were contacted regarding their removal.

10. In September, several off-road vehicle users gained access to Chickaloon Flats by traveling around the Point Possession Beach and entering the flats from the west side. Miles of vehicle trails scarred the estuary after each incident. No suspects were identified.

11. On October 22, Outdoor Recreation Planner Johnston and Park Ranger Green flew to Chickaloon Flats with a Kenai Air Service helicopter, and cited four off-road vehicle operators for utilizing three and four-wheeler all-terrain vehicles. The unauthorized all-terrain vehicle operators left several miles of vegetation scars in the area east of the Chickaloon River (at approximately mile 6 of the river). One person was also cited for migratory bird hunting with an unplugged gun. Each was found guilty in court and refuge jurisdiction of Chickaloon Flats above mean high tide was confirmed.

During the same flight, Johnston and Green placed a sign prohibiting all-terrain vehicle use at the western edge of Chickaloon Flats. Several incidents of illegal all-terrain vehicle use had previously originated from the Point Possession beach access. During the flight, officers also noted that the refuge closure signs placed on a defacto airstrip at mile seven of the Chickaloon River had been removed by vandals.

12. Approximately 30-50 incidents of unauthorized aircraft use occurred on Chickaloon Flats during late July and early August of 1988.

13. The Caribou Island cabin toilet was stolen during August ("Is nothing sacred?").

14. A large permanent camp was discovered on an island on the Upper Kenai River. The camp was removed and the owner cited for leaving personal property on the refuge longer than 72 hours. The camp was well-hidden and in place for over a year.

15. An Anchorage man was issued a notice of violation for defacing a rock outcrop adjacent to the Sterling Highway with spray paint. The vandal did significant damage to the rock face. Natural tone paint was used to blot out the bright orange and red graffiti.

16. A cabin owner on state land adjacent to the refuge boundary near Trophy Lake was found guilty in state court for wanton waste of a moose during the September season. Mr. George Zimmerman is suspected of repeated waste violations and is currently under investigation for allegedly establishing ten unauthorized hunting platforms. A sub-legal bull moose was also found wasted during 1987. The method of take and butchering was identical to the 1988 case.

17. On October 6, Tom McGuire, the owner and operator of Trail Ridge Air Service, was convicted and fined in the U.S. Magistrate's Court in Anchorage for utilizing refuge lands without a special use permit. Mr. McGuire's pilot had transported three fishermen to a closed lake in June.





Seasonal Refuge Officer Gay Muhlberg assists in  
disassembling a large unauthorized permanent camp on an  
island in the Upper Kenai River. RKJ

Table 33. Violations on the Kenai National Wildlife Refuge for years 1979 through 1988.

Violation	'79	'80	'81	'82	'83	'84	'85	'86	'87	'88
Snagging of fish	--	--	27	24	26	23	10	1	15	14
Fishing in closed water	--	--	13	4	13	4	3	3	3	1
Overlimit of fish	--	--	3	3	6	3	4	1	4	8
Fishing without a license	3	6	12	4	1	1	2	1	1	10
Other fishing violations	--	--	--	--	7	4	2	0	2	1
Snowmobiling violation	1	0	0	4	6	2	0	0	2	1
Motor boat in prohibited area	1	0	0	0	0	0	0	0	1	4
Unauthorized use of motor vehicle	4	11	7	10	9	20	28	15	13	9
Parking in No-Parking Zone	21	15	19	13	2	12	2	0	3	3
Dropping objects from airplane	1	0	0	0	0	0	0	0	0	0
Landing aircraft in prohibited area	4	4	1	4	6	0	0	0	4	2
Shooting fireworks/selling Target shooting/weapons violation	1	0	0	1	4	2	2	0	2	0
Violation of State game regulations	--	--	--	--	--	--	2	6	3	1
Migratory Bird hunting violations	1	1	3	0	1	1	0	0	4	0
Littering	--	--	--	--	10	2	2	1	2	4
Illegal camp/boats/cabin	0	0	5	0	3	2	3	4	1	1
Unauthorized advertising	0	9	3	1	0	0	0	2	0	2
Illegal wood cut/cut green trees	0	1	0	0	0	0	0	0	0	0
Speeding	0	3	3	4	5	2	9	3	4	4
Reckless operation of machine	0	0	1	0	5	3	0	2	1	1
Unattended fire	0	0	1	0	0	0	0	0	0	0
Interference with employee	0	0	1	0	0	0	0	0	1	0
Destruction of Government property	0	0	1	0	0	0	0	0	0	1
Failure to comply with refuge	0	0	0	1	0	0	0	0	0	1
Special Use Permits	0	0	0	1	2	2	2	1	3	2
Violation of Coast Guard Regulations	--	--	--	--	5	0	0	0	0	0
Violation of other Refuge Regulations	--	--	--	--	--	--	2	1	5	0
Unauthorized trapping/trapping permit violation	--	--	--	--	--	--	4	4	2	0
Bear baiting/Interference/public theft	--	--	--	--	--	--	--	1	5	0
Totals	37	50	100	74	111	83	74	46	83	69

Table 34. Kenai National Wildlife Refuge incidents (Nov-Nov) 1985-1988.

<u>Incident/Violation</u>	<u>Number of Incidents</u>			
	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>
Low flying aircraft	8	14	10	15
Violation of a refuge SUP	8	4	18	12
Vandalism	10	22	23	28
Altercation/disturbance	2	9	5	3
Theft	4	12	9	6
Drunk and disorderly	1	1	7	2
Unattended or abandoned property	6	5	8	10
Unauthorized taking of wildlife/injured wildlife	4	34	27	40
Violation of trapping permit	5	5	9	3
Violation of wood cutting permit	8	1	11	5
Assist to public involving injury	3	16	13	10
Assist to public not involving injury	0	26	35	45
Unauthorized use of motor vehicle	16	15	18	21
Coast Guard violation/boating	30	10	25	60
Animal trespass (grazing)	2	1	-	-
Unauthorized cutting green trees or timber removal	9	9	17	27
Unauthorized fireworks	4	1	3	1
Unauthorized parking/blocking refuge road/facility	40	29	35	17
Target shooting/unauthorized use of firearms	6	17	10	7
Search and rescue	3	6	15	13
Drowning	2	0	2	3
Miscellaneous fishing violations	9	9	13	33
Unattended fire/wildfire/unauthorized fire	3	14	20	24
Disposal of waste/littering	8	10	25	23
Other refuge regulations	1	16	20	17
Assist to Ak State Troopers/traffic accidents	8	18	20	23
Assist to Ak Fish & Wildlife Protection Officers	15	18	21	18
Miscellaneous traffic violations	-	1	4	8
Bear baiting permit violation	-	4	5	4
Bear encounter	-	6	4	3
Aircraft violation	-	3	33	43
Assists to Fish & Wildlife Agents (Off refuge)	-	5	7	30
	<u>220</u>	<u>341</u>	<u>481</u>	<u>562</u>

The above incidents were either unsolvable or resulted in warnings issued. Violations which resulted in violation notices are not included in the above list.



Refuge staff were involved in several Search and Rescue operations during 1988. Most of the searches were conducted cooperatively between Central Emergency Services, Alaska State Troopers and Refuge Staff. Central Emergency Services, Troopers, State Forestry, Alaska State Parks and the refuge have developed an effective interagency response to emergencies through a series of meetings and joint training exercises conducted throughout 1987 and 1988.



An interagency rescue team attempts to recover a drowning victim's submerged boat on refuge lands in the Kenai River Canyon. RL

On January 11, Outdoor Recreation Planner Johnston attended a two-hour training session with Central Peninsula Emergency Services on the "T" Card system for managing Search and Rescues. On January 25, Johnston attended a cooperative meeting of the Alaska State Troopers, Kenai Civil Air Patrol, Central Peninsula Emergency Services, and the State Department of Natural Resources regarding a February interagency Search and Rescue training exercise. Refuge staffers Johnston and Larned, and Refuge Volunteer Sam Evanoff participated in the February training exercise in the Caribou Hills. Refuge aircraft and snowmobiles were utilized. Refuge personnel learned search techniques and the Incident Command System of Search Management.





A Central Emergency Service's Incident Commander explains a mock search exercise to state, refuge and volunteer trainees during a staged rescue on refuge lands.

BL



Above photo shows refuge employee Bill Larned preparing to transport a role-playing aircraft-accident victim after initial emergency treatment at the accident site.

SE

Refuge staff participated in the following Search and Rescue incidents during 1988:

1. In October, three overdue hunters were located by a refuge aerial search on Tustumena Lake. The hunters had been delayed due to unsafe lake conditions caused by high winds.
2. Outdoor Recreation Planner Johnston assisted Alaska State Troopers search for a Turnagain Arm wind surfer who had last been seen near Potter Point. His wind board had washed up on the refuge's Chickaloon Flats. The body was later recovered off refuge lands.
3. An interagency Search and Rescue on June 4 ended successfully with a helicopter medivac of an injured hiker on the Skyline Trail. Outdoor Recreation Planner Johnston initiated the rescue after a hiker reported a companion's serious knee injury.
4. On July 10, 1988, an off-duty serviceman and a friend capsized a boat in the Kenai River approximately 1/2 mile below Jim's Landing. Refuge staff and other agency personnel searched throughout the night. The incident was reported by the boat passenger who had survived the incident. Spencer Reeder was missing and presumed dead. His body was discovered by a fishing guide several weeks later.
5. Refuge staff were involved in three Search and Rescue incidents during September. An aerial and ground search on September 17, involved refuge staff, Alaska State Troopers and Central Emergency Services medical staff. Outdoor Recreation Planner Johnston provided four hours of aerial search support and park rangers provided ground search support during the September 17 incident. A State Trooper helicopter located the missing hunter's signal fire. The other Search and Rescue incidents were resolved when refuge staff located the parties reported overdue on refuge lakes.
6. On November 2, refuge staffers assisted with a body retrieval search, initiated by the Alaska State Troopers. Park Ranger Green, Refuge Manager Trainee Winkelman and Heavy Equipment Operator Kivi retrieved the body of a Soldotna man who drowned when he fell into the Kenai River in 1987. The body was found in the area where the Kenai River enters Skilak Lake. The man tried to cross the Russian River Ferry cable, hand-over-hand, but only made it halfway across the river before falling in. A later autopsy report revealed the body was that of Tom Bigby. Apparently, he was drinking when the accident occurred.
7. Refuge officers assisted Alaska State Troopers with approximately ten incidents where families or friends had reported refuge visitors overdue and the overdue parties were located without incident.





An Alaska State Troopers' helicopter lands on the Sterling Highway to pick up interagency rescuers to be transported to the mountainous location of an injured hiker.

RKJ



This minor aircraft accident did not require a rescue. Aid was provided by a refuge pilot and a second private pilot in the area.

RKJ

## 18. Cooperating Associations

The refuge's Alaska Natural History Association sales outlet experienced overall sales growth in 1988 with a final tally of \$26,700, an increase of more than \$3,000 over 1987. This 13 percent increase is a result of an expanded variety of sales items, a consistently well-stocked inventory, the responsive sales efforts of staff and volunteers, and a positive relationship with local chambers of commerce, who refer travelers to our visitor center.

Tourism on the Peninsula saw an increase in out-of-state visitation, and a decrease in visitation by Anchorage residents, due to the drop in Anchorage's population base. Visitation to the refuge's Visitor Center in Soldotna and the log cabin Visitor Contact Station together totalled approximately 30,000. Visitor Contact Station visitation dropped from 5,000 to 3,700, and sales dropped from \$4,730 to \$3,200. The contact station was open 15 fewer days than in 1987 due to training, personnel shortages, and visitor emergencies.

Our Soldotna Visitor Center stabilized in visitation at 28,000. Sales proceeds totalled \$23,500; up nearly \$5,000 from the 1987 total. This increase in sales is attributed to two key factors. The Alaska Natural History Association policy changes allowed us to purchase the bulk of our inventory at the beginning of the summer. Also, referrals from the business community, Visitor Contact Station, and the new Kenai Peninsula Visitor Information Center helped overcome access problems that make it difficult for first-time visitors to find the Refuge Visitor Center.

New sales items included: ten new book titles with an emphasis in children's books, four new postcards, three new posters, and a refuge sweatshirt. Kenai's most ambitious sales project was the production of the 1989, full color 9" x 12" photo calendar entitled, "A Wild Year". The calendar featured wildlife of the Kenai Peninsula with written captions highlighting peninsula natural history events.

Proceeds from cooperating association sales were used for volunteer awards, honorariums for outstanding volunteer contributions, resource books for the refuge library, and to fund teacher training in environmental education. In addition, a portion of the proceeds funded the Visitor Center wildlife mural exhibit entitled, "How do You Measure Up to Alaskan Wildlife?".





The Alaska Natural History Association display area in the Kenai National Wildlife Refuge Visitor Center provides a convenient outlet for educational books, posters, and slides.

CW

#### 19. Concessions/Commercial Operations/Special Use Permits

Refuge outfitter/guides Special Use Permits were completed by May 15, 1988. The permit program was relatively unchanged for 1988, although several addendums for various permit activities were adjusted to reflect regional policy.

Appropriate outfitter/guide liability insurance was required once again during 1988. Historically required at Kenai National Wildlife Refuge for visitor special use permit services, liability insurance has not been required since 1985. The requirement was supposed to be consistent with a policy decision to suspend it region wide. That policy was lifted during 1988 and insurance responsibility was again required. Outfitters and transporters utilizing horses seem to be the only segment of the business which has difficulty in obtaining insurance.

Three new outfitter/guide businesses were permitted during 1988, and, several long-time businesses failed to obtain permits for the year. Forty-five outfitter/guide permits were issued, an overall reduction of three from 1987.





Alaska Wildland Adventure clients congratulate themselves after surviving a day on the Kenai River. Several river outfitters provide natural history outings and specialize in wildlife observations. RKJ

A total of 20 sport fishing guide permittees were authorized to utilize the Upper Kenai River during 1987. There was a turnover of two from 1987-1988 and two new permittees were taken off the refuge's waiting list. One new air taxi (Kachemak Air Service) was issued a permit during 1988. Four Anchorage-based air services continued to operate fourteen semi-permanent tent camps on the northern lowland portion of the refuge.

Several other Anchorage air taxis are believed to regularly utilize refuge lands without permits. Attempts to identify non-permitted air taxis will continue. Trail Ridge Air Service of Anchorage was issued a notice of violation in June for unauthorized commercial use.

Big Red's Flying Service finally removed both of their semi-permanent tent camps from Two Island Lake. The camps were ordered to be removed due to trumpeter swans nesting on the lake beginning in 1985. The refuge is not planning to relocate the two camps.

Table 35. Special Use Permittees and Categories of Services, 1988.

<u>AIR TAXI/DESTINATION TENT CAMPS</u>	<u>HORSE PACKING GUIDE SERVICES</u>	<u>RIVER FLOAT TRIPS</u>
Alaska Air Guides Alaska Bush Carriers Alaska High Adventure Alaska West Air Service Harbor Air Service Kachemak Air Service Kenai Air Service Kenai Lake Air Service Ketchum Air Service Maritime Helicopters Regal Air Service Rust's Flying Service	Hansen Outfitters Hope Outfitters Jones Guide & Outfitting Svcs. Kenai Guide Service Running W Outfitters Willard Moose Camp	Alaska Pioneer Canoeing Ass. Alaska River & Ski Tours, Inc. Alaska River's Company Alaska Wildland Adventures Osprey Outfitters Ozzie's Guide Service
<u>BACKPACKING/BACK COUNTRY</u>	<u>LAKE/OCEAN TOURING</u>	<u>HUNTING/OUTFITTER GUIDE SERVICES</u>
No permittees	Alaska Fishing & Wilderness Ad. Alaska Pioneer Canoeing Ass. Alaska Wildlife Adventures GreatAlaska Fish Camp Hugh Glass Backpacking Kenai Guide Service Kenai Paddle Excursions Pacific Coast Charters	Bear Creek Outfitting/Packing Dennis Owen Guide Service* Eugene Hanson Hope Trading Post Jones Guide & Outfitting Service Kenai Guide Service Running W Outfitters Savage Outfitters Strawberry Stables Voyageur Charters & Excursions Willard's Moose Lodge
<u>CANOE GUIDE SERVICE</u>	<u>SPORT FISHING GUIDE SERVICES</u>	<u>PHOTOGRAPHY GUIDE SERVICES</u>
Alaska Pioneer Canoeing Ass. Frontier River Safaris GreatAlaska Fish Camp Hugh Glass Backpacking Kenai Guide Service Kenai Paddle Excursions	Alaska Air Guides Alaska Bush Carriers Alaska Drift Boaters** Alaska Fish & Float** Alaska North Flying Service Alaska River & Ski Tours** Alaska River's Company** Andy Szensy Guide Service** B & B Guide Service** Big Red's Flying Service Bruce Nelson Float Fish** Booth Guide Service** Dave Richards Guide Service** Freebird Charters** Frontier River Safaris** GreatAlaska Fish Camp** John's Guide Service Kenai River Sportfishing Camp** Ketchum Air Service King Fisher Guide Service** Osprey Outfitters** Ozzie's Guide Service** Pacific Coast Charters** Randa's Guide Service** Rust's Flying Service RW's Guide Service**	Alaska Marine Helicopters Alaska River & Ski Tours Alaska Wildland Adventure Hugh Glass Backpacking Hope Trading Post Kenai Guide Service Willard's Moose Lodge
<u>EQUIPMENT RENTALS</u>		<u>WINTER BACKCOUNTRY GUIDE SERVICES</u>
Alaska Pioneer Canoeing Ass. GreatAlaska Fish Camp Kenai Paddle Excursions		Alaska River & Ski Tours Kenai Guide Service
<u>GAME MEAT TRANSPORTING</u>		<u>SCHEDULED BOAT SERVICES</u>
Bear Creek Outfitting/Packing Eugene Hanson/Kenai Packing Service Harbor Air Service Hope Trading Post/Bill Miller Jones Guide & Outfitting Service Kenai Air Alaska, Inc. Kenai Lake Air Service Rideout Outfitters and Packers Savage Outfitters Strawberry Stables Willard's Moose Lodge Voyageur Charters & Excursions		Alaska Sportsman's Lodge (ASAKO Corporation) KAYAK INSTRUCTION & GUIDE SERVICE
		<u>COMPETITIVE EVENTS</u>
		Peninsula Sled Dog Racing Ass.

\*Operates intermittant years and did not operate in 1988.

\*\*Operates on Upper Kenai River.

\*\*\*New permittee.

Note: The above lists several businesses more than once if they offer services in more than one category.

The Alaska State Supreme Court ruled in an opinion dated October 21, 1988, (Owisclek versus State of Alaska Guide Licensing and Control Board) that exclusive guide areas were without legal force. The Service concluded that the opinion, if implemented on refuge lands, had the potential to impact wildlife resources. Therefore, no new permits will be issued to outfitters and guides on refuges in Alaska to allow the State of Alaska adequate time to develop a "legal system" for managing commercial sport hunting.

Sportsmen's Lodge was sold to Mitsunshu Asako. Mr. Asako's Alaska representative is Kay Sugamoto of Asia and Pacific Tours. The lodge was previously owned by the Alroot partnership. The sale was handled by Ms. Wade Reynolds of Totem Realty, Anchorage, Alaska. The new business name is Alaska Sportsmen's Lodge - Asako Corporation.

A Special Use Permit was issued to Alaska Sportsmen's Lodge - Asako Corporation for 1988. A total of 24,762 persons were transported by the carrier-powered ferry during 1988, including: 13,647 in June, 6,763 in July and 1,254 in August. Over 1,300 persons were transported on the carrier's peak day of operation. Over 1,000 persons were transported each day from June 21-25. A total of \$69,639 was collected at the facility during 1988.

The Kenai-Russian River Access Area was operated under contracted agreement for the final year of the contract by Robert Hagland of Pacific Coast Charters. Two employees operated fee booths and collected \$42,137 monthly figures were the following; \$21,519 - June, \$15,818 - July, \$4,688 - August.



## I. EQUIPMENT AND FACILITIES

### 1. New Construction

A 16' x 20' observation deck at the termination of the Keen-eye Nature Trail, within the Visitor Center/Headquarters Lake Complex, was completed the latter part of October. Phase II of this project, consisting of nearly 200 feet of boardwalk, is scheduled for completion in the spring of 1989. Laborer Bud Marrs did an outstanding job of pre-cutting the support timbers and decking planks, and then reassembling the pieces on site. The project presented some unique logistical problems, but thanks to the collective effort of the entire maintenance staff, the mission was completed safely, on time and under budget.

During the latter part of August, we began experiencing problems with the ten-year-old headquarters complex sewage drain field. Following an on-site assessment by Division of Engineering personnel, a decision was made to add another field parallel to the existing one. The contract was awarded to Ross Brothers of Soldotna, and the five-line leach field was completed in late October.

The carpentry shop, under the able direction of Laborers Marrs and Bartman, was again put to good use during 1988. In addition to the routine sign construction and maintenance activities, skirting bases were made for sub-entrance signs along Funny River and Swanson River Roads, respectively.



Skirting bases were constructed for sub-entrance signs along Funny River and Swanson River Roads. JEF



Signs were also made for Maritime, Togiak, and Kodiak National Wildlife Refuges. A request was also received from Innoko and Becharof/Alaska Peninsula National Wildlife Refuges. These signs are scheduled for completion in 1989.



Bud Marrs with one of two signs made for Maritime National Wildlife Refuge's marine vessel Tiglax. JEF

Laborers Bartman and Marrs pooled their unique talents to construct several bookcases for the biologists' office and a built-in cabinet for the manager's office.

In an effort to improve lumber storage efficiency, a new cantilever storage rack was installed in the carpentry shop. This elevated storage system resulted in badly needed additional work space while permitting us to store lumber by size, type, and quality.

Maintenance Mechanic Al O'Guinn took the lead in fabricating 15 experimental aluminum-culvert wolverine traps. By year's end, several



traps had been completed and ready for field testing. This project was, again, another example of Al's wide range of talents in supporting refuge operations, and his ability to seemingly work miracles with the welder.



Cantilever racks greatly improved our lumber storage capability in the carpentry shop. JEF



Maintenance Mechanic Al O'Guinn with the first prototype wolverine trap. JEF





A total of fifteen 18-inch aluminum traps were made for field testing in 1988-89. JEF

In other construction activities, a new outhouse was fabricated for Engineer Lake Campground while new fire grates were installed at the Russian River Campground. A protective canopy was constructed over the gas pump island at the maintenance shop complex.

## 2. Rehabilitation

All asphalt surfaces at the Headquarters/Visitor Center and maintenance shop complexes were seal-coated the latter part of June through contract to Peninsula Paving. Funding did not permit coating access to the residence/bunkhouse or to Headquarters Lake. Hopefully, this can be accomplished in 1989.

The ten years of tolerating red water at refuge headquarters (with an iron concentration making it more conducive to welding than drinking) has apparently ended. The dramatic conversion from  $\text{Fe}_2\text{O}$  to  $\text{H}_2\text{O}$  occurred when a local plumbing firm, Peninsula Plumbing, was awarded a contract to bypass the 6,000 gallon fire emergency storage tank. The domestic feed supply now goes directly from the dual-stage softening unit to the pressure tank. As part of the contract, all domestic water lines were purged with chlorine. A post-conversion water analysis indicated we had lowered total iron from greater than ten parts per million, to less than

0.5 parts per million within the domestic supply. Who knows; after all these years, we may be able to brew a drinkable cup of coffee and spend less time cleaning stains from stools, sinks, shower stalls and drinking fountains.

A contract for 2,000 cubic yards of gravel was awarded to Foster Construction Company for graveling access roads and parking areas at Watson Lake, Kelly-Petersen Campgrounds and Egumen Lake Wayside. Several other campgrounds and access roads in the Skilak Wildlife Recreation Area were graveled and graded under force account.

Equipment Operator Kivi logged considerable grader time on the Skilak Loop Road during the summer. Years of neglect by the state necessitated pulling the ditches to salvage as much residual gravel as possible. Technically, the Skilak Loop Road remains under state jurisdiction; however, funding and personnel cutbacks have placed this road in the low maintenance priority category. It appears the refuge will be assuming a more active role in road maintenance in future years.

Murphy's Law, which we believe was enacted specifically for the popular Russian River Campground, made "true believers" out of remaining skeptics as the only water pump in the area decided to go on the "fritz" during the peak of the first red salmon run. A replacement pump was installed amid a growing line of thirsty and slimy-fingered fisherman. The pump at Watson Lake was also pulled, repaired and put back in operation.

During July, coliform bacteria tests came back positive for both the Hidden Lake and Tustumena Campground wells. Both were treated with a chlorine bleach solution, and while the Hidden Lake well was certified for public consumption within 24 hours, the Tustumena well was shut down for nearly two weeks before the coliform level reached acceptable limits.

In one way or another, the entire refuge staff became involved in a massive effort to clean up the long-neglected Skilak boneyard. Since the refuge was established in 1941, this area has been a convenient "out-of-sight-out-of-mind" repository for old signs, lumber, pipe, fuel drums, concrete barriers - you name it. Over the years the area was used not only by the refuge, but by the Bureau of Land Management, the State, and even the military during World War II. Following several days of intensive labor, and several dump truck loads to the local landfill and recycling center, the area looked a bit more respectable. Several 55-gallon drums have yet to be tested and disposed of in accordance with applicable regulations.





The old Skilak boneyard represented years of abandoned items no longer used in present-day refuge operations - culvert, fire grates, garbage cans,... JEF



...signs, fuel and oil drums,...

JEF





...concrete barrier posts, etc., etc.

JEF



Everything burnable was thrown in "the hole".

JEF





Even biologists had the opportunity to exercise their frequently fertile minds (and muscles). JEF



After several days of burning,...

JEF





...the area was rehabed, with only the 55-gallon drums remaining for testing and disposal. JEF

### 3. Major Maintenance

Equipment Operator Kivi and Maintenance Mechanic O'Guinn removed, tested, and replaced one of the electric motors for one of the doors at the Kenai hangar. No problem was found with the motor, so it appeared the door's "binding" problem was probably related to a minor structural change due to "frost heaving". The main lift cable was examined and found to be crimped in a couple of places. The cables were replaced, as well as several pulleys which showed signs of excessive wear. A new in-line safety water filter was also replaced at the Kenai hangar gas pump, as was the main drive pulley belt.

Equipment Operator Kivi and Laborer Bartman completed interior painting and making necessary repairs to Residence Number 1, following the vacancy of Candace and Walter Ward.

Maintenance Mechanic O'Guinn provided technical assistance to the United States Forest Service at Moose Pass, regarding a brake problem with their World War II vintage forklift.

Operator Kivi assisted Maritime National Wildlife Refuge personnel in off-loading Chisik Island trespass cabin debris from the Tiglax and transporting it to the Homer landfill.



Maintenance Mechanic O'Guinn and Laborer Bartman snowmachined to the Finger Lakes' cabin in February to make needed repairs to the heat-duct system. This effort was more or less of a stop-gap measure to insure a higher level of safety to the visiting public during the winter. A new wood burning stove will be installed prior to the 1989 summer season.



Rehabilitation and maintenance of selected cabins in remote locations continued as time, money and manpower permitted. JEF





New stovepipe, flashing and cedar shakes were added to the Lake Emma cabin. JEF

#### 4. Equipment Utilization and Replacement

One of the true maintenance "veterans", F.L. Clark, retired in December from active duty following at least 30 years of faithful service. In fact, no one on the present staff quite remembers when he came on the scene, but he was undoubtedly a product of the pre-World War II era. His birth certificate was never found although we knew his abilities, limitations, and personality well. No one could ever accuse him of not carrying his weight over the years in support of refuge operations. It was only in recent years that he had difficulty, not only in carrying, but in lifting his weight as well. He frequently refused to work on cold winter mornings. In addition, it was almost impossible to fit him with protective head gear. Reluctantly, the decision was made to replace Clark with a real power lifter, a native of England, and known around the shop as JCB 930. We'll miss ya Clark! Give us a call should you ever need a lift!





Equipment Operator Dick Kivi reverently pauses for a moment of silence before taking "Old Clark" on his final ride.

JEF



A 20-year wait for Dick, but, he says, the new JCB 930 all-wheel drive, 6000-pound-lift-capacity forklift was worth it.

JEF



Acquiring our new forklift was not without a major snafu. As sometimes happens, the communication link from the refuge, to Contracting and General Services, to the supplier goes on the "fritz". Our specifications for lifting the mast were very specific, but somewhere between Contracting and General Services and the Washington based supplier, a decision was made to accept the JCB 930 with a different mast height, too tall for operating inside any of our buildings! The mast was eventually exchanged, but in the meantime the machine sat idle at a local equipment dealership for several weeks.

The second major piece of heavy equipment received during the year was a Prime Mover 520 Hydro-Ax. The machine is intended to be used primarily for clearing fire lines as part of our fire management program. Initial field work is scheduled for the Mystery Creek area in January of 1989.



The new 520 Rotary Hydro-Ax will be used primarily for clearing fire lines as part of our fire management program.

JEF

A new addition to the "Kenai Armada" was a 1988 Model 19 Guardian Boston Whaler, Load Rite trailer and 150 horsepower Evinrude. Although it arrived too late in the season for conducting a maiden voyage, it has already been christened Flagship of the Kenai Navy.





The new 18-foot (Model 19 Guardian) Boston Whaler with 150-hp Evinrude, will be used as a combination work/patrol boat on Skilak and Tustumena Lakes. JEF

Two new 4 x 4 Chevrolet S-10 extended cab pickups were received during the year. This brings our total S-10 fleet to 11 vehicles. These pickups have become the "backbone" of our recreation and biological programs. The S-10's represent about a third of our total refuge fleet, but account for over 50 percent of the annual mileage (about 191,000 miles in 1988). We've experienced few maintenance problems, and overall maintenance cost for the S-10 fleet in 1988 was 13 cents per mile.

The new 16-inch Rockwell radial-arm saw was installed in the carpentry shop along with three 55-gallon mobile dust collectors.

#### 5. Communications Systems

Ten programmable, portable King radios with phone-patch capability were received in late 1988. This is the first step in upgrading our communications system in order to have reliable and wider-range coverage on the refuge.

#### 6. Computer Systems

Two IBM-compatible personal computers (Compaq 286) were received in October. They will be used for the new Financial Tracking System,

creating a data base for our vehicles and associate maintenance, and anything else we can think of putting on them. A third IBM compatible has been ordered for biological use.

A new Calcomp Digitizer Model 91362 was received in July, and will be integrated into the Data General and Geographical Information System.

A gap still exists in the area of employee training. Although nine employees are registered at Kenai Peninsula College, for Lotus 1-2-3 and MS-DOS training, we are still lacking in Systems Management training.

## 7. Energy Conservation

Table 36 shows a comparison of energy consumption between calendar years 1987 and 1988.

Table 36. Energy-use comparisons.

Product	Unit of Measure	Comparison		Comparison
		1987	1988	% Change with 1987
Electricity	Kilowatt Hours	139,888	165,527	+18.3
Natural Gas	100 Cubic Feet	16,721	12,978	-22.3
Vehicle Gas	Gallons	11,746	12,194	+3.8
Aviation Gas	Gallons	6,348	4,064	-35.9
Propane	Gallons	430	385	-1.4
Diesel Fuel	Gallons	1,644	2,960	+80.0

The increase in electricity consumption in 1988 (18.3 percent) probably resulted from two factors: 1) The bunkhouse was filled to capacity most of the summer, in addition to two mobile trailers housing additional employees. The residence was also used by a survey team from the Environmental Protection Agency. 2) Activity level in the carpentry shop more than doubled from 1987.

The decrease in natural gas (22.3 percent) is probably a direct result of milder temperatures, and the fact that the residence was vacant during the winter months.

Propane and vehicle gas (non-diesel) consumption was nearly identical to 1987 levels.

The nearly 36 percent decrease in aviation fuel consumption reflects fewer hours flown in both the PA-18 (Super Cub) and Cessna 206. A total of 104 fewer hours were flown in the Cub (177 versus 281) while the Cessna 206 was flown 61 hours less (167 versus 228) in 1988.



A significant increase (80 percent) was noted in diesel fuel consumption in 1988. Most of this is related to increased road grading on the Skilak Loop Road, as well as intensified snow plowing during the entire month of December within the Headquarters Compound, and the Ski Hill, Swan Lake and Moose Research Center Access Roads.

#### 8. Other

The resignation of Laborer Jim Farrar on June 2, provided a unique challenge in filling in behind an "Old Pro" who, in past years, handled most of the maintenance activities within the Skilak Loop, Russian River, Hidden Lake and Jim's Landing Campgrounds. We were fortunate to pick up another veteran (Bob Campbell) with considerable maintenance experience on the Kenai. Bob, like Farrar, was stationed at the Skilak Guard Station on an intermittent basis for the remainder of the summer public use season.

Local "People Count" Enrollee Erica Williamson did an excellent job in keeping the lawns at the headquarters, bunkhouse, and residence neat and trim. In addition, Erica was given a variety of other assignments - washing and waxing vehicles, brushing, shop cleanup, and a myriad of other duties. Her attention to detail and her cheerful attitude "won the hearts" of the maintenance staff. On Erica's last day, the staff treated her to a pizza lunch at the shop, and presented her with a plaque and gold engraving.



Erica Williamson, a local "People Count" enrollee, filled a real void in our summer maintenance program. She was presented with the coveted "we'll moose ya" plaque (made by Bartman and Marrs) on her final day of work.

JEF



Long-time Equipment Operator Dick Kivi has worn many "hats" over the years, but perhaps the most unusual occurred on November 2, when he and Refuge Manager Trainee Bob Winkelman recovered a body found in the Kenai River above Skilak Lake. Among his other responsibilities, Dick is also the Regional Heavy Equipment Training Officer. In addition to re-certifying Kenai Maintenance Personnel, Dick conducted training sessions for staff at Alaska Peninsula/Becharof and Yukon Delta National Wildlife Refuges.

Kenai held their first ever "small lot sale" during November. Approximately 45 individual lots consisting of chain saws, mowers, weed eaters, boat trailer, a raft, power tools, and a variety of other miscellaneous items were offered for sale on a sealed-bid basis. This was found to be a simple and effective way to dispose of space-taking "junk" that never seems to make it through the normal General Service Administration property disposal process.

The nearly 60 inches of snow that fell between November 1 and the first of the year kept the maintenance crew busy plowing and piling snow on a near-daily basis through December. Snow load on the Headquarters/Visitor Center building, in addition to ice build-up over the eaves, was a matter of concern. Heat loss was apparently excessive and further aggravated the situation.



The heavy snow and long hours of darkness in December finally got to Operator Kivi. JEF





Trying to find a place to pile snow became a problem with over 60 inches falling between November 1 and December 31.

JEF



Kivi and O'Guinn take a break from "glacier bustin" on the Visitor Center roof following heavy snowfall in December.

JEF



## J. OTHER ITEMS

### 1. Cooperative Programs

Kenai National Wildlife Refuge contributed a grant of \$5,000 for interpretive displays at the Soldotna Chamber of Commerce's new Kenai Peninsula Visitor Information Center located on the Kenai River two miles from refuge headquarters. Refuge staff Candace Ward and Rick Johnston provided technical assistance for the project. The center opened in March 1989 and the chamber staff provided excellent information and referral service for the refuge.

Kenai Community College and the refuge provided mutual assistance by jointly sponsoring environmental education, wildlife, and internship courses.

Kenai Peninsula Audubon Society and the refuge jointly sponsored the Kenai River Flats "Snow Goose Watch" in April and hosted the December Winter Bird Identification and Christmas Bird Count Workshops.

### 2. Other Economic Uses

#### a. Oil and Gas

##### (1) Beaver Creek Oil/Gas Field

Marathon Oil Company, operator of the Beaver Creek Oil and Gas Field, completed the construction of a new underground water-gathering system between several producing wells. This system collects formation waters produced during the production of oil and gas within the field, and transports the waters for reinjection at the Beaver Creek No. 2 Disposal Well. A potable-water pipeline was also installed from the Beaver Creek No. 3 Pad to the office complex adjacent the Beaver Creek No. 4 Well Pad.

In early September, crude-soiled gravels were discovered surrounding a shipping pump between the 1000- and 5000-barrel holding tanks within the Beaver Creek Oil and Gas Field Tank Farm. Soil borings were immediately taken to delineate the extent of the problem; however, the underground leak situation had, apparently, been occurring for several years. Early information suggested that the contaminated soils extended beneath the tank settings and would require their removal for a proper cleanup. On September 25, cleanup efforts were set back when a recycling hose, attached to the 1000-gallon tank, disconnected from a flange, causing a 145-barrel spill. Forty-five barrels were immediately recovered as liquids, however, 100 barrels seeped into the surrounding soils to be excavated.



The entire tank farm facility at the Beaver Creek Field was relocated to provide excavation of contaminated soils at this location. RR

Following the displacement of both tanks, and excavation of about 3200 cubic yards of soil, it was apparent that the original spill would develop into a major cleanup undertaking. Subsequently, a new tank farm location was constructed within the existing Beaver Creek No.4 Well Pad area and the two displaced tanks with associated piping were relocated to that site. Preliminary testing of samples taken by the Department of Environmental Conservation, on October 1, revealed very low concentrations of toxic substances.

Representatives from Marathon Oil, and the Bureau of Land Management, as well as the Beaver Creek Oil/Gas Field Operator, the Fish and Wildlife Contaminant Coordinator, the Refuge Contaminant Coordinator, and members of the refuge staff, met at the Headquarters, November 7, to discuss the current status and future program for cleanup of the chronic spill at the Beaver Creek Field Tank Farm. Final crude-spill cleanup of the now-frozen area was terminated for the season. More than 3200 cubic yards of contaminated material, removed from the tank farm spill site, are now temporarily stockpiled within a lined and bermed holding facility at the Beaver Creek No.7 Well Pad. Final results of contaminated soil and water analysis, accompanying a mitigation plan for the remaining cleanup, has not been received for agency review and approval.



Displacement of crude oil holding tanks and excavation of more than 3200 yards of contaminated soils was accomplished at the Beaver Creek Field prior to winter freeze-up. RR

The Beaver Creek Field includes six producing wells - four natural gas and two crude. Average daily crude oil production for the year was 539 barrels/day while natural gas production was 37,570 Mcf/day. Cumulative production through December 1988 was 3,661,366 barrels of crude and 77,232,933 Mcf natural gas. Natural gas is transported through Kenai Peninsula pipeline facilities for utilization in the Anchorage Bowl area. Produced crude is regularly trucked 34 miles daily to North Kenai refinery facilities.

## (2) Swanson River Oil Field

ARCO Alaska, Incorporated, Field Unit Operator, drilled no new wells this period but did complete several well workovers. During the year, about 27 wells were in production at any time, dependent upon maintenance and other work programs. Daily production averaged 5810 barrels/day with cumulative production through December at 209,410,772 barrels. The thirty-year cumulative total represents a recovery of nearly 46 percent of the estimated barrels of original oil in place.





The Swanson River compressor complex facility provides high pressure gas for reinjection into oil producing formations, forcing "black gold" to the surface. It was at this location in 1972 that an explosion contaminated the area with PCBs.

RR

The PCB-remediation project at Swanson River continued for the second season with a new primary contractor - Ogden Environmental Services of San Diego - responsible for the excavation and processing of PCB-contaminated soils. The contractual relationship with ARCO's original cleanup contractor, American Toxic Disposal of Illinois, and SRH Associates was terminated. Martech Construction of Anchorage, Alaska, became the excavation subcontractor for Ogden.

Ogden was contracted by ARCO to bring their Transportable Circulating Fluidized Bed Combustor on-site to thermally destroy stockpiles of PCB-contaminated soil. Under Title 40, Part 761, in Code of Federal Regulations, Ogden must first obtain a permit from the U.S. Environmental Protection Agency before they process soils containing regulated concentrations of PCBs. Permit requirements for the disposal of PCBs are regulated under the Toxic Substances Control Act, Public Law 94-469 (1976).



From 1962 to 1972, Aroclor 1248 was used as a heat transfer oil in the process heat system of the propane recovery unit within the compressor plant complex at the Swanson River Field. A 1972 explosion at this facility released an unknown quantity of the oil containing PCBs. The operational procedures in use at that time directed the final disposal site for the contaminated soil and snow to the SCU 14-3 pit holding facility. Oily sand and gravel from this facility were later used for dust suppression and maintenance on approximately two miles of roads within the Field. Responsible parties and regulatory agencies were unaware at that time that the material was contaminated with PCBs.

As previously scheduled, PCB work resumed March 11 at the SCU 14-3 pit facility. The still-frozen pit conditions permitted heavy equipment to negotiate the pit floor and excavate contaminated soils from the sides and floor, transporting those materials to the main holding pit area for



Excavation of contaminated PCB soils began in March, 1988, at the SCU 14-3 waste holding facility. RR

future processing. Unfortunately, the proposed two or three-week excavation of the SCU 14-3 waste pit turned into several weeks following the finding of free hydrocarbons (oil) containing PCBs outside the original pit perimeter. This find necessitated the excavation of adjacent overburden soils to expose and delineate the extent of soil





Free oil, containing PCBs, was found outside the SCU 14-3 holding facility requiring timely and extensive excavation.

RR

contamination. Removal of those soils to the on-site lined holding facility was completed June 9.

The Circulating Bed Combustor Unit was fabricated in New Orleans, shipped by truck to Washington, barged to Anchorage, and trucked to the Swanson River Field (21 trailers). The processing unit foundation was formed and poured during early July and the first module of the unit was set in place July 19. The selected operation crew for the unit underwent intensive, training at Ogden's facilities in San Diego and in New Orleans on an identical unit at the fabricator's.





To determine if PCB-contaminated soils were sufficiently removed, release sampling followed the excavation of contaminated areas.

RR



Certain areas presented difficult excavation problems associated with active pipeline facilities.

RR





Although contaminated soils adjacent to buildings were removed, numerous wipes of building concrete foundations could not totally remove PCB contamination. RR



The Circulating Bed Combustor requires a substantial foundation to properly support the facility. RR



During July, Ogden Environmental Service's Circulating Bed Combustor was erected module by module. RR

Startup activities at Swanson River commenced for the new Circulating Bed Combustor Unit during August, with a shakedown by the operation crew. The unit was fired with natural gas, and clean sand and gravel material circulated during shakedown operations. The unit reached a temperature of 1600°F while utilizing several tons of material. A Rapid Turnaround Test (1700°F) was conducted with the unit on September 22 using test-burn material containing concentrations of 1,300-2,800 parts-per-million PCBs. Results indicated destruction and removal efficiencies better than 99.99999 percent and a PCB residual in the purified soil of less than 0.15 parts-per-million.

The official U.S. Environmental Protection Agency Demonstration Test of the Circulating Bed Combustor commenced September 24. A total of six test runs were conducted through September 27, processing more than 162 tons of contaminated soils. Combustion efficiency was 99.95-99.97 percent. The purified soil analytical results detected no residual PCBs at the level of detection. The Demonstration Test results indicate the Circulating Bed Combustor Unit performed as planned and met Toxic Substances Control Act requirements for the destruction of PCBs.





Tours for agencies and other special groups have been frequent at the Circulating Bed Combustor facility. RR

A public informational meeting was held in Soldotna on June 2. The meeting was hosted by the Service and ARCO made a presentation on the project history and background. Ogden provided information on the transportable Circulating Bed Combustor thermal processing unit technology and the associated permitting required. Another public meeting was held on December 2 in Soldotna, sponsored by the U.S. Environmental Protection Agency and Alaska Department of Environmental Conservation and hosted by the Fish and Wildlife Service. The purpose of this meeting was to present the initial results of the Demonstration Test and to discuss the status of the State Hazardous Waste Siting regulations and project evaluation. The Alaska Department of Environmental Conservation stated in the meeting the Department Commissioner had indicated the Order-by-Consent preempted the siting regulations.

Processing of the "unregulated" (less than 50 parts-per-million) PCB material commenced in accordance with permits from the Environmental Protection Agency and the Alaska Department of Environmental Conservation, while waiting for issuance of the Toxic Substance Control Act Permit required by the Environmental Protection Agency to process regulated concentrations of PCB material. An Alaska Department of Environmental Conservation Air Quality Control Permit conditioned around the Toxic Substance Control Act Permit will also be issued.



The Circulating Bed Combustor continued through year's end to process PCB contaminated soils of less than 50 parts-per-million. Some problems with



Although seasonal excavation terminated, the Circulating Bed Combustor facility, now winterized, continued processing stockpiled PCB-contaminated soils.  
RR

the auger/hopper soil feed system accepting and transporting very fine silty soils with high moisture content slowed the normal five tons-per-hour production rate to one or two tons. Ogden engineers (on site) improved feed handling by redesign of the feed auger and hopper, increasing production by more than four tons-per-hour. The processed material, now "purified soil" at 99.99998 percent clean or about 25 parts-per-billion, was subsequently stockpiled at the 14-3 stockpile disposal site.

The total amount of contaminated soil incinerated during 1988 was 1207 tons, including the amount processed during the September Demonstration Test. The purified soil analytical results have detected no residual PCBs above the two-parts-per-million limit (all essentially non-detectable). A total of 42,323 tons of contaminated soils were excavated and removed to the containment facilities this year. To date, total cumulative tonnage excavated is 75,094 tons.



Processed contaminated soils from the Circulating Bed Combustor are disposed in the reclaimed 14-3 holding facility. Note the Combustor's winterized enclosure.

RR

Ecology and Environments field laboratory, supporting the PCB project, ended seasonal operations November 19. The lab analyzed collected soils to determine PCB levels requiring excavation, as well as excavated areas accepted by the On-Scene Coordinator for release under the Order by Consent to cleanup PCB contaminated soils. The Ecology and Environment field laboratory analyzed a total of 10,398 samples during 1988. The cumulative total samples analyzed through 1988 was 18,176.

(3) Birch Hill Unit

ARCO Alaska, Incorporated, requested winter access through Tyonek Native Corporation 22(g) lands to the Birch Hill 22-23 capped gas well located nine miles north of the Swanson River Field. A small gas leak at the wellhead necessitated killing the well. The refuge approved the access route originally constructed during the development of this well.

ARCO Alaska, acting in behalf of Chevron U.S.A., engaged Chumley's Urethane of Sterling, Alaska, to prepare the road access route to the Birch Hill 22-25 gas well along a route approved by the Refuge and



surface owner, Tyonek Native Corporation. Unable to construct an ice road because of warm temperatures, necessary equipment was transported to the well site location utilizing a large skid pulled by a dozer. The well was subsequently killed, cemented and properly secured by the first week in March.

b. Other

(1) Air Quality Study

Wayne King, Fish and Wildlife Service, Denver, arrived August 9 to study visibility degradation problems within the Kenai Peninsula and Cook Inlet Basin under the Kenai Air Quality Study. Wayne also chaired an agency meeting with representatives from the State of Alaska, U.S. Environmental Protection Agency, Fish and Wildlife Service, and National Park Service at Refuge Headquarters. On August 12, Wayne King and Ken Slotle, of the air monitor group, were provided with an aerial tour of the refuge during an inspection of the spruce bark-beetle kill at Point Possession.

(2) Skilak Guard Station Drums

On October 24, 1988, an inventory of stored drums was conducted within the storage facility at the Skilak Guard Station, Mile 14 Skilak Loop Road. Forty-seven drums of various contents - some known, others unknown - were identified. Although other agencies have utilized this facility during past years, solid information regarding the contents of some drums was not forthcoming. Two drum storage locations were established at this site. One location supported 72 stacked empty drums that were removed earlier from the old abandoned Air Force recreation site at the outlet of Skilak Lake. The other location supported a group of 47 drums, 31 of which were full or partially full of unidentified liquid contents. The refuge is working with the Regional Contaminant Coordinator toward a proper analysis and disposal of the drums and their contents. A contracted sampling program will be initiated to analyze each drum containing unknown contents and arrange for their proper disposal.

3. Items of Interest

The following "Very Important People" visited the Kenai National Wildlife Refuge during 1988.

Regional Director Walt Stieglitz and Deputy Regional Director Dave Olsen visited the refuge on March 24 and were briefed on the development alternatives in the Environmental Assessment for the Skilak Wildlife Viewing Area.

Tom Follrath, Deputy Chief of Refuges, and Marv Plenert, both from Washington, D.C., visited the refuge on April 6 and were given an aerial tour of the refuge by Assistant Refuge Manager/Pilot Richey. Of

interest, were native claim lands and conveyances, the Skilak Wildlife Recreation Area, the PCB project, and oil and gas operations.

Walt Stieglitz, John Rogers, and Joe Mazzoni visited the refuge on May 11. They reviewed the current Kenai Native Association land exchange proposal with Assistant Refuge Manager Richey and the proposed Fiscal Year 1988 construction within the Skilak Wildlife Recreation Area. The group also visited Refuge Headquarters and discussed the proposal with Refuge Manager Doshier and Deputy Refuge Manager Hedrick before returning to Anchorage.

Pat Ryan, Office of the Secretary, Washington, D.C., and Ginny Hyatt, Alaska Safety Officer, were given an aerial tour of the refuge by Assistant Refuge Manager/Pilot Richey and Wildlife Biologist Bailey on June 22. Of particular interest were refuge telemetry operations. Following a visit with the staff at Headquarters, they were returned to the Office of Aircraft Services in Anchorage.

Dr. Brahim Haddane, Assistant Director of the Veterinary Office of the National Zoological Park, Morocco, and James P. Clinton, State Department Escort Officer, visited the refuge on June 28. The two men were taken on a radio-tracking flight over the refuge by Pilot Larned and Wildlife Biologist Bailey.

In August, Randy Bowman, Legislative Affairs Office, Washington, D.C., and Elizabeth Stolpe, Senator Murkowski's office, visited the refuge to discuss the proposed legislation to facilitate a "land swap" with the Kenai Native Association.

On August 17, Deputy Regional Director Dave Olsen and key congressional staffers were given a "floating" tour of the refuge portion of the Kenai River by Deputy Refuge Manager Hedrick. The group was then given a "drive-through" and briefing on the Skilak Loop Wildlife Recreation Area by Refuge Manager Doshier.

Dave Kline, Regional Vice-President for Alaska Audubon, visited the refuge on September 28 and provided a discussion and slide show on the wildlife and issues of the Arctic National Wildlife Refuge for an audience of 24.

In August, T. Boone Pickins and his wife, Beatrice Pickins, Chairman of the Fish and Wildlife Foundation, visited the refuge. The Pickins', accompanied by Director Dunkel and his wife, were given a tour to Skilak Lake and the Moose River by Refuge Manager Doshier and Deputy Refuge Manager Hedrick. Mr. Pickins was interested in observing the "combat fishing" ritual that takes place on the Russian River during the red salmon runs. Unfortunately, the red salmon were not at the Russian River when Mr. Pickins were here, so he had to settle for salmon fishing at the Moose River.

4. Credits

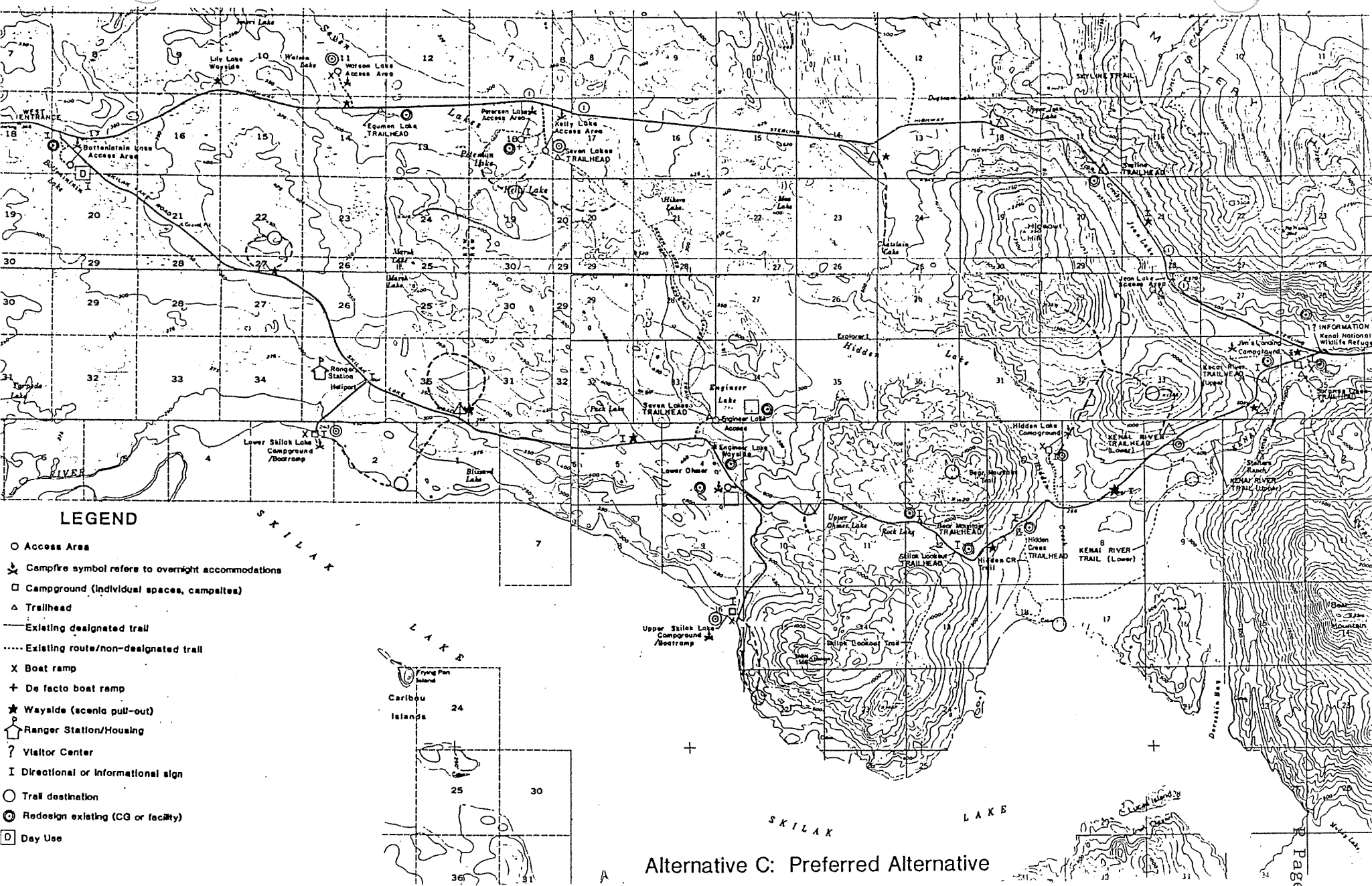
All staff members took part in preparing the 1988 narrative report.



K. FEEDBACK

The value and diversity of the 1.35-million-acre Kenai Wilderness to area wildlife populations which require large and/or undisturbed habitats to survive is difficult to over-emphasize. Several species, such as trumpeter swans, brown bear, caribou, Dall's sheep, mountain goat, wolverine, wolves, and salmon, are dependent on the untrammelled habitats associated with Kenai wilderness. The Kenai Wilderness sustains wildlife populations that have become standard by which wildlife on other less-protected habitats are measured for overall potential and health. The three pillars of most wildlife success stories on the Kenai National Wildlife Refuge are a biologically sound harvest strategy, restricted recreational access and wilderness habitat protection. The wisdom of Congress in designating the majority of the Kenai National Wildlife Refuge as a unit of the Wilderness Preservation and Management System, is apparent on a daily basis.

The myth that certain refuges, particularly Alaska refuges, can go it alone without wilderness protection is one that is quietly fading with the California sunset. Hank Fisher, in a speech at the First North American Wilderness Management Conference in Idaho, uttered the most profound words at the conference. He repeated ten times, "wilderness is good for wildlife"...At least for the Kenai National Wildlife Refuge, and the wildlife species found here, Mr. Fisher's words have rung true.



- LEGEND**
- Access Area
  - ★ Campfire symbol refers to overnight accommodations
  - Campground (individual spaces, campsites)
  - △ Trailhead
  - Existing designated trail
  - ..... Existing route/non-designated trail
  - X Boat ramp
  - + De facto boat ramp
  - ★ Wayside (scenic pull-out)
  - 🏠 Ranger Station/Housing
  - ❓ Visitor Center
  - I Directional or Informational sign
  - Trail destination
  - ⊙ Redesign existing (CG or facility)
  - ◻ Day Use

Alternative C: Preferred Alternative





# SKILAK WILDLIFE VIEWING AREA

## Recreation Facilities Inventory

Alternative A - Current Situation  
 Alternative B - Master Plan  
 Alternative C - Preferred Alternative  
 Present - X  
 Not Present - 0

Recreation Facilities																																													
Vehicle Parking			Boat Trailer Parking			Vehicle Campsites			Tent Only Campsites			Foot/Ski Trails			Sanitary Facilities			Drinking Water			Picnic			Group Use			Information			Interpretive Display			Boat Launch			Canoe/Raft Launch			Overnight Camping Fee Required						
A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C				
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