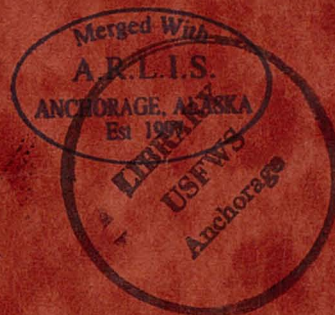




KENAI NATIONAL WILDLIFE REFUGE  
SOLDOTNA, ALASKA



U.S. DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
NATIONAL WILDLIFE REFUGE SYSTEM

ANNUAL NARRATIVE REPORT  
CALENDAR YEAR 1994





REVIEW AND APPROVALS

KENAI NATIONAL WILDLIFE REFUGE

Soldotna, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1994

<u>Rob L. West</u>	<u>1-9-97</u>	<u>Cecilia</u>	<u>2/7/97</u>
Refuge Manager	Date	GARD-South Chief of Refuge	Date

<u>Jane E. Hoh</u>	<u>2/7/97</u>
Regional Office Approval	Date
GARD-South	

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## INTRODUCTION

The Kenai National Wildlife Refuge is located on the Kenai Peninsula in southcentral Alaska. The northern portion of the Refuge is 25 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 nearest portion of the Refuge by road from Anchorage, commercial commuter aircraft fly into the nearby cities of Kenai and Soldotna daily.

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 Kenai 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 as the Kenai National Moose Range 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 left open for development. Homesteads, grazing areas, road systems, and other developments occurred in these areas, and they were excluded from the Refuge during a 1964 boundary adjustment. Excluded at the same time were Cook Inlet coastal lands one to three miles inland and considerable portions of the Harding Ice Field, reducing the Refuge area to 1.73 million acres.

Passage of the Alaska National Interest Lands Conservation Act (ANILCA), commonly known as "The Alaska Lands Act," on December 2, 1980, redesignated the Kenai National Moose Range as the Kenai National Wildlife Refuge. The Act also increased the Refuge acreage, adding approximately 150,000 acres at the southern tip of the Refuge and about 90,000 acres of former Forest Service lands to the extreme northeast portion of the Refuge near Chickaloon Flats. At the same time, passage of ANILCA withdrew 16,535 acres from the Refuge to satisfy the claims of the Salamatof Native Association under the Alaska Native Claims Settlement Act of 1971. The now 1.97-million-acre Refuge was reestablished and is currently 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) ensure water quality and quantity, 4) provide opportunities for scientific research, interpretation, and environmental education, and 5) provide opportunities for fish and wildlife-oriented recreation. In addition to establishing a new name, new boundaries, and expanded purposes, ANILCA formally designated 1.35 million acres of the Refuge as wilderness.

The Refuge is divided into two main physiographic regions: a mountainous region and a forested lowland. Elevations on the Refuge range from sea level to more than 6600 feet in the Kenai Mountains, with treeline at about

1800 feet. Among the peaks of the Kenai Mountains lies the Harding Ice Field which thrusts numerous glacial fingers out into the Refuge. The glaciers, mountains, lakes, alpine tundra, and foothills are extremely scenic.

Thirty-nine percent of the Refuge is forested. Swampy forests of black spruce alternate with peatbogs and grassy mires, while white spruce forests dominate the drier areas and the foothills and mountains. White spruce stands are often intermixed with or include deciduous trees, such as white birch and aspen, especially in old burns and cut-over areas. Lowland shrub (alder and willow) covers 9 percent of the Refuge. Mountain tundra covers about 11 percent. Of this class, about 87 percent is dwarf shrub and lichen tundra, and 13 percent is tall shrub (alder and willow) thickets usually associated with tundra. Water and associated wetlands cover 13 percent, and snow, ice, and glaciers cover the remainder of the Refuge.

The Kenai River, the largest river system on the peninsula, drains about 2148 square miles (5563 km<sup>2</sup>). About 54 percent of the watershed is on the Refuge, 37 percent in the Chugach National Forest, and the remainder on private lands. Ten major tributaries feed the Kenai River System: Beaver Creek, Slikok Creek, 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 Cook Inlet include the 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, and most 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 4500 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. Five species of salmon, a wide variety of furbearers, and significant populations of brown and black bear, sheep, goats, wolves, bald eagles, trumpeter swans, caribou, moose, and loons occur on the Refuge.



## INTRODUCTION

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K. FEEDBACK

NTR



A. HIGHLIGHTS

The Kenai experienced very heavy snowfalls in both the winters of 1993-94 and 1994-1995 (Section B).

A warm, dry summer on the Kenai and much of the western lower 48 states lead to a national fire planning leve 5, hampering the Refuge's prescribed burn program (Section F.9).

An Interagency cooperative plan for the upper section of the Kenai River was begun (Section D.2).

A new Interagency group formed to focus on the Kenai River Watershed (Section J.1).

The first new well since 1978 was drilled in the Beaver Creek Field (Section J.2)



Beaver Creek Well BCU#9, was the first well drilled within the Field since 1978, while testing was still in progress at years' end, initial prospects for substantial gas production looks favorable.

JF

B. CLIMATIC CONDITIONS

Table 1. Monthly temperatures (averages) and precipitation data, 1994\*

	Temperature (Fahrenheit)				Precipitation		Snowfall**	
	Averages				Inches		Inches	
	Normal	High	Low	1994	Normal	1994	Normal	1994
January	12.5°	42°	-25°	21.0°	1.05	1.25	10.7	15.8
February	16.5°	45°	-10°	16.3°	.96	.97	9.8	10.5
March	23.0°	46°	-28°	23.7°	.96	1.29	9.3	22.0
April	33.3°	56°	10°	37.6°	.82	.68	4.7	3.8
May	43.7°	65°	32°	45.0°	1.10	.59	0.4	--
June	50.2°	74°	36°	52.3°	1.20	.62	--	--
July	54.5°	72°	39°	55.1°	1.61	1.99	--	--
August	53.7°	73°	29°	54.5°	2.49	.88	--	--
September	47.1°	66°	22°	46.3°	3.16	2.82	--	--
October	34.7°	53°	-1°	32.8°	2.72	.86	3.4	4.4
November	21.0°	37°	-26°	12.2°	1.50	4.00	8.6	51.6
December	14.4°	47°	-27°	14.3°	1.40	2.28	12.4	25.7
Yearly								
Average	33.7°	56°	4°	34.3°				
Totals					18.97	18.23	59.3	133.8

\*January - July data were obtained from monthly National Oceanic and Atmospheric Administration (NOAA) Climatological Data reports. August - December data are preliminary data obtained from the National Weather Service office in Anchorage. For temperature and precipitation, the reference period for normal values is 1961-1990.

\*\*Information obtained from monthly NOAA Climatological Data reports, the State Climatologist, the Federal Aviation Administration, and the National Weather Service.

The mild 1993 winter weather continued into 1994. Heavy March snows (22") more than offset the earlier snow shortfall, bringing the 1992-93 snowfall to 21 percent above average. The summer of 1994 was another beautiful Kenai summer, with temperatures a degree or two above normal, and rainfall substantially less than normal. This ended with the onset of an early and hard winter: in November temperatures were about 8° below normal and snowfall was 600 percent of normal (51.6"). December warmed to normal, but snowfall was 207 percent of normal. Heavy moose browsing of willows was already apparent in November, and many moose took to the roadways to avoid the deep snows.

C. LAND ACQUISITION

1. Fee Title

Kenai Native Association, Incorporated (KNA)

As required by Public Law 102-458, negotiations on the Kenai Native Association(KNA)/Kenai Wildlife Refuge(Refuge) proposed land exchange continued during 1994.

Legislation to authorize the KNA/Refuge land swap was introduced during the congressional session but failed to pass the Senate prior to the session's end.

KNA tracts being negotiated in the exchange include Stephanka (north and south), Skilak Outlet, Moose River, Swanson River Road (East and West), Tustumena Lake (Central), and the Old Kenai National Wildlife Refuge Headquarters.

The legislation would have combined Kenai Wilderness removal, Kenai Wilderness designation and boundary changes, change in Alaska Native Claims Settlement Act (ANCSA) section 22g status, cash or surplus property transfer, and transfer of current KNA lands within the Refuge.

Salamatof Native Association (SNA)

Large numbers of visitors continued to discover and use the public use easements associated with Salamatof's Moose Range Meadows subdivision. Shoreline habitat damage continued to accelerate as both public anglers and private property guests trampled accessible shoreline areas.

The status of the ownership of the variable non-development easements remained in limbo. Federal register regulations were published implementing Department of Interior Solicitor Dennis Hopewell's 1993 determination that the United State's subsurface holdings underlying Salamatof lands, require the surface estate to remain within the Refuge as an inholding and the Refuge boundary has not changed.

Refuge staff met with Moose Range Meadows Subdivision property owners and Salamatof President Jim Segura to discuss alternatives for restoring and preventing future damage to several heavily impacted shoreline areas along the 25-foot public use easement.

Cook Inlet Region Incorporated (CIRI)

Park Ranger/Pilot Johnston completed an investigative and file search project in March associated with the CIRI ANCSA section 14h(1) adjudication for lands selected for archeological and historic places in the Kenai-Russian River confluence area. A report was sent to Joseph Labay, the chief adjudicator for the Cook Inlet Region, Bureau of Land Management. The report summarized and detailed information that would support non-



conveyance of certain selected lands, government appropriations, and other factors. Specifically the report included historical photographs, a visual resource analysis of the Kenai-Russian River Access Area, historical funding expenditure documentation, a summary of administrative actions for the area including land appropriations, sport fishing management expenditures, and Fish and Wildlife Recreation Act requirements.

#### Native Allotments

Administrative Law Judge Childs ruled in favor of the Dolchok heirs and awarded a 100-acre native allotment at Harvey Lake during 1993. An appeal of the ruling to the full Interior Board of Lands Appeal (IBLA) was also filed in 1993. The appeal was pending throughout 1994.

Regional Office reality appraisers began work on the Morris Miller allotment at Olsen Lake. Two aerial reconnaissance flights were conducted in the local area to photograph and examine comparable properties.

#### 2. Easements



The Kasilof River Boat Ramp was reconstructed during April 1994. Maintenance crews braved a late season snowfall to complete the job prior to the river rising.

RJ

Approval for improving and rehabilitating the Kasilof River boat ramp was secured in 1993. Due to high water occurring before the boat ramp could be completed, that portion of the Alaska Native Claims Settlement Act (ANCSA) 17b easement work was delayed until 1994. Refuge staff corresponded with Cook Inlet Region, Inc. (CIRI) regarding Refuge efforts to modify and upgrade the ANCSA 17b easement at the Kasilof River. An as-built diagram for the new launch was included in the correspondence.

### 3. Other

#### Inholders/Land Acquisition

The Land Protection Plan, which identifies and prioritizes inholding lands for reacquisition, conservation easements, and other measures, was completed in October. Refuge staff provided input and assistance with the plan throughout 1994 to Susan Schulmeister, Region 7, Division of Realty.

On October 5, 1993, in correspondence consistent with ANILCA Section 103(b), Refuge Manager Doshier requested that the Kenai National Wildlife Refuge boundary be officially changed to include Burnt Island and adjacent tidelands. No response to the request was received in 1994.

The former Sportsman's Lodge property, acquired in 1993 with federal aid money and transferred to Alaska Department of Fish and Game (ADF&G) Sport Fish Division, continued to be managed on an interim basis by the Refuge in conjunction with the Kenai/Russian River Access Area. Paul Schrooten, (Division of Engineering), with assistance from ADF&G and the Refuge, is developing an interim plan to improve access, traffic flow, and visitor information for the summer of 1995.

#### Rights-of-Way

Compatibility determinations were completed for all Refuge rights-of-way during 1994 in conjunction with the compatibility review.

Unauthorized or undesirable use by snowmobiles, all terrain vehicles (ATV), and other vehicles continues to be a concern at several Refuge locations where rights-of-way clearing has removed or modified natural vegetation breaks. Control points along the Refuge boundary have also changed significantly due to native land conveyances. Several problem areas were identified for barrier construction and/or signing during 1994.

Refuge Operations Specialist Frates and Ranger/Pilot Johnston met with right-of-way officials from Homer Electric Association (HEA) regarding illegal access occurring at several boundary/rights-of-way interfaces. HEA was requested to block off several rights-of-way that have ongoing law enforcement problems. HEA officials were uncooperative and unwilling to commit funds to solving these problems. It remains the Refuge's position that the terms of various right-of-way permits either directly or indirectly calls for the permit holder to be responsible for illegal or incompatible uses that occurs as a result of right-of-way construction and

associated vegetation clearing. The fact that permit holders, such as HEA, may not read their permits as such suggests that stipulations need to be reviewed for clarity of direction. Many of the Refuge's right-of-way permits were originally issued by the Bureau of Land Management or were issued before problems evolved. Careful review of each permit will be necessary as they come up for review.



Unauthorized all-terrain-vehicle tracks have caused damage along several Refuge rights-of-way, particularly in wet areas. RJ



D. PLANNING

1. Master Plan

Nothing to report

2. Management Plans

Caribou Management Plan

Biologist/Pilot Rick Ernst completed the draft Caribou Management Plan in February and submitted it for internal review to the three cooperating agencies: Fish and Wildlife Service, Forest Service, and ADF&G. Comments were received and incorporated, and the final plan was submitted for approval in October. At years' end, the plan had been signed by the Service and ADF&G and was awaiting approval by the Forest Service.

Moose/Habitat Management Plan

Comments on the draft Moose/Habitat Management Plan were received from the Regional Office and the State Division of Governmental Coordination in January and March respectively. Work on the plan was put on hold for the remainder of the year while Ernst focussed his efforts on the Caribou Management Plan.

Public Use Management Plan

The Public Use Management Plan (PUMP) was the priority task of most of the public use and biology staff in January and February. Long hours were devoted to the preparation of the issue analysis section of the environmental assessment. Initial drafts of ten issue analyses were submitted to Associate Manager Constantino on March 1 for review. After the Associate Manager and the Planning Division had reviewed the drafts, a meeting was held with them and Assistant Regional Director Rowan Gould to discuss how the PUMP process could be simplified. It was agreed that the issues to be addressed in the plan would be prioritized and efforts focused on one element at a time. A revised work plan was approved in late May.

Upper Kenai River Cooperative Management Plan

The Refuge initiated discussion in September with Alaska State Parks, Chugach National Forest, Alaska Department of Fish and Game, Kenai Peninsula Borough, and Cook Inlet Region, Inc. regarding the development of a cooperative management plan for public lands and waters in the upper Kenai and Russian River corridors. All concurred that such a plan is needed and that the time is right to embark on such an effort. Monthly meetings were held to address objectives, strategies, obstacles, public involvement, and funding of a joint planning effort. A goal statement and project charter were developed and a briefing was scheduled for the Regional Director on January 4, 1995. The interagency upper Kenai River plan is a parallel effort to the Public Use Management Plan and will be the

vehicle for addressing public use issues in this intensively used area of the Refuge.

#### Skilak Wildlife Recreation Area

Implementation of recreation facility improvements in the Skilak Wildlife Recreation Area continued with planning and design work for Jims' Landing and Lower Skilak campground. Proposed improvements in the riparian zone of Jims' Landing were scaled down to respond to objections from several permitting agencies. The revised proposal eliminates overnight camping facilities.

Seasonal Park Ranger Scott Slavik prepared an environmental assessment of four alternatives for improvements at Lower Skilak Campground. A combination of two of the proposed alternatives was selected as the preferred alternative in February. In August, the Alaska Department of Fish and Game (ADF&G) expressed concerns about the impact of proposed development at Lower Skilak on brown bear movement. A meeting was held with ADF&G, Interagency Brown Bear Study Team members, and Deputy Assistant Regional Director Elison to discuss these concerns. It was agreed that proposed improvements should be reexamined. Three additional alternatives were developed, each with less development adjacent to the lake shore. It was decided to delay expansion of camping facilities until a study of brown bear movement patterns is completed. Interim improvements will be directed toward the access road and parking deficiencies.

#### Fire Management Plan

Revision of the Fire Management Plan was initiated in December.

### 3. Public Participation

The Refuge held an open house in Sterling on July 8 to provide information on planned prescribed burning in the Mystery Creek area.

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

A letter of no objection was received by the Division of Engineering from the ADF&G Habitat Division for the revised proposal for rehabilitation of Jims' Landing.

A permit was obtained by the Division of Engineering to contract for repair work on the Upper Skilak Campground boat ramp. The new ramp was undercut by wave action during the summer of 1993.

Corps of Engineer and ADF&G permits for reconstruction of the Kasilof River boat ramp were slightly modified and extended for work which was completed in April.

A draft environmental impact statement for the Sterling Highway Mile 37 to 60 Project (No.F-021-2(15)/53014) was received in May and reviewed by Refuge staff. The Refuge provided comments to Ecological Services for a

consolidated Service response to the Alaska Department of Transportation and Public Facilities. The Service supported the 3R alternative which appeared to have less impact on wildlife and wilderness resource values. The 3R alternative involves resurfacing, restoration, and rehabilitation primarily along the existing right-of-way.

The Refuge requested a permit from the Alaska Department of Environmental Conservation for the Mystery Creek III Prescribed Burn. The approved permit includes smoke management stipulations to minimize particularities and maintain visibility in populated areas.

As a result of legal settlements in the National Audubon Society compatibility law suit, all Refuge uses were reviewed for their compatibility with Refuge purposes and the Refuge Recreation Act. All Refuge uses including recreational uses, snowmobile use, sport fishing, rights-of-way, oil and gas exploration and extraction, fisheries enhancement, public leases and uses, inholder access, campgrounds, research activities, facilities, etc. were reviewed and compatibility determinations finalized.

##### 5. Research and Investigations

Graduate student Win Staples began revising a draft of his M.Sc. Thesis entitled Lynx and Coyote Diet and Habitat Relationships during a Hare Low on the Kenai Peninsula, Alaska in November 1994 at the University of Alaska-Fairbanks. The data for this research project was collected on the Kenai National Wildlife Refuge between 1988 and 1991.

Graduate student David "Burney" Dunn, University of Alaska, Fairbanks, was a victim of a triple homicide in Fairbanks in October 1994. His research project was designed to obtain information on the snowshoe hare population and its relationship to habitat and lynx populations on the Kenai National Wildlife Refuge. Graduate student Craig Perham, University of Alaska, was employed by the University and the Alaska Cooperative Wildlife Research Unit to complete entry of Burney's field data into a computer spread sheet/database and to conduct some preliminary analysis of the data. At the request of Burney Dunn's parents, data collected by Burney are also being forwarded to Colorado State University for possible use by Burney's brother Jeff Dunn to help complete his requirements for a M.Sc. in mathematics.

Graduate student and Refuge biological technician Elizabeth Jozwiak, (Colorado State University, Fort Collins) continued to analyze radio telemetry data collected from wolves over the past 10 plus years, complete required course work, and analyze data from an experiment testing the accuracy of aerial-obtained Ground-Position-Satellite (GPS) wolf locations. Liz completed a draft of her thesis in December 1994, and will return to work on the Refuge in January 1995, and complete her thesis by May 1995.

E. ADMINISTRATION



Refuge staff left to right: Theodore Bailey, Deanne Nelson, Mark Chase, Al O'Guinn, Brenda Marsters, Jim Frates, Daniel Doshier, Tony Fischbach, Elizabeth Jozwiak, Larry Adams, Bill Kent, Ed Berg, Chris Johnson, Emily Dekker-Fiala, Richard McAvinchey, Brenda Wise, Richard Johnston, Diana Thomas, Richard Ernst. 10/94

1. Personnel

Table 2. Listing of permanent personnel for the Kenai National Wildlife Refuge, 1994.

1.	Daniel W. Doshier	Refuge Manager	GM-14 PFT
2.	Mark A. Chase	Refuge Operations Specialist	GS-0485-11
3.	James E. Frates	Refuge Operations Specialist	GS-12 PFT
4.	Theodore N. Bailey	Fish & Wildlife Biologist	GS-12 PFT
5.	William C. Kent	Park Ranger	GS-12 PFT
6.	Richard D. Ernst	Wildlife Biologist/ Pilot	GS-0486-12
7.	Larry R. Adams	Forester	GS-11 PFT
8.	Richard K. Johnston	Park Ranger/Pilot	GS-12 PFT
9.	Candace D. Ward	Park Ranger	GS-09 PFT
10.	Edward E. Berg	Ecologist	GS-11 PFT
11.	Elizabeth A. Jozwiak	Biological Technician	GS-07 PFT
12.	Richard J. McAvinchey	Wildlife Biologist	GS-09 PFT
13.	Richard D. Kivi	Equipment Operator	WG-10 PFT
14.	Elvin "Al" O'Guinn	Maintenance Mechanic	WG-10 PFT
15.	Vivian J. McCain	Budget Assistant	GS-07 PFT
16.	Emily A. Dekker-Fiala	Outdoor Recreation Planner	GS-09 PFT
17.	Deanne K. Nelson	Accounting Technician	GS-05 PFT
18.	Brenda E. Marsters	Refuge Clerk	GS-04 PFT
19.	Brenda B. Wise	Refuge Clerk	GS-04 PFT
20.	Christopher G. Johnson	Refuge LE Officer	GS-07 PFT
21.	Albert V. Marrs	Carpenter	WG-9 PPT
22.	Brian A. Kemsley	Automotive Worker	WG-8 PPT



Table 3. Listing of the temporary personnel for the Kenai National Wildlife Refuge, 1994.

<u>Employee</u>	<u>Position</u>	<u>Grade</u>
23. Patricia Brown	Park Ranger	GS-06
24. Aleska Szweda	Park Ranger	GS-05
25. Robert E. Barto	Park Ranger	GS-05
26. Michael E. Welsh	Park Ranger	GS-05
27. Michael S. Oexner	Park Ranger	GS-05
28. Scott S. Slavik	Park Ranger	GS-05
29. Madeline A. Duffy	Park Ranger	GS-04
30. David P. Reese	Forestry Tech	GS-05
31. Diana R. Thomas	Bio-Tech	GS-05
32. Amy George	Forestry Tech	GS-05
33. James M. Farrar	Laborer	WG-03
34. Donna M. Bartman	Laborer	WG-03
35. John A. Mitzel	Laborer	WG-03
36. Michael B. Gracz	Bio-Tech	GS-07
37. Edward S. Child	Bio-Tech	GS-05
38. Eric A. Meester	Bio-Tech	GS-04
39. Christopher Lizarraga	Bio-Tech	GS-05
40. Mark A. Krom	Bio-Tech	GS-04
41. Andrew D. DeVolder	Bio-Tech	GS-05
42. Ayn B. Whytemare	Bio-Tech	GS-05

Table 4. Staff breakdown from Fiscal Year 1985 to Fiscal Year 1994.

<u>Year</u>	<u>Permanent</u>		<u>Vacant as</u>	<u>Temporary</u>	<u>Volunteers</u>
	<u>Full-time</u>	<u>Part-time</u>	<u>of 12/31</u>		
FY85	13	2	2	10	43
FY86	16	0	1	13	28
FY87	16	0	1	13	30
FY88	18	0	2	18	19
FY89	18	0	0	13	15
FY90	18	1	2	13	17
FY91	16	1	3	15	66
FY92	16	1	2	15	73
FY93	18	2	0	12	80
FY94	19	3	1	20	71

Full-time equivalent utilization for 1994 was 21.58

Table 5. Temporary positions for 1986-1994.

	1987	1988	1989	1990	1991	1992	1993	1994
Biological Aids & Technicians	3	5	7	4	3	3	1	8
Forestry Technicians	0	0	0	0	0	0	0	2
Laborers & Carpenter	4	5	4	4	4	4	3	3
Park Rangers	5	7	6	4	6	6	7	6
YACC/YCC Staff	0	0	0	1	1	1	1	1
Clerk/Typist	1	1	0	0	0	0	0	0
Student Trainee	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>0</u>
TOTAL	13	18	17	13	15	15	13	20

## 2. Youth Programs

### Youth Conservation Corps

This year's Youth Conservation Corps (YCC) program consisted of ten enrollees, two of which were utilized in the Visitor Center on a regular basis. Mike Oexner led the YCC program for the first time and did a very good job with a diverse group of young people. Mike was assisted by Rose Perri, a Student Conservation Association Resource Assistant from Chicago, Illinois. The field season ran from June 13 through August 5.

This year's crew completed a wide variety of challenging work projects. With ten enrollees, 3,048 enrollee labor hours were available for the 1994 season. The projects were divided into fourteen categories of task classifications. These classifications included:

- |                                    |                           |
|------------------------------------|---------------------------|
| * Campground/Facility Maintenance  | * Trail Construction      |
| * Visitor Information Assistance   | * Trail Maintenance       |
| * Restoration of a Historical Site | * First Aid/CPR           |
| * Litter Pick-up or Removal        | * Range Fence Maintenance |
| * Fish Population Surveys          | * Environmental Education |
| * Wildlife Survey/GPS Hare Grids   | * Facility Maintenance    |
| * Erosion Control Project          | * Agency/General Support  |

The YCC Crew participated in four spike camps over the summer which periodically provided a welcome change in their work environment, as well as providing alternative views of working environments and expectations. Additionally, the biology projects in which they participated provided valuable insight into management practices and how data gathered in the field contributes to sound decision-making beneficial for fish and wildlife populations.

Environmental Education continues to be an integral part of the Kenai Refuge's YCC Camp. It contributes to a successful summer by enhancing the enrollee's awareness of their surroundings and the world as a whole. During the eight-week camp, the leaders tried to set aside one day a week

for this purpose; methods used were field trips, guest speakers, videos, and informal discussions.



Mike Friendshuh, Heather Gerhard, Emily Johnson, Eddie Greenhalgh, Kelly Harpole, and Johnthomas Williamson embark on a five-day canoe system spike camp to maintain portage trails. 6/94/WCK

#### Student Conservation Association

Two Student Conservation Association (SCA) high school work groups participated in trail projects on the Refuge during 1994. One crew with six enrollee's and two leaders rerouted and resurfaced the "Keen-Eye" Trail in order to make it wheelchair accessible. Another crew with eight enrollees and two leaders rerouted, widened, and rehabilitated approximately 1/2 mile of the Fuller Lakes Trail. Crews stayed in spike camps near their work sites. The "Keen-Eye" Trail project utilized Challenge Grant funds and the Fuller Lakes project utilized Maintenance Management funds.





Student Conservation Association crews reroute  
and reconstruction work on Fuller Lakes Trail  
during 1994. RJ



Eight Student Conservation Association high  
school volunteers participated in the Fuller  
Lakes project.



### 3. Other Manpower Programs

██████████ performed 40 hours of Community Service on the Refuge this year. He assisted the maintenance personnel with a variety of projects, including the concrete work for construction of the new toilets to be used in the Skilak Wildlife Recreation Area.

### 4. Volunteer Services

Kenai's volunteer program, which involved 71 people and thousands of volunteer hours in 1994, is comprised of five components: local volunteers, seasonal volunteers, Student Conservation Association (SCA) Resource Assistants, local service groups, and campground hosts.

Volunteers contributed 21,282 hours of service to Kenai National Wildlife Refuge in 1994, the equivalent of more than ten full-time staff positions. Of the total, the Student Conservation Association Program accounted for two-thirds of the work hours with more than 14,000 hours of service.

#### Local Volunteers



Local volunteers worked on several trail projects, on the Refuge during the year.  
SS



Local volunteers contribute a minimum of twelve-hours of service per month assisting in Refuge Visitor Center operations and hosting our weekend wildlife media programs. Local volunteers contribute significantly to the level of service we provide the public with information and interpretation.

#### Seasonal Volunteers

Seasonal volunteers commit to at least three months of continuous 40 hour-per-week service. Generally these volunteers are recruited through the U.S. Fish and Wildlife Service's Region 7 Volunteer Program, coordinated by Bill Kirk at the Regional Office in Anchorage. Seasonal volunteers receive free housing, and a per diem subsistence allowance for food and essentials. In 1994, seasonal volunteers participated primarily in public use and biological field work, often in conjunction with pursuing undergraduate and graduate degrees.

#### Student Conservation Association Resource Assistant Program

Student Conservation Association (SCA) Resource Assistants work with the Refuge for twelve-to-sixteen-week terms, completing a variety of operational tasks while learning about resource agency careers. SCA Resource Assistants receive a small subsistence allowance and round-trip transportation to the Refuge.

In 1994, twelve SCA Resource Assistants and two SCA high school crews contributed to biological field assistance, interpretation, environmental education, backcountry patrol, visitor service, trail construction and maintenance. Since 1985, the Refuge has been extremely fortunate to select consistently high-caliber Resource Assistants who accomplish quality work. The SCA Resource Assistant Program continues to expand and remains the backbone of the Refuge's volunteer program.

SCA Projects included the following:

- \* Visitor Center and Visitor Contact Station operation
- \* Interpretive and environmental education programs
- \* Trail brushing and rerouting
- \* Universal access trail construction
- \* Patrol of foot and canoe trails
- \* Litter pick-up
- \* Campground maintenance
- \* Biological data collection
- \* Wildlife live-trapping and radio-collaring

#### Local Service Groups

During the spring and summer of 1994, several youth service organizations, such as Scouts, 4-H, Campfire, and church youth, as well as adult groups such as Alaska Flyfishers volunteered for work projects involving litter pick-up, campground maintenance, and canoe trail portage rehabilitation. Often the groups visited the Refuge Visitor Center for training in minimum impact camping and bear safety prior to beginning their service projects.



Volunteers unload junk recovered during an Upper River cleanup, sponsored by the Alaska Flyfishers. RJ

#### Campground Hosts

The Campground Host Program continued in 1994 with returning hosts Rose and Erby Aucoin from Louisiana caretaking Hidden Lake Campground. Dick Chace (returning for his fourth host season) continued to host Upper Skilak Campground.

## 5. Funding

Fiscal Year 1994 funding summary (000's):

1261	Fixed Costs:	\$	825.0
	Projects:	\$	280.0
	Challenge Grants:	\$	<u>27.0</u>
	SUBTOTAL	\$	1132.0
1262	Fixed Costs:	\$	371.0
	MMS:	\$	<u>152.0</u>
	SUBTOTAL	\$	523.0
9110	Fire (Administration)	\$	219.0
9120	Fire (Studies/Projects)	\$	173.0
6860	Expenses for Sales	\$	90.0
4960	Fee Collection Revenues	\$	8.7
8610	Quarters	\$	<u>16.6</u>
	GRAND TOTAL	\$	2162.3

## 6. Safety



An aircraft made an emergency landing at treeline near Timberline Lake. The investigation was assisted by a Refuge officer/pilot and the aircraft was later salvaged from the site. RJ



All-terrain vehicle (ATV) training was provided for several Refuge employees and seasonals in June. The Refuge has two ATV's. The Service requires ATV training before employees use ATV's. Certified trainer, Jim Croak came down from Anchorage and gave the training at the Twin Cities Raceway in Kenai.

On August 4, Wildlife Biologist/Pilot Ernst left Headquarters Lake for a caribou telemetry flight on the Twin Lakes Caribou Herd. Before reaching the Kenai Mountains Ernst heard a commercial airliner call Kenai Flight Service to report a MAYDAY from aircraft N1315H, which was picked up on emergency frequency 121.5 while the airliner was over Mount Spurr. Ernst tuned the supercub's radio to 121.5 and heard United and Delta pilots trying to contact N1315H. Ernst was flying over the mountains just south of the Skilak Lake when he noticed a small plane on the gravel bar along the Skilak River. He descended to investigate and upon making a low pass noticed the tail number was N1315H. There were four people walking along the gravel bar waving their arms. Ernst notified Flight Service and was asked to contact N1315H on frequency 122.65. All four people on board were okay. They were on a sightseeing flight over Skilak Glacier when the plane lost oil pressure. No flight plan was filed and there was no survival gear on board. A plane from Mission Aviation Repair in Soldotna flew in later that day to rescue the passengers. The aircraft was retrieved two days later.



A helicopter prepares to recover a private aircraft that made an emergency landing near Point Possession.

JS



Monthly safety meetings provided information on CPR training, earthquakes, fisheries in Alaska, EPRIB/ELT, and ergonomics and your visual display terminal.

The Refuge Station Safety Plan was updated in July and copies submitted to the Region Office and the Soldotna State Troopers' office.

7. Technical Assistance

Refuge pilots and aircraft continued to support Refuge related fisheries research and resource projects on Tustumena Lake and elsewhere on the Refuge in 1994.

## F. HABITAT MANAGEMENT

### 1. General

The Kenai Refuge has a variety of terrestrial wildlife habitats and species. Fifteen habitats have been described in six habitat classes: Special habitat class (Riparian habitat; Wetlands habitat; and an Estuary habitat); Forested (Mature forest; Intermediate forest; and Early forest); Alpine (Alpine shrub-lichen tundra); Shrub (Lowland shrub and Subalpine shrub); Unique (Cliffs and Islands in lakes); Others (Snow, ice, and glaciers; Gravel and rock; and Water).

At least 199 species of amphibians, birds, and mammals permanently or casually use these habitats. Many of these species actually use a variety of habitats. The value of heterogeneous vegetation patterns, which contribute to habitat diversity, is important to many species, such as moose, black bear, wolves, and lynx.

The Refuge has been categorized as having about 462,000 acres in several levels of management other than the 1,350,000 acres that is under wilderness management. About 44 percent of the non-wilderness lands are open to habitat manipulation, such as timber harvesting and firewood cutting, under the Refuge's Comprehensive Conservation Plan (CCP).

Manipulating habitats to make them more suitable for certain species is favored by those interested primarily in moose and opposed by those who favor management designed to benefit all species. In the CCP, timber harvesting is acknowledged to be an effective means of habitat manipulation and management for moose. At the present time the Refuge has de-emphasized timber harvesting as a management tool in favor of prescribed burning.

### 3. Forests

Timber harvesting on the Refuge continues to be a low priority habitat management technique; prescribed fire and managed wildfire are preferred. There was no timber harvesting on the Refuge during this calendar year.

Many locals remained interested in access to the Funny River Road public firewood-cutting area. Firewood-cutting also serves the purpose of lowcost habitat and fuel management. Funny River Road provides access to the firewood-cutting area. Families are allowed to cut up to five measured cords of firewood per year for their own personal use. This year, early and heavy snows hit the wood cutting area. The Refuge plowed the main access road but decided later not to try to keep up with the snow plowing. A number of permittees were caught with permits in hand when the snows came, and were displeased with the decision not to do any more plowing. Permits costing \$20 were issued to 22 people this year as compared to 51 in 1993, 58 in 1992, 54 in 1991, and 50 in 1990.

In 1994 the Refuge was opened as usual for free personal-use Christmas tree cutting. No permits are required for this type of cutting, but the tree cutting was way down from previous years due to the three plus feet of snow

on most of the Refuge. The spruce regrowth area of the 1947 burn, located on Mystery Creek Road, was made available for commercial Christmas tree harvesting. One permit for 50 trees was issued.

Fire-killed spruce poles for fences, furniture, and other domestic uses continue to be in demand by a few Peninsula residents. In response, we have issued free permits for pole cutting at a gravel pit access road on the Sterling Highway near Mystery Creek Road turnoff and along certain areas of Mystery Creek Road. Three permits were issued this year compared to seven in 1993, six in 1992, four in 1991, and five the year before.

#### 6. Other Habitats

A report detailing habitat conditions along the Kenai River was published in July by the Habitat and Restoration Division of ADF&G, Final Report, an Assessment of the Cumulative Impacts of Development and Human Uses on Fish Habitat in the Kenai River, Technical Report No. 94-6, Gary S. Leipitz.

The report described and mapped areas of shoreline impact including several areas within the Refuge. Generally the field inventory documented that 11.1 to 12.4 percent (18.4 to 20.6 miles of the river's 134 miles of upland and 32 miles of island shoreline) have been impacted by bank trampling, vegetation denuding, and structural development along the river banks. The Service is the largest landowner along the river.

In October, the Refuge sent a letter of support to the Kenai Peninsula Borough for proposed ordinance 94-52 which would establish a Kenai River Overlay District to protect riparian habitats on lands adjacent to the river. The proposed ordinance generated a great deal of interest and controversy and had not been acted upon at year's end.

#### 9. Fire Management

The main focal point for fire management during the winter and spring of 1994 was the planned 5000-acre Mystery Creek prescribed burn. This work involved several facets: plan review, smoke management permit renewal, personnel hiring, fire training, cooperative agreements, pre-fire vegetation inventory, cooperation with Seattle Fire Lab, equipment preparation, weather station modification, and blacklining the burn units. The summer portion of the fire season was dedicated to fire assignments in the Lower 48. The fall saw the Refuge smoking in several locations as hunter and camper fires in "limited suppression" areas were allowed to burn unchecked.

#### Plan Review and Renewal

The four-year-old prescribed burn plan was reviewed and found adequate. It was again signed off by the necessary managers. A renewal of the previous year's smoke management permit was requested from the Alaska Department of Environmental Conservation (DEC). DEC reissued the permit without any changes from the 1993 permit.

### Hiring

A three-person "vegetation's response-to-fire" inventory crew was hired by Biologist McAvinchey. The special hiring conditions obligated by the office of Personnel Management for new employees (even for only those slightly involved in fire line work) delayed the arrival of two of these new hires long enough that they missed out on the fire training necessary for them to participate as part of the Refuge burn crew.

Dianna Thomas was rehired into her seasonal biological technician position for the forth season. During the previous three years, this fire-funded position primarily worked fire environmental education and pre-and-post-fire vegetative surveys. Dave Reese, with previous wildfire and prescribed burning experience from the Chugach National Forest, was hired into the vacant seasonal forestry technician position. Besides fire experience, Reese brought heavy equipment, chainsawing, and boating experience to the Refuge fire program.

Amy George was hired to carry on the fine work of Bio Tech Thomas, and others, who put together "The Role of Fire in Alaska" environmental education curriculum. Forest Tech George took this curriculum into private and public schools, Refuge campgrounds, summer camps, and scouting activities, explaining how wildfires relate to the natural processes on the Kenai Peninsula and in Interior Alaska. George, a 1993 Student Conservation Association Intern, brought to the Refuge environmental education teaching experience that she gained while working for private summer camps in the Lower 48. George received fire training this year and became part of the Refuge prescribed burn team.

The spring priority was the training of the fire staff, and other willing employees, to certifiable levels necessary for the Refuge to conduct prescribed burning. Fire Management Officer Adams attended the following courses, S-390 Intermediate Fire Behavior; S-490 Fire Behavior Calculations; and Smoke Management Techniques (April 3-11), all of which were given at Boise, Idaho. He also attended Fire Management for Line Officers (April 23-May 1, 1994) held at Denver, Colorado.

Both Fire Ecologist Berg and Biologist McAvinchey attended "Fire in Ecosystem Management" at Marana (February 26-March 4). McAvinchey also attended "Introduction to Fire Effects" at Boise (March 21-25).

Bio Tech Thomas attended the 32-hour S-217 Interagency Helicopter Operations class at Fairbanks from May 16 through May 20. Reese received the standard boating safety, bear safety, firearm qualification, CPR, aircraft safety, and blood born pathogen training that all of the Refuge field employees received.

On June 28, Adams, Thomas, and Reese attended an afternoon of Terra Torch training put on by State Forestry at the request of the Refuge. Then Forestry lent their Terra Torch to the Refuge and Reese mounted it on a military surplus 5/4 ton diesel truck.



Along with an instructor from State Forestry, Bio Tech Thomas coordinated and instructed the Refuge's Basic Wildland Fire Training class from July 5 through July 8. Eight Kenai National Wildlife Refuge personnel, two State emergency firefighters, and one Forest Service employee completed the course. After this class the Refuge was able to step-test and certify 16 Refuge personnel for fireline duty.

Berg and Adams finished the 1994 training activities by attending the Alaska Fire Effects Workshop October 4 and 5 at Fairbanks. They heard a number of excellent Alaska fire and wildlife oriented researchers and practitioners present subjects of interest.

#### Cooperative agreements

The Refuge staff waited on a statewide cooperative agreement that would allow State Forestry and Fish and Wildlife to mutually help each other concerning natural resource matters, and especially with the Refuge's prescribed burn program. The agreement was signed by Forestry. Then the Region-7 contracting officer said that this two-way reimbursable agreement had to be signed at the Washington, D.C. level.

In the meantime, a cooperative agreement was negotiated and signed by Cook Inlet Spill Prevention and Response, Inc. (CISPRI) and Region 7 to have CISPRI provide heli-torch support on our controlled burns. CISPRI is set up to respond 24 hours a day to oil spills within the Cook Inlet area. CISPRI can respond to, and tolerate the uncertainties of, the "go, no-go" decision making processes associated with prescribed burning easier than other cooperators located much farther away. Using other cooperators would involve the reimbursement of travel, salaries, and per diem costs not needed with CISPRI. In exchange, CISPRI gets to maintain their required currency requirements in the use of heli-torches which they use on oil spills.

#### Burn preparation

Refuge fire personnel continued to prepare for the start of burning on the 5,000 acre Mystery Creek prescribed burn. The southeast flanks of units 5 and 6 were hydro-axed 20 to 30 feet inward from the edge of the Mystery Creek Road.

Seattle Fire Lab personnel, lead by Roger Ottmar, spent nearly two weeks refreshing old fire research plots that had been established four or five years ago in anticipation of the Mystery Creek burn. Their project was to develop models that would estimate the amount of smoke that will be generated by prescribed burning under different duff moisture levels and species compositions. They have other plots elsewhere in the State.

#### National fire emergency

By midsummer it was determined that the statewide cooperative agreement with Forestry never made it out of the Regional Office since it had been errantly packed away during regional office remodeling and related office

movements. Subsequently, a local agreement was in preparation at the time the national wildfire activity went to Planning Level 5.

With the nation at Planning Level 5, the Refuge fell under the national direction not to ignite any prescribed fires until the planning level came down. This high planning level obligated the U.S. Fish and Wildlife Service to make all fire-funded employees available to the national fire suppression effort. On July 30, Bio Tech Thomas was sent to the Idaho City Fire complex near Boise and worked as a Helibase Radio Operator. Biologist McAvinchey was shipped out on August 5 to the Thunderbolt Fire near Boise as a helispot manager. Technician Thomas was released back to the Kenai on August 20. McAvinchey returned to the Kenai on September 16.

On August 2, Adams took a Situation Unit Leader assignment to a fire on military land near Delta Junction, Alaska. Forest Technicians George and Reese followed by land vehicle with the Refuge's 2 helitorches. Once on the fire there were numerous problems with the helitorches, which were ruled so intermittently functional that they were far worse than totally inoperative. The torches were finely set aside. George returned to the Refuge on August 6. Reese received some training on the substitute Canadian helitorches before returning to the Kenai on August 11. Adams returned home on August 21.

#### Blacklining

On July 19, blacklining of the three miles of hydro-axing began in an effort to widen the fuel break effect of the Mystery Creek Road. The Terra Torch was used to ignite the hydro-axed debris along the road. The red-carded fire staff, with the assistance of a small engine crew from the Seward Ranger District, conducted the blacklining during a period of three days. Weather conditions were minimal for a clean burn, which lead to a smoldering and creeping fire that kept trying to do an untimely advance across the units. The Refuge dozer and attached fire plow were used to construct a break on the interior side of the blackline to maintain control of the fire until the necessary cooperative agreements and weather conditions were in place.

Plowing the control line was the first Alaskan use of a dozer-drawn fire plow in Alaska for fire suppression or prescribed burning activities. The use of the plow seems promising in the Refuge's flat, unfrozen terrain, especially with the perceived ability to return later with a dozer and roll the plowed soil and mantel back into the furrow. Plowing is hoped to be a fast way of making fuel breaks with less disturbance to the forest floor than by blading with a dozer, and an easier method to reclaim than dozer lines.

Our ability to evaluate the 1994 plow work was complicated by the randomly scattered hydro-axed tree trunks on the ground. The trunks laying at 90° to the travel of the dozer collected between the coulter and the middlebuster, and caused the plow to float out of the furrow. The debris that would jam in the plow would then have to be pulled by hand or chainsawed away. Then the dozer would have to be backed up, and the

plowing process started again. This was very time consuming. We do not anticipate this jamming problem in standing timber. We intend to test the plow in standing timber during the 1995 field season.



The Terra Torch being used to "blackline" the edge of units 5 and 6 of the planned Mystery Creek prescribed burn.

On August 3, and during Adams' fire assignment to Delta, the Mystery Creek blacklining effort smoldered back to life and the fire managed to burn into the unit burning 5 to 10 additional acres. Lead by Biologist McAvinchey, a number of Refuge personnel and some Seward Ranger District engine crewmen kept the fire from running across the burn unit and over the intended control lines. This holding action continued for several days.

On August 5, McAvinchey left for a scheduled vacation. Fire Management Officer Perry Grissen was detailed from the Kanuti National Wildlife Refuge to fill in as the Kenai National Wildlife Refuge Fire Management Officer and supervise the Mystery Creek activities. On August 17 the Refuge opened the Mystery Creek Road to the public for the start of moose hunting. After that date the blacklining never needed any further attention. The total area burned came to 20 acres.



Weather station

Fire staff tried to work out problems with the Mystery Creek Remote Automated Weather System (RAWS) weather station so that information could be called up by hand held radio, instead of waiting the 3 to 4-hour intervals necessary for readings to go to satellites and be down-loaded back to earth stations. Keith Pollack from Bureau of Land Management (BLM) Fairbanks came and made modifications to our RAWS station, which will allow the Refuge to call-up the Mystery Creek RAWS and get the most current weather readings.

Refuge Fire Activity

The Windy Point fire was reported on August 30 on the south shore of Tustumena Lake. The fire was flown by Bio Tech Thomas and Pilot Johnston. They estimated the fire to be .1 acres. Since the fire was in "Limited" protection, it was not attacked. The fire became very active on September 4, increasing to 200 acres by the end of the day. By the morning of September 5, heavy smoke had reached Homer and Kachemack Bay. On September 6 Forestry hired a Public Information Officer to deal with the press and public about the smoke and fire. The smoke drifted into the central peninsula on September 7, causing alarm to local residents. The size was now estimated to be 2,000 acres. The Alaska Department of Environmental Conservation (DEC) got involved, wanting to know what the Refuge was going to do about the fire and smoke.



The Windy Point Fire on August 30 was estimated  
at 0.1 acres.

8/30/RJ





The Windy Point Fire on September 7 was estimated at 2000 acres.

The other three limited action fires were much smaller and hardly note worthy except for the Gull Rock fire on the north end of the Refuge and the south shore of Turnagain Arm of Cook Inlet. It was discovered on August 16 and by mistake attacked by a Forest Service helitack until the land status and "Limited" suppression category were realized. The smoke was extremely visible to thousands of citizens traveling the Seward Highway on the north shore of Turnagain Arm. The smoke coming right out of this heavily forested mountain side was even visible to workers in tall office buildings in Anchorage. A multitude of fire reports were received by emergency services agencies.

On September 7, the Gull Rock fire apparently burned fairly actively. An employee at the Potter Marsh weight scales, across the Arm from the fire, said the smoke that Anchorage residents thought had come from the Tustumena fire on the September 7, actually came from the Gull Rock fire.

On September 8, heavy smoke drifted into the Anchorage bowl. DEC was on the phone once again demanding to know what the Refuge was going to do about the smoke. DEC was encouraged to wait for the expected weather change. That afternoon the central peninsula received  $\frac{1}{4}$  inch of rain. The fire continued to creep around and torch an occasional spruce tree or two on into October. The fire was mapped on October 13 at 2800 acres. Some smoke was seen after that date but rains and snow checked the progress of



any spread. The fire was called "out" during a flyover on November 13, 1994.



The Gull Rock Fire was still putting up enough smoke on October 14 to be seen from the Seward Highway, four miles to the north across Turnagain Arm.

RJ

Variable winds and velocities made the smoke come out of the heavy timber at different locations. At times it looked like the fire had burned nearly one hundred acres. Adams and Reese walked into this fire on October 14, and found the fire burning all of the two-foot deep, heavy moss-laden, organic forest floor. The closed canopy stands of spruce and hemlock had trees more than 100 feet tall and three to four-and-one-half feet in diameter. The root systems of the trees were burning out and the big trees were jack-strawing together. The tops would not burn until they fell over into the hot ashes. Reese and Adams paced the fire out and found it to be a mere 14 acres after two months of burning. By the middle of November the area was covered with snow and no smoke could be seen rising out of the canopy. However, this fire has a fair chance of burning through the winter in the thick forest floor.



The Glacier Lake fire took more than a month to burn 320 acres in a "Limited" action area on the south end of the Refuge.  
RJ

#### Monitoring Vegetation Response to Fire

In order to evaluate the effects of fire on the vegetation component of Refuge upland habitats, permanent study plots were established in several areas of the Refuge that have been, or will be burned. The National Park Service Western Region Fire Monitoring Handbook 1992 was chosen for the methodology to follow. From May through mid-October, a three-person crew with help from other Refuge staff, established and surveyed 36 total permanent plots in four different areas. The crew included Chris Lizarraga, Ed Child, and Mark Krom, with help later from volunteer Rich Capitan. The surveys began in the proposed Mystery Creek Road prescribed burn area, mostly within T6N, R6W. At each of 24 randomly selected points within burn units 3, 4, 5, or 6, a 20-x-50 m rectangle was marked with steel rods and a steel fence post at the center. The overstory, pole-size, and sapling trees were measured and mapped in subplots, and several samples were taken of herbaceous ground cover and brush plants. Fuel was sampled in four transects within each plot. The vegetation was photographed at several corners and midline of the plots. Twenty-four plots were established within the proposed prescribed burn area, primarily black spruce forest regrowth from the 1947 burn. Using the same methods, six plots were established within the 1991 Pothole Lake wildfire in September. Permanent plots were also established inside and outside of two moose exclosures in the burned and crushed areas in Skilak Loop, and one plot in



the moose exclosure in the 1947 burn within the Moose Research Center south of Coyote Lake.

More permanent plots are planned for Mystery Creek burn units 1 and 2, to be established during the 1995 field season. These pre-burn plots will be resurveyed for fuels after the units are burned, and they will be resurveyed for vegetation change three to five years after burning. Plots established in areas already burned or crushed, including those inside exclosures, are for detection of successional change in vegetation and fuels over time. These will need to be resurveyed at longer intervals. After plots are established in the proposed burn area, others will be established in other recent and older wildfires and prescribed burn areas of the Refuge.

#### Surplus military vehicles

During the winter, Fire Management acquired four military 4X4 pickups. The trucks were assigned to the fire and vegetative survey crews.

During the summer the Refuge decided to surplus the 1957 fuel tanker that had been used to haul fuel to Refuge controlled burns. In December, Adams was able to secure a rather nice 1200 gallon Air Force fuel truck build in 1976, which should handle our fuel hauling needs for the next 10 to 15 years.

#### 10. Pest Control

A series of warm summers since 1989 have intensified the recent outbreak of spruce bark beetles. A cumulative total of 800,000 acres has been affected on the Kenai Peninsula since the early 1950's, with 400,000 acres affected since 1989. For the Refuge, however, the infested acreage seems to be holding steady at the present time, at about 240,000 acres (a figure unchanged since 1991). The primary areas of new outbreaks are concentrated in the southern Peninsula, especially around Kachemak Bay. Several areas of the Peninsula have experienced repeated outbreaks over the years, including the Resurrection Creek drainage and areas southwest of Tustumena Lake. Northern portions of the Refuge experienced outbreaks in 1958-60 (twenty-thousand acres), 1966-70 (three-hundred-thousand acres), 1983 (forty-five acres), 1986-1988 (three-thousand acres) (U.S. Department of Agriculture Forest Service data).

No logging or silvicultural prescriptions were undertaken this year in beetle-killed stands on the Refuge.

#### 11. Water Rights

The water resource's section of the Regional Office's Division of Refuges and Wildlife installed eleven stream gauging stations on Refuge lands during 1994. The gauge locations: Bear Creek, Chickaloon River, Crooked Creek, Fox River, Funny River, Glacier Flats, Killey River, Lower Crooked Creek, Moose River, Mystery Creek, Nickolai Creek, Russian River, Swanson River, Upper Chickaloon River, and Upper Killey River.

## 12. Wilderness and Special Areas

Several Refuge staff members participated in a wilderness management workshop during April. The wilderness training workshop was sponsored by the wildlands section of the Alaska Parks and Recreation Association with training provided by the Arthur Carhart Wilderness training institute. The training examined Alaska's wilderness management situation from an interagency prospective and featured several guest speakers including former Division of Refuges head William Refault. Several case studies and field trips featured Kenai National Wildlife Refuge and Kenai Wilderness issues.

During 1993, the Alaska Department of Environmental Conservation received a complaint that several old barrels of oil were located along Surprise Creek Trail within Kenai Wilderness. During May 1994, with the assistance of a contract helicopter and crews from the Refuge and Division of Forestry, several empty and four barrels containing diesel fuel were removed from the old Surprise Creek mine within Kenai Wilderness.



A contract helicopter unloads barrels recovered from an old mine site near Surprise Creek. Skilak Loop Road was used for the staging area.

RJ

A request for a permit by a private helicopter company to land a rafter at the headwaters of the Fox River within the Kenai Wilderness was denied.

Legislation was introduced for the proposed Kenai Native Association land exchange. The bill which passed the House of Representatives before adjournment included removal of approximately one-and one-half sections of Kenai Wilderness from the lowland wilderness unit. Kenai Native Association lands south of the Kenai River to be returned to the United States would then be included within Kenai Wilderness.



G. WILDLIFE1. Wildlife Diversity

No new or unique species were observed or reported on the Refuge in 1994.

3. WaterfowlTrumpeter Swans

A total of 180 trumpeter swans was observed during the June 10 and 13, 1994, aerial surveys. Of these, 41 were recently-hatched cygnets of 1994 and 141 were adults. Of the adults, 13 pairs (24 adults = 17 percent) already had broods, 25 pairs (50 adults = 35 percent) were incubating on nests, 19 pairs (38 adults = 27 percent) were non-nesters, and the remainders were either observed as singles (8) or were in flocks (21). Eleven of 25 (44 percent) observed incubating attempts failed based on the absence of brood during subsequent productivity surveys on July 12 and 13. The proportion of swans observed with broods during the nesting surveys (17 percent) suggested a 1-2 week earlier-than-average nesting year in 1994 compared to previous years.

Wintering Waterfowl on the Kenai River

As in previous years, common goldeneyes, common mergansers, and mallards were the most numerous waterfowl using the Kenai River during the winter. Aerial surveys primarily for eagles were flown in January and February 1995 because the river was frozen over in spots. Waterfowl observations are summarized in Tables 6 and 7.

Table 6. Waterfowl observed on the middle Kenai River (Skilak Lake outlet to Bing's Landing) during bald eagle float surveys, winters 1993-94, 1994-95.

<u>Date</u>	<u>Mallard</u>	<u>Goldeneye</u>	<u>Merganser</u>	<u>Swan</u>	<u>Bufflehead</u>	<u>Scaup</u>	<u>Scoter</u>	<u>Unid.</u>
11/17/93	10	95	14					60
02/13/93	4	81	39		19			21
01/18/94	104	374	30			13	7	70
02/16/94^		100+	50-100	15				
03/17/94^	100's	100's	100's	13				
11/22/94	73	154	13	12			1 Loon	50
12/16/94	63	223	18				2	2
01/17/95^				12				
02/16/95^				20				

^ Aerial surveys, rough estimates except swans

Table 7. Waterfowl observed on the upper Kenai River (Kenai Lake outlet to Jim's Landing) during bald eagle float surveys, winters 1993-94, 1994-95.

<u>Date</u>	<u>Mallard</u>	<u>Goldeneye</u>	<u>Merganser</u>	<u>Swan</u>	<u>Bufflehead</u>	<u>Scaup</u>	<u>Unid</u>
11/16/93	24	35	24	3	2		
12/14/93	99	76	39				14
01/17/94	46	47	15		2		18
11/25/94	91	97	17	1	17		
12/19/94	86	100	7		27	1	5

Snow Geese- Spring Migration and Staging on the Kenai River Flats

Snow geese and other waterfowl were observed on the Kenai River Flats by volunteer Todd Eskelin on April 10, 15, and 21, 1994. For the second year in a row, there did not appear to be a large aggregation of snow geese staging for an extended period on the Kenai River Flats in 1994. Total numbers of geese and other waterfowl observed during this period are shown in Table 8.

Table 8. Numbers of snow geese and other geese and waterfowl observed on the Kenai River Flats between April 10-21, 1994.

<u>Estimated numbers of:</u>				
<u>Date</u>	<u>Snow geese</u>	<u>Canada geese</u>	<u>Pintails</u>	<u>Mallards</u>
April 10	0	7	160	107
April 15	0	43	176	31
April 21	2234	1078	345	52

4. Marsh and Water Birds

An aerial survey of common and Pacific loon populations north of the Kenai River on the Refuge was flown on July 27-30 and August 3, totaling 17.6 flight hours. Sample design was identical to the random, stratified sample flown in 1989 and 1990 and in 1979 and 1980; the same randomly chosen lakes and ponds were surveyed in 1994. Fewer common loons were observed in 1994 compared to 1979 and 1980 but more were recorded than during the 1989 and 1990 aerial surveys. More Pacific loons were recorded in 1994 compared to the four previous years loons were surveyed (See Table 9.)

Table 9. Numbers of common and Pacific loons observed during 1994 and previous aerial surveys on the Kenai National Wildlife Refuge.

<u>Species</u>	<u>Age</u>	<u>Year of Survey</u>				
		<u>1994</u>	<u>1990</u>	<u>1989</u>	<u>1980</u>	<u>1979</u>
Common Loon	Adult	137	135	151	187	150
	Chicks	27	6	7	25	25
	Total	164	141	158	212	175
Pacific	Adult	33	25	23	1	0
	Chicks	1	2	1	1	0
	Total	34	27	24	2	0

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

Due to limited availability of personnel, no systematic surveys of the nesting colonies of gulls and cormorants were made on Skilak Lake in 1994.

#### 6. Raptors

##### Summering Bald Eagles

Bald eagle nesting surveys were conducted in the PA-18 from May 9-11 and on May 15 by Pilot/Wildlife Biologist Ernst and Fish Wildlife Biologist Bailey. Of 106 previous nests that were checked, 49 were inactive, 40 had incubating eagles on nests, 11 nests were missing, and 6 nests had adults near the nests but no eggs were observed. An early productivity survey started on June 30 appeared to be too early based on the sizes of observed eaglets and was aborted before all active nests were checked. However, a later productivity survey flown on July 14 and 15 appeared to have been conducted too late, as many nests appeared to be used but no eaglets were present. Of 40 active nests subsequently checked, eaglets were found in 20 and 11 other nests were empty but had evidence of being used. Six of the observed nests with young had large eagles that appeared about ready to fledge. The results of these surveys suggested a wide variation in nesting, hatching, and fledgling times occurred in 1994.

##### Wintering Bald Eagles

Table 10. Numbers and ages of bald eagles observed during boat surveys along the Kenai River during winters 1992-93, 1993-94, and 1994-95.

Survey Dates	River Route					
	Upper River*		Middle River**		Total	
	Ad	Juv	Ad	Juv	Ad	Juv
11/16&17/92	43	51	40	40	83	91
12/17&19/92	144	63	160	99	304	162
01/16&17/93	73	33	170	46	243	79
02/17&19/93^	31	0	148	14	179	14
03/18&19/93	68	15	113	30	181	45
11/16&17/93	17	8	37	6	54	14
12/13&14/93	28	2	69	5	97	7
01/17&18/94	24	4	65	11	89	15
02/16/94^	12	1	57	5	69	6
03/17/94^	!1	0	28	0	29	0
11/22&25/94	15	10	67	16	82	26
12/16&19/94	40	17	86	15	126	32
01/17/95^	31	3	57	6	88	9
02/16/95^	18	1	66	6	84	7

\* Kenai Lake to Jim's Landing

\*\* Skilak Lake outlet to Bing's Landing

^ Aerial survey

! Severe turbulence - Kenai Lake outlet to Russian River canceled

#### 7. Other Migratory Birds

Table 11. The ten most frequently recorded birds along the Seven Lakes and Swan Lakes Road Routes in 1994.

Species	Numbers of observations	
	Seven Lakes	Swan Lake Road
	<u>Route</u>	<u>Route</u>
Swainson's Thrush	58	59
Slate-colored Junco	52	94
Robin	33	16
Myrtle Warbler [Yellow-rump]	33	46
Gray-cheeked Thrush	25	7
Hermit Thrush	23	
Alder Flycatcher	20	55
White-crown Sparrow	14	
Varied Thrush	14	
Gray Jay	11	16
Common Redpoll		43
Blackpoll Warbler		17
Orange-crowned Warbler		16
Ruby-Crowned Kinglet		19



The North American Breeding Bird Surveys were conducted on the Seven Lakes Route (Skilak Loop and Mystery Creek Roads) on June 17 and on the Swan Lake Road on June 16, 1994, by Wildlife Biologist McAvinchey and a number of seasonal bio-technicians and volunteers. The three most frequently recorded species along both routes were slate-colored Juncos (146), Swainson's thrushs (107), and Myrtle warblers (79). The ten most frequently recorded species observed along each route is shown in Table 11.

## 8. Game Mammals

### Moose

No moose census was done in 1994; however, a population composition survey (Table 12) was completed during November thanks to record breaking snowfalls. A total of 3868 moose was counted in GMU 7 and 15 (2386 cows, 633 bulls, and 849 calves). Bulls and calves per 100 cows were 26.5, and 35.6 respectively. Percent calves were 21.9.

The composition data for the Skilak Wildlife Recreation Area (SWRA), which is open for a cow moose permit hunt, was 65 bulls, 121 cows, and 39 calves, for a total of 225 moose. The bulls and calves per 100 cows were 54 and 32 respectively. These figures exceed the management goals for the SWRA, and will prompt an increased harvest in the future.

Table 12. Composition Count data for GMU 7 and 15, November 1994.

Area	<u>bulls</u>				<u>cows</u>			<u>lone</u> calf	<u>unknown</u> sex/age	<u>TOTAL</u> MOOSE
	<u>Yearling</u>	<u>Med</u>	<u>Lrg</u>		<u>w/o</u>	<u>w/1</u>	<u>w/2</u>			
	<u>S/F</u>				<u>calf</u>	<u>calf</u>	<u>calf</u>			
7	28	22	31	12	199	64	11	0	0	453
15A	43	29	79	35	540	215	14	1	0	1199
15B*	18	21	53	59	197	57	9	0	0	489
15C	<u>45</u>	<u>4</u>	<u>94</u>	<u>30</u>	<u>688</u>	<u>348</u>	<u>44</u>	<u>8</u>	<u>0</u>	<u>1727</u>
Total	134	106	257	136	1624	684	78	9	0	3868

\* Trophy area only (15B East)

### Caribou

The Alaska Department of Fish and Game (ADF&G) last surveyed the caribou herds on and adjacent to the Refuge in November 1993 (Table 14). Radio-collars were deployed on caribou in four of the five herds on the Kenai Peninsula during the year. Adult cows were collared on April 14, four in the Twin Lakes Herd, seven in the Killey River Herd and three in the Fox River Herd. In May, ADF&G collared ten calves to identify causes of mortality for the Kenai Lowland Herd.

Table 14. Caribou observed on and adjacent to the Kenai National Wildlife Refuge by the Alaska Department of Fish and Game, 1993.

<u>Date</u> <u>Surveyed</u>	<u>Herd</u> <u>GMS</u>					<u>Total</u>	
		<u>Adults</u>	<u>Calves</u>	<u>Cows</u>	<u>Bulls</u>	<u>Obs.</u>	<u>Aircraft</u>
06/08/93	Lowland (15A)	50	16	-	-	66	Supercub
11/15/93	Twin Lakes (15B)	30	6	23	7	36	Helicopter
11/15/93	Killey River (15B)	219	62	141	78	281	Helicopter
11/15/93	Fox River (15C)	50	7	31	19	57	Helicopter
11/11/92 <sup>a</sup>	Kenai Mt. (7)	289	55	234	101	390	Helicopter

<sup>a</sup> This herd not surveyed in 1993, figures are for 1992.

The Kenai Lowland Herd has had very low recruitment and it was assumed that calves were being killed by wild and domestic canids. Two collared calves and three adult caribou were killed in August by a motor vehicle as they crossed the Bridge Access Road. The other eight collared calves were still alive in December.

Telemetry flights during the year have documented several interesting observations. One of the collared cows from the Killey River Herd calved in the Twin Lakes area (north of the Killey River) and spent the rest of the year with the Twin Lakes Herd. This was the second radio-collared cow to migrate from the Killey River Herd to the Twin Lakes Herd providing evidence that the Twin Lakes Herd may not be a separate herd but part of the Killey River Herd. All four of the Twin Lakes collared cows produced calves. Three of seven Killey River, and one of three Fox River, collared cows were observed with calves. Calves were first observed on May 13 with peak production around the last week of May for the Skilak-Tustumena Bench herds.

The Fox River Herd has expanded its known range to the east. Animals were seen on several occasions on the Tustumena Glacier. Killey River Herd animals were also observed crossing the Indian Glacier in late summer, expanding its known range as well.

### Wolves

Attempts to monitor the wolf population on the northern part of the Refuge, as planned in the Interagency Wolf Operations Plan of 1988, were hampered for the second year by a lack of shared funding from the Alaska Department of Fish and Game and the mortality and dispersal of radio-collared wolves. Two radio-collared wolves were found dead on the Refuge in 1994 from injuries associated with snares. These snares had been broken by the captured wolf which then ran off and later died. Three additional wolves were live-captured during the summer of 1994 and fitted with radio-collars; two were from the Swanson River Pack and another, blind in one eye, was later determined to be a loner. One of the radio-collars on a Swanson River wolf failed several months after it was put on. The collar on this unique white wolf was easily visible from the air even after it had failed.

Visual observations indicated that the Swanson River Pack, which denned near the Swanson River oilfield, had five pups and that the pack totaled ten individuals on October 21, 1994. Subsequently only nine, eight, and seven wolves were seen in the pack on November 18, January 24, 1995, and February 3, 1995, respectively.

The Elephant Lake Pack denned at their traditional den northwest of Elephant Lake in 1994 but because of dense forest the wolves were not observed until November 8 when four wolves were seen. Thereafter, pack observation fluctuated between three and four through February 1995.

Three other radio-collared wolves periodically monitored throughout the year were always alone when observed. Two wolves were visually observed twice in the Swan Lake Canoe System area occupied by the Bear Lake Pack during the later summer and fall of 1994. No radio-collars are currently functioning in this pack.

#### 9. Marine Mammals (sea otters & walruses sealed)

Skulls and tusks from six beach-found walruses and the pelts and skulls of 19 sea otters were sealed by Refuge personnel during 1994.

#### 10. Other Resident Wildlife

##### Small Mammals

Small mammals were live-trapped in conjunction with the snowshoe hare live-trapping effort. A Sherman live-trap was placed in the vicinity of each snowshoe hare live-trap, for a total of 49 Sherman traps at each snowshoe hare grid. A total of 222 red-backed voles were captured, with 130 recaptures for 352 total captures. Of those 222 voles, 149 survived the trapping. Also captured were 3 shrews, 2 of which died.

A small mammal live-trapping effort was also conducted in October at vegetation survey plots within the Mystery Creek Road proposed burn area. Adjacent to each of two vegetation survey plots, grids of 100 Sherman traps were set out in a ten-meter spacing between traps. Each grid was trapped for five days and nights, with the traps checked each morning at first light and each evening just before dusk. In the 2000 trapping periods there were 15 Red-backed Voles and two shrews captured, with 12 recaptures of voles. Both shrews died in the initial captures.

##### Snowshoe Hares

Live-trapping snowshoe hares in five study grids in 1994 revealed an increase in numbers of hares in all grids compared to 1993. Numbers of hares captured in the Swanson River Grid (increased 4 to 8, in the Campfire Lake Grid 14 to 22, in the Funny River Grid 2 to 7, in the 1969 Burn/Oilfield grid 4 to 13, and in the Skilak Loop Grid 9 to 15). However, these numbers are still only a fraction of the total numbers of individual snowshoe hares captured during the peak population period of 1983 and 1984 (See Table 15).

Table 15. Snowshoe hare summaries on Kenai National Wildlife Refuge, Soldotna, Alaska 1983-1994.

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Study Area Grid: Swanson River Road

<u>Year</u>	<u>Juvenile</u>	<u>Adults</u>	<u>Total</u>	<u>Captures</u>	<u>Pellets/m<sup>2</sup></u>
1984	20	34	54	85	51.0
1985	10	30	40	113	51.6
1986	8	23	31	101	27.9
1987	2	10	12	31	14.1
1988	5	4	9	11	10.7
1989	2	2	4	4	5.0
1990	1	2	3	6	1.8
1991	2	1	3	4	1.1
1992	0	2	2	4	3.2
1993	1	3	4	10	4.9
1994	3	5	8	14	3.0

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\*Uncleared plot

Table 16. Snowshoe hare summaries Kenai National Wildlife Refuge, Soldotna, Alaska, 1983-1994.

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Study Area Grid: Funny River Road

<u>Year</u>	<u>Juvenile</u>	<u>Adults</u>	<u>Total</u>	<u>Captures</u>	<u>Pellets/m<sup>2</sup></u>
1983	76	27	103	232	60.1*
1984	79	47	126	216	35.0
1985	25	49	74	159	44.4
1986	15	19	34	44	20.5
1987	15	16	31	63	9.4
1988	2	2	4	5	6.6
1989	2	1	3	3	2.1
1990	0	1	1	3	2.6
1991	13	13	26	46	1.1
1992	5	2	7	11	2.4
1993	1	1	2	2	4.4
1994	6	1	7	12	4.3

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\*Uncleared plot



Table 17. Snowshoe hare summaries Kenai National Wildlife Refuge, Soldotna, Alaska, 1983-1994.

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<u>Study Area Grid: Campfire Lake Area</u>					
<u>Year</u>	<u>Juvenile</u>	<u>Adults</u>	<u>Total</u>	<u>Captures</u>	<u>Pellets/m<sup>2</sup></u>
1983	-	-	-	-	-
1984	-	-	-	-	-
1985	-	-	-	-	-
1986	13	19	32	93	52.8*
1987	11	13	24	77	19.9
1988	7	5	12	39	10.4
1989	4	5	9	18	3.2
1990	1	4	5	12	4.1
1991	2	4	6	17	3.0
1992	5	5	10	23	3.4
1993	3	11	14	28	6.7
1994	11	11	22	42	1.9

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\*Uncleared plot

Table 18. Snowshoe hare summaries Kenai National Wildlife Refuge, Soldotna, Alaska, 1983-1994.

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<u>Study Area Grid: 1969 Burn/Swanson River Oilfield Area</u>					
<u>Year</u>	<u>Juvenile</u>	<u>Adults</u>	<u>Total</u>	<u>Captures</u>	<u>Pellets/m<sup>2</sup></u>
1983	-	-	-	-	-
1984	-	-	-	-	-
1985	-	-	-	-	-
1986	-	-	-	-	-
1987	-	-	-	-	-
1988	-	-	-	-	-
1989	0	1	1	1	7.5*
1990	1	0	1	1	3.1
1991	1	1	2	4	1.0
1992	1	2	3	12	1.3
1993	1	3	4	5	1.5
1994	11	2	13	33	2.5

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\*Uncleared plot

Table 19. Snowshoe hare summaries Kenai National Wildlife Refuge, Soldotna, Alaska, 1983-1994.

<u>Study Area Grid: Skilak Loop Road</u>					
<u>Year</u>	<u>Juvenile</u>	<u>Adults</u>	<u>Total</u>	<u>Captures</u>	<u>Pellets/m<sup>2</sup></u>
1983	-	-	-	-	-
1984	-	-	-	-	-
1985	-	-	-	-	-
1986	-	-	-	-	-
1987	-	-	-	-	-
1988	-	-	-	-	-
1989	-	-	-	-	-
1990	-	-	-	-	-
1991	-	-	-	-	-
1992	9	5	14	23	12.5*
1993	2	7	9	17	3.7
1994	4	10	15 <sup>1</sup>	17	1.2

\*Uncleared plot

<sup>1</sup> Includes 1 escapee of unknown age [1994]

### Beaver



Beavers have felled numerous large cottonwood trees in the Upper Kenai River. RJ

Beaver lodges were aerially surveyed in the 1947 Burn (Swan Lake Canoe System Area and Swanson River Canoe System Area), the 1969 Burn (South of the Swanson River), and in mature forest habitats at Point Possession during September 26, 27, and 29, 1994. Active lodges observed were 14, 23, 32, and 16, respectively, in each of the above areas. Average densities of active lodges were the greatest in the 1969 burn area.

Table 20. Total active lodges observed during aerial beaver surveys over trend areas on the Kenai National Wildlife Refuge, 1992-1994.

<u>Survey Area</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>
<u>1969 BURN:</u>			
South Swanson River	21	27	31
<u>1947 BURN:</u>			
Swan Lake Canoe System	22	15	16
Swanson River Canoe System	19	-	20
<u>MATURE FOREST:</u>			
Vogel Lake Area	22	-	16

#### Spruce grouse

Lack of time in late-September and early-October prevented completing early morning roadside spruce grouse surveys in 1994.

#### Lynx

Three lynx were captured in traps, including one incidentally captured and reported by a fur trapper, and fourteen lynx were captured by trained dogs and fitted with radio-collars during 1994 to monitor their reproductive success, mortality rate, movements, and dispersal rates. Of these, six lynx were captured for the first time and eleven lynx were recaptured. Of the fifteen individual lynx handled, nine were females and six were males. During the fall capture period, one immobilized male lynx strangled in a tall cottonwood tree before it could be reached and lowered to the ground. During the 1994 denning period, at least six of eight monitored females exhibited denning behavior, but three lost their young prior to the fall. This information suggests that in 1994 lynx productivity and kitten survival slightly increased relative to 1993.

### 11. Fisheries Resources

#### Hidden Lake

Cook Inlet Aquaculture Association has completed all sockeye enhancement field activities at Hidden Creek and Lake since 1991. Between May 20 and July 14, 1994, a total of 417,752 sockeye smolts migrated from Hidden Lake.

Based on otolith marks, 87 percent of the migrating smolts were hatchery-reared fish, up 3 percent from 1993. Most of the smolts migrated between June 7 and June 25. Between July 15 and September 14, six-thousand-eight-six adult sockeye salmon returned to Hidden Creek and 60 percent of these fish were age 1.2. On May 24, 1994, approximately 1.815 million sockeye fry were released in Hidden Lake and of these, 200,000 were released at the boat ramp. Between September 22 and October 8, 1994, approximately 2.19 million eggs were collected and shipped to Trail Lakes Fish Hatchery. No unusual water quality conditions were observed in Hidden Lake in 1994.

b. Russian River

No significant changes in sockeye salmon escapement into the Russian River spawning areas were noted in 1994. In 1994, the early run escapement of sockeye into the Russian River system was 44,872, compared to 37,881 in 1993. The late-run escapement for sockeye in 1994 was 122,248, compared to 125,795 in 1993.

c. Tustumena Lake System

Cook Inlet Aquaculture Association assumed responsibility to operate the Crooked Creek Fish Hatchery from the Alaska Department of Fish and Game in 1994. Sockeye fry and fingerlings hatched from eggs collected from adults in Tustumena Lake in 1993 contracted the IHN virus in the hatchery and had to be destroyed. There was thus no release of 1993-hatchery-reared sockeye fry into Tustumena Lake in 1994.

Results of a telemetry study conducted of spawning adult sockeye in Tustumena Lake by the National Biological Service between 1989 and 1991 revealed that 31 percent of the adults spawned along the shoreline of Tustumena Lake. This is a significant proportion of spawning considering that one of the primary reasons for justifying the stocking program in Tustumena Lake was the assumed scarcity of spawning areas in the system and a belief that spawning was limited to the lake's tributaries. The study also discovered a unique late run of sockeye spawning at the outlet of Tustumena Lake.

16. Marking and Banding

An annual report of wildlife banded or tagged on the Refuge during 1994 was sent to the Service's, Division of Law Enforcement in Anchorage. Details of numbers and species marked can be found in the respective sections of section G.



18. Injured Wildlife

Refuge personnel continued to work with local veterinarian Bart Richards to examine, care for, and rehabilitate injured wildlife during 1994.



Assistant Manager Mark Chase and Area Biologist Ted Spraker free a bull moose that was inadvertently snared by old antenna guy wires near headquarters.

RJ



H. PUBLIC USE1. General

This year was typical for public use activities and programs in regards to visitor uses and trends. Significant improvements were made to many of our visitor facilities which will enhance the Refuge experiences of visitors.

January through March provided many winter outdoor activities including cross-country skiing, snowmobiling, ice-fishing, small game hunting, and wildlife observation opportunities. April and May saw early fishermen on the Kenai River and on many Refuge lakes. Snow geese and other returning waterfowl offered exciting wildlife observation and photography chances throughout the Refuge. June through August mean "SALMON" in Alaska, and Kenai Refuge is certainly no exception. Along with the piscatorial pursuits come camping, hiking, canoeing and boating, and additional observation, and photography especially of young waterfowl and moose. Big game hunting also begins in August and continues into October; in recent years, fishing activities have continued into October also, especially on the upper Kenai River, and rutting moose are always favorite subjects for photographers. November and December see winter activities drawing visitors to the Refuge, especially if below freezing weather comes early, providing sufficient ice for skating and fishing.



The Kenai-Russian River confluence after the busy 1994 season.

RJ

Facility rehabilitation in the Skilak Wildlife Recreation Area continued this year when rehabilitation work began on the Visitor Contact Station (VCS) area and Jim's Landing. The road into Jim's will be widened and resurfaced, but the biggest news is that in the future camping will not be allowed and the area will be a day-use only area. Hopefully, this will reduce human impacts to the riverbank. The VCS area will receive an improved traffic flow pattern, the log building will be relocated, and there will be two new concrete-walled restrooms for visitor use. It is expected that these improvements will be completed in the spring of 1995.

Overall visitation to the Refuge was estimated at 515,000; this reflects the overall Kenai Peninsula trend of nearly a nine percent increase over the previous year.

## 2. Outdoor Classrooms - Students

### Visitor Center and "Keen-Eye" Trail

In 1994, approximately 2750 students participated in the Refuge's Environmental Education (EE) program at the visitor center and adjacent nature trail.

A typical field trip to the Visitor Center takes half-a-day. Students begin with an introductory wildlife film or videotape selected from the Refuge's extensive media library. After the media program, students explore the exhibit area using questionnaires associated with various exhibits. The questionnaires focus on concepts such as animal/plant adaptations, interdependence, natural communities, and succession. The three levels of questionnaires cover grades kindergarten through first, second through third, and fourth through sixth.

Visitor Center activities are followed by lunch on the center grounds. Students then hike the three-quarter-mile "Keen-Eye" Trail with activity guides. Led by their teacher, they investigate spruce forest, wetland, and freshwater lake communities through an integrated series of "hands-on" activities. There are three levels of trail activity guides covering grades kindergarten through first, second through third, and fourth through sixth.

### Outdoor Education Center

In 1994, the Refuge's Outdoor Education Center (OEC), located off Swan Lake Road, was utilized by 485 youth for a total of 1260 user days. Rehabilitated from spring through fall 1993 and ready for spring 1994 use, upgraded OEC facilities met with positive response from educational groups. They especially appreciated the increased size and light in the new commons room, improvement in toilet facilities, and universal access of the site for wheelchair users.

The OEC provides an attractive outdoor site for overnight field trips and youth group retreats. Teachers and youth leaders use the facility free-of-charge to conduct environmental education, nature appreciation, and outdoor

skills activities. Rustic accommodations include six sleeping cabins, a "commons" lodge (called the "Bear Den"), a campfire ring, outdoor benches and picnic tables, an outhouse, and a water pump.

### 3. Outdoor Classrooms - Teachers

In 1993, sixty-six educators were introduced to the Refuge's EE program through teacher orientation sessions and EE workshops taught by Refuge staff. Orientation sessions were scheduled in the fall and spring, when teachers show the greatest interest in bringing classes for field trips to the Refuge. During a one-and-one-half hour orientation, teachers experience an abbreviated version of a sample class field trip. Workshops are given in four to eight hour blocks and explore environmental education topics in greater depth with teachers and youth leaders. This focused adult leadership training by Refuge staff greatly multiplies the educational efforts of Refuge staff. Two Refuge staffs worked with 66 educators, who taught 1,320 youth which greatly increasing the impact of Refuge environmental education programs.

### 4. Interpretive Foot Trails

Through the award of a Challenge Grant and the volunteer labor of the Student Conservation Association (SCA) High School Program, the Refuge successfully added a universal trail segment to the Visitor Center's "Keen-Eye" Nature Trail. This 1/4 mile segment was built with less than a six percent grade and is accessible by wheelchairs with assistance. This segment links with a boardwalk and lakeside viewing platform that create a scenic walk from the boreal forest community through wetlands to a beautiful lakeside vista. Not only have wheelchair users benefitted from this scenic trail, but seniors and parents with small children have remarked on the ease of accessing the nature trail with the addition of the universal access component.

### 6. Interpretive Exhibits/Demonstrations

During early winter 1994, Kent and Ward finalized installation of the newly renovated "Sounds of the Kenai" exhibit. Local visitors appreciate one area of the visitor center which changes seasonally. Youth especially enjoy seeing the seasonal change of animal photos and their accompanying sounds.

In April, for the seventh consecutive year, the Refuge public use staff participated in the Kenai Peninsula Sportsman's Show. Volunteer Amy George and Ward developed a new Refuge specific recreation exhibit for the show which lent an eye-catching, professional look to our booth. Our booth made contacts with more than 1,000 of the 2,500 people who visited the show.

Kent, Ward, and local artist John Clare worked on the creation of three interpretive panels for Upper Skilak Campground. Themes included Skilak Lake gull/commodorant rookery, lynx/snowshoe hare interrelationships, and



Kenai Wilderness. Panels are planned for completion and installation in spring 1995.

In September, Kivi, Marrs, and Ward transported and set up a mobile display depicting legal and illegal moose antler configurations at Soldotna's Kenai Peninsula Mall. The public was fascinated by the display, and people enjoyed quizzing each another on "which racks are legal."

In October, Ward began work with Fruland/Bowles on minor rehabilitation projects for Alaska Stream Life and Alaska Refuges exhibits for the Refuge visitor center.

In November, Kent, Ward, and Clare began work on modular posters for Refuge bulletin boards. Themes include bear safety, boating safety, Refuge regulations, and watchable wildlife. Posters are planned for completion in spring 1995.

#### 8. Hunting

Five Special Use Permits were issued to mobility impaired hunters for entry on Refuge roads otherwise closed to vehicles. These special access areas were on oil field roads in the Marathon and Swanson River Road areas.



This is one of several hunter camps placed along the Lower Swanson River during moose hunting seasons. Refuge officers try to contact most hunting camps via canoe patrol. 8/94/SS

Sheep, goat, and small game seasons opened on August 10. Full-curl ram restrictions remained in effect. Thirty-three full curl rams were taken in GMU 7 and 15 in 1994; another nine sub-legal rams were also harvested. Open registration hunting in selected areas opened on October 15. Goat hunters harvested 148 animals on the Peninsula. The total includes 106 males, 41 females, and 1 unknown in 1994.

State and Refuge personnel and volunteers contacted sheep and goat hunting parties at Emma Lake, Green Lake, and Round Mountain. Use of Fuller Lakes Trail/Round Mountain also appeared to be experiencing increased use, primarily due to a new Dall sheep ewe season and twenty ewe permits issued. Five ewes were harvested during the permit hunt.

Due to the horse use restriction placed on Fuller Lake Tail during 1994, big game hunting in general for the area was slightly decreased.

Brown bear harvest in GMU 15 included 5 sows and 4 boars; 7 brown bears were taken in defense of life and property (DLP) or were killed by managers and are included in the totals found in Table 21. A total of 4 bears were taken in GMU 7 (spring and fall).

Table 21. Big game harvest on the Kenai Peninsula, 1994 (includes spring 1994).

Species	<u>Game Management Unit</u>				Total	Harvest
	15A	15B	15C	Total 15	7	
*Brown bear	5	9	4	18	4	22
Black bear	38	17	62	117	85	202
Caribou						
Mountain Herd		-	-		29	29
Lowland Herd	-	-	-	-	-	0
Dall's sheep	-	-	-	-	-	33
Mountain goat	-	-	-	-	-	176
Moose**						
General	232	46	270	548	62	610
Drawing	10	24		34		34

\*Includes defense of life and property kills and illegal kills.

\*\*Preliminary data - harvest report returns not complete.

Source: Alaska Department of Fish and Game

Black bear harvest in GMU 7 and 15 totaled 156 animals. The Refuge issued 32 special use permits for black bear baiting stations. Nine black bear (2 females and 7 males) were harvested at bait stations on Refuge lands (see the accompanying table for Refuge baiting information.)

Table 22. Black Bear Baiting on the Kenai National Wildlife Refuge. 1989-94

YEARS	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>
Total Permittees	28	44	74	63	49	32
Reporting Permittees	24	38	68	60	47	31
(percent reporting)	(86%)	(86%)	(92%)	(60%)	(96%)	(97%)
Reporting Permittees who hunted	14	21	33	22	28	25
(percent who hunted)	(58%)	(55%)	(49%)	(37%)	(60%)	(80%)
Hunter success	43%	29%	24%	18%	39%	28%
Total Harvest	12	10	12	6	14	9
Harvest Composition	8F, 4M	7F, 3M	5F, 7M	5F, 1M	7F, 7M	2F, 7M
Dates of Harvest						
APR 15-22	0	0	0	0	0	0
APR 23-30	0	0	0	0	0	0
MAY 1-9	0	0	2	0	2	0
MAY 10-25	CLOSED FOR BAITING DURING BROWN BEAR SEASON					
MAY 26-31	7	3	3	3	6	3
JUN 1-7	1	5	3	1	3	3
JUN 8-15	4	1	4	2	3	3
Total black bear obs	45	51	59	29	58	66
Total brown bear obs	8	4	10	1	7	22

The regular GMU 7 and 15 moose hunt began on August 20 and continued through September 20. For the first fall hunting season in twelve years moose hunter check stations were not staffed along Swanson River Road and other Refuge locations.

The number of large antlered bull moose continued to provide enhanced hunting opportunity in various portions of GMU 15A particularly within the 1969 Swanson River Burn.

The GMU 15B (east) late season moose hunt continued until October 15. Fifty-six trophy moose were sealed during the early hunt and 21 during the late hunt for a total of 77 trophy moose taken in GMU 15B east in 1994. Harvest numbers and field interviews with permittee/big game transporters indicated a unit wide decrease in available trophy moose.

The limited entry cow moose hunt in the Skilak Wildlife Recreation Area had 20 permittees reporting 13 cows harvested. For the second year running, a new record for mistakes or illegal take of cow and sub-legal antlered moose occurred during 1994 in GMU 15 and 7. Thirty-three incidents were documented, which included 17 cows. The large increases in the number of illegal takes during 1993 and 1994 may be due to the longer season.

Harvest summaries by species are included in Tables 23 thru 28.

Table 23. Total Moose Harvest on the Kenai Peninsula, 1990-94 (source: Alaska Wildlife Harvest Summary, ADF&G).

GMU	1990	1991	1992	1993	1994
15A	90	174	135	222	238
Skilak Loop <sup>a</sup>	7	11	6	10	13
TOTAL	97	185	141	232	251
15B					
WEST	54	39	48	46	56
EAST	31	38	26	24	21
TOTAL	85	77	74	70	77
15C	200	294	184	271	308
Illegal Take <sup>b</sup>					
Cows	5	9	9	21	17
Bulls	25	34	20	32	36
TOTAL	30	43	29	53	53

\* Season extended to 32 days

<sup>a</sup> Special season cow hunt by permit only.

<sup>b</sup> Illegal take not broken down by subunit and is included in subunit totals.

Table 24. Total Caribou Harvest on the Kenai Peninsula, 1990-94 (source: Alaska Wildlife Harvest Summary, ADF&G).

HERD	1990	1991	1992	1993	1994
Kenai Mountains	7	16	15	29	28
Kenai Lowlands	3	4	1	6 <sup>a</sup>	3
Killey River					11

<sup>a</sup> No legal season after 1992, number is road kills and/or illegal take.

Table 25. Total Dall Sheep Harvest on the Kenai Peninsula, 1990-94 (source: Alaska Wildlife Harvest Summary, ADF&G).

GMU	1990	1991	1992	1993	1994
7 <sup>a</sup>	8	14	5	7	4
15	25	26	28	26	28
Ewe Hunt <sup>b</sup>				8	5
TOTAL				34	33

<sup>a</sup> GMU 7 sheep harvest is off-Refuge.

<sup>b</sup> Round Mt. drawing permit hunt, 20 permits issued for ewes only.



Table 26. Goat Harvest on the Kenai Peninsula, 1990-94 (source: Alaska Wildlife Harvest Summary, ADF&amp;G).

GMU	1990 ♂/♀	1991 ♂/♀	1992 ♂/♀	1993 ♂/♀	1994 ♂/♀/unk
7 <sup>a</sup>					
Drawing	15/10	22/ 8	37/15	39/29	29/14
Registration	17/ 8	27/13	33/15	16/10	27/6/1
Tier II		2/ 0	3/ 1		2/1
TOTAL (by sex)	32/18	51/21	73/31	55/39	58/21/1
TOTAL	50	72	104	94	80
15B					
Drawing	2/0	4/2	0/3	4/1	2/2
Registration	3/3		1/0	3/0	1/0
TOTAL (by sex)	5/3	4/2	1/3	7/1	3/2
TOTAL	8	6	4	8	5
15C					
Drawing	19/ 8	18/ 7	17/ 5	15/12	13/8
Registration	3/ 1	15/ 4	18/ 7	26/15	13/5
Tier II	1/ 4	11/ 0	16/ 4	5/ 1	19/5
TOTAL (by sex)	23/13	44/11	51/16	46/28	45/18
TOTAL	36	55	67	74	63

<sup>a</sup> goat harvest is off-Refuge.

Table 27. Black Bear Harvest on the Kenai Peninsula, 1989-1994.

GMU	1989	1990	1991	1992	1993*	1994
7						
Boars	33	63	75	56	70	53
Sows	12	15	47	33	19	17
Unknown	1	2	4	3	1	2
DLP	0	0	0	5	2	3
TOTAL	46	80	126	97	92	75
15						
Boars	86	72	103	109	81	105
Sows	30	39	49	58	25	34
Unknown	1	4	7	2	2	2
DLP	0	0	0	1	4	3
TOTAL	117	115	159	170	112	144

\* Bag Limit Reduced from 3/year to: 1 bear/spring and 1 bear/fall.

Table 28. Brown Bear Harvest on the Kenai Peninsula, 1990-1994.

	1990	1991	1992	1993	1994
GMU 7*					
Boars	1	0	4	3	1
Sows	0	1	5	0	2
DLP	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>1♂</u>
TOTAL	1	1	9	4	4
GMU 15A					
Boars	0	0	1	3	0
Sows	1	2	2	0	2
DLP	<u>0</u>	<u>0</u>	<u>1</u>	<u>2</u>	<u>0</u>
TOTAL	1	2	4	5	2
GMU 15B					
Boars	2	2	1	2	2
Sows	1	1	1	4	2
DLPs	<u>0</u>	<u>0</u>	<u>0</u>	<u>2</u>	<u>2 (1♂, 1♀)</u>
TOTAL	3	3	2	8	6
GMU 15C					
Boars	3	4	7	3	2
Sows	3	1	2	1	1
DLP	<u>0</u>	<u>0</u>	<u>2</u>	<u>1</u>	<u>5 (3♂, 2♀)</u>
TOTAL	6	5	11	5	8
GMU 7 & 15	11	11	26	22	20
TOTALS					

## 9. Fishing

The Kenai Peninsula continues to play a major role in providing recreational fishing opportunities in Southcentral Alaska. The Kenai Peninsula supported 946,252 angler-days, or 37 percent of the State's total sport fishing effort during 1993 (Mills, 1994). The Kenai River is the most intensively fished river in Alaska and supported 324,120 angler-days, or 7.9 percent of the State's total sport fishing effort in 1993.

The effects of intensive sport fishing activity on fish and wildlife populations and habitats were a primary source of concern during the year. Several meetings discussing protection of shoreline areas occurred during the year. At years' end, a section of the upper Kenai River shoreline between mile 71 and 73 was under discussion for protection from shore angling foot wear.

A resident fish investigation was conducted on the upper and middle sections of the Kenai River from June through October during 1994. The primary focus of the study was to learn more about the length and age

composition of Dolly Varden and rainbow trout populations in the Kenai River between Kenai and Skilak Lakes (upper river) and from Skilak Lake to Naptown Rapids (middle river). To accomplish this objective, three sport fishing guides and one sport fishing enthusiast volunteered to systematically collect a minimum of 100 length measurements from each species per month during the study period. Length information was also collected by Kenai Fisheries Resource Office personnel. A creel survey was conducted concurrently to collect age structures from harvested fish and characterize the sport fishery.

Length information was collected on a total of 2,908 Dolly Varden and 2,497 rainbow trout in the upper Kenai River. Dolly Varden ranged from 97 to 724 mm fork lengths with an average length of 337 mm. Rainbow trout were slightly larger than Dolly Varden with an average length of 388 mm. No length information was collected by guides from the middle Kenai River since few guides consistently target resident fish species in this section of river.

Table 29. Sport fishing effort and catch for waters on and adjacent the Kenai National Wildlife Refuge during 1993 (Mills 1994).

Location	Species caught							
	Angler days	Chinook salmon	Coho salmon	Sockeye salmon <sup>a</sup>	Pink salmon	Rainbow trout	Dolly Varden <sup>b</sup>	Lake trout
<b>Kenai Peninsula Freshwater</b>								
	500,904	79,948	89,120	436,560	14,020	113,739	138,382	8,348
<b>Refuge Sport Fisheries<sup>c</sup></b>								
Kenai River	324,120	34,347	59,200	323,469	3,485	52,138	74,596	1,180
Russian River	610,18	0	4,421	91,851	566	12,377	3,629	0
Kasilof River	27,969	20,555	4,852	3,719	184	778	4,718	202
Moose River	630	9	24	271	0	79	16	0
Hidden Lake	5,030	0	26	998 <sup>a</sup>	0	602	127	2,358
Canoe Routes	10,940	71	4,954	285	0	17,244	1,681	0
Skilak Lake	3,289	0	48	3,407	0	857	653	1,050
Tustumena Lake	1,055	0	287	19	0	129	517	92

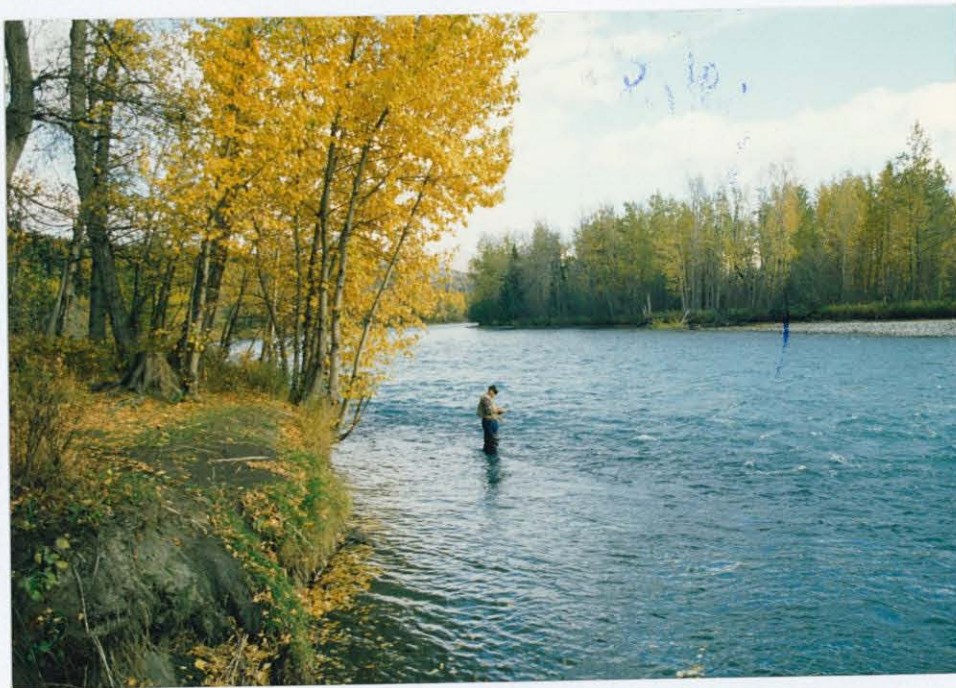
<sup>a</sup> Includes kokanee.

<sup>b</sup> Includes Arctic char.

<sup>c</sup> Sport fisheries on the Kenai Refuge or supplemented with Refuge produced fish.

<sup>d</sup> Swanson River and Swan Lake canoe routes.

A total of 1,774 angler parties representing 4,893 anglers were interviewed during the creel survey. Interviewed anglers fished 27,383 hours with about 63 percent of that effort occurring in the upper river. Most anglers interviewed in the upper river (65 percent) were targeting rainbow trout and Dolly Varden. Conversely, the majority of anglers fishing the middle river (67 percent) were targeting salmon. Anglers interviewed caught 8,130 rainbow trout, 8,838 Dolly Varden, and 6,578 salmon. The majority of rainbow trout (91 percent) and Dolly Varden (84 percent) were caught in the upper river. Salmon catch rates were nearly identical between the upper and middle sections of river. Most of the fishing directed at rainbow trout and Dolly Varden is catch and release with only 2 percent and 14 percent of the fish caught in the upper and middle sections of river being harvested, respectively. Age structures were obtained from 357 Dolly Varden and 219 rainbow trout. (Palmer, 94)



An out-of-State fly-fisherman enjoys a peaceful moment along the Upper Kenai River during October.

RJ

Hidden Lake supports the most popular lake trout fishery on the Kenai Peninsula. Lake studies conducted in interior Alaska have indicated that several lake trout populations have been over fished. This concern and the lack of data from this fishery prompted the need to study the sport fishery on Hidden Lake. Findings from a creel survey was conducted on Hidden Lake



from May through August in 1993 indicated that 44 percent of the fishing effort and 66 percent of the lake trout harvest occurred during May. After learning that May was the most important month in terms of effort and harvest, we continued the creel survey on Hidden Lake during May 1994. A total of 108 angler parties representing 271 anglers were contacted. Estimates of effort and harvest for the month were 1973 angler-hours and 258 lake trout. These estimates are slightly lower than in 1993 when 2468 angler-hours harvested 316 lake trout.

Table 30. Estimated sockeye salmon harvest, effort and success rates on Russian River, 1973-1994

Year	Harvest			Total Effort (Man-Days)	Catch Per Hour	Census Period
	Early Run	Late Run	Total			
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	113,012	0.431	06/08-08/20
1988	50,820	19,540	70,356	72,023	0.264	06/13-08/09*
1989	11,290	55,210	61,500	60,569	0.284	06/09-08/20*
1990	30,215	56,175	86,390	84,710	0.255	06/12-08/20*
1991	65,390	31,450	97,840	96,161	0.290	06/01-08/20
1992	30,512	29,646	60,158	60,449	0.238	06/12-08/18
1993	37,261	38,289	75,550	57,491	0.277	06/11-08/20
1994	48,723	26,375	75,298	65,814	0.279	06/11-08/17

\*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 the end of the late run.

Length, weight, and age information was obtained from 43 lake trout.  
(Palmer, 94)

"The Russian River early run escapement of sockeye salmon was 44,872 and the early harvest was 48,923 with approximately 42,422 man-days of effort. The early catch-per-hour ratio during 1994 was .275. Approximately 78

percent of the harvest and 73 percent of the effort occurred at or just below the Kenai/Russian confluence. The Russian River fishery experienced the fourth largest historical second run which totaled 148,652 sockeye as of August 20, when censuring was discontinued. The harvest was 26,375, and the escapement was logged in at 122,277. The catch-per-hour-ratio was .289. The second run man-days of effort totaled 23,382 (See Table 30.) Approximately 79 percent of the harvest and 79 percent of the effort occurred at the confluence or below.

Table 31. Kenai Peninsula freshwater sport fisheries, 1993.

	Days Fished		Est. % occur.
	<u>(non-guided)</u>	<u>(guided)</u>	<u>on KNWR</u>
Kenai River: (Soldotna Bridge to Moose River)	57,479	12,874	10%
Kenai River: (Moose River to Skilak Outlet)	34,192	4,391	15%
Kenai River: (Skilak Inlet to Kenai Lake)	45,577	7,436	70%
Russian River	61,018		70%
Kasilof River	57,117		3%
Swanson River	51,690		75%
Other Rivers	3,114		20%
Swanson River/Canoe Lake System	2,818		100%
Swan Lake/Canoe Lake System	2,332		100%
Other Lakes	6,549		40%
Tustumena Lake	3,289		100%
Skilak Lake	1,713		100%
Hidden Lake	5,030		100%
Rainbow Lake	593		100%
Engineer Lake	430		100%

The statistics in Table 31 represent survey data for 1993 published during 1994.

#### 10. Trapping

The Refuge issued 70 Special Use Permits for trappers during the 1993-94 season. One of those permits was issued for trapping with a gun only. Thirty-seven permittees returned their trapping harvest report forms on time. Reminder letters were sent via certified mail to the 33 persons who had not reported. A total of 66 harvest report forms have been received as of October 1, 1994; four permittees did not report. Thirty permittees did not trap on the Refuge during the 1993/94 season. Three cited poor snow conditions as a reason for not trapping.

Table 32. Total reported aquatic fur bearer harvest and average per permit holder on the Kenai National Wildlife Refuge, 1960-61 through 1993-94.

Aquatic furbearer reported harvest									
Season	Total permits	Beaver		Otter		Muskrat		Mink	
		Tot	Mean per Permit holder	Tot	Mean per Permit holder	Tot	Mean per Permit holder	Tot	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
1988-89	63	17	0.27	1	0.02	6	0.1	17	0.27
1989-90	90	5	0.06	7	0.08	0	0.00	45	0.50
1990-91	52	7	0.14	4	0.08	5	0.1	16	0.32
1991-92	55	13	0.24	6	0.11	10	0.18	63	1.15
1992-93	65 <sup>1</sup>	31	0.55	15	0.27	6	0.11	74	1.32
1993-94	70 <sup>2</sup>	16	0.24	5	0.08	1	0.02	70	0.95

<sup>1</sup> calculations based on 56 harvest report forms returned.

<sup>2</sup> calculations based on 66 harvest report forms returned.

Eight of 36 trappers who reported trapping on the Refuge were unsuccessful. The other 28 trappers succeeded in harvesting: 63 mink, 24 ermine, 22 coyotes, 16 beaver, 13 wolves, 5 otter, 1 muskrat, 1 fox, and 1 wolverine. Activity averaged 39.0 days and 11.1 sets per trapper.

Most of the trapping pressure occurred near Skilak Lake, Swanson River/Swan Lake Roads, Moose River, Kasilof River, Slikok/Coal Creeks, and Tustumena Lake.

Two radio-collared wolves in separate incidents died as a result of snare related injuries or starvation after having the snares break away from their anchors. In both cases a trapping permittee was unable to be associated with the recovered snare wires.

Table 33. Historical wolf harvest/known wolf mortality on the Kenai Peninsula 1973-74 through 1993-94. (Source: Alaska Department of Fish and Game ).

YEAR	UNIT 7	SUBUNIT 15 (A)	SUBUNIT 15 (B)	SUBUNIT 15 (C)	TOTAL	LAND AND SHOOT METHOD <sup>9</sup>
1973-74	1	0	0	1	2 <sup>1</sup>	
1974-75 <sup>2</sup>	1	0	1	4	6	
1975-76 <sup>3</sup>	7	3	1	8	19	
1976-77 <sup>3</sup>	3	5	2	3	13	
1977-78 <sup>3</sup>	16	5	7	8	36	6
1978-79 <sup>3</sup>	12	24	5	14	55	10
1979-80 <sup>3</sup>	6	15	13	12	46	3
1980-81 <sup>3</sup>	12	18	1	11	42	0
1981-82 <sup>3</sup>	12	28	15	7	62	3
1982-83 <sup>3</sup>	8	28	10	3	49	0
1983-84	10 <sup>3</sup>	27 <sup>3,4</sup>	5	8	50	3
1984-85	5 <sup>3</sup>	31 <sup>3</sup>	3	7	46	-
1985-86	13 <sup>3</sup>	23 <sup>3,5</sup>	15	12	63	-
1986-87	20 <sup>3</sup>	9 <sup>3</sup>	13	8	50 <sup>6</sup>	-
1987-88	3 <sup>3</sup>	8 <sup>3</sup>	9	5	25	-
1988-89 <sup>7</sup>	2	6	6	4	18	-
1989-90 <sup>7</sup>	3	4 <sup>8</sup>	10	1	18	-
1990-91	3	5	2	0	10	-
1991-92	2	2	0	5	9	-
1992-93	3	8	2	6	19	-
1993-94	6	6	9	6	27	-

1. Two non-sport kills.
2. Beginning of legal season on wolves.
3. Trapping season November 10-March 31.
4. Western portion of 15(A) closed to trapping and hunting February 12 due to lice control efforts.
5. Trapping and hunting closed February 15, 1986 (quota set at 20).
6. One non-sport kill in Unit 7 and one non-sport kill in Subunit 15(B).
7. Trapping season November 10 - February 28.
8. Season extended 31 days, no harvest during extended season.
9. Land and shoot hunting of wolves was prohibited on the Kenai Peninsula beginning with the 1984-85 season.



Table 34. Total reported land furbearer harvest and average per permit holder on the Kenai National Wildlife Refuge, 1960-61 through 1993-94.

Land furbearer reported harvest											
		Lynx		Coyote		Wolverine		Weasel		Wolf	
		Mean	per	Mean	per	Mean	per	Mean	per	Mean	per
		permit	holder	permit	holder	permit	holder	permit	holder	permit	holder
Season	permits	Tot		Tot		Tot		Tot		Tot	
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 <sup>1</sup>	0.4	80	0.6	2	0.1	43	0.3	39	0.3
1983-84	114	38 <sup>1</sup>	0.3	87	0.8	2	0.1	29	0.2	30	0.3
1984-85	107	31 <sup>1</sup>	0.3	107	1.0	2	0.1	17	0.2	38	0.3
1985-86	114	23 <sup>1</sup>	0.2	110	1.0	4	0.1	3	0.1	33	0.3
1986-87	109	33 <sup>1</sup>	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
1988-89	63	1	0.02	15	0.24	0	0.0	1	0.02	12 <sup>2</sup>	0.19
1989-90	90	1	0.01	28	0.31	8	0.09	15	0.17	7	0.08
1990-91	52 <sup>3</sup>	0	0.0	22	0.44	0	0.0	6	0.12	3	0.06
1991-92	55	0	0.0	35	0.64	3	0.05	3	0.05	0	0.0
1992-93	65 <sup>4</sup>	0	0.0	31	0.55	1	0.05	11	0.20	8	0.14
1993-94	70 <sup>5</sup>	0	0.0	22	0.33	1	0.02	24	0.36	13	0.20

<sup>1</sup> Includes lynx radio-collared and released for study.

<sup>2</sup> Includes four wolves radio-collared and released for study.

<sup>3</sup> Two permits revoked - calculations based on 50 trapping permittees.

<sup>4</sup> Calculations based on 56 returned harvest reports.

<sup>5</sup> Calculations based on 66 returned harvest reports.

Two trapper orientation programs were held during 1993, (January 22 and November 9).

### 11. Wildlife Observation

Many Refuge visitors make inquiries regarding wildlife viewing opportunities during stops at the Visitor Contact Station and the Visitor Center. They are encouraged to get an early start and to stay out late to have the best chances of seeing critters.

Spruce grouse are readily seen along Refuge roads; Dall sheep can be seen with the Refuge-provided spotting scopes at the Russian River Access Area; and moose can be encountered at any time of the year on roads and trails throughout the Refuge. Brown and black bears, while not always visible, make their presence known along Refuge trails with their droppings, tracks, and claw marks on trees. Black bears are occasionally seen along the Skilak Loop Road and the Swanson River/Swan Lake Roads.

Beaver viewing has been significantly enhanced as a result of trapping restrictions at roadside lakes and day-use trails. A spotting scope at the end of the Keen-Eye Trail at the Visitor Center allows visitors to view loons, gulls, and an occasional bald eagle. Eagles are also readily seen along the upper Kenai River during the fall and winter, as they feed on the last of the salmon.

The Refuge maintains a variety of roadside wildlife/wildland observation points along roadways. Swans, moose, beaver, eagles, waterfowl, passerines, and other wildlife can be seen at these locations. Overlooks/observation points have been established on Skilak Loop Road overlooking the Kenai River inlet into Skilak Lake, and at a site overlooking Engineer Lake, the west end of Hidden Lake and the west face of Hideout Mountain. Both locations have commercial-grade spotting scopes installed during the summer season. Wildlife observation opportunities can be excellent at these sites, and as funds become available, we will install interpretive signing to aid visitors' wildlife/wildland viewing.

### 12. Other Wildlife-Oriented Recreation

A busy canoeing/boating season began in earnest in May, as visitors took to the waters in pursuits of recreational activities. The traditional Memorial Day weekend "opener" for summer activities, saw all Refuge launch sites, campgrounds, and canoe trails at capacity. The traditional weekend of the "crazy time," Labor Day, was also quite busy with similar activities, and was augmented by moose hunting activity.

The Swan Lake and Swanson River Canoe Trails continue to be popular areas for Refuge visitors; an estimated 6500 visitors pursued Refuge recreation opportunities within the two systems. Canoeists generally participate in multiple activities while on the canoe trails, including camping, fishing, wildlife observation, and hunting (during the moose season). Facility maintenance and monitoring within the systems were conducted by the back-country crew throughout the summer. Their patrols were augmented by YCC spike camps along designated portions of the routes.

Dan Quick of Northlite Inc. conducted numerous investigation field trips gathering information for a proposed field guide to the Swan Lake and Swanson River canoe routes. Quick met several times with Refuge staff to obtain resource and visitor information. When completed the guide is expected to be a comprehensive guide to these popular wilderness trails.

### 13. Camping

This year, more than 65,000 visitors spent the night on the Refuge in campgrounds or backcountry areas. Although our developed campgrounds remain popular with the recreational vehicle and car-camping set, the backcountry trails are receiving substantial use also. Many of the more popular campsites within the canoe trail systems and along the Swanson and Kenai Rivers have been heavily impacted; it is likely that some restrictions may be imposed so that the most heavily impacted sites can be rehabilitated. The Public Use Management Planning Team has identified this as an issue to be addressed.

Hidden Lake Campground continued to be a popular destination for visitors in 1994, and the improved Upper Skilak Campground also proved popular once "the word" got out on the grapevine. These are the only campgrounds where user fees were collected this year; \$29,954 was collected, and 30 percent will be available next year for maintenance/administration costs at these two areas. Fees were collected from May 25 through September 8, 1994.



Refuge Pilot Johnston talks with two visitors at their tent camp on Snag Lake.

BK



The Kenai/Russian River Access Area continued to be a popular recreation area during the year. The Refuge Concessioner collected fees from 14,104 vehicles using this area during his 60 days of operation. No fees were collected after the concessioner ceased operation of the ferry at the end of the sockeye run.

Planning continued for rehabilitation of the Lower Skilak Campground this year. The Interagency Brown Bear Team (IBBT) raised concerns regarding migration corridors in the area which will influence the level of development at this site. At years' end a "compromise" initial level of development was agreed upon which will allow for increased parking area for boat trailers; the IBBT will conduct a study which will hopefully provide data which will be used to determine the final level of development.

#### 14. Picnicking

This activity generally occurs as an aside to other visitor activities, such as fishing, wildlife observation, and environmental education.

#### 15. Off-Road Vehicles



Unauthorized all-terrain vehicle use has occurred at several Refuge locations (Plover Lake area). RJ



The 1993-94 snowmobile season was opened by the Refuge Manager on January 6, 1994. Low early winter snowfall delayed the opening.

Record November snowfall provided more than adequate snow cover to open the 1994-95 snowmobile season on December 1, 1994. The insulating character of the early, heavy snowpack resulted in thin ice. Experienced snowmobilers avoided lakes and streams until late December.

#### 16. Other Non-Wildlife Oriented Recreation

Cross-country skiing is a popular Refuge activity during the winter. There are 14 miles of Refuge-maintained trails around the Visitor Center. Many times during the season, the parking lot was full of vehicles, whose occupants were utilizing these trails. Additionally, skiers utilized our hiking trails and open areas on the Refuge.



Portions of the Fuller Lakes Trail have begun to resemble a moat. Reroute work on this section is scheduled for 1995.

RJ



Two boats enjoy calm water while boating on  
Skilak Lake. JS

#### 17. Law Enforcement

The Refuge had three permanent duty Refuge Officers, including one 1802 Refuge Law enforcement officer, and three seasonal commissioned officers. Rob Barto and Patty Brown returned as seasonal Law Enforcement Officers and Mike Welsh joined the Refuge after working with the National Park Service for a number of years.

Supervisory Park Ranger Bill Kent gave up his law enforcement commission in 1994 after long thought and discussions with higher levels. Hopefully, the money saved from training/travel/background investigations will be used to continue upgrading the station's law enforcement equipment.

Park Ranger\Pilot Rick Johnston conducted all aerial law enforcement patrols and law enforcement reconnaissance and assisted with other investigations, search and rescue and patrols. Rick also contributed in a case administrative and advisory roll. his experience and contacts were beneficial in many cases.

Assistant Refuge Manager Mark Chase arrived in June and contributed a great deal of professionalism to the Refuge law enforcement program.





One-half curl dall sheep shot and left on  
Tustumena Glacier. CJ



Legal bull moose shot and wasted by hunter  
apparently because the hunter did not understand  
the spike fork antler regulations (Swanson River  
Road). CJ

There were 170 violation notices issued in 1994. Fifty-eight percent were fishing related infractions (see Table 35).

Table 35. Kenai National Wildlife Refuge violations 1985-1994.

<u>Violation</u>	<u>85</u>	<u>86</u>	<u>87</u>	<u>88</u>	<u>89</u>	<u>90</u>	<u>91</u>	<u>92</u>	<u>93</u>	<u>94</u>
Snagging fish.....	10	1	15	14	20	26	7	21	31	33
Fishing closed waters.....	3	3	3	1	8	15	36	15	12	5
Overlimit fishing.....	4	1	4	8	4	24	17	16	14	8
Fishing without a license.....	2	1	1	10	14	8	11	9	16	7
Other fishing violations.....	2	0	2	1	29	51	69	51	59	46
Snowmachine violations.....	0	0	2	1	0	0	0	3	3	0
Motor boat closed area.....	0	0	1	4	2	0	4	1	0	0
Unauth. use of motor veh. ....	28	15	13	9	2	4	7	8	15	6
Illegal parking.....	2	0	3	3	2	5	19	19	5	25
Illegal aircraft landing.....	0	0	4	2	0	1	0	0	3	0
Illegal fireworks.....	2	0	2	0	0	1	1	2	0	0
Weapons violation.....	2	6	3	1	0	0	3	0	2	0
Violation of big game regs. ....	0	0	4	0	7	7	10	5	10	2
Migratory Bird Hunting Act.....	2	1	2	4	2	1	4	18	8	2
Littering.....	3	4	1	1	0	4	3	1	0	1
Unauthorized structure.....	0	2	0	2	0	0	0	1	1	0
Illegal woodcutting.....	9	3	4	4	0	1	4	2	0	3
Speeding.....	0	2	1	1	1	1	1	4	1	3
Unattended fire.....	0	0	0	1	1	2	3	0	0	4
Interference with officer.....	0	0	1	0	0	0	1	0	1	0
Destruction of property.....	0	0	0	1	0	2	0	0	0	0
Permit violations.....	2	1	3	2	1	2	1	4	4	1
Violation Coast Guard regs.....	0	0	0	0	14	8	8	3	3	7
Violation Refuge Spec. regs.....	2	1	5	0	3	5	5	2	2	6
Trapping violations.....	4	4	2	0	1	2	5	2	3	0
Lacey Act.....	0	0	0	0	0	0	0	0	2	1
Violation of control. subs. ....	0	0	0	0	0	0	0	0	9	9
Violation of bear baiting regs...	0	0	0	0	0	0	1	2	2	2
Theft.....	0	1	5	0	0	0	0	0	0	0
Violation of traffic code	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>5</u>	<u>5</u>	<u>0</u>	<u>1</u>	<u>4</u>
<b>Total</b>	<b>77</b>	<b>46</b>	<b>81</b>	<b>70</b>	<b>111</b>	<b>175</b>	<b>225</b>	<b>190</b>	<b>212</b>	<b>170</b>

Chris Johnson our Permanent Full Time Refuge Law Enforcement Officer became a certified firearms instructor upon completion of training at the Federal Law Enforcement Training Center (Glynco) in April.

#### Significant Law Enforcement Incidents:

Officer Johnson arrested a subject on Hidden Lake in February for outstanding State of Alaska warrants. Officer Johnson had previously cited the subject for illegal fishing in January and became aware of the warrants later. When Officer Johnson observed the subject ice fishing in February, he arrested the subject and transported him to the Alaska State Troopers.



Johnston participated in a search for a lost hunter near Silver Lake on Swanson River Road. After approximately one hour of aerial searching, the hunter was located at an unnamed lake near Grebe Lake. Johnston landed on the lake, provided emergency assistance, and then flew the lost hunter out.

Periodically, from Memorial Day weekend into August, portions of the Hidden Lake Campground fees were stolen from the site's Iron Ranger. Apparently the thieves were able to fish the fee envelopes out from a gap at the bottom of the Iron Ranger. Many hours were spent staking out the area hoping to catch the thieves in action, but without success. Modifications were made to the device to prevent further thefts. It is estimated that between \$1100 and \$1800 dollars was taken.



Eagle caught in a snare on Marathon Road. CJ

On August 15, the concessionaire at the Russian River Ferry reported a theft of approximately \$1000 dollars from their ferry booth. The ferry operators had left the door open to the booth. After a short ferry trip they discovered the money box gone. Two suspects and a suspect vehicle were identified. The suspects were interviewed by Alaska State Troopers but no action was taken.

On August 25, the Refuge received a report of a missing kayaker on Hidden Lake. An unsuccessful hasty boat search was conducted; high winds and rough water hampered the initial search. The search continued through the night with boats searching the lake shore with spot lights. Troopers were notified and coordinated the search. Ground, boat and aircraft continued to search the next day. A jacket and a kayak paddle were found floating in the water. Several days after the initial report divers found the body of



██████████, in approximately 60 feet of water near the point she was last seen.

Refuge Officer Johnston conducted several investigations of subjects and business illegally outfitting and guiding on Refuge lands. Several other investigations were also conducted regarding commercial visitor service permit compliance. In one instance a Korean booking agency was cited.



An unfortunate drowning occurred off the far point on Hidden Lake during 1994. Refuge Officers made several safety inspections and issued numerous warnings and violation notices for unsafe boating practices. RJ

In September, Refuge Officer Johnson observed a suspect illegally fishing on the Kenai River. Officer Johnson contacted the suspect and issued Notice of Violations (NOV). The suspect was acting overly suspicious. Officer Johnson ran a check on the subject and found an outstanding warrant for his arrest. Officer Johnson arrested the subject on the river and transported him by boat to Lower Skilak Landing and then by vehicle to Wildwood Detention Center.

After many unpleasant "confrontations" with personnel from the Solicitor's Office over various aspects of case management, the Refuge's law enforcement staff developed a document for quality improvement, identifying six tasks for implementation. These six tasks were:



- 1) Develop an internal, two-tiered process of review for each NOV issued. This will be done by Refuge Law Enforcement Officer Chris Johnson, Supervisory Park Ranger Bill Kent, and Assistant Manager Mark Chase.
- 2) Create a "crib sheet" with proper codified citations and court approved language describing the offense(s).
- 3) Involve the Senior Resident Agent at the earliest practical time for cases likely to involve investigative assistance or later referred to the U.S. Attorney's Office.
- 4) Expand seasonal law enforcement officer's orientation training.
- 5) Make concerted effort to have the involved Refuge Officer available for pre and post trial meetings with Regional Solicitors.
- 6) Commit to enhancing personal skills covering all aspects of Refuge law enforcement.



Warning signs and increased campground patrols have been initiated at Hidden Lake Campground. Incidents of theft have increased at several Refuge campgrounds.

RJ

It is hoped that by following these steps and guidelines, the Refuge will improve our working relationship with the Solicitor's Office.

A record 53 sub-legal bull moose and cow moose were illegally harvested in GMU 15 and 7, including eight on Refuge lands. Several cases remain unsolved, while four of the eight Refuge incidents resulted in Notices of Violation by State or Federal officers.

Johnson arrested two individuals on outstanding State of Alaska warrants. The subjects were in a group ice fishing on Campfire Lake and were observed utilizing a controlled substance by Johnson. When the subjects saw Johnson, they proceeded to dump most (but not all) of the controlled substance in the lake. A subsequent records check revealed that two of the subjects had outstanding warrants for arrest on State violations which occurred on the Refuge. The two were arrested without incident and transported to the Alaska State Troopers.

#### 18. Cooperating Associations

Final 1994 sales for the Refuge's Alaska Natural History Association cooperating sales outlet (Kenai branch) totaled \$27,500.

Proceeds from cooperating association sales were used for volunteer awards and were especially instrumental in creating honorariums for outstanding volunteer contributions in 1994. Association funds were used for conducting environmental education workshops for teachers and youth leaders.

Proceeds from sales were used to publish "Refuge Reflections," a summer visitor information newspaper. In addition, the Refuge joined efforts with Chugach National Forest and Kenai Fjords National Park to publish Kenai Pathways, a much needed pamphlet on Kenai Peninsula hiking trails. The Refuge worked with Trails Illustrated to produce a waterproof recreation map for Refuge canoe and hiking trails.

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

Tawah Trading Company's contract to operate the Russian River Ferry and collect fees at the Kenai/Russian River Access Area was renewed in 1994 due to the urgent need for management of the adjacent Sportsman's Lodge property. The property was purchased in 1993 by the State using Federal Aid (Dingel-Johnson) funds and the Regional Director signed a lease agreement to provide for Service operation in conjunction with the Russian River Ferry/Access Area. The lease agreement was completed very close to the date when the Ferry was to begin operation, and there was insufficient time to put out a new contract for bid. Some parts of the old contract were revised, including specifying definite start/stop dates for the ferry. The contractor was allowed to increase fees for the ferry and access fee, and a new vehicle size delineation for the difference in access fees to be charged was agreed upon. The present contract (No. 1448-0007-94-6744) includes a clause allowing for cancellation of the contract if improvements



to the Sportsman's property are completed by June 1996. Under those conditions, a new contract will be developed and put out for bid.

A total of 14,104 vehicles were accommodated and \$72,074 in access fees were collected. The concessioner's ferry transported 39,818 passengers for user fees of \$157,768. The concession contract includes a clause exempting Tawah from paying a percentage of gross receipts to the government. In return, the concessionaire provides free ferry passage for State and Refuge employees and pays for toilet pumping/dumpster service during the time the ferry is in operation. The contractor also collected \$4,045 in boat launching fees on the State-owned Sportsman's Lodge property. The State allows the contractor to retain these fees in exchange for "administration of the fee program."

Comments were provided to the Regional Office regarding a rewrite of Region 7 commercial use policy. Several features of Kenai's program were described for possible Region wide use.



Several Upper Kenai River guide services have begun to stack their float boats during pickups to increase their efficiency. RJ

The new fee structure, which was implemented for special use permittees during 1993, continued for 1994. The fee that is calculated on a per-client rate of \$2.00 for general visitor/clients to \$8.00 for brown bear hunters graduated to the full fee for 1994 after a 50 percent discount its first year.



Permittees were asked to have permit application requests to the Refuge by April 1. A new more detailed application was also developed for prospective permittees. Permittees were also required to submit a safety plan covering all aspects of their operations.

Most Special Use Permits (SUP) for various outdoor recreation services were issued by May 1, 1994. A total of 60 individuals or businesses obtained annual permits for commercial visitor services providing approximately 12,495 visitor days of use. An additional 24 individuals obtained incidental permits for the upper Kenai River (See Table 36). All visitor service permits were reviewed for compatibility with Refuge purposes as part of the service wide effort to insure the compatibility of Refuge uses.



Reported use numbers by several Upper Kenai River scenic float guides increased significantly during 1994. This boat appears to be overloaded. RJ

A draft commercial use document was developed for various management options associated with the public use management plan. Issues included allocation methods for upper Kenai River guide use, fly-in tent camp management, and private/commercial use allocation.

Based on a July inspection by Kent and Johnston several tent camps were discovered to be out of compliance with the Region 7 policy for their temporary structures. Certified letters were sent [REDACTED] [REDACTED] [REDACTED] notifying them of the corrections needed.





Refuge staff inspected several tent camps during 1994. Several camps were not in compliance with permit stipulations. WK



Refuge Manager Doshier inspects a commercial use structure located within Kenai Wilderness. RJ

An informational meeting was held September 22, for upper Kenai River guides. Guides and Refuge staff discussed issues and management concerns regarding the upper Kenai River.

A one-year temporary permit was issued [REDACTED] [REDACTED] conduct big game guide/outfitter services in Refuge portions of GMU 15C. [REDACTED] had failed to apply for the area during the five-year prospectus offering in 1992. The three other applicants for the area all decided not to finalize their permits after successfully competing for the area. A new competitive offering for the remainder of the original five-year time periods was advertised in late 1994 with proposals due by January 16, 1995.

Table 36. Guided recreational visits occurring on Kenai National Wildlife Refuge, 1994.

	# Permits	Number Visitors	Total Visits
Upper Kenai River			
Sport Fishing	20	3309	3817
Upper Kenai River Scenic Floats (Rafting)	15	6641	6781
Lower Kenai River			
Sport Fishing	35	900	3000
Fly-in Tent Camps	4	409	804
Guides/Outfitter/	5	11	158
Big Game/Transports	11	250	900
Other	<u>17</u>	<u>975</u>	<u>1400</u>
*TOTAL	107	12,495	16,860

\* Several permittees utilized multiple Refuge areas, so column total exceeds total 1994 permits issued.

Special use permits were issued or are current for the following activities: commercial firewood (22), trapping (58), guide/outfitter (35), 3-day incidental (24), cow hunt (26), use OEC (12), air taxis (13), tent camps (4), transporters (3), cut poles (4), bear baiting (33), mobility impaired hunters (5), fish studies (6), hunting with hounds (1), salmon study (3), egg take (1), dog-sled racing (1), gravel use (2), inholder firewood (1), big game guide (5), Antler collection (1), geophysical research (3), audiovisual (1) aircraft tiedown (3), collecting (2), scientific (4). The total number of permits issued in 1994 was 273.



Table 37. Tent camp use from 1985 to 1994.

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
<u>KETCHUM</u>										
Snag	64	60	70	69	76	70	32	36	44	31
(3)	180	173	210	207	218	183	86	118	116	77
camps	540	519	630	621	654	549	258	450	280	142
<u>McLain</u>										
(2)	30	29	67	62	58	53	28	45	59	205
camps*	468	348	807	603	630	588	154	350	404	278
<u>Wilder.</u>										
	44	53	47	41	49	42	23	31	39	43
	140	149	126	116	127	112	61	85	110	105
	420	447	378	348	381	336	183	245	215	178
<u>RUST</u>										
<u>Bird</u>										
	NR?	36	19	9	21	31	41	35	37	19
	NR?	149	65	35	78	108	115	92	129	54
	NR?	447	103	70	156	216	230	166	236	102
<u>Tangera</u>										
	NR?	12	11	4	10	13	11	13	9	3
	NR?	41	30	10	32	35	25	36	25	11
	NR?	123	60	20	64	70	50	75	15	22
<u>King</u>										
**									26	125
<u>AK BUSH CARRIER</u>										
<u>Mull</u>										
	38	33	36	42	35	44	38	41	12	18
(2)	135	125	138	144	130	135	112	120	24	54
camps	338	250	276	288	266	278	224	240	48	152
<u>Bedlam</u>										
	35	37	39	38	35	36	26	29	14	13
(2)	103	115	118	124	115	134	116	118	58	39
camps	206	230	295	248	230	258	232	236	144	83
<u>Alaska Air Guides</u>										
<u>King</u>										69

\* Scenic Lake closed due to swans, camp moved to McLain Lake in 1986 season.

\*\* King Lake sold in 1993, camp was not used due to late season installation.

## I. EQUIPMENT AND FACILITIES

### 1. New Construction

Following several years of stumbling over steel stock scattered in various places throughout the maintenance compound, Mechanic O'Guinn constructed a multi-level steel frame support capable of holding a variety of lengths and sizes of pipe, angle iron, flat steel, and other stock components.

A new 1000 gallon aviation fuel tank for Headquarters Lake was ordered with Fiscal Year 1994 Regional fuel storage tank replacement funds, and was expected to be on line for the 1994 field season following the excavation and removal of the 2000 gallon underground tank in 1993. However, bid specifications were contested by a potential contractor, and the entire bid procedure became entangled in a legal quandary of confusion. The net result was that we "limped" through the busy summer season without an approved fuel dispensing system. The tank was finally delivered on November 11, and with any luck at all we ought to have the tank on line and operational for the 1995 field season.



One of three steel gates designed and fabricated by Mechanic Al O'Guinn for positive access control in critical areas.

6/94/JF



Three steel gates were fabricated by Mechanic O'Guinn and installed at (1) west end of Swan Lake Road; (2) Skilak Road gravel pit and (3) Finger Lakes access road. A fourth gate was constructed by a local firm as part of the contract for the Recreational Vehicle (RV) Dump Station on Skilak Road near Engineer Lake, and installed to restrict access to the evaporation lagoon and water supply system.

The forms for six precast concrete outhouses were poured during the summer under the supervision of Division of Engineering's Harold Shipley. One of the outhouses was erected at the Tustumena Lake access area and the other at the RV dump station site on Skilak Loop Road. The remaining units will be used at the Visitor Contact Station and at Jim's Landing as part of a rehabilitation project initiated in 1994 and scheduled for completion in 1995.



Precast concrete outhouse being assembled at the recreational vehicle dump site on Skilak Loop Road. Five such structures were erected at various locations in 1994. 22/94/JF

A new well pump and piping was installed at the Tustumena Lake access area in May to replace the pump and pipe stolen the previous winter.

## 2. Rehabilitation

As part of a continuing effort to correct previously identified maintenance deficiencies through the Maintenance Management System (MMS), serious



lighting problems were corrected in both the maintenance and carpenter shops with the installation of ten 400 watts high intensity halogen vapor lights. To reduce heat loss in the maintenance shop, two-inch urethane panels were retrofitted over the entire 32' X 100' ceiling. A third element to the MMS project involved rewiring the machine lathe to conform with code specifications.

Work got underway in April on replacement of the old misaligned (and much maligned) Tustumena Lake Boat Ramp. Over two-hundred 12' X 1' X 6" concrete planks were laid into the Kasilof River to form a 24' wide ramp. Concrete planks were removed from the old ramp; some were reused and the remainder transported to the storage yard at the Skilak Guard Station. The new ramp should alleviate past launching problems due to poor alignment with the river and a severe drop off which claimed a number of casualties to both motors and trailers over the years.



New concrete plank boat ramp being installed at the Tustumena Lake Boat Landing. 5/95/JF

Another MMS project was the graveling of approximately 7.5 miles of Swan Lake Road during the period October 6 to October 18. Foster Construction of Soldotna was awarded the contract for hauling nearly 17,000 cubic yards (with a 6" lift) of gravel from the old Swanson River Airstrip. The 3500-foot strip was no longer required for Unocal's operations. Thus, it was an appropriate time to begin the reclamation process. While we anticipated the strip to contain considerably more gravel, there was more than enough to meet contract quantities. We anticipate additional MMS funds will be available in the future to complete the remaining six miles of road to the entrance of the Moose Research Center.





The completed Kasilof River Boat Ramp.

RJ



Foster construction Company removing gravel from the abandoned Swanson River airstrip. Nearly 17,000 cubic yards of gravel were used for the Swan Lake Road improvement project. 25/94/JF

The existing maintenance office shop was enlarged by removing the outer wall of the tool storage room. The action was required to accommodate additional office space for Jim Frates who moved from the main office to the shop to be closer to the maintenance operations which he supervises.

### 3. Major Maintenance

Following the decision to keep the double-walled above ground 1000 gallon aviation fuel tank at the Service's Kenai hangar site, considerable maintenance was required in order to meet an Office of Aircraft Services approved fuel management system. The 75' filler hose which came with the tank did not meet quality specifications nor did the unit come with a pressure differential gauge. Using the non-approved hose caused a discoloration in the fuel as the interior liner of the hose began "sloughing off." This necessitated a change in the filter systems as well as further testing of fuel for additional contaminants. Although the tank structure meets local fire codes and airport authority standards, the "as advertised" 1000 gallon tank has, as we discovered, a useful capacity of only 850 gallons.

The internal fire alarm system at the Refuge Headquarters/Visitor Center was installed and integrated into the original building design back in the late 1970's. Despite several attempts to correct the problem, the system has never worked properly, and has been a source of irritation as well as concern ever since. While the SYSTEM 3 unit was, and still is a "top of the line" system the decision was made to use MMS funds to once again bring the integrated system into proper working order. Yukon Fire System's out of Anchorage was contracted to locate and correct the problem--a feat several previous vendors had been unable to do. Yukon discovered a factory-defect in the main panel's circuit wiring scheme along with several other "minor" problems which produced intermittent false alarms. While the system's primary function of detection and alarm notification is now on line, there is still a minor problem somewhere in the maze of wiring within the building resulting in an occasional false alarm at the main panel. We will let well enough alone for the time being.

The three phase power converter (Roto Phase) installed when the Refuge Office and Visitor Center was constructed in 1979 was replaced with a new unit the latter part of October. Signs of internal arcing were detected in September, and a new unit placed on order. Unfortunately, the old unit "gave up the ghost" before the new unit arrived and the entire Refuge complex was without water for nearly a week since the water pump was one of four three-phase motors tied to the rotophase. When rewiring the new rotophase, it was discovered that the unit's circuit breaker was set for 500 amps rather than the specified 60 amps. Little wonder the rotophase continued to roast itself into eventual oblivion!

### 4. Equipment Utilization and Replacement

In an effort to better meet our overall responsibilities within the Refuge's fire management program, four surplus 1985 military 4 x 4 Chevrolet heavy-duty pickups were obtained from Fort Richardson. The

vehicles, with the exception of one (bent rear axle) were all in reasonably good shape requiring minimal repairs to make them operational.

The new eight-yard Ford dump truck, a replacement unit for the 1978 GMC, arrived in March to replace our 1978 GMC. The old dump was sold through General Service Association (GSA) to a local contractor. Four new 1994 Chevrolet S-10 pickups were delivered in July and will replace four mid 1980 models--all with mileage in excess of 100,000 miles. One 1984 Chevrolet S-10 pickup was also sold through GSA in June.

##### 5. Communication Systems

A permanent repeater was installed on Hideout Mountain, near the east entrance to the Skilak Lake Loop Road. A temporary unit was tried in this location during late summer of 1993 which provided excellent coverage of the upper Kenai/Russian River area. A new fiberglass shelter was airlifted to the site in early May, and the repeater equipment, solar panel, and batteries were installed by the radio technician contracted through the Regional Fire Management Officer's office. Minor difficulties were corrected by Regional Communications Coordinator Tim Miller in the immediate weeks that followed. The shelter was finally cable-anchored in place in early June by Supervisory Park Ranger Kent and Wildlife Biologist/Pilot Ernst.

Miller returned in August to install the "repaired" repeater; the same day he did this, the problems returned. Tim made another trip up the mountain the next day, and returned a borrowed National Parks Service repeater, taking the "repaired" part back to get it exchanged for a new one. Winter blew in before the replacement arrived, so Tim will install it at the earliest possible time in the spring of 1995.

The base station radio was modified to perform scanning operations, and to accommodate the two new frequencies used with the Hideout Mountain repeater.

The new repeater proved especially beneficial during the summer because for the first time, reliable radio communication was available in the Russian River area, the Kenai River Canyon, Mystery Creek Road, and the campgrounds in the Skilak Wildlife Recreation Area. Also, the National Biological Service project crews on Tustumena Lake used the Swanson River Road repeater for regular "extended" conversations, and having a second radio channel for routine and emergency Refuge communications was critical.

Numerous mobile radio "swaps" and installations were performed by the radio tech from Al's Electronics of Kasilof in an efficient and professional manner. Kenwood mobile radios had "E-proms" installed by the radio tech to accommodate the two new radio frequencies associated with the Hideout Mountain repeater. Bendix-King 14-channel radios were installed in vehicles used by the Public Use staff, Fire Management staff, Refuge Manager, Refuge Operations Specialist, and Supervisory Fish and Wildlife Biologist. The Bendix-King radios will be the Refuge's standard for future mobile radio purchases, replacing the non-programmable Kenwoods.



6. Energy ConservationTable 38. Energy Use Comparisons 1993-1994.

<u>Product</u>	<u>Unit of Measure</u>	<u>Energy Use</u>		<u>Percent Change</u>
		<u>1993</u>	<u>1994</u>	
Electricity	Kilowatt Hours	179,411	191,377	+ 6.6
Natural Gas	100 Cubic Foot	16,704	18,225	+ 9.0
Vehicle Gas	Gallons	12,858	14,420	+ 4.4
Aviation Gas	Gallon	5,157	5,221	+ 1.2
Propane	Gallons	301	300	----
Diesel Fuel	Gallons	4,186	4,380	+ 4.6

The increase in electricity and natural gas is most likely attributable to cold weather in October and November as well as an increase in computer hardware installed in the Refuge Office/Visitor Center. While not substantial, the increase in vehicle gasoline consumption is simply a reflection of additional staff driving more vehicles more miles than in 1993.

## J. OTHER ITEMS

### 1. Cooperative Programs

#### Winter Wolverine Aerial Surveys

The Kenai National Wildlife Refuge and Alaska Department of Fish and Game completed and signed a cooperative agreement to use Fiscal Year 1994 funding to complete at least one wolverine abundance survey on/adjacent to the Refuge during the winters of 1994-95 or 1995-96.

#### Kenai River Watershed Interagency Coordinating Group

A new interagency group was formed in September to strengthen commitment, cooperation, and involvement between State, Federal, and local agencies responsible for protecting resources within the Kenai River watershed. The Kenai River Watershed Interagency Coordinating Group (KRWICG) met monthly under the leadership of the Environmental Protection Agency. Representatives from the Refuge, Kenai Fisheries Resource Office, and Ecological Services participated in this group.

### 2. Oil and Gas Operations

#### Swanson River Field (UNOCAL Corporation)

Since taking over as Unit Operator in December of 1992, Unocal has directed operational strategies toward the recovery and marketing of natural gas reserves historically used for gas cycling to maintain the crude producing Hemlock zone's downhole pressure. During 1994, natural gas was transported via an underground pipeline to Unocal's Agricultural Division plant at Nikiski. Most of Unocal's efforts in 1994 focused on the field's transformation from crude to gas production. Two wells, SR 341-8 and SR 432-15 were re-drilled in an attempt to stimulate both gas and crude production.

While Swanson River experienced several small spills during the year, only two required extensive remedial action. A six-inch crude flow line at the 3-9 Tank Setting failed on February 23, releasing an estimated 50 barrels of the product. Due to extremely cold temperatures, little outflow to the surrounding area occurred. Approximately 200 cubic yards of material was excavated and taken to the solid waste disposal site.

The most serious spill resulted from corrosion in an underground 4" crude line near the 112-27 production pad. Crude apparently leaked for sometime before being discovered pooling in an adjoining wetland. The line was immediately shut in, but not before an area approximately one-third acre in size was saturated with both crude and salt water. Fortunately, the line was carrying about 98 percent water--which probably caused greater damage to the surrounding vegetation than the crude. The entire area was excavated and later tested for hydrocarbon residuals. Fill material will be brought in during the summer of 1995 and the site re-vegetated.



Spill site near the Swanson River production pad resulting from a ruptured 4" underground crude line in July. A nagging problem with an aging system of underground lines.



Stressed vegetation (alder) resulting from high salt content of produced water at the 112-27 spill site-Swanson River Field. 16/94/JF



Unocal continued to monitor ongoing remediation projects at the Pipe and Supply yard, 3-9 Tank Setting, solid waste site and Building A, at the compressor plant (for PCB's). These projects, in addition to evaluating remediation options for hydrocarbon contamination at the remaining six tank settings and flare stacks were inherited by Unocal when they took over from ARCO Alaska, Inc. in 1992. All remediation projects are currently undergoing a reevaluation by Unocal and their partner Chevron USA, and a meeting is set for early in 1995 with Alaska Department Environment Conservation (ADEC), Bureau of Land Management and US Fish and Wildlife Service (USFWS) to establish a framework for remediation goals and objectives.

Unocal consented to using the old 3500 foot airstrip as a gravel source for the Swan Lake Road re-graveling project. They envisioned no further need to maintain the strip, and in fact had abandoned all maintenance work the previous year. Unocal will begin restoration of the strip as soon as the remaining gravel is removed.

The Refuge greatly appreciated Unocal's cooperation in making one of their six residences within the field available for as many as five seasonal staff during the summer public use period. Rental payments were paid directly to Unocal, and rates established to reflect those for comparable government quarters.

#### Beaver Creek Production Facility (Marathon Oil Co.)

The highlight for Beaver Creek in 1994 was the drilling of the first new well since 1978. The new gas well, BCU #9, was drilled from the BCU #5 and BCU #6 production pad and required only slight modification to accommodate the rig. The well was drilled to about the 10,000 foot level, and perforated at the 8900-foot level in the Beluga Sands Zone. At years' end, production was approximately 3.8 million cubic foot/day, bringing the total field production to around five million cubic feet daily. The only other gas producer was BCU #1A, coming in at approximately 1.2 millions/day. Crude production for Beaver Creek in 1994 averaged around 500 barrels/day.

Marathon Oil Company underwent a reorganization of holdings within the Cook Inlet Basin in December. This was essentially a corporate "paper shuffle" and not expected to have any major consequences for the USFWS in overall management of the field. The move was similar to other oil companies in the Cook Inlet Region designed to consolidate resources at a time of declining production and increasing operational costs. Marathon is looking toward reducing field personnel, and developing technology for off-site automated monitoring of field operations in 1995.

Marathon Oil Company completed both a Hazard Assessment (final report) and Terrestrial Resource Evaluation relative to the 1990 diesel spill. While data suggest no outward or downstream migration of hydrocarbon contamination through the groundwater, there is still a level of concern since the area is in the upper reaches of the Beaver Creek Watershed--a source of water for the city of Kenai. A strategy has been developed and approved by both the ADEC and USFWS to remove free standing diesel fuel

from at least two monitoring wells at the site. The project was to be initiated before the end of the year, but technical problems with the pumping system will delay operations until early in 1995.



Marathon Oil Company Beaver Creek Gaswell No. 9  
was the first new well drilled within the field  
since 1978. 19/94/JF

Jim Frates provided assistance to Marathon in developing a structured program to integrate an oil and gas awareness program within the Kenai and Nikiski Middle Schools. Part of the curriculum will address the compatibility (or lack thereof) of oil and gas operations on the Refuge as well as the entire Upper Cook Inlet Region.

Beaver Creek personnel again provided valuable assistance in administration of the third annual physically challenged moose hunt within the unit boundary.

Several meetings were held in September and October with Marathon and Western Geological Survey personnel regarding a proposed geophysical survey for the Beaver Creek unit during the late winter-early spring of 1995. While heavy snowfall throughout the unit was sufficient to protect underlying vegetation during seismic operations, it also concentrated moose within the 1969 burn which--also contains excellent winter habitats. For this reason, it seems doubtful we will permit any seismic activity during the early part of 1995.

Other Oil and Gas Activities (non-unitized areas)

Discussions were held throughout the year with ARCO Alaska, Inc. concerning their proposed exploratory Bufflehead Well located just north of the Swanson River Field unit boundary. ARCO completed their Environmental Assessment (EA) in December and have applied for a right-of-way permit under Title 11 of the Alaska National Interest Conservation Act (ANILCA). On August 16, Frates, Danielle Jerry (Division of Realty) and Mike Joyce (ARCO biologist) took a helicopter tour of the proposed drill site and access road. On August 17, Frates and Jerry represented the USFWS at a meeting called by the Alaska Department of Governmental Coordination (DGC) to discuss permit actions required by various State agencies as well as the USFWS. ARCO hopes to begin road construction during the late spring or early summer and commence drilling in June or July.

Continued interest in geophysical exploration on Refuge lands has been expressed by several oil companies in addition to Cook Inlet Region, Inc. While no seismic work was done on Refuge lands in 1994, Marathon Oil Company initiated an ambitious program south of the Refuge within the Kenai Gas Field and within the corporate boundaries of the City of Kenai. They have expressed interest in continuing north to include lands within the Beaver Creek Unit.

Texas Union Petroleum and ARCO Alaska, Inc. have all indicated a desire to further explore Refuge lands.

On October 19, Frates participated in a mock spill drill put on by Tesoro Oil Company held at the Cook Inlet Spill Prevention and Response Inc. (CISPRI) headquarters in North Kenai, the exercise simulated a diesel fuel spill from an underground products line along the eastern shore of Cook Inlet within a half-mile of the Refuge boundary. A number of industry, Federal and State agencies, in addition to the U.S. Coast Guard, spent several hours working through the exercise on a "real time" basis under the Incident Command format. The simulation was as close to the "real thing" as any spill drill could be, and at times it was difficult to believe the participants were not involved in an actual event. As might be expected, problem areas centered around communications and a clear understanding (or misunderstanding) of respective agency roles and responsibilities.

3. Contaminants (non-oil field related)Surprise Mountain Drums

On May 12, a combined exercise using a State Forestry helicopter was successful in transporting four drums of diesel fuel off Surprise Mountain. The drums and contents had been stashed on the mountain since the 1960's-- along with other assorted debris left over from previous mining activity. Fortunately, the drums had not been leaking and the overall operation went smoothly.

Old Kenai Headquarters Site



A local firm, Rozak Engineering, completed a disposal plan for approximately 10 cubic yards of hydrocarbon contaminated soil excavated following removal of an oil shed several years ago. While the ADEC approved the disposal plan, an early freeze prevented the material from being removed. NESSCO Inc., a North Kenai firm, was awarded the removal and remediation contract. Field work is scheduled as soon after "spring break-up" as possible. The small and seemingly innocuous project has taken an inordinate amount of time and money, and demonstrates again that dealing with regulations governing contaminated sites should first place a high priority on initial prevention.

#### Underground Fuel Tanks--Maintenance Compound

Approximately 100 cubic yards of contaminated soil stored within the shop compound, following the removal of two underground fuel tanks in 1993, was finally moved off site in August by Nessco Inc.

Residual contamination beneath the gas pumps will be retested and removed in 1995 under terms of a contract awarded to Nessco Inc. in 1994.

#### Pentachlorophenol (PCP) Site (Moose Research Center)

Part 2 of the Site Investigation for PCP's located at the long abandoned Swan Lake #1 exploration drill pad inside the Moose Research Center was completed in August by Enserch Environmental Corporation of Denver. The contract, administered by the FWS Service Engineering Center (SEC), was initiated in 1993 to determine distribution and contamination levels of PCB's as the result of fence post treatment operations (using a then non-classified hazardous preservative commonly called "Penta") in the 1960's and early 1970's. Work to date has included historical research, literature review of the environmental setting, geophysical surveys, soil gas survey, sampling and analysis of surface soils, subsurface soils, containerized wastes, and surface water.

The Site Investigation-Part 2, Draft Summary Report, was received in December and included recommendations for future remediation activities. The report, as years' end, was still undergoing internal review by both the FWS and ADEC.