

onal Wildlife Refuge
ldotna, Alaska



ANNUAL NARRATIVE REPORT
Calendar Year 1987



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

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REVIEW AND APPROVALS

KENAI NATIONAL WILDLIFE REFUGE

Soldotna, Alaska

US FISH & WILDLIFE SERVICE--ALASKA
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ANNUAL NARRATIVE REPORT

Calendar Year 1987

Daniel W. Doherty
Refuge Manager

9/16/88
Date

E. H. Hines 10/5/88
Refuge Supervisor Review Date

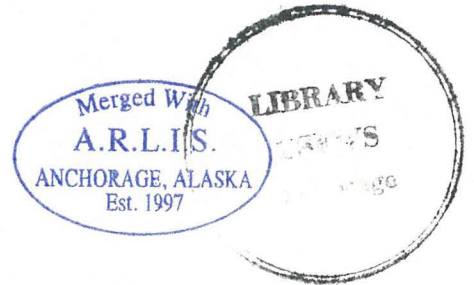
J. A. P. Rogers
Regional Office Approval

10/31/88
Date

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KENAI NATIONAL WILDLIFE REFUGE

Soldotna, Alaska



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Calendar Year 1987

U. S. Department of the Interior

Fish and Wildlife Service

NATIONAL WILDLIFE REFUGE SYSTEM

INTRODUCTION

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

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

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

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

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

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

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

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

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

The Kenai River, the largest river system on the peninsula drains about 2,148 square miles (5,563 km²). About 54% of the watershed is on the refuge, 37% in the Chugach National Forest, and the remainder on private lands. Ten major tributaries feed the Kenai River System: Beaver Creek, Slikok River, Soldotna Creek, Funny River, Moose River, Killey River, Skilak River, Russian River, Cooper Creek, and Juneau Creek.

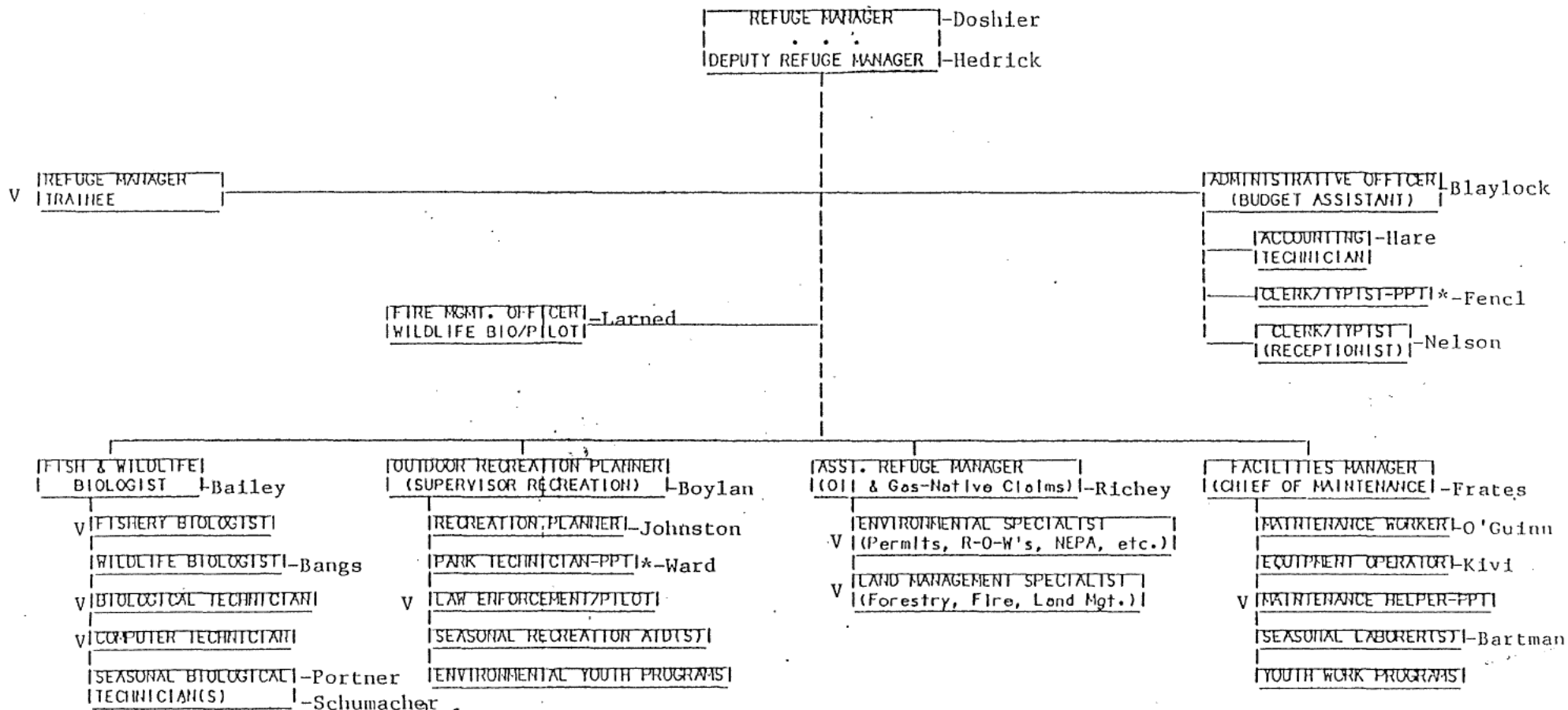
Other refuge river and stream systems flowing westward into the Cook Inlet include Kasilof River (which drains Tustumena Lake), Deep Creek, and the Swanson, Fox, Ninilchik, and Chickaloon rivers.

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

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

Table . Staff On Board Effective Dec 31, 1986

KENAI NATIONAL WILDLIFE REFUGE
ORGANIZATION CHART
May 10, 1984



APPROVED BY:

Refuge Manager

Date

Asst. Regional Director (AWR)

Date

V=Vacant

*=Converted PPT

Refuge Supervisor South (RF)

Date

Regional Director

Date

INTRODUCTION

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A. HIGHLIGHTS

1987 Kenai weather was characterized by a mild, early spring, followed by a wet summer, warm fall and the snowiest winter in recent years.

Three administrative positions, the Budget Assistant, Refuge Clerk and Travel Clerk received promotions as a result of a desk audit conducted by the Regional Office.

A large early run of sockeye to the Russian River brought hordes of anglers who caught 145,280 fish (a new record) in June.

The long-awaited brochure detailing the refuge's new aircraft regulations finally arrived in July.

A prescribed burn was completed in Skilak Loop during August and September. Final acreage was 1,620 burned with a 2,237 acre perimeter.

Our first moose season under the new harvest strategy designed to increase bull numbers came off with few glitches.

A "Charrette" concerning the controversial Furbearer Management Plan produced mixed results in spite of a supreme effort by all participants.

B. CLIMATIC CONDITIONS

Continuing with December 1986's heavy rains and gusty wind conditions, we began the new year with continuous fluctuations in temperatures and precipitation (Table 1). Following a "brown" Christmas season, we experienced a 63 degree temperature spread during January, with a high of 42 degrees F and a low of -23 degrees F. There were eight days of snow during January which made it the snowiest January in three years, much to the delight of local skiers.

Table 1. Monthly temperatures and precipitation data*

Month	Temperature				Precipitation	
	'86 High	'87	'86 Low	'87	Total	Snow
January	37F	42F	3F	-23F	1.63 in.	18.10 in.
February	43	40	-17	- 1	.29	1.80
March	44	45	-20	-9	.12	trace
April	53	52	0	20	.77	2.80
May	66	60	25	27	.94	.00
June	73	68	32	35	1.42	.00
July	71	77	35	43	1.81	.00
August	68	76	35	32	.54	.00
September	61	59	21	21	2.94	.00
October	53	53	9	8	1.70	trace
November	48	40	-13	3	1.53	18.7
December	43	39	- 2	-21	1.69	19.0
Total for 1987.					15.38	60.40
Total for 1986.					23.92	22.00
40-year Average Total.					19.89	67.81
*Reported by Federal Aviation Association, Kenai Airport.						

Following a rather dark and unfriendly February of mostly overcast days, we experienced clear skies and more than ten hours daylight in late February. Two merging high pressure areas in the Interior and a strong low system pushing north from the Gulf coast produced extreme winds and gusty conditions for six days beginning February 21. Gusts of 35 to 40 knots were common and on February 25 and 26, recorded gusts of 52 and 55 knots, respectively, were experienced at Kenai. Staff flights over the refuge revealed that thousands of green spruce succumbed to the winds. Any emerging spruce bark beetle would be thoroughly bewildered at the choices. Although not reaching gusts of nearly 70 knots as in past

seasons, such wind storms are common to the western Kenai Peninsula every few years.

Most of March was downright balmy with temperatures in the teens at night and in the 40's during the day, turning refuge roads into an ooze of melting snow and mud. The bright sunshine lifted one's spirits even as the mud pulled down our vehicles. Let 1987 be remembered as the year that Spring was actually a legitimate season, and this year it came in April! Temperatures were characterized by highs in the 50's and lows in the 40's with very little precipitation. Ice went out on Headquarters Lake April 29 (May 18, 1986).

May provided its usual cool days and partially overcast to overcast skies. Temperatures continued their upward climb during the month and by May 30 had reached a high of 60 degrees F. June is normally a glorious sunny month on the Kenai and thought of as a kind reward for surviving the long dark winter and muddy breakup. This June, however, we were treated to a solid month of cloudiness, brisk easterly winds, frequent showers, and temperatures that rarely exceeded 60 degrees F.

Although wet and dark days continued into July, a high pressure system stabilized weather conditions over the Kenai from July 21-28. This resulted in some record temperatures reaching 82 degrees F on July 28 at our Soldotna office. August was an Alaskan summer at its best with little rain, lots of sun (and fish), and temperatures that reached the low 80's but felt much warmer.

September weather could best be described as 4D -- dreary, depressive, damp, and disgusting. The previous record for the number of days when precipitation exceeded .01 inch was 13. This month we experienced 16 days when daily precipitation exceeded .01 inch. Total precipitation for September was 2.94 inches. The long term (20 year) average is 3.62 inches. In summary, it was lousy moose hunting weather but good for ducks.

October was one of the mildest in recent memory. There were few days with frost and the first real snow fell on Halloween night, October 31. Refuge lakes and ponds remained open until October 27, when a hard frost put ice on some of the smaller ponds. Snowfall for November ranked second on the all-time snowfall records kept since 1944. November's 22 inches of snow nine miles north of Kenai was exceeded only during November 1961, when 23.4 inches of snow fell. Snowy November continued into December along with our first cold snap. Lows reached -21 degrees Fahrenheit before the Kenai reverted to more "normal" weather. The latter part of the month featured periods of rain and snow and highs in the upper 30's. Snow accumulation was 18 inches at the first of December and 14 inches at the end of the month.

C. LAND ACQUISITION1. Fee Titlea. Alaska Native Claims Settlement Act

(1) Kenai Native Association, Incorporated - Nothing to report.

(2) Salamatof Native Association, Incorporated

The Salamatof Native Association was slightly miffed at a bill from their attorneys for more than a week's work just to verify that the Government still owns the sand and gravel within Kenai Native Association's Moose Range Meadows subdivision. Under the still pending exchange agreement, sand and gravel resources will be conveyed to Salamatof in return for non-development zones adjacent to the Kenai River. This exchange document is yet to be ratified.

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

(4) Point Possession, Incorporated

Early this year, the staff reviewed proposals regarding Point Possession Native Group's entitlement to refuge wilderness lands at the extreme north portion of the refuge. A Bureau of Land Management decision for conveyance of these refuge lands was appealed by the Service without success. The Point Possession Native Group received patent to 4,481 acres June 26, 1987.

(5) Cook Inlet Region, Incorporated

Several Easement Identification Meetings were conducted in Anchorage by Bureau of Land Management with other agency representatives including the Forest Service and several departments from the State of Alaska. This group reviewed more than forty requests for certain easements under 17(b) of the Lands Act within Cook Inlet Region's 14(h)(1) selection at Russian River. Anchorage meetings October 7 and 14, were attended by participants representing the Service, Bureau of Land Management, United States Forest Service, Alaska Departments of Natural Resources, Transportation, and Fish and Game to identify, reconsider, and determine justifiable the 17(b) easements proposed.

Although at this time only a limited area south of the Kenai River was certified by the Bureau of Indian Affairs and therefore subject to 17(b) easements, the group identified all possible 17(b) easements that might someday be necessary to protect public access through lands which in the future may be conveyed to private ownership. The existing Fish and Wildlife Service Kenai/Russian River Campground, which encompasses about 9 1/2 acres, is generally too large to qualify for a site easement and should therefore be held by appropriation as in the case of similar and adjacent Forest Service facilities.

On March 18, Refuge Manager Daniel Doshier and Assistant Refuge Manager Bob Richey met with Steve Planchon, Senior Planner for Cook Inlet Region, Incorporated, to discuss the "restricted zone" accompanying Cook Inlet Region's selected lands south of Tustumena Lake and the Kasilof River. Cook Inlet Region felt a conveyance of these selections including agreement on the restricted zone might be required prior to any Arctic National Wildlife Refuge land exchange.

Cook Inlet Region's letter dated April 22, 1987, agreed to identify the Restricted Zone adjacent the Kasilof River and Tustumena Lake shorelines, as that area 1320 feet upland from the ordinary high water along these shorelines as mandated under the Terms and Conditions for Land Consolidation and Management in the Cook Inlet Area [Section 12(a) of Public Law 94-204]. The Bureau of Land Management published the final easement and major waterway recommendations July 27, 1987. These easements included the access road and campground in addition to existing trails both upriver and downriver.

(6) Arctic National Wildlife Refuge Land Exchange

Wildlife Biologist Ed Bangs attended the first Arctic Wildlife Refuge land exchange meeting in Anchorage on January 21, assisting the Regional Office staff on the land exchange assessment report involving Kenai Refuge lands. On May 28, Assistant Refuge Manager Bob Richey provided an aerial overview for Carl Rasmussen, Realty, of nearly 30 selected land parcels on the Kenai Peninsula as possible candidates included in the proposed Arctic Wildlife Refuge land exchange.

b. Native Allotments

Outdoor Recreation Planner Rick Johnston conducted an investigation of the Alec Dolchok native allotment (AA-8272) within Kenai wilderness at Harvey Lake. Forty acres were initially approved in 1983. Heirs to the allottee sought to increase the acreage to 80 acres, the Bureau of Land Management reinstated and approved an additional 60 acres. While investigating the claim, the refuge discovered the entire case file was based on a false claim and numerous false statements. The Regional Solicitor, on behalf of the Kenai refuge, filed a Notice of Appeal to the additional 60 acres on January 15, 1987. The Interior Board of Land Appeals remanded the entire claim for a government contest hearing to reexamine factual issues. Johnston is to be commended for his effort on this issue. Much of the work was on his own time and may prevent a particularly damaging inholding.



An historical trapping cabin, thought to have been owned by Mike Dolchok in the 1920's and 1930's, was discovered in the upper Killey River area. The cabin's discovery became a piece of evidence in contesting the Alec Dolchok allotment. RKJ

2. Easements

After ten years of various discussions and meetings the State Department of Transportation continues their interest for the proposed Sterling Highway reroute in the vicinity of Mile 55 which may impact designated wilderness refuge lands. With regard to the National Environment Policy Act of 1969, and the necessary timing for the permits and authorizations required by the several involved agencies, the Department of Transportation has requested a determination and direction from the Federal Highway Commission. No further actions have been taken.

The refuge staff responded with a letter dated May 6, 1987, to a request from Hart Crowser, Incorporated for comments regarding the four preliminary route selections for the proposed Anchorage-Kenai 115kV Power Transmission Line Intertie as it may impact Kenai Refuge lands. The Enstar Route, recommended as the preferred alternative under the feasibility study, is certainly the most environmentally damaging to Kenai Refuge lands and was our last choice as an alternative. We recommended the Tesoro route, generally paralleling the Cook Inlet coastline, as that route with the least impact to refuge resources.

3. Other

a. Boundary Survey

Since November 1986, several meetings and staff contacts were held regarding Bureau of Land Management's proposed 260 mile cadastral survey program on and within certain refuge lands. From cabin facilities at Tennessee Miller's Homestead five miles northeast of Soldotna, a dozen surveyors using three helicopters surveyed from Point Possession to the Kasilof River. The survey included not only surface and subsurface lands earlier conveyed to native corporations, but those encompassing the Swanson River and Beaver Creek Oil and Gas Fields, boundaries of the Kenai Wilderness, one native allotment, and certain sections of the Kenai Refuge boundary. A second Bureau of Land Management survey team, camped at Ninilchik, conducted similar activities along the refuge boundary south of Tustumena Lake.

A meeting April 16 with Darryl Wilson, Chief of Field Survey for the Bureau of Land Management, and his staff, was conducted at the Refuge Headquarters to discuss this proposal. Stipulations covering this program were developed and special use permit KN 3-87 issued to the Bureau covering this extensive cadastral survey program.



The Bureau of Land Management conducted an extensive 260-mile cadastral survey program both within and adjacent refuge lands.

RR

By June, the Bureau's survey program was about sixty percent complete. The Beaver Creek Oil and Gas Field Unit boundary was completed, the Swanson River Field and Birch Hill Units were near completion. Survey crews continued along conveyed native land boundaries and Cook Inlet Region, Incorporated subsurface conveyances south of the Kenai River. Bureau crews did well in limiting their need to fell trees and have proved they can, with some difficulty, thread a boundary line through the forest.

The Bureau completed their survey program during August which generally included those refuge lands within the western half of the lowlands north of Tustumena Lake. Helicopters were used extensively throughout the program utilizing one unit as an auto-surveyor to locate exact section/township corners between established monuments. Survey lines were cut, however, around the oil and gas field unitized areas, as well as, at the native allotment site.

Another Division of the Bureau of Land Management Cadastral Survey, under yet another program, installed nearly fifty (50) separate and different survey monument types within the Beaver Creek Oil and Gas Field. These monuments will be tested under normal field conditions within a cold climate environment. Selected test sites have a history of frost heaving and these test monuments will be monitored especially for heave during the five year Program. Monuments included post and rod types with anchoring devices, variable length drive rods, epoxy coated, sleeved and materials thermal conductive. With the exception of three or four, all monuments are six or less inches above the ground and located in an area outside visitor use.

b. Old Refuge Headquarters

The old refuge headquarters in Kenai continues to surface in various discussions involving Alaska land trades. It is presently used to house our fisheries people and also provide a office for Lake Clark National Park. We will not trade the site until we can provide other facilities for fisheries.

c. Inholders

The Bureau of Land Management contacted this office to request input regarding the proposed sale of certain lands on Burnt Island adjacent the refuge at Chickaloon Bay. This 6.99-acre island currently includes a 5-acre homesite, the maximum acreage obtainable under the Homesite Act of 1898. Our major concern involves the "reasonable" access we have provided in the past to the homesite owner, family, and friends, and the good possibility the Island may be subdivided some day, requiring substantially greater road access by many persons. It could well become a burdensome problem and difficult to manage for the refuge.

D. PLANNING

2. Management Plans

a. Furbearer Management Plan

In 1986, the U.S. Fish and Wildlife Service (Service) approved the Final Kenai Refuge Comprehensive Conservation Plan. That plan directed that a more detailed management plan be prepared to address specific public comment regarding furbearer management changes on the refuge.

In August, 1987, the Service prepared a draft Furbearer Management Plan for the Kenai Refuge under the management constraints and direction provided by the Kenai Comprehensive Conservation Plan and Service policy. The Kenai Refuge Furbearer Management Plan is intended to provide specific guidance for the management of furbearers and their uses, including trapping. Because of the importance of furbearers as a wildlife resource and the local and national interest in their management and use, the Service determined under the provisions of the National Environmental Policy Act that an environmental assessment needed to be prepared.

The Service substantially modified its preferred alternative (Alternative B) for managing furbearers on the Kenai Refuge from proposals in the draft Furbearer Management Plan. The Service took this action in response to the public comments received on the draft plan and recommendations from the Kenai Refuge furbearer management charrette.

The furbearer plan was very controversial and generated over 1500 comments. The vast majority (+95%) support closing the refuge to all trapping. Hopefully, the compromise reached in 1988, between Alaska Department of Fish and Game, trappers, and other citizens, will result in meaningful changes that address the multitude of problems, both biological and social, with the current trapping program, while still permitting a refuge recreational trapping program.

3. Public Participation

The public, as well as several organizations and other governmental bodies, took an active role in participating in refuge planning and decision making. Several step-down management plans were either initiated or developed during 1987, and in various ways the public became involved in the final outcome.

A draft Furbearer Management Plan was released for public comment and generated one of the largest amounts of public comment ever received by the Kenai National Wildlife Refuge on a particular issue. Several informational meetings were held regarding the plan, for local trappers, the Alaska Department of Fish and Game, and other interested parties. Formal meetings occurred on October 2, 6, 13, 29, 30, in addition to daily updates.

A charrette was held on December 2-4 in an attempt to reach consensus between various interested parties. Attendees included Alaska Department of Fish and Game, U.S. Fish & Wildlife Regional Office, Audubon Society, Alaska Outdoor Council, Kenai Peninsula Trapper's Association, Alaska Wildlife Alliance, etc. The Charrette was led by Regional Office planner Norm Olson, and several persons including Alaska Department of Fish and Game area biologist Ted Spraker, and Kenai Refuge biologist Ted Bailey, gave formal presentations to the group.

A public informational meeting was held on November 19, regarding the PCB cleanup. Representatives of ARCO, the Environmental Protection Agency, the Bureau of Land Management, the Department of Environmental Control, and the Fish and Wildlife Service attended. The meeting was well attended by all concerned agencies and ARCO's contractors. Only 12 members of the public attended this meeting and were mostly concerned about the process to be used in the degradation of the stockpiled PCB material.

Several congressional inquiries on behalf of constituents were received and responded to by refuge staff, including an inquiry from a married couple from Hope who had mounted a campaign to investigate and do away with bear baiting in Southcentral Alaska. In early December, Refuge Biologist Bangs and Outdoor Recreational Planner Johnston compiled (Freedom of Information) information requested, regarding refuge complaints and incidents related to bear-baiting, as well as defense of life and property incidents of the last several years.

Refuge Biologist Bangs spoke at the Wesleyan Outdoorsmen's dinner in January. The status of refuge biological programs and the 1986-87, regulatory changes were presented. Comments were all positive toward the regulatory changes.

The Alaska Bowhunters Association Board of Directors met at the refuge headquarters on January 28. Topics of discussion included the Alaska Department of Fish and Game/United States Fish and Wildlife Service restrictions on moose harvest to spike-fork bulls, or bulls over 50 inches, in Game Management Unit 15A, B and C. All comments at the meeting favored the proposal.

National Audubon Society Vice-president for Science J.P. Meyers, and Regional Representative David Cline, visited the Refuge's Skilak Wildlife Recreation Area and discussed wildlife issues on July 16.

As a prelude to inevitable concern over possible loss of public access at the Kenai/Russian River confluence due to the Alaska Native Claims Settlement Act Section 14(h)(1) land conveyance, a local sportfishing advocate attempted to give out literature regarding the pending conveyance at the Russian River parking area. The sportfishing advocate, Dale Boundarant, was prevented from dispensing fliers at the Russian River fishing area which protested the selection of the land by a native organization. 50 CFR prohibits such activities on the refuge. Mr. Boundarant's concerns may be only a beginning "salvo" in what could be a strong negative public reaction to the loss of refuge land in such a popular fishing area.

Refuge staff spent significant time working on various "step-down" plans in the wake of the Kenai Comprehensive Conservation Plan. A draft management plan for issuing Special Use Permits on the non-motorized upper Kenai River was completed during 1987. A draft Public Use Management Plan and a draft Cabin Management Plan were also developed. A draft Furbearer Management Plan was completed by the biological staff. And last, but not least, the revised Prescribed Burn Plans for 1987, were sent to the Department of Environmental Conservation to request a smoke permit.

5. Research and Investigations

a. Kenai Peninsula Interagency Brown Bear Team Studies. Investigators: U.S. Fish and Wildlife Service (Ed Bangs), Alaska Department of Fish and Game (C. Schwartz), United States Forest Service (N. Weiland).

Limited field work was conducted in 1987. Four brown bears were radio tracked via aircraft from April through November. Leg snares were used in an attempt to capture brown bear on the Upper Funny River and Goat Creek. Because of low bear density on streams this year, only one young male was captured. The area above Goat Creek was examined for its potential for a bear observation station, but visibility in much of the stream was obscured by dense streamside vegetation. Nine sightings of brown bear by hikers in the Upper Russian Lakes drainage and 25 sightings from other areas on the Kenai Peninsula were recorded. A report summarizing these efforts was prepared.

Mike Jacobs, who worked on the project the past two years, was selected as the graduate student responsible for producing the 1st draft of the Kenai Peninsula Brown Bear Management Plan. He is currently enrolled at West Virginia University and should complete his work in 1988.



Picture of MIKE JACOBS!!!!

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

Three new marten (1 adult male, 1 juvenile male, 1 juvenile female) were radiocollared between February, 1987, and February, 1988, in the Kenai National Wildlife Refuge marten study area. During the same period three resident marten (2 adult male, 1 adult female) were recollared. Since June 1986, a total of 11 individuals have been captured 54 times. Unfortunately, during 1987, two marten shed their collars, and one disappeared from the study area when his collar went dead.

Extensive habitat surveys were conducted on four areas of the refuge during the summer of 1987. Two areas were known to have marten, a third was later found to have marten, and the fourth, Big Indian Creek, is a potential release site if a reintroduction is attempted. The surveys sampled canopy cover and composition, snags, downed logs, berries and forest openings.

A 4X5 small mammal trap grid was set up for four nights in June at Pothole Lake. Capture success of red-backed voles and masked shrews was nearly 10 times that of 1986. Visual observation indicated that there was a great increase in red-backed vole numbers all over the refuge this year.

Nearly 250 scats have been collected since the summer of 1986, mostly from the Surprise Creek area. Known age scats are being analyzed to determine seasonal variation and overall diet content of Kenai marten.

Radio location data have been plotted and analyzed for home range size and relationships, movements and seasonal altitudinal variations. Sufficient data (15⁺ locations) is currently available for 6 marten. Home range size for adult males (2.62 mi² n=3), juvenile males (1.35 mi² n=2), and adult females (1.35 mi² n=1) were similar to those reported by Buskirk (1983) for upper Susitna Basin marten.

Snowtracking techniques were refined during 1987, to relate behavior to microhabitat and overall habitat use of Kenai marten. Unfortunately, inconsistent, often crusty snow conditions have limited snowtracking opportunities.

During November 1987, marten tracks were discovered at Cottonwood Creek. This was the first marten sign found south of Skilak Lake and glacier flats. More snowtracking surveys are planned for spring 1988, if conditions permit.

Genetics studies to clarify subspecific designation of Kenai marten have come to a halt. Preliminary electrophoresis investigations with marten from interior Alaska were inconclusive, but did not detect significant differences between Interior and Kenai Peninsula marten using selected enzymes. Genetic differences of Kenai marten must be delineated before a donor population can be selected for a reintroduction effort.

Fiscal year 1988, is the final year of the Kenai National Wildlife Refuge marten study. More time will be devoted to analyzing data already collected and publishing the findings.

c. Lynx Home Range and Spatial Organization in Relation to Population Density and Prey Abundance. Investigators: U.S. Fish and Wildlife Service and University of Alaska (M.B. Kesterson, T.N. Bailey, E.E. Bangs, T.V. Schumacher, M.F. Portner, W.W. Larned).

Graduate student M.B. Kesterson completed field work and began writing his thesis. A draft copy of his thesis was completed. The abstract from that draft thesis appears below:

ABSTRACT

Food habits, habitat use, home range and spatial organization of lynx (*Lynx canadensis*) were studied in relation to lynx and snowshoe hare (*Lepus americanus*) densities on the Kenai National Wildlife Refuge, Alaska from September 1984-May 1987. Twenty nine lynx were captured a total of 40 times in 3 study areas on the Kenai National Wildlife Refuge. Lynx in the lowland study area selected mid-successional forest ($P = 0.01$). Size of seasonal home ranges varied from 1.0-477.9 km² ($n = 1232$ relocations). Seasonal home ranges of female lynx were smallest in summer (9.4 km²) and became progressively larger through spring (51.6 km²) ($P = 0.001$). Seasonal home ranges of males (93.0 km²) averaged more than twice those of females (43.8 km²) ($P = 0.001$). Concurrent with declining snowshoe hare numbers and a 4-fold increase in population density, home range size of resident lynx in the lowland study area declined suggesting that lynx may adjust home range size proximally relative to population density rather than prey abundance. Spatial organization of lynx appears similar to that reported for other North American fields. Residents occupied home ranges that were intrasexually exclusive. Males shared their larger ranges with 1-3 adjacent females. Home ranges of transient lynx overlapped widely with those of adults of both sexes.

d. Lynx populations in relation to Habitat Prey Competitors and Mortality on the Kenai National Wildlife Refuge. Investigators: U.S. Fish and Wildlife Service and University of Alaska (W. Staples, T.N. Bailey, E.E. Bangs, T.V. Schumacher, M.F. Portner, W.W. Larned).

Objectives:

1. Determine densities and spatial relationships of lynx in lowland successional forest and other habitats on the Kenai National Wildlife Refuge during a period of low snowshoe hare abundance.
2. Document habitat use patterns of lynx in the northern lowlands.
3. Compare diets of lynx and coyotes in lowland successional habitats and their degree of spatial overlap.
4. Determine relative abundance of primary and alternate prey of lynx in habitats used by lynx.
5. Provide an area with radiocollared lynx to test the reliability of a snow-track census technique.

Field studies began in the late winter of 1987-88. Progress on the study will appear in the 1988, Annual Narrative Report.

d. Tustumena Lake Sockeye Enhancement Project. Investigators: Alaska Department of Fish and Game, Fisheries Rehabilitation and Enhancement Division, (Kyle) and U.S. Fish and Wildlife Service - Kenai Fisheries Resources Station (Gray).

Evaluation continued concerning the experimental stocking of sockeye fry into Tustumena Lake. In 1986 16,500,000 fry were released. Adult sockeye escapement into Tustumena Lake in 1986 was 276,000 fish. This escapement and the 1986 fry plant produced 4,600,000 smolt out of the lake in 1987, considerably less than was expected. In 1987, 15,432,000 fry were stocked in addition to an adult sockeye escapement of 250,000 into the lake. Concern over apparent low survival of sockeye fry in the lake during 1987 has led to an interim decision, negotiated between the Refuge and Fish and Game, to limit 1988 stocking to 6,000,000 fry or less.

E. ADMINISTRATION

1. Personnel



Kenai National Wildlife Refuge Staff:

Back row: Ward (7), Kivi (11), O'Guinn (12), Bangs (9), Staples (19), Bailey (8), Johnston (6). Middle row: Frates (10), McCain*, Schumacher (18), Doshier (1), Hedrick (2), Hare (14). Front row: Richey (3), Bartman (25), Tutterrow**, Marsters (29), Fenc1 (15), Portner (17), Nelson (16). Missing: Larned (4), Blaylock (13).

*Vivian McCain, Budget Assistant, hired 2/03/88.

**Leigh Tutterrow, Volunteer, 12/87-4/88

Norm Olsen

1987 PERSONNEL
Permanent

1.	Daniel W. Doshier	Refuge Manager	GM-13	PFT
2.	Michael B. Hedrick	Deputy Refuge Manager	GS-12	PFT
3.	Robert A. Richey	Assistant Refuge Manager Oil & Gas (Pilot)	GS-12	PFT
4.	William W. Larned	Fire Management Officer (Pilot)	GS-12	PFT
5.	Michael F. Boylan	Supervisory Recreation Planner	GS-11	PFT
			Transferred	
6.	Richard K. Johnston	Recreation Planner	GS-09	PFT
7.	Candace D. Ward	Park Ranger	GS-07	PFT
8.	Theodore N. Bailey	Fish & Wildlife Biologist	GS-11	PFT
9.	Edward E. Bangs	Wildlife Biologist	GS-09	PFT
10.	James E. Frates	Facility Manager	GS-11	PFT
11.	Richard D. Kivi	Equipment Operator	WG-10	PFT
12.	Elvin "Al" O'Guinn	Maintenance Mechanic	WG-10	PFT
13.	Leslie G. Blaylock	Budget Assistant	GS-08	PFT
14.	Jeri Lee Hare	Accounting Technician	GS-04/5	
15.	Patricia A. Fencel	Refuge Clerk	GS-03/4	
16.	Deanne K. Nelson	Travel Clerk	GS-03/4	

Temporaries

17.	Mary F. Portner	Biological Tech.	GS-05
18.	Thomas Schumacher	Biological Tech.	GS-05
19.	Winthrop Staples III	Biological Tech.	GS-05
20.	William P. Eickhoff	Park Ranger	GS-05
21.	Karen P. Farrar	Park Ranger	GS-05
22.	Ronald A. Levy	Park Ranger	GS-05
23.	Kathleen Kemsley	Park Ranger	GS-05
24.	David K. Kenagy	Park Ranger	GS-05
25.	Donna M. Bartman	Laborer	WG-03
26.	Joey Koch	Laborer	WG-03
27.	Albert "Bud" Marrs	Laborer	WG-03
28.	James Farrar	Laborer	WG-03
29.	Brenda Marsters	Clerk Typist	GS-03

a. Permanent Personnel

After several years of relatively low staff turn-over, two key staff members went on to "bigger and better" assignments.

Budget Assistant Leslie Blaylock left the Service and transferred to a GS-09 position with Geological Survey in Anchorage. With her went a staggering amount of information and understanding of the financial and management aspects of the Kenai Refuge. Leslie started with the refuge when we were still the Moose Range managed from the cramped quanset hut in Kenai and she was the only female in the office.



Budget Assistant Leslie Blaylock is all smiles as she completes her last day on the job. JEF

It soon became apparent what we had all suspected was true, that this position (especially with Leslie in it) was one of the two most important positions on the refuge staff. And with the exception of Doshier and Hedrick, the staff concensus was that it was the most important position on the refuge staff!

Anyway, with admirable effort by Accounting Technician, Hare, there may be life after Leslie. It does point out though, another "truism" known by refuge staffs and evidently by no one else, that these positions are vastly underpaid in relation to their importance.

At the year's end this position was still vacant.

The second defector brought the end of the Mike Boylan "era" at Kenai. Mike transferred at the year's end to Adak as the new refuge manager of the Aleutian Islands Unit of the Alaska Maritime National Wildlife Refuge.

Mike's tenure at the Kenai was highlighted by an unprecedented amount of media coverage (mostly favorable) concerning refuge issues, management, and recreational opportunities. This publicity has led to an increased awareness and appreciation of the refuge by local Peninsula residents.

We wish both Leslie and Mike success in their new positions.

On the bright side, the remaining three members of our administrative staff, Jeri Lee Hare, Accounting Technician; Patricia Fencel, Refuge Clerk; and Deanne Nelson, Travel Clerk; all received well-deserved promotions.

Table 2. Staff Breakdown from Fiscal Year 1983 to Fiscal Year 1987.

	<u>Permanent</u>		<u>Vacant as of 12/31</u>	<u>Temporary</u>	<u>Volunteers</u>
	<u>Full-Time</u>	<u>Part-Time</u>			
FY83	12	2	2	16	26
FY84	13	3	1	14	25
FY85	13	2	2	10	43
FY86	16	0	1	13	28
FY87	16	0	1	13	30

b. Temporary Personnel

Summer seasonals are the "muscle" of the Recreation, Biology, and Maintenance programs. This year we also utilized a seasonal position in Administration, the first since 1982. For the past few years Kenai has been blessed with a group of seasonals of uncommonly high quality. Most have worked for the refuge for several years and have been the primary reason Kenai survives, and even makes some progress, in managing the hordes of people that descend upon us.

Management of the Kenai, from Biology to Administration, is driven by human use of the refuge. And while the Kenai has a relatively large permanent and seasonal staff, we are overwhelmed by people about five weekends a year. During these periods, when various parts of the refuge become "cities" with all their inherent problems, that "quality" in employees carries the day. We have it from top to bottom in our seasonal staff and they do a tremendous job.

Full Time Equivalents for Kenai this year was 25, up somewhat from 1986. Due to transfers and resignations, utilization was 23.9.

Table 3. Temporary Positions

	1983	1984	1985	1986	1987
Biological Aid & Techs.	4	3	1	2	3
Laborers	6	4	3	4	4
Park Rangers	3	4	3	5	5
YACC/YCC Staff	3	3	3	2	0
Clerk/Typist	0	<u>0</u>	<u>0</u>	<u>0</u>	1
TOTAL	16	14	10	13	13

2. Youth Programs

For the first time in several years Kenai National Wildlife Refuge did not sponsor a Youth Conservation Corp program. Since the disbanding of the actual Youth Conservation Corp Program in 1981, the Kenai National Wildlife Refuge has always sponsored a similar program with U.S. Fish and Wildlife Service money. The program has been relatively successful and is quite popular in the community. But in 1987, the Kenai National Wildlife Refuge was faced with funding the program from money already committed to existing programs and did not receive specifically budgeted money for the youth program, thus elected to not have one. A refuge program review conducted during 1987, recommended future sponsorship and funding for a youth program at Kenai National Wildlife Refuge.

4. Volunteer Services

Kenai's volunteer program, which involves some 30 people annually and thousands of hours, is comprised of 3 components: local volunteers, seasonal volunteers, and Student Conservation Association.



"People-Count" volunteers spruce up refuge bunkhouse
with a new coat of paint. JEF

a. Local volunteers

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

Kenai maintains a cadre of more than a dozen local volunteers, who meet the 12 hours per month minimum requirement by working alternating weekends in the refuge's visitor center. They contribute by hosting interpretive programs such as wildlife films and providing wildlife and refuge information to visitors. If it were not for these volunteers, not only would the visitor center's weekend and summer hours be reduced or eliminated, but refuge law enforcement would likewise be reduced as park rangers' time would be solely dedicated to operating the visitor center. Local volunteers significantly contributed to the high level of public service given to over 30,000 people who visited the refuge visitor center in 1987.

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

b. Seasonal volunteers

Seasonal volunteers are people from outside the immediate area who work at least three months continuously for 40 hours each week. Generally, these volunteers come from the volunteer recruitment program coordinated by Bill Knauer at the Alaska Regional Office. Seasonal volunteers receive \$450 per month for food and essentials, and free housing.

By year's end for 1987, 14 local volunteers had contributed 1,500 hours of volunteer service. Our 14 seasonal volunteers contributed 2,500 hours of service. In total these individuals contributed the equivalent of approximately two person-years of work to refuge operation in 1987.

c. Student Conservation Association

The Student Conservation Association program is an important component of the refuge's public use and biology programs. Due to consistently high quality of applicants and ease of recruitment, the refuge has made increased use of this program. In 1987, the refuge added two Student Conservation Association positions to the existing six positions to operate the refuge visitor center during peak summer visitor use. While Student Conservation Association people are not "volunteers" in the strictest sense of the word, since they receive a food and travel allowance, they fill a large gap that heretofore existed in accomplishing routine seasonal tasks on the refuge while learning about career choices. Since working with the program in 1985, we have consistently had high caliber people and quality work, and heartily recommend this program to other refuges.

In 1987, eight Student Conservation Association interns worked over 4,000 hours collectively for the refuge in projects which included: Visitor Center and Visitor Contact Station operation, youth wildlife education programs, public interpretive programs, trail brushing and rerouting, patrol of foot and canoe trails, litter pick-up and maintenance projects, moose hunter check station operation, biological data collecting, and furbearer live trapping and radio collaring. This year's Student Conservation Association crew included Lara Hill, Cynthia Goff, Mike McGraw, Connie McDermott, Bill Burdett, Dave Miller, Jena Ehrenhardt, and Judy Hagen.

5. Funding

Table 4. Kenai National Wildlife Refuge position patterns and funds, Fiscal Year 1983 through 1987.

FISCAL YEAR	1983	1984	1985	1986	1987
<u>PERSONNEL</u>					
FTE's Person years	18.5	21.5	21.5	20.8	25
PFT Positions filled	12	13	13	16	16
Vacant PFT 12/31**	10	8	8	7	7
PPT Positions filled	2	3	2	0	0
Vacant PPT 12/31**	1	0	1	1	0
Temporary	13	10	7	11	13
Temp. Intermittent	0	1	0	0	0
YCC Staff Positions	3	3	3	2	2
Vacant YCC Staff	1	1	0	0	0
YCC Enrollees	18	20	15	12	0
Volunteers	26	25	43	28	30

**Vacancies from Organization Chart.

OPERATING AND MAINTENANCE FUNDS

Wildlife Funds	970,000	928,000	863,000	953,000	1,087,000
Fisheries	0	10,000	30,000	0	0
Expenses for Sales	54,000	62,000	62,000	59,000	82,000
Subtotals O&M	1,024,000	1,000,000	955,000	1,012,000	1,169,000
Small ARMMS	<u>0</u>	<u>0</u>	<u>130,000</u>	<u>169,200</u>	<u>130,000</u>
Totals	<u>1,024,000</u>	<u>1,000,000</u>	<u>1,085,000</u>	<u>1,181,200</u>	<u>1,279,000</u>

SPECIFIC PROJECT FUNDS

YCC Funds	<u>0</u>	<u>34,693</u>	<u>26,600</u>	27,500	0
I&R-Fee Area	0	0	0	0	0
Fee Area Rehab	0	0	0	0	0
Large ARMMS	40,000	264,000	225,000	50,000	0
Refuge Resource Problem	0	0	150,000	20,000	75,000
Refuge Resource Problem	0	0	40,000	10,000	0
Skilak Loop SMA				362,000	1,500,000*

Accelerated Refuge Maintenance Management (ARMMS)

*No Year Money

The \$1,500,000 for the Skilak Wildlife Recreational Area was a congressional add-on for visitor services and implementation of the Kenai Comprehensive Conservation Plan. It will be used primarily to enhance wildlife viewing and interpretation, plus major rehabilitation of existing campgrounds.

Small Accelerated Refuge Maintenance Management funds of \$130,000 were used for maintenance and small projects that did not exceed \$5,000.

Refuge Resources Project funds to \$75,000 were for maintaining PCB clean-up efforts, analysis of abandoned drill mud pits, and baseline air quality impacts.

Funds were absent for the Youth Conservation Corp program this year and the program was suspended.

6. Safety

Our station safety record for 1987, got off to a rather "slippery" start in January when [REDACTED] fell on ice-covered steps at the Moose Research Center. [REDACTED] suffered a painful back injury and was placed on light duty for several weeks. Fortunately, [REDACTED] was able to get to his grader and return to Headquarters, but considering the remoteness of the area, and the fact that he was alone, the accident could have been much more serious.

Two other staff members escaped serious injury in two separate vehicle accidents -- a roll-over (while in pursuit of a moose hunter who bolted through a check station) and the other resulting from a 5-vehicle accident due to icy roads. Both were wearing seat belts -- another good example that our safety training pays dividends.

Unfortunately, several members of the visiting public were not quite so lucky. Two drownings occurred during the year -- both in the Kenai River. The drowning in the Kenai River near the Russian River occurred when a 33-year-old man tried to cross the river via the ferry cable. From witness accounts the man was obviously not in a sober condition when he attempted to "hand-walk" across the cable. A number of astonished fishermen saw him fall about mid-way to the opposite shore. His body has never been recovered.

The second drowning occurred when an Anchorage woman (without a life jacket on) capsized her canoe on the Kenai River in late August. Her body was found months later.

Another fatality occurred when a duck hunter, using a refuge cabin in the Chickaloon Flats area, died from asphyxiation while using a homemade charcoal stove. His son was also in critical condition, but survived the ordeal.

Considering the level of aircraft use on the Kenai, 1987, was a relatively safe year. Only one major accident was recorded -- a Cessna 170B which had a propeller separate in flight south of Brown's Lake. The pilot and passenger survived the crash despite broken bones and lacerations. Subsequent crash investigation by the Federal Aviation Administration revealed that the mechanic, in replacing the propeller, failed to properly include the required spacing washers. The plane, in pieces, was gathered up and helicoptered off the refuge the following day.



"Crumpled remains" of Cessna 170B that wrecked south of Brown's Lake after propeller separated. JEF

The monthly safety meetings, by topic and presenter, are summarized in table 5.

Table 5. 1987 Safety Meetings

<u>Date</u>	<u>Chairperson</u>	<u>Topic</u>
01/23/87	Candace Ward	Movie, Winter preparedness "In Winter's Domain"
03/02/87	Mike Hedrick	Video, "Saving Sight" (Eye injuries)
03/16/87	Bob Richey	Movie, "Bend Your Knees" (Back Safety)
04/27/87	Ted Bailey	Video, "Drowning: A Preventable AK Tragedy"
05/18/87	Mike Boylan	Video, "The Bear Facts" (Bear attacks)
06/02/87	Ed Bangs	Movie, "Bears and Man" (Bear safety)
09/21/87	Jim Frates	Video, Fire Fighter Series II & III (Fire Ext.)
10/19/87	Les Blaylock	Video, Fire Power (Excellent fire prevention movie.)
11/16/87	Dick Kivi	Video, "Winter Driving Tactics" (Winter driving)
12/21/87	Al O'Guinn	Video, Only the Best (Health Care Program)

7. Technical Assistance

Park Ranger Candace Ward was detailed March 7-13, to Selawik National Wildlife Refuge, where she conducted a week-end Environmental Education Workshop for Kotzebue teachers, then completed the refuge's Public Use Review with Regional Office Outdoor Recreation Planner Dave Patterson.

Bill Larned and other staff helped the local Audubon Society staff a snow goose observation area at the Kenai River Flats on Saturday, April 18.

The City of Soldotna began work on its \$350,000 Visitor Center during fall 1987, with the refuge invited to take a major role in the facility by being allocated the largest display space for an exhibit of our choice. Refuge staff Mike Boylan, Rick Johnston and Candace Ward, all participated in this project which is due for completion in March 1988.

In mid-October, refuge staff Donna Bartman, Dave Kenagy, and Candace Ward, assisted Alaska Maritime Refuge in dismantling a trespass cabin on Chisik Island. The cabin project was an excellent example of successful inter-refuge co-operation.

While attending the annual recurrent law enforcement refresher, six Kenai National Wildlife Refuge staff members assisted the Division of Law Enforcement in serving four search warrants, seizing contraband and serving a felony arrest warrant. The assistance to agents was the "raid" portion of an extensive federal/state investigation entitled "Operation Mammal". Violations included the Lacey Act, Endangered Species Act, Marine Mammal Protection Act, and possession of a controlled substance.

F. HABITAT MANAGEMENT

3. Forests

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

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

For these reasons, timber harvesting on the Kenai National Wildlife Refuge is used primarily where safety or other special considerations precludes the use of fire. These special areas will be pointed out in the Habitat Management Plan currently being developed for the refuge.

In 1987, a 50-acre tract adjacent to the Funny River Road firewood area was cruised and evaluated for a commercial timber sale, the objective being for a logger to remove the mature live spruce, which would create easier access for subsequent public firewood harvest. It was determined that there was not sufficient commercial saw timber to attract bidders without including firewood salvage in the package, so the sale was canceled in favor of simply opening the area for personal use firewood harvest.

Public firewood areas serve the dual functions of low-cost habitat enhancement/fuel management and a source of heating fuel for local people. The Funny River Road cutting area was expanded this year by 80 acres for a total of 440 acres. This year in order to partially defray

administrative costs of the popular program as well as to bring it in line with State and other public firewood programs, a \$20 fee was charged per permit for a 5-cord season limit. Most permittees seemed to consider this a reasonable charge, but total permits issued for the year dropped from 600 in 1986, to 184 in 1987. Several factors may have influenced this change: previously many people may have picked up a permit for very small amounts of fireplace wood which the \$20 fee makes uneconomical, the depressed economy has forced many people out of the area this year, and the unusual snow accumulations since October have made firewood access tougher than usual so many people have bought wood this year instead of cutting their own.

Refuge lands were opened as usual for personal-use Christmas tree cutting, and the Mystery Creek Road was available for Commercial Christmas tree harvest, although there were no permits purchased this year because of the heavy snow accumulation in that area.

The State's three huge LeTourneau tree crushers have not been used for habitat work on the refuge since 1986, although the Alaska Department of Fish and Game has kept one machine operating to rehabilitate several hundred acres per year inside the enclosures at the Moose Research Center. The last areas crushed in the Skilak Loop vicinity were subsequently burned in July of 1986, (Lily Lake prescribed burn) and August of 1987, (Skilak Loop II -- see \$9, Fire Management).



LeTourneau tree crusher and "operator", located inside enclosure at the moose research center. JEF

Between the winter of 1984 and the fall of 1987, our Cooperative State/Federal habitat rehabilitation project has produced 2300 acres of crushed and burned forest habitat, 500 acres of crushed-only forest habitat, and 480 acres of burned only forest habitat manipulation, for a total of 3280 treated acres. This acreage is all in the Skilak Loop vicinity, and completes our work there for several years at least. Vegetative response is encouraging for those areas treated from 1984, through 1986, with most regrowth due to root- and stump-sprouting of willow, aspen, and to a lesser extent birch. The undesirable spruce has been removed from nearly all burned acreage, although regeneration through seeding should soon be evident.

Our next big project is to complete the refuge Habitat Management Plan which will establish a habitat treatment schedule with a target of at least 2000 acres per year using prescribed burning as the primary method of treatment. The plan should be completed during fiscal year 88 with some interim habitat projects scheduled for summer of 1988.

9. Fire Management

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



Bureau of Land Management Burn Boss Dave Dash and
State Forestry Holding Boss Larry Adams on assignment
at Skilak Loop. WL

Nineteen eighty-seven was another slow fire season for the Kenai with cloudy and showery weather predominating through July, although total precipitation was below normal. The fire danger never got into the high range until late August and early September, when a persistent high pressure ridge brought beautiful clear warm days and eventually severely dried even the larger fuels and duff, which is rare for this area.

There were 6 wildfires reported on the refuge during 1987, totalling only 3.0 acres. All resulted from unattended campfires. Four were in Full suppression areas (so designated in the Kenai Peninsula Interagency Fire Plan), three along the road system and one on a small island in Skilak Lake. The Island fire was the largest at one-half acre. The other two, in a Limited suppression area east of the Chickaloon Flats, were monitored only, and involved 0.7 and 1.5 acres when declared out. The first fire of the year was reported on June 20, and the last was declared out on October 26.



Fire on island in Skilak Lake was the largest of six reported wildfires on the refuge in 1987. The one-half acre fire was caused by an unattended campfire. RKJ

This year, for the first time, a seasonal biotechnician, Mark Ostwald, was hired to assist with the fire and habitat programs. Although a bit frustrated by the fact that we were not able to actually conduct a prescribed burn until after he left in August, Mark did a vast amount of work in preparation for planned burns, as well as evaluating effects of past burns and other habitat projects. We hope to be able to hire one or two seasonals for the fire program in 1988, to continue this work, which is critical to meeting our habitat and fire management objectives.

Our 1987 prescribed burning activities began with the revision of the plans for the 1650-acre Skilak Loop II burn and the 360-acre Funny River Road firewood area burn, both slash disposal burns, and the drafting of a plan for a 410-acre standing timber burn in the Willow Lake area near the end of Swan Lake Road. By mid-May, all these plans were approved and open burning permits were obtained from the Alaska Department of

Environmental Conservation. All preparations went well for the first planned event, the Funny River burn, including obtaining a track All Terrain Vehicle through a Cooperative agreement with Alaska Division of Forestry, borrowing a water expansion pumping system from the Chugach National Forest, coordinating and briefing all necessary interagency personnel, etc., etc. Unfortunately, this burn was to rely on the dead grass remaining from the previous year to carry the fire through the discontinuous slash fuel, and sporadic spring showers kept the fuels wet until an early greenup shut us down for the season by the first of June.

After recovering from this minor setback we began mobilizing for the second planned burn at Willow Lake. This one required a long rain-free period to dry surface fuels under a dense mature spruce canopy. Several times in June and July we got close to prescription, then a thundershower would set us back another week. A couple of times a shower seemed to actually center over the burn unit, hardly getting a drop anywhere else. In late July we decided to put top priority on the Skilak Loop II unit, which was in a "rain shadow" and was the closest to being in prescription. Finally it seemed that prescription parameters would be met by July 27, and final preparations were made. But when the date arrived, the Bureau of Land Management burn boss, some State burn-crewmembers, and the helicopter for the aerial ignition system were all unavailable, so we were back on "hold" until late August.

At last, on August 24, it was determined that we were in prescription for fuel moistures and a persistent ridge of high pressure promised continued fair weather, so all resources were assembled for an August 27 ignition date. On the morning of the 27th, conditions looked favorable including smoke dispersal predictions, and all necessary resources were available. So a successful test burn was conducted at noon, and the remainder of the unit was ignited by helitorch, completing the last strip by 1830 hours.



The U.S. Forest Service helitorch, with propane igniter, worked beautifully, piloted by the late "Cub" Martin. WL



"I think it needs three more bat wings and a couple of lizard tongues".
WL

All operational aspects of the burn went smoothly and safely, but by dawn of the following day, it became evident that a combination of an unforecasted local surface weather disturbance, the still-dominating high, and, very likely, our smoke itself, had put a stubborn inversion cap over the Cook Inlet area, causing our heavy residual smoke to spread to Anchorage, Cooper Landing, Sterling, Soldotna, and all places in between. This drew considerable attention from the news media, the Department of Environmental Control, the Governor's office, and the general public. Unfortunately, the condition persisted for two more days until a rapidly-moving dry cold front quickly dispersed the smoke and caused most of the remaining unburned fuels to be rapidly consumed. At this point, there was a brief flurry of activity as holding crews worked (successfully) to keep a very active wind-whipped fire front from crossing one of the control lines.



Once again, we directed the lighting operation from the refuge super cub circling overhead. This is not only the most efficient way to handle the lighting, but provides constant aerial surveillance for holding, fire behavior observation, and smoke management. WL



As in our previous slash burns, the fire crept a short ways into the surrounding standing timber, then went out. WL



The All Terrain Vehicle engine, equipped with a compressed air foam system, is an indispensable holding resource on the Kenai. WL

Though we were exonerated from blame in the smoke incident because we had operated entirely within our approved burn plan and open burning-permit restrictions, we did learn a great deal from the experience and should be able to improve our performance in forecasting, reducing, and mitigating smoke impacts from future burns. Fire Management Officer Larned also picked up a lot of useful "state of the art" smoke management technology at a course entitled "Smoke Management Techniques", put on by the National Wildfire Coordinating Group in Phoenix, Arizona in December.

The 1620-acre Skilak Loop II burn was by far the largest prescribed burn conducted on the refuge to date, and also the hottest, the cleanest, the deepest-burned, and the cheapest per acre (about \$6.00). Habitat effects of this burn should be very different because the unusually dry subsurface conditions allowed the fire to consume most of the duff over the upland portions, killing most rootstocks and exposing mineral soil for reseedling. This type of condition resulted in revegetating predominantly by seed after the 1969 Swanson River Fire, which became our most productive moose habitat. All in all, the Skilak Loop II burn would seem to be a "quantum leap" in our habitat program, with the future looking very bright at this point.



Heavy consumption of organic material left shallow root systems exposed above mineral soil. WL



The "smoking remains" three days after ignition.

WL



Dry duff and litter resulted in a moderately severe burn that exposed mineral soil in many areas. WL



"Habitat improvement" you say? "For my own good" you say? Looks more like a nuclear holocaust to me. WL

10. Pest Control

The on-going spruce beetle infestation which has claimed over 55,000 acres of mature white spruce on the refuge, is still killing trees and drawing a lot of attention from the standpoint of aesthetics, perceived waste of valuable timber, and potential salvage of the trees for firewood and houselogs. Apparently, little additional acreage was affected this year, although a complete survey by the Forest Service was not conducted this year. One potential source of attractive new host material for the beetles in 1987, was many thousands of white spruce trees that were blown down in the western portion of the peninsula during a severe windstorm in late February. This phenomenon could have a profound effect on the spread of the epidemic over the next few years, as freshly-killed spruce provide choice habitat for breeding beetles, which can then attack healthy trees in much larger numbers.

The spruce trees in two of our most popular campgrounds, "Jim's Landing" on the upper Kenai River and "Upper Skilak" on Skilak Lake, have been devastated by spruce beetles, and in December proposals were solicited from local timber operators for the removal of those dead trees constituting a hazard to campers from wind-throw and fire. An incredible 650 trees were marked at Upper Skilak, and 185 at Jim's Landing, to be removed during January and February, 1988. Sunbathing opportunities should be greatly enhanced at both sites for the next few years.

12. Wilderness and Special Areas

The draft supplemental environmental impact statement for the wilderness proposal of the Kenai Comprehensive Conservation Plan/Environmental Impact Statement/Wilderness Review was released in August 1987.

The supplemental Environmental Impact Statement addresses the wilderness review and areas qualifying for additional wilderness protection as discussed in the final Kenai National Wildlife Refuge Comprehensive Conservation Plan/Wilderness Environmental Impact Statement. The Alaska National Interest Lands Conservation Act, section 1317, requires the Secretary of Interior to review refuge lands acts for their wilderness suitability.

The proposed action presents an additional 195,000 acres, comprised of three units, as suitable for wilderness designation to be added to the existing Kenai Wilderness by Congress. The three areas are: Chickaloon Flats/Two Indians unit, 177,500 acres; The Tustumena/Kasilof Unit, 10,500 acres; and the Southwestern Tustumena unit, 8,000 acres. These lands support a wide range of habitats including estuarine, alpine shrub-lichen, lowland subalpine shrub, mature forest, and lakes and streams.

Wilderness values were significantly enhanced during 1987, as the three-year delay in getting refuge-access regulations reinstated, ended in late 1986. Nineteen eighty-seven was the first full year of protection for several wilderness areas from snowmobile, aircraft and motorboat encroachment. In addition, several areas previously open to various motorized access were restricted, thus significantly enhancing wilderness character and wildlife protection. In particular, non-compatible aircraft landings in the Swan Lake/Swanson River Canoe Route portions of Kenai wilderness were almost completely eliminated during 1987.

On September 30, Assistant Refuge Manager Richey and Park Ranger Dave Kenagy traveled by helicopter to the Caribou Hills. Wilderness boundary signs and non-motorized signs were placed along the eastern boundary at several prominent trails leading on to the refuge. Signs were originally placed there in the early 1970s and several were deteriorated or had been removed.



Park Ranger Dave Kenagy with new boundary and non-motorized signs posted at certain locations along the Caribou Hills refuge boundary. RR



New boundary signs were posted in the Caribou Hills adjacent old seismic trails entering refuge lands.

RR

On August 3, two dozen 55-gallon barrels were removed by helicopter from the site of an old gold mine in the Surprise Creek area of the Kenai Wilderness. At least half of the barrels were full of oil and several were leaking. State Forestry personnel participated in the barrel removal as a training exercise and a local volunteer trucked the barrels off the refuge.



In August, 1987, 55-gallon barrels were airlifted from Surprise Creek in Kenai Wilderness.

RKJ



Fifty-five gallon barrels located at the site of an old gold mine in the Surprise Creek area. RKJ

On November 23, the refuge received a telephone request from ERA Helicopters to conduct landings on refuge portions of the Harding Icefield. The request was denied, based on current refuge aircraft landings regulations and wilderness values.

The program to allow wilderness inholders off-road vehicle access through Kenai wilderness continued during 1987, with a continuing deterioration of the surface vegetation along non-wilderness and wilderness portions of the winter route. The inholder off-road vehicle users continue to depart from the route, travel beyond the inholding and travel over non-snow-covered portions of the route despite permit stipulation not authorizing such travel. It also is particularly difficult to distinguish between permittees and non-permittees riding off-road vehicles during refuge patrol flights. The route was initially opened in December of 1987, and closed on February 24, 1988, although unauthorized off-road vehicle use continued into April.

The Bureau of Land Management conveyed in excess of 4,400 acres of land within Kenai wilderness to the Point Possession native group on the northern tip of the refuge. The conveyance and circumstances surrounding the native group have been the subject of appeal by a local air taxi, The Sierra Club and The U.S. Fish and Wildlife Service. The decision subtracts a substantial amount of valuable wildlife habitat and fly in fishing lakes from the refuge as well as wilderness protection.

Volunteers conducted several backcountry patrols in the Swan Lake and Swanson River Canoe routes during May, June, July, August and September. Patrol persons conducted trail clearing, trail rehabilitation, placement of signs and dispensed information to the public.

Since the Youth Conservation Corp was not available during 1987, canoe route trails slightly deteriorated. Patrol rangers and volunteers could not keep up with the maintenance needs.

Student Conservation Association volunteers and staff also worked on Fuller Lakes Trail within Kenai wilderness. Although they accomplished significant work, subsequent horse use of the trail all but cancelled improvements. Horse use of Fuller Lakes Trail causes major trail surface damage when the trail is soft due to snow melt or rains. The Fuller Lakes Trails were closed to spring and early summer horse use for the first time during 1987, however, increased horse use by an outfitter/guide, coupled with wet conditions, cancelled out gains made due to the closure.



Trail disturbance caused by horse use.
Fuller Lake Trail

RKJ

G. WILDLIFE1. Wildlife Diversity

Attempts to maintain the natural diversity of species on the refuge by protecting rare or uncommon species were partially successful in 1987. Marten trapping was prohibited in the area between Russian River and Skilak River and wolverine trapping was prohibited for three years in the northern part of the refuge pending the results of an inter-agency wolverine study. Both changes will become effective with the 1988-89 trapping season. A proposal to protect red fox on the refuge by closing the trapping and hunting season was unsuccessful. The red fox on the refuge is currently classified as a unique subspecies and observations of fox on the refuge are rare. A study of red fox distribution and ecology on the refuge was submitted as a preliminary study but received a low priority rating in the region. This study will be proposed again in 1989.

3. Waterfowl

No systematic surveys of waterfowl, other than Trumpeter Swan and wintering waterfowl along the Kenai River were conducted on the refuge because of its relative low productivity for waterfowl. Waterfowl observed along the Kenai River during the 1987-88 winter are shown in Tables 6 and 7.

Table 6. Waterfowl observed on the Kenai River: Skilak Lake Outlet to Bing's Landing, 1987-88.

Month	Species			
	<u>Goldeneye</u>	<u>Merganser</u>	<u>Mallards</u>	<u>Bufflehead</u>
Nov 87	307	12	84	0
Dec 87	-	-	-	-
Jan 87	383	130	0	0
Feb 87	627	51	165	3
Mar 87	479	78	55	0

Table 7. Waterfowl observed in Upper Kenai River: Kenai Lake Outlet to Jim's Landing, 1987-88.

Month	Species			
	<u>Goldeneye</u>	<u>Merganser</u>	<u>Mallard</u>	<u>Bufflehead</u>
Nov 87	51	23	7	0
Dec 87	76	60	43	0
Jan 87	108	114	16	0
Feb 87	311	96	106	0
Mar 87	56	70	14	0

5. Shorebirds, Gulls, Terns and Allied Species

In early June, 1987, a nesting survey revealed 12 active double crested cormorant nests on the "main rocks" (largest rock) at Skilak Lake. A later survey on July 31 indicated that 2 more nests had been established on an adjacent rock. At this time 10 juvenile cormorants were visible in at least 3 nests on the main rock.

6. Raptors

Two, with a possibility of two more new nest sites of bald eagles were discovered on the refuge during 1987. This made a total of 34 active nests, plus three that had adults near the nest during the nesting survey but did not later produce eaglets. Twenty-six of the active nests produced eaglets. Forty-three total eaglets were produced. There was an average of 1.65 eaglets per nest with eaglets. Seventy-six point four percent of the active nests later produced eaglets (Tables 8 and 9).



An adult eagle with a spawned-out silver salmon "freshly plucked" from the icy Upper Kenai River.

TS

Table 8. Bald eagle nesting locations, nesting eagles (1 & 5 May 87) and production (21 & 23 July 87) on the Kenai National Wildlife Refuge, 1987.

TERRITORY LOCATION	Nest Survey		Productivity Survey	
	Status	Checked	Nests	Eaglets
<u>NORTH OF KENAI RIVER (Game Management Unit 15A):</u>				
A. <u>ON REFUGE</u>				
I. <u>OUTSIDE WILDERNESS</u>				
Torpedo Lake	A	1	1	2
Blizzard Lake on Skilak Lake	s/n1	0	0	nc
Afonasi Lake	A	1	1	2
East Fork Moose River (N. Pipeline Rd.)	Hawk	1	0	nc
Moose River near East Fork	A	1	1	0
West Fork Moose River	A	1	1	0
Coyote Lake	A	1	1	1
Pipeline Road/Noname Creek	A	1	1	1
Big Indian Creek	I	1	1	0
Pincher Creek	A	1	1	2
Beaver Lake	I	2	0	nc
N. Beaver Lake (3 miles)	ANB	1	1	1
Mink Creek Lake area	I	1	0	nc
Campfire Lake	I	2	0	nc
Chickaloon River Inholdings	A	0	1	2
II. <u>INSIDE WILDERNESS</u>				
Jim's Landing	A	1	1	2
Camp Island Lake	A	2	2	2
Loon Lake	A	2	2	2
Clam Lake/Moosehorn Lake Ridge (east)	I	1	0	nc
Swan Lake	I	2	0	nc
Rock Lake	A	1	1	2
Spruce Lake	A	1	1	2
Bear Lake	A	2	2	1
NE Moose Lake	I	1	0	nc
Chickaloon River near Moose Pasture	A	1	1	1
Chickaloon River near Moose Pasture	s/n1	0	0	nc
Bedlam Creek Bluff	A	2	2	1
King Lake	s/n1	0	0	nc
Gene Lake	ANB	3	3	0
Sucker Lake	A	2	2	0
Camper's Lake	A	1	1	2

B. OFF REFUGE

Kenai River near Gwen's Lodge	I	1	1	1
Juneau Creek	A	2	2	2
Moose Point Lake (Birch Hill) area	I	2	0	nc
Otter Creek Outlet	s/nl	0	0	nc
Stormy Lake	s/nl	0	0	nc
Bishop Creek Outlet	I	3	0	nc
"Drained" (Near Suneva) Lake Area	nc	1	0	nc
Daniel's Lake	I	0	0	nc
Quartz Creek Bridge	A	1	1	2

Table 9. Bald eagle nesting locations, nesting eagles (1-5 May 86) and production (21-23 July 86) on the Kenai National Wildlife Refuge, 1987.

TERRITORY LOCATION	Nest Survey		Productivity Survey	
	Status	Checked	Nests	Eaglets

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

A. ON REFUGEI. OUTSIDE WILDERNESS

Headquarters Lake	A	1	1	1
Funny River	s/nl	0	0	nc
Killey River (Lower-North)	I	1	0	nc
Killey Creek (middle) (2)	I	2	0	nc

II. INSIDE WILDERNESS

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

B. OFF REFUGE

Kenai River (Salamatof Native Land)	A	2	2	1
Kenai River (North of Brown's Lake)	I	1	0	nc
Russian River	I	1	0	nc
Beaver Creek Outlet/Kenai River	A	1	1	2
Lower Kenai River (above bridge)	A	1	1	3
Lower Kenai River (Island by college)	I	1	0	nc
Kasilof River near bridge	A	1	1	1
Coho Road Gaswell Area	s/nl	0	0	nc
Kalifornsky Beach Road	s/nl	0	0	nc

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

Nikolai Creek	ANB	1	1	0
Upper Fox River	A	1	1	0
Lower Fox River/Clearwater Slough	I	1	1	nc

B. OFF REFUGE

Sheep Creek	A	1	1	2
Bradley River Outlet	A	1	1	2
Lower Deep Creek	nc	1	0	nc
<u>W. Bank Sheep Ck./Fox R. (1)</u>	A	1	1	sn/1

Key: New nest located for first time in 1986 is underlined.

A = active; I = Inactive; nc = not checked; s/nl = searched/not
Located

? = unknown; - = assumed no eagles/eaglets at nest; 0 = no eaglets
observed.

Table 10 indicates the ages of bald eagles observed during boat surveys along the Upper Kenai River during winter-spring and fall-winter months, 1987.

Table 10. Ages of bald eagles observed during boat surveys along the Upper Kenai River during winter-spring and fall-winter months, 1987.

	River Route Number								
	1			2			Total		
	Ad	Juv	Unid	Ad	Juv	Unid	Ad	Juv	Comb
01/15&16/87	78	42	0	176	46	6	254	88	6
02/17&18/87	89	46	4	96	34	5	185	80	9
03/20&19/87	36	19	4	61	20	3	97	39	7
11/17&19/87	18	16	0	29	26	0	47	42	0
12/16/87	46	22	0	No survey conducted					

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



Bald Eagles seen along the Lower Kenai River during Winter float surveys.

TS

7. Other Migratory Birds

The Alaska Breeding Bird Survey was conducted along two routes in 1987 by Biological Technician Mary Portner.

The Seven Lakes Route was surveyed on June 26. Results of the survey as shown in Table 11 indicate the most commonly observed birds were the Swainson's Thrush (59), Yellow-rumped Warbler (35), and White-crowned Sparrow (30). A total of 302 birds of 26 species were observed along this route.

Table 11. Birds recorded on the Seven Lakes Route, Alaska Breeding Bird Survey, 1987.

Species	#	Species	#	Species	#
Common Loon	5	Greater Yellowlegs	5	Glaucous-winged Gull	-
Arctic Tern	1	Olive-sided Flycatcher	7	Herring Gull Hybrid	1
Western Wood-Pee wee	1	Alder Flycatcher	24	Tree Swallow	3
Violet-green Swallow	4	Gray Jay	7	Common Raven	3
Boreal Chickadee	1	Gray-cheeked Thrush	59	American Robin	5
Varied Thrush	16	Orange-crowned Warbler	7	Yellow-rumped Warbler	35
Blackpoll Warbler	4	Northern Waterthrush	9		
Wilson's Warbler	2	Savannah Sparrow	4	White-crowned Sparrow	30
Slate-colored Junco	24	Common Redpoll	14		

The Alaska Breeding Bird Survey on the Swan Lake Route was completed on June 21. The most commonly encountered birds included Swainson's thrush (75), Alder Flycatcher (59), and slate-colored Junco (42). A total of 396 birds of 30 species were recorded.

Table 12. Birds recorded on the Swan Lake Route, Alaska Breeding Bird Survey, 1987.

Species	#	Species	#	Species	#
Common Loon	7	Horned Grebe	1	Sandhill Crane	3
Common Snipe	2	Herring Gull	1	Northern Three-toed	
Olive-sided Flycatcher	11	Western Wood-Pee wee	3	Woodpecker	2
Alder Flycatcher	59	Tree Swallow	9	Gray Jay	15
Common Raven	1	Boreal Chickadee	7	Golden-crowned Kinglet	2
Ruby-crowned Kinglet	25	Gray-cheeked Thrush	7	Swainson's Thrush	75
American Robin	2	Varied Thrush	11	Orange-crowned Warbler	9
Yellow Warbler	2	Yellow-rumped		Blackpoll Warbler	5
Northern Waterthrush	10	Warbler	37	Wilson's Warbler	2
Savannah Sparrow	3	White-crowned		Slate-colored Junco	42
Common Redpoll	16	Sparrow	24	Pine Siskin	3

Trumpeter Swan nesting surveys revealed 42 nesting attempts on the Kenai Peninsula, 38 of which were on the refuge (Tables 13, 14, and 15).

Table 13. Trumpeter swan nesting locations and productivity on the Kenai National Wildlife Refuge, 1987.

		Location (Swans)	Nested	Early		Late	
Location	Wilderness			Cygnets	Adults	Cygnets	Adults
North of	Inside	Angler Lake	X	6	2	0	0
Kenai R.	"	Aspen Lake	X	0	0	0	0
(Inside	"	Camp Island	X	5	0	0	0
Refuge)	"	Chickaloon Oxbow	X	5	0	0	0
	"	Diamond Lake	X	0	0	0	0
	"	Dipper Lake	X	3	0	0	0
	"	Grebe Lake	X	4	0	4	0
	"	Greycliff	X	5	0	4	0
	"	Moose Lake	X	5	0	5	0
	"	Moose R (L)	X	0	0	0	0
	"	Moose R (U)	X	7	0	0	0
	"	Mystery Creek	X	0	2	0	0
	"	Phalarope Lake	X	5	0	0	0
	"	Scenic (NE)	X	6	0	4	0
	"	Scenic Creek	X	5	0	6	0
	"	Scenic Lake	X	7	0	0	0
	"	Vogel Lake	X	0	0	0	0
	"	Warbler Lake	X	1	0	0	0
Subtotal			18 (13)	64	(5)	23	

Table 14. Trumpeter swan nesting locations and productivity on the Kenai National Wildlife Refuge, 1987.

				Early		Late	
Location	Wilderness Location	(Swans) Nested		Cygnets	Adults	Cygnets	Adults
North of	Outside	Boundary Lake	X	5	0	6	0
Kenai R.	"	Curlew Lake	X	0	5	0	0
(Inside	"	Doroshin	X	2	0	2	0
refuge)	"	Finger Lakes	X	0	4	0	0
	"	Hook Lake	X	0	4	0	0
	"	Lonesome Lake	X	4	0	1	0
	"	Mink Lake Creek	X	0	0	0	0
	"	Mink Lake Creek	X	0	0	0	3
	"	Quill Lake	X	3	0	1	2
	"	Seven Egg Creek	X	4	0	0	0
	"	Swan/Campfire	X	6	0	8	2
	"	Swan/Campfire	X	3	0	0	0
	"	Torpedo	X	0	0	0	0
	"	Trapper Joe	X	0	0	0	2
Subtotal			14 (7)	27		(5)	18
GRAND TOTAL			32(20)	91		(10)	41

Nesting Survey = May 12, 19, & 26, 1987.

Early Brood Survey = July 6, 8, & 9, 1987.

Late Brood Survey = September 21 & 23, 1987.

Table 15. Trumpeter swan nesting locations and productivity on the Kenai National Wildlife Refuge, 1987.

			Nesteds	Early		Late	
Location	Wilderness	Location (Swans)		Cygnets	Adults	Cygnets	Adults
North of Kenai R.	Outside	Bishop Creek	X	4	0	4	0
(Outside refuge)	"	Stormy/Suneva	X	6	0	5	0
	"	Tony's	X	4	0	4	0
Subtotal			3 (3)	14		(3)	13
South of Kenai R.	Inside	Fox Lake	X	5	0	4	0
(Inside refuge)	"	Fox River	X	4	0	2	0
	"	Harvey/Killey	X	3	0	0	0
		Tea/Brown's	X	5	0	6	0
		Tustumena Pond (S)	X	4	0	0	0
Subtotal			5 (5)	21		(3)	12
(Inside Refuge)	Outside	Bay Lakes Bogs	X	4	0	0	0
Subtotal			1 (1)	4	0 (0)	0	0
TOTAL			9 (9)	39	0 (6)	25	0
(Outside refuge)		Gaswell Bogs	X	0	0	0	0
Subtotal			1 (0)	0	0	0	0
GRAND TOTAL			10 (9)	39	0 (6)	25	

8. Game Mammals

a. Moose

A winter moose census was conducted by refuge staff and Alaska Department of Fish and Game from February 3-8, 1987. This was the first year the Gasaway technique was used, so results were not directly comparable to past censuses. This method uses larger count units to reduce the variance and confidence intervals, while surveying the same total area.

The 1987 census estimated the number of moose in subunit 15A, which includes the refuge north of the Kenai River, to be 2702 ± 262 at the 90% confidence level. At best, this estimate puts moose numbers at 700 fewer than the objective population of 3,600. The refuge has undertaken a program of crushing and burning to provide better moose habitat and enhance moose viewing and hunting opportunities.



In order to enhance the Service's image with visitors, refuge staff employed (WG-2) this fine specimen to stand by the entrance sign from 8:00-4:30 daily. JEF

Moose composition counts for Game Management Unit 15A were conducted

cooperatively by refuge staff and Alaska Department of Fish and Game from November 24-29, 1987 (Table 16). New antler restrictions, imposed for the 1987 season by Alaska Department of Fish and Game at the urging of refuge staff and local sportsmen, seem to have been a success. The post hunting season bull-cow ratio was raised from 6 bulls:100 cows to 16.6 bulls:100 cows. This was an impressive step toward the refuge goal of 30 bulls:100 cows, and the antler restrictions will be kept in place for the foreseeable future.

Table 16. Moose Composition Counts, Kenai National Wildlife Refuge, 1987.

Area	Date	Yrlg.	Bulls (Legal)		Cows			Lone Calf	Total
			50"+	-50"	W/O Calf	W/1 Calf	W/2 Calves		
2	11/24/87	24 (13)	20 (0)	5 (5)	177	98	12	1	459
5	11/27/87	7 (6)	12 (0)	1 (1)	57	43	6	0	181
6	11/29/87	6 (3)	9 (1)	4 (4)	52	7	0	0	85
7	11/24/87	1 (0)	2 (0)	0 (0)	30	11	0	0	55
9	11/24/87	3 (3)	3 (0)	0 (0)	51	11	0	0	79
9B	11/27/87	0 (0)	1 (0)	0 (0)	15	20	0	2	58
Total		41 (25)	47 (1)	10 (10)	382	190/190	18/36	3	917

Cow-calf ratios were up slightly from 1986 to 38.8 calves:100 cows with a twinning rate of 8.6 twins:100 producing cows. It is hoped that habitat enhancement combined with hunting restrictions will increase opportunities for refuge visitors to view and hunt the large bull moose the Kenai is famous for.

b. Caribou

Three caribou herds on the Kenai Peninsula were surveyed at various times during 1987 (Table 17). The mountain herd continues to grow slowly and 250 either sex permits were issued in 1987. The lowland herd has remained at a stable number and it is thought that excess caribou from this herd join the mountain herd. Caribou in the benchland herd, which were transplanted from the Nelchina Basin in 1985 and 1986, appear to be doing well. The herd now numbers at least 92 animals in four groups and calf survival appears high.

Table 17. Caribou surveys on the Kenai Peninsula, 1987.

	Date	Agency	Bulls	Cows	Calves	Total
Mountain Herd	12-13-87	ADF&G	72	168	33	273
Lowland Herd	6-87	ADF&G	21	51	26	98
	10-87		42:100 cows		31:100 cows	97
Benchland Herd	6-19-87	ADF&G USFWS	---	---	---	85

c. Dall's Sheep and Mountain Goats

Dall's sheep and mountain goats on the Kenai Peninsula were surveyed by Alaska Department of Fish and Game during summer 1987 (Tables 18 and 19). The status of Kenai sheep and goat populations is not well documented, but it is believed that both are expanding slowly. However, the number of mature rams in this heavily hunted area remains abnormally low.

Table 18. Dall's sheep surveys on the Kenai Peninsula in 1987.

Count Area	Date	Count Time	Legal Rams	Sub-Legal Rams	Ewes	Lambs	Unid.	Total
837	7/29/87	0.8 hrs	2	5	8	2	0	17
838	7/29/87	1.7	2	15	67	26	0	110
839	7/29/87							
	8/18/87	2.3	6	16	20	6	0	48
833	7/29/87	0.5	2	1	59	13	0	75
855	8/03/87	1.8	7	21	47	11	0	86
856	8/03/87	3.2	18	86	245	77	0	426
857	8/01/87	2.2	2	19	70	35	0	126
858	7/21/87	2.3	4	9	18	4	0	35
Totals		14.8 hrs	43	172	534	174	0	923

Table 19. Mountain goat surveys on the Kenai Peninsula in 1987.

Count Area	Date	Count Time	Adults	Kids	Total	Kids Per 100 Adults	Percent Kids
837	7/29/87	0.8 hrs	31	8	39	26	21
838	7/29/87	1.7	4	2	6	50	33
839	7/29/87						
	8/18/87	2.3	58	26	84	45	31
845	8/19/87	2.9	222	66	288	30	23
846	8/18/87	2.3	145	28	173	19	16
854	8/03/87	0.9	65	14	79	22	18
855	8/03/87	1.8	30	16	46	53	45
856	8/03/87	3.2	31	13	44	42	30
857	8/01/87	2.2	50	20	70	40	29
858	7/21/87	2.3	60	21	81	35	26
859	8/21/87	2.7	87	23	110	26	21
860	8/26/87	2.7	89	21	110	24	19
Total		25.8	872	258	1130	30:100	23%

d. Wolf

Wolf numbers in the northern portion of the refuge continue to be low and a never ending source of controversy with the Alaska Department of Fish and Game. Pre-trapping season numbers were agreed to be about 40 wolves in Game Management Unit 15A by both agencies. However, new data gathered during trapping season indicated that pre-season numbers may have been as low as 32 wolves. This was within the refuge post-season objective of 27-37 wolves in packs, but the Alaska Department of Fish and Game disagreed with the numbers and did not close the season as requested.

Little is known about wolf numbers or pack sizes in the central and southern regions of the refuge, but these areas carry less prey and are smaller than subunit 15A.



An adult female wolf captured for radiocollaring along the North Pipeline Road in late August 1987. TS

e. Lynx

Eleven lynx were radiocollared by refuge staff on the Swan Lake Canoe System study area, and four along the Pipeline Road during 1987. Game Management Unit 15A, in which these areas are located, has been closed to lynx trapping for three years. State efforts to collar lynx in Game Management Unit 15B, which is more remote, but open to lynx trapping, were not as successful.

All radiocollared lynx except known resident cats and one yearling female left the Swan Lake Canoe System study area, and an adult male originally captured at Mystery Hills was released by a trapper near Cordova, 150 air miles to the east. These movements may have been a result of declining snowshoe hare populations. Low snowshoe hare numbers also may have been responsible for the lack of any known lynx reproduction in the Swan Lake Canoe System study area.



An adult male lynx captured and radiocollared along the South Pipeline Road near No Name Creek during summer 1987. TS

Following repeated suggestions from refuge staff, the Alaska Department of Fish and Game supported the closure of lynx trapping seasons over much of Southcentral Alaska for the winter of 1987-88. New State policy indicates that lynx from intensively trapped areas like the Kenai will only be harvested during cyclic highs in the population.

f. Beaver

Complete coverage aerial beaver surveys were flown over the Swanson River and Swan Lake Canoe Systems during October 1987. A total of 17 and 12 active colonies were observed on rivers and lakes, respectively. Relatively few lakes were occupied, and beaver numbers appear to remain abnormally low after the high harvest of the 1985-86 season (Table 20). Low trapper success mirrored this condition.

Table 20. Beaver surveys conducted on the Kenai NWR, 1983-87.

Swanson River Canoe System					
Year	Lakes used by beaver		Percent lakes used by beaver		Total Active colonies observed on lakes
	+40 Ac	-40 Ac	+40 Ac	-40 Ac	
1987	12	5	11%	10%	17
1986	10	8	9	17	18
1983	9	11	8	23	20
Swan Lake Canoe System					
Year	Lakes used by beaver		Percent lakes used by beaver		Total Active colonies observed on lakes
	+40 Ac	-40 Ac	+40 Ac	-40 Ac	
1987	4	8	3%	14%	12
1986	3	11	2	19	14
1985	9	11	6	19	20
1983	5	3	3	5	8

To counter this trend, roadside lakes were closed to beaver trapping in 1985, and a stipulation, requesting that trappers voluntarily remove only one beaver per lodge, was added to the 1987-88 refuge trapping permit. An intensive three-year study of the status and ecology of beaver in the Swan Lake Canoe System has also been proposed to begin in 1988.

g. Marten

Marten continue to be uncommon on the refuge, and are apparently known to occur only in a small area south of the Kenai River and north of the Tustumena benchlands along the mountainous eastern boarder with the Chugach National Forest. Since June, 1986, 11 marten (8 male, 3 female) have been live-trapped and radiocollared in this area. Eight (5 male, 3 female) appear to have been young of the year and may have dispersed from adjacent Forest Service lands where marten may be more numerous.



A rare and elusive Kenai marten curiously peers around a tree. TS

During November, 1987, marten tracks were discovered at Cottonwood Creek. These provided the first evidence of marten inhabiting the refuge south of Skilak Lake and glacier flats. Snowtracking surveys for marten on other portions of the refuge are planned for spring 1988.

h. Other Furbearers

Little is known of other furbearers on the refuge. Red fox continue to be rare, wolverine uncommon, and other numbers are unknown. Studies of fox and wolverine are planned for 1988 or 1989. Little is known of mink, muskrat, and weasel populations.

Tracks and observations suggest coyotes remain relatively common, however, low snowshoe hare numbers have forced them to use alternate food sources which may not support current densities. Coyotes were commonly seen during the winter of 1987-1988, while conducting bald eagle surveys on the Lower Kenai River. They appeared to be scavenging the remains of sockeye salmon carcasses from the previous summer.

i. Small Mammals

Refuge small mammal populations were not censused during 1987. However, the abundance of sign and numerous visual sightings indicated that there was an eruption in red-backed vole numbers. The presence of tundra voles on the refuge was also documented from a specimen found dead on a trail at Surprise Creek.

10. Other Resident Wildlife

Capture success of snowshoe hares on the Swanson River Road, Funny River Road, and Campfire Lake live-trap grids indicated a further decline in the refuge snowshoe hare population. Hare numbers are expected to reach the low point in their cycle soon and should begin to stabilize and build in 1988 or 1989.

Table 21. Total number of individual snowshoe hares captured in Kenai National Wildlife Refuge. Permanent live-trap grids for 1983-1987.

<u>Year</u>	<u>Grid Location</u>		
	<u>Swanson River Rd.</u>	<u>Funny River Rd.</u>	<u>Campfire Lk.</u>
1983	34	103	--
1984	54	126	--
1985	40	74	--
1986	31	34	32
1987	12	31	24

Visual observations indicated spruce grouse were more numerous in 1987 than in 1986 or 1985. Hens with broods were regularly seen on the pipeline road and grouse seemed unusually abundant along Surprise Creek Trail. Refuge grouse surveys for 1986 and 1987 mirror this trend, however, overall populations appear to have declined as much as 89% since the 1960's.

Table 22. Results of spruce grouse surveys conducted on the Kenai National Wildlife Refuge for 1986 and 1987.

Survey Route	1987			1986		
	No. Surveys	No. Broods	Total Grouse	No. Surveys	No. Broods	Total Grouse
Swanson River Rd.	5	0	0	10	0	6
Swan Lake Rd.	5	0	0	10	0	10
Skilak Loop Rd.	6	11 in 2 broods	31	1	0	2
	<u>16</u>		<u>31</u>	<u>21</u>	<u>0</u>	<u>18</u>
	1.94 grouse/survey			0.86 grouse/survey		

11. Fisheries Resources

Stocking of sockeye fry by Alaska Department of Fish and Game in Hidden Lake was reinitiated, after the suspension of the 1986 fry plant due to disease. The 1987 fry plant amounted to 4,500,000 fish. This augmented the progeny of the 1986 adult escapement of 17,500 sockeye. Adult escapement into Hidden Lake in 1987 was 43,500 sockeye.

Hidden Lake appears to have the ability to artificially produce tremendous numbers of sockeye salmon when stocked with large quantities of hatchery fry. Since it is part of the Kenai River system and the run timing is the same as other Kenai River sockeye stocks, the refuge expressed concern over the potential impacts on natural sockeye stocks in the Kenai River. This led to an agreement between the Service and the Department to limit the enhancement effort in Hidden Lake to a level that would not require special management actions, such as increased commercial fishing effort or adult removal from the spawning areas.

Fisheries resources personnel determined the relative abundance of resident fish at three locations in Tustumena Lake. Dolly Varden, lake trout and round whitefish, in order of decreasing relative abundance, were the most common species caught in gill nets. Coastrange sculpins were the most abundant species caught in minnow traps followed by Dolly Varden. Threespine sticklebacks and slimy sculpins were also collected, but infrequently. Stomach analysis revealed fish comprised the bulk of food(40%) of lake trout and insects (78%) of Dolly Varden diets.

Fisheries resources personnel also studied chinook and coho salmon stocks in the Kasilof River watershed. Hatchery-raised early chinooks returned in May and June to the Crooked Creek tributary. The naturally occurring late run of chinooks arrived about July 25, spawning mainly in the slackwater below the outlet of Tustumena Lake and in the vicinity of a large bend in the river at mile 16. The early runs of cohos were observed. Late run coho were observed on October 1, through at least mid-November at Indian Creek and were also seen in Pipe, Glacial Flats and Seepage Creeks.

16. Marking and Banding

See Table 23 for summary of wildlife tagged.



Master's Degree candidate Mike Kesterson prepares to release an adult female lynx which had sustained an injury and was rehabilitated at refuge headquarters.

TS



Student Conservation Association volunteer Laura Hill with a yearling male lynx captured along the North Pipeline Road near Mystery Creek. TS



Biological Volunteer Dan Becker had a firm grip on wolf and coyote trapping techniques. TS

Table 23. REPORT OF ANIMALS/BIRDS TAKEN UNDER FEDERAL FISH & WILDLIFE PERMIT #692350 AND 1985 STATE OF ALASKA PERMIT #87-357.

Species	Date	Activity	Age	Sex	Weight	Status	Area
Wolf	2/18/87	Radiocollared	SA	F	90.00 lbs	Released	Finger Lakes
Wolf	2/18/87	"	A	M	99.00 lbs	"	N. Quill Lake
Wolf	6/23/87	"	A	F	78.00 lbs	"	Moose Research Center
Wolf	7/01/87	"	A	M	94.00 lbs	"	Grebe Lake
Wolf	7/29/87	"	Pup	M	28.00 lbs	"	South Pipeline
Wolf	8/12/87	"	A	M	74.00 lbs	"	North Pipeline
Wolf	8/15/87	"	A	F	75.00 lbs	"	Mystery Creek Road
Wolf	8/25/87	"	A	M	94.00 lbs	"	Mystery Creek Road
Wolf	8/30/87	"	A	F	78.00 lbs	"	N. Pipeline Road
Coyote	4/23/87	Eartagged	SA	F	21.00 lbs	Released	Swan Lake Road
Coyote	6/24/87	Released	-	-	---	"	Grebe Lake
Coyote	8/03/87	Eartagged	A	F	23.50 lbs	"	Mystery Creek Road
Coyote	8/19/87	"	SA	F	23.50 lbs	"	North Pipeline
Lynx	8/10/87	Radiocollared	A	M	28.00 lbs	Released	South Pipeline
Lynx	8/15/87	"	SA	M	19.50 lbs	"	Mystery Creek Road
Lynx	8/16/87	"	A	M	24.50 lbs	"	South Pipeline
Lynx	8/28/87	"	A	F	20.00 lbs	"	Mystery Creek Road
Lynx	2/25/87	"	Kit	F	14.50 lbs	"	Birch Lake
Lynx	3/10/87	"	SA	M	19.00 lbs	"	Wolf Lake
Lynx	3/14/87	"	Kit	M	18.00 lbs	"	Duckling Lake
Lynx	3/16/87	"	Kit	M	15.25 lbs	"	Campfire Lake
Lynx	3/16/87	"	Kit	M	15.00 lbs	"	Moose Research Center
Lynx	3/16/87	"	Kit	M	16.00 lbs	"	Birch Lake
Lynx	3/18/87	"	Kit	M	15.75 lbs	"	Birch Lake
Lynx	3/18/87	"	SA	F	16.25 lbs	"	Birch Lake
Lynx	3/20/87	"	A	F	22.50 lbs	"	Swan Lake Road
Lynx	3/24/87	"	Kit	F	15.00 lbs	"	Moose Research Center
Lynx	3/26/87	"	A	M	24.25 lbs	"	Clam Lake
Lynx	3/31/87	"	A	M	26.25 lbs	"	Clam Lake
Lynx	5/08/87	"	SA	M	---	Died	Swan Lake Road
Snowshoe Hares	6/16-8/24/87	Live Trapped & Eartagged	-	-	---	Released	24 - Campfire Lake
						"	12 - Forest Lake
						"	31 - Funny River
						"	67 Snowshoe Hares
Marten	1/23/87	Radiocollared	SA	M	2.25 lbs	Released-Unk	Surprise Creek
Marten	1/23/87	"	SA	F	1.50 lbs	Alive	Surprise Creek
Marten	2/25/87	"	A	M	2.00 lbs	Dead	Surprise Creek
Marten	9/16/87	"	A	M	2.25 lbs	Alive	Pothole Lake
Marten	9/16/87	"	SA	M	1.50 lbs	Shed Collar	Pothole Lake
Marten	9/17/87	"	SA	M	1.75 lbs	Alive	Pothole Lake
Marten	11/05/87	"	A	M	2.00 lbs	Alive	Surprise Creek
Brown Bear	7/24/87	Eartagged	2	M	250 lbs	Released	Goat Creek
Small Mammals	6/25-29/87	Snaptrapped	-	-	---	15 R-Back Voles 7 Masked Shrews	Pothole Lake
Small Mammals	7/13-17/87	"	-	-	---	3 R-Back Voles	Big Indian
Small Mammals	10/20-21/87	"	-	-	---	3 R-Back Voles 1 Tundra Vole	Surprise Creek
Harbor Seal	4/28/87	Found Abandoned	1 Day	M	28.0 lbs	Died	Anchor Point
Little Brown Bat	7/03/87	Found Injured	-	M		Euthanized	Soldotna

Table 23 (Continued). REPORT OF ANIMALS/BIRDS TAKEN UNDER FEDERAL FISH & WILDLIFE PERMIT #692350 AND 1985 STATE OF ALASKA PERMIT #87-357.

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

Species	Date	Activity	Age	Sex	Weight	Status	Area
Bald Eagle	6/02/87	Found Electrocuted under powerline	Ad	---	---	Dead	Alaska Peninsula
Bald Eagle	1/24/87	Killed in trapper's trap	2 Ad	---	---	Dead	Brown's Lake
Bald Eagle	2/17/87	Found Electrocuted under powerline	Ad	---	---	Dead	Upper Kenai River
Bald Eagle	3/16/87	Found dead	4 1/2 Yr	---	---	Dead	Outlet, Killey River
Bald Eagle	4/12/87	"	Ad	---	---	Dead	Kenai Keys
Bald Eagle	4/15/87	"	Ad	---	---	Dead	Kenai Keys
Varied Thrush	5/04/87	Dead	Ad	---	---	Dead	Sterling Highway
Common Redpoll	6/01/87	Dead	Ad	---	---	Dead	Kenai

18. Injured Wildlife

In 1987, seventeen animals of 12 species were turned into the refuge for rehabilitation. They ranged in size from a little brown bat with a broken wing to an abandoned harbor seal pup. Bald eagles topped the list as the most commonly injured. Of the 6 reported, 2 had been directly injured in traps and another was missing one toe, a common trap-related injury. In addition, several bald eagles were reported dead in traps. All wildlife was either successfully released, sent to a zoo facility or humanely euthanized.

H. PUBLIC USE

1. General

Public use of Kenai National Wildlife Refuge occurred during 1987, with relatively few changes in overall or geographic distribution, types of use, destinations and volume. Due to a significant decrease in Southeastern Alaska population, particularly Anchorage, Kenai National Wildlife Refuge as well as other Kenai Peninsula recreation areas have not experienced the expected spiral upward in overall use. The majority of the refuge's destination visits came from Anchorage, and Anchorage has experienced a population drop in 1986, and 1987, due to a sagging local economy. Tourism seems to be stable or increasing but the vast majority of Alaska-bound tourists do not visit the Kenai Peninsula.

Of those that do visit, the majority (93%) of both resident and nonresident visitors to the Kenai Peninsula come via highway. Since the major highway to the central and southern Kenai Peninsula passes through refuge lands, the refuge has an excellent opportunity to contact large numbers of visitors. Informational and educational exhibits within the Skilak Wildlife Recreation Area have an excellent opportunity to increase our contacts with these users.



"Home is the sailor home from the sea and the hunter
home from the hill".

RKJ

-Robert Lowell Stevensen

A large majority of persons who visited refuge lands were engaged in sportfishing. This is also true for the entire Kenai Peninsula. Sportfishing visits largely occur in May, June, July and August, often peaking on weekends. Sportfishing, because of large 1987, salmon runs in the Kenai and Russian rivers, is one area of refuge use that did experience significant increases compared to other visitation.

Historically, refuge information services and facility planning have necessarily focused on sportfishing users. However refuge planning during 1987, focused on seeking to diversify wildlife opportunities and facilities in the Skilak Wildlife Recreational Area.

The refuge contributed funds for the development of the new Kenai Peninsula Visitor Center located in Soldotna. The exhibits within the center concentrated on a broad range of wildland and wildlife opportunities, many of which are on the refuge.



This and several other photos featuring activities and landscapes with the refuge, is on display at the new Kenai Peninsula Visitor Center. RKJ

Overall visits to the refuge during 1987 were estimated at approximately 390,000.

2. Outdoor Classrooms - Students

Approximately 1,900 students participated in the refuge's environmental education program in 1987. While some fall use occurred in 1987, the most popular months continued to be April and May. All available spaces for May field trips were booked by the third week in April. The environmental education program experienced an overall decrease of 850 students (down 45% from 1986) due to cuts in the school district's transportation and field trip budgets. In many cases no money was available for trips for many schools and insurance was impossible to arrange for chaperone car pooling. Hopefully, the situation will improve in 1988. Many teachers and students voiced great disappointment with missing out on refuge field trips in 1987.

With improved maintenance and word-of-mouth advertising of the refuge's Outdoor Education Center (located off Swan Lake Road adjacent to the Swanson River and Swan Lake Canoe Systems), classes have two major options for field trips, namely, 1) the Visitor Center and Trail in Soldotna, and 2) an overnight trip to the Outdoor Education Center's cabins.

A typical field trip to the Visitor Center lasts five hours, from 9:00 A.M. to 2:00 P.M. Students begin with an introductory wildlife film of their choice. Since the refuge's acquisition of 25 new wildlife films and videotapes, classes can focus on learning about particular Alaskan species such as wolves or bears. After the film, students search the exhibit area with clipboards and quizzes to answer questions on various exhibits. Exhibit quizzes focus on concepts such as adaptations, interdependence, communities, and succession. There are four levels of quizzes for grades K/1, 2/3, 4/6, and 7 and above. The development of the K/1 quiz activities, led verbally by adult chaperones, is a popular addition to the Environment Education curriculum. Visitor center activities are followed by lunch at nearby Headquarters Lake. After lunch, students return to their clipboards and pencils to hike the 1/2 mile "Keen Eye Trail" where they answer questions in an accompanying leaflet.



Local youngsters explore refuge visitor center exhibits through "hands on" activities. CW

The simple facilities of the Outdoor Education Center allow teachers to increase environmental awareness of students by allowing classes to stay overnight in the six cabins.

Thirteen classes and some 180 students used the Outdoor Education Center facility in 1987. Future plans include development of a brochure to promote increased awareness of the facility to Kenai Peninsula and Anchorage schools.

Boyd Shaffer, Kenai Peninsula College instructor, hosted his spring semester course "Mammals of Alaska and the World" each Friday from 9:00 A.M. - 12:00 P.M. in the Visitor Center auditorium. This collaboration between the refuge and Kenai Peninsula College enables college students to benefit from viewing our excellent wildlife film video library. In addition, it saves the instructor the headaches of arranging for well maintained audiovisual equipment. Thus, the refuge education program has expanded to reach a new audience of college level students.

3. Outdoor Classrooms - Teachers

Through 1987, teacher orientation sessions, 53 new teachers were introduced to Kenai's environmental education program. Orientations were scheduled for fall and spring months when teachers showed the greatest interest in field trips.

At present, 233 teachers (or 35% of Kenai Peninsula Borough classroom teachers) have attended a refuge teacher orientation session. Teachers bring classes from as far away as Tyonek, Seldovia, and Anchorage. However, 85% of the classes participating in the refuge environmental education program come from the local communities of Kasilof, Kenai, Nikiski, Soldotna, and Sterling.

In October, Park Ranger Candace Ward taught a "Wildlife of Alaska's Forests" environmental education workshop in the Kenai Peninsula Borough Teacher In-Service. Twenty-four teachers and resource agency personnel attended the course. Refuge staff were pleased with teacher response in the face of decreasing state and local education emphasis.



Local teachers enthusiastically participated in environmental education workshops hosted by refuge staff.

CW

In November, Park Ranger Ward conducted a community college/refuge sponsored "Project Wild" workshop for 26 teachers and youth leaders. Participants enjoyed the course and appreciated the availability of college credit for the course.

Student Conservation Association Volunteer Mike McGraw and Park Ranger Ward organized a summer refuge program for community schools youth ages 5-12. Over 200 youth participated in activities ranging from bear safety to nature appreciation. Student Conservation Association McGraw did an outstanding job and was complimented by local civic leaders and parents.

6. Interpretive Exhibits/Demonstrations

Several brochures were developed or reprinted this year and have provided invaluable assistance to visitors. They include:

a. Canoeing in the Kenai National Wildlife Refuge:

This reprint arrived just in the nick of time for the busy summer canoe system.

b. Aircraft Regulations on the Kenai National Wildlife Refuge:

Outdoor Recreation Planner planners Mike Boylan and Rick Johnston, along with regional office staff Bev Graffel and Patti Gallagher, did an outstanding job on text and visuals on this brochure. We have received many compliments on it from pilots and flying clubs.

7. Other Interpretive Programs

The refuge's most popular interpretive program continued to be the weekend wildlife film series shown all year. The service began in 1983, and during 1987, 8,284 people attended the series. This is an increase of 1,434 (17%) over 1986.

The popularity of this film series is due to several factors including: 1) a high quality video projection system, 2) purchase of an additional 25 wildlife videos and films, and 3) extensive publicity and local support. The series has become a local institution due to the continued high quality of its programming.

During the summer season, 2,200 people viewed the refuge video: "Wild Refuge-Fortune and Future of the Kenai". This is an increase of 500 people (23%) over 1986. This 15 minute video truly helps us to orient visitors and tell the refuge story.

The big screen video projection system adds a new dimension to the refuge's audiovisual equipment by enabling us to provide a variety of interpretive, educational, and training programs previously impossible. Local wildlife-oriented groups have increased their use of the visitor center for meetings and programs because of the variety of audiovisual media. These groups include the Kenai Peninsula Nordic Ski Club, Kenai Peninsula Audubon Society, Kenai Peninsula Trapper's Association, Kenai Peninsula Community College, and Alaska Bowhunters.

With the advent of improved audiovisual equipment and the development of our film video library, the refuge is now able to publish a monthly wildlife film schedule. Local radio stations and newspapers have increased the amount of free advertising for our film series as a result of our increased organization. Obvious growth in film attendance during 1987 has resulted from a combination of improved film/video quality and increased advertising.

Refuge staff conducted a variety of interpretive and educational programs including assisting in the local Audubon Chapter's April "Snow Goose Watch" at the Kenai River Flats, and providing wildlife slide shows/lectures for Interlocken Tours, the Mono Lake Committee, and Sierra Club outings and groups.

A special training session was held at the refuge in 1987, in interpretation techniques led by Park Ranger Ward for Alaska State Park Rangers in April 1987.

In addition to seasonal employees, and Student Conservation Association volunteers' training programs, refuge staff conducted a variety of environmental education programs throughout 1987, for groups such as Sunshine Day Camp, Trailside Discovery Camp, Grayline Tours, seniors groups and local youth groups such as scouts, Royal Rangers, and Campfire Kids.

8. Hunting

Hunting is very popular on the refuge and has predictably changed the composition of wildlife populations, most noticeably, moose. Historical hunting pressure has prompted permit hunts for mountain goat, upland caribou, and moose in Game Management Unit 15B east to reduce hunter density. With the support of refuge staff and the Alaska Department of Fish and Game, the Alaska Board of Game placed antler restrictions on the hunting of bull moose on the Kenai Peninsula for the first time in 1987. New regulations state that legal bulls must have a spike or fork on one side, or a 50-inch antler spread or 3 brow tines on one side. Hunters found the new regulations confusing, but most were in favor of the

restrictions, even though the 1987, harvest was half that of 1986. There appeared to be an increased kill of cow moose along with illegal bulls, evidently from hunters who were shooting first and looking later. In some cases the kill was not discovered in time to salvage the meat. Such incidents are expected to decrease as hunters learn to properly field identify legal moose.

Moose hunter check stations were operated for the ninth year by refuge staff and volunteers. Information, regulation compliance, and data gathering are the purposes of the check stations. Three stations were operated for 373 hours and contacted 2458 hunters. Hunter effort was down due to the new antler restrictions, but the success rate was similar to 1986.

Table 24. Summary of moose hunter check stations operated on the Kenai National Wildlife Refuge, 1987.

Check station	No days operated	No hours operated	No hunters contacted	No moose checked bulls	cows	No. black bear checked
(bow season)						
Swanson River Rd.	5	70	183	2	0	0
(rifle season)						
Swanson River Rd.	18	180.5	1711	33	0	1
Mystery Creek Rd.	8	88.5	369	1	0	0
Marathon Rd.	3	34	195	2	0	0
Total	34	373	2458	38	0	1

These regulations were enacted to increase the number and size of bull moose. The post hunting season bull:cow ratio for 1987, was 16.6 bulls:100 cows, a 277% increase over 1986 (6 bulls:100 cows), and a substantial step toward the refuge goal of a post hunting season ratio of 30 bulls:100 cows.

Table 25. Big game harvest on the Kenai Peninsula, 1987.

Species	Game Management Unit				Total Mortality
	15A	15B	15C	7	
Brown bear	2	2	6	3	13
Sport harvest = 12 (8 male, 4 female)					
Defense of life and property = 1 female					
Total on refuge = 6					
Black bear	40	19	55	93	207
Upland Caribou		21 male	23 female		44 ^a
Dall's sheep		22 in GMU15		8	30
Mountain Goat	73 male	27 female	2 unknown		102 ^b
		34 (east)			
Moose	147	48 (west)	126	33	388 ^c

- a. 250 permits issued, 18% success rate.
 b. Most goats are killed off the refuge.
 c. Does not include poaching and road kills which accounted for 238 moose on the Kenai Peninsula between June 1, 1986, and Feb. 28, 1987.

A five-day bow hunt for moose was added prior to rifle season for the first time in 1987. This hunt was lobbied for strongly by bowhunters, but participation seemed light, and only six moose were taken.

The brown bear harvest was down slightly from 1986 (17), and the male-female ratio of 8 male:4 female was more acceptable. However, even this limited harvest may be too high for a population which may contain as few as 150 bears.

Small game hunting remained popular along road accessible portions of the refuge, but low snowshoe hare populations resulted in reduced hunter success. Small game hunting was also dramatically less within the Skilak area due to new small game hunting restrictions. The Skilak area is now open to small game hunting with bow and arrow only.

Waterfowl hunting was poor on the Chickaloon Flats and Kenai River outlet again in 1987. Waterfowl populations have been down for several years and hunting success has mirrored this situation.

In 1987, 55 black bear baiting permits were issued to 65 individuals. Baiting was permitted in the same areas and times as in 1986. Black bear baiting is a very controversial issue and the refuge had many comments from people who find it distasteful. A statewide petition has been circulating to outlaw baiting in Alaska. The Alaska Board of Game will act on several bear baiting proposals this spring, which may change or eliminate the existing program.



Refuge Officer Dave Kenagy laments an unmarked, illegally placed and nonpermitted bear bait station found within Kenai Wilderness on a remote lake. Similar illegal stations are relatively common and are a public safety problem.

RKJ

The refuge continues to monitor the sheep hunting situation on Round Mountain where a difficulty in distinguishing the boundary of the Cooper Landing closed areas may be causing the closed area herd to be harvested by walk in hunters. At least six sheep were harvested adjacent to the closed area boundary during 1987. Perhaps a more easily determined boundary will be recommended to the game board in the future, which protects the entire Round Mountain herd.

9. Fishing

Sportfishing remained the single most influential activity on Kenai National Wildlife Refuge. During the summer months, users at almost all the refuges' rivers, lakes or associated facilities have a rod and reel in hand and a new found determination to catch either a salmon, rainbow trout or dolly varden char.

The Kenai River experienced a huge run of sockeye salmon with a record escapement of 1.4 million salmon. Salmon fishing locations that are generally marginal to poor experienced major fisheries status for a brief period while the large volume of sockeyes were passing through. The outlet of Skilak Lake and Jim's Landing are two places where major successful sport fisheries cropped up in reaction to the run. The bank in front of Jim's Landing appeared to have angler effort similar to such heavy fisheries as the Russian River or Jean Creek Slough.

As a result of the huge salmon runs, spawning salmon plugged slack water eddies throughout August and September.

Table 26. Kenai Peninsula Freshwater Sport Fisheries, 1986.

	Days fished (non-guided)	(guided)	Est. % occurring on KNWR
Kenai River - (Soldotna Bridge to Moose River)	58,433	5,443	7%
Kenai River - (Moose River to Skilak Outlet)	48,969	2,202	15%
Kenai River - (Skilak Inlet to Kenai Lake)	35,843	3,126	70%
Russian River	70,729		70%
Kasilof River	36,115		5%
Swanson River	6,831		90%
Other Rivers	2,389		20%
Hidden Lake	6,254		100%
Canoe Lake System	6,608		100%
Moose River	1,208		90%
Other Lakes	16,143		50%

The above statistics represent survey data for 1986, and were published in 1987*.

*See Alaska Statewide Harvest Report, 1986, for species breakdown.

The Russian River exhibited an extraordinary long and heavy first run of red salmon. On Saturday, June 27, ferry records showed that 1,800 people crossed the river to fish. Refuge seasonal and Permanent Full Time staff faced three weeks of intensive fishing activity by an estimated 40,000 anglers. The traditionally closed confluence sanctuary was opened by emergency order at noon June 20, due to the strong run. Record levels of early-run sockeye were caught by sport fishermen at Russian River in addition to a record level of escapement to the spawning areas. The second or late-run of sockeye was below the magnitude of the early-run and its long term average despite the fact that total Kenai River escapement this year (1.4 million) far surpassed the previous high of 750,000 in 1977.

The early Russian River sport sockeye harvest was 154,189 from approximately 82,006 man days of effort. The late run harvest was 40,580 with 33,144 man days of effort. Alaska Department of Fish and Game creel census reports showed that fish caught per hour of effort was .48 for the early run, and .29 for the late run. The harvest, angler effort and success ratio per hour fished were all-time records by wide margins.



Successful anglers at the Kenai/Russian River access area
break in a new fish cleaning table. RKJ

Generally, the 1987 figures reflect a continuation of recent years' data which show increased run size as well as angler success. The huge first run effort reversed a stabilizing trend in overall effort.



Hikers observe migrating sockeye salmon at Russian River falls that have successfully negotiated the "gauntlet" of sport fishermen on the lower reaches of the Russian and Kenai rivers.

Table 27. Estimated sockeye salmon harvest, effort and success rates on Russian River, 1963-1987.

Year	Harvest			Total Effort (Man-Days)	Catch/ Hour	Census Period
	Early Run	Late Run	Total			
1963	3,670	1,390	5,060	7.880	0.190	6/08-8/15
1964	3,550	2,450	6,000	5,330	0.321	6/08-8/16
1965	10,030	2,160	12,190	9,720	0.265	6/15-8/15
1966	14,950	7,290	22,240	18,280	0.242	6/15-8/15
1967	7,240	5,720	12,960	16,960	0.141	6/10-8/15
1968	6,920	5,820	12,740	17,280	0.134	6/10-8/15
1969	5,870	1,150	7,020	14,930	0.094	6/07-8/15
1970	5,750	600	6,350	10,700	0.124	6/11-8/15*
1971	2,810	10,730	13,540	15,120	0.192	6/17-8/30*
1972	5,040	16,050	21,090	25,700	0.195	6/17-8/21
1973	6,740	8,930	15,670	30,690	0.102	6/08-8/19*
1974	6,440	8,500	14,940	21,120	0.131	6/08-7/30*
1975	1,400	8,390	9,790	16,510	0.140	6/14-8/13*
1976	3,380	13,700	17,080	26,310	0.163	6/12-8/23*
1977	20,400	27,440	47,840	69,510	0.168	6/18-8/17
1978	37,720	24,530	62,250	69,860	0.203	6/07-8/09
1979	8,400	26,830	35,230	55,000	0.136	6/09-8/20*
1980	27,220	33,490	60,710	56,330	0.245	6/13-8/20
1981	10,770	23,720	34,440	51,030	0.156	6/09-8/20
1982	34,500	10,300	44,820	51,480	0.261	6/11-8/04**
1983	8,360	16,000	24,360	31,890	0.117	6/08-8/09**
1984	35,880	21,970	57,850	49,550	0.238	6/04-8/19**
1985	12,300	58,410	77,710	50,770	0.286	6/13-8/16**
1986	35,099	30,813	66,012	51,400	0.240	6/14-8/20**
1987	154,189	40,575	194,790	115,150	0.431	6/8-8/20

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

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

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

Silver salmon fishing also occurred at Clear Water Slough, Chickaloon River, Nikolai Creek, Kasilof River and the Swanson River. Including the Kenai River, silver salmon fishing occurs on five separate watersheds within Kenai National Wildlife Refuge.

Resident trout fishing occurred on several rivers and throughout refuge lakes. Roadside lakes and rivers experienced the greatest effort, however certain backcountry and fly in lakes received notable effort. Hidden, Engineer, Dolly Varden, Kelly, Peterson, Willow, Nest and Campfire Lakes are also popular ice fishing lakes with Hidden Lake receiving over 2,000 angler days of ice fishing effort. Ice fishermen could not utilize Hidden Lake as well as several other lakes during November or early December in 1987, due to a relatively thin ice layer caused by a thick coating of insulating snow.



Fly fisherman at Hidden Lake tries for a fall trout. Many facilities that were crowded during peak season weekends, became solitary, high quality opportunities after September 10. RKJ

A two year rainbow trout study was conducted during 1986 and 1987 by the University of Alaska under contract by the Alaska Department of Fish and Game. Bob Lafferty, a graduate student at the University of Alaska was the project leader. The goal of the study was to obtain baseline data regarding rainbow trout and other resident fish within the Kenai River to enable managers to conserve the resident fish resource while sustaining recreational sportfishing. Lafferty's investigations included population size, age structure, distribution, migration, harvest, effort, recruitment and overall ecology. During 1986, Lafferty estimated approximately 3,500 rainbow trout or approximately 300-400 fish per mile above Jim's Landing with fish often concentrated in a few deep holes.

Lafferty concluded that the Kenai River resident trout population was healthy and that it appeared existing sportfishery regulations were adequate to sustain what appears to be a reasonable harvest and recruitment situation. (note: The upper Kenai River has one of the most conservative sportfish regulatory programs in the State of Alaska.)

Lafferty's study discovered the following:

1. Out of 1783 rainbow trout tagged, only 21 were recaptured by anglers and returned.
2. There exists an excellent voluntary catch release program on the Upper Kenai River as evidenced by rainbows caught during the study with hooking scars.
3. There appeared to be an even age class distribution of rainbows in the population of 2-12 years with no significant absence of a particular age class.
4. The population of fish is migratory within certain sections of river primarily used for feeding, and rainbows above and below Skilak Lake are separate populations with evidently no migrating across the large lake.
5. The majority of successful anglers utilize boats.

10. Trapping

One Hundred and nine permits were issued for the 1986-87 furbearer trapping season. The lynx season which was already closed in Game Management Unit 15A, was closed by emergency order in Game Management Unit 15B. The season began December 15th but the low number of kittens in the harvest prompted a closure on January 11th. In March, the Alaska Board of Game closed lynx trapping over all of Southcentral and many other areas of Alaska. Trapping will be reopened when lynx populations recover, which is projected to be around 1991.

Table 28. Total reported land furbearer harvest and average per permit holder on the Kenai National Wildlife Refuge (Moose Range), 1960-1987.

Season	Total permits	Land furbearer reported harvest									
		Lynx		Coyote		Wolverine		Weasel		Wolf	
		Total	Mean per permit holder	Total	Mean per permit holder	Total	Mean per permit holder	Total	Mean per permit holder	Total	Mean per permit holder
1960-61	16	13	0.6	15	0.9	1	0.1	1	0.1	--	---
1961-62	24	23	1.6	30	1.2	4	0.2	13	0.5	--	---
1962-63	28	28	1.0	27	1.0	2	0.1	0	0	--	---
1963-64	33	28	0.8	39	1.2	1	0.1	6	0.2	--	---
1964-65	17	24	1.4	11	0.6	6	0.3	10	0.6	--	---
1965-66	16	17	1.1	16	1.0	4	0.2	2	0.1	--	---
1966-67	25	7	0.3	5	0.2	4	0.2	35	1.4	--	---
1967-68	---	---	---	---	---	---	---	---	---	--	---
1968-69	22	18	0.8	44	2.0	1	0.1	81	3.7	--	---
1969-70	53	62	1.2	23	0.4	3	0.1	35	0.7	--	---
1970-71	59	67	1.1	30	0.5	10	0.2	79	1.3	--	---
1971-72	61	181	3.0	13	0.2	14	0.2	35	0.6	--	---
1972-73	65	146	2.2	51	0.8	8	0.1	4	0.1	1	0.1
1973-74	81	245	3.0	58	0.7	7	0.1	149	1.8	0	0
1974-75	52	162	3.1	24	0.5	10	0.2	68	1.3	0	0
1975-76	70	113	1.6	32	0.5	6	0.1	16	0.2	1	0.1
1976-77	86	53	0.6	25	0.3	6	0.1	10	0.1	2	0.1
1977-78	86	43	0.5	34	0.4	4	0.1	14	0.2	8	0.1
1978-79	96	36	0.4	44	0.5	3	0.1	7	0.1	32	0.3
1979-80	104	12	0.1	64	0.6	3	0.1	58	0.6	19	0.2
1980-81	102	2	0.1	38	0.4	0	0	14	0.14	16	0.16
1981-82	104	17	0.2	66	0.6	4	0.1	70	0.7	44	0.4
1982-83	122	* 47	0.4	80	0.6	2	0.1	43	0.3	39	0.3
1983-84	114	* 38	0.3	87	0.8	2	0.1	29	0.2	30	0.3
1984-85	107	* 31	0.3	107	1.0	2	0.1	17	0.2	38	0.3
1985-86	114	* 23	0.2	110	1.0	4	0.1	3	0.1	33	0.3
1986-87	109	* 33	0.2	43	0.4	5	0.1	2	0.1	17	0.2

*Includes lynx radiocollared and released for study.

Table 29. Total reported aquatic furbearer harvest and average per permit holder on the Kenai National Wildlife Refuge (Moose Range), 1960-87.

Season	Total permits	Aquatic furbearer reported harvest							
		Beaver		Otter		Muskrat		Mink	
		Total	Mean per permit holder	Total	Mean per permit holder	Total	Mean per permit holder	Total	Mean per permit holder
1960-61	16	145	9.1	16	1.0	2	0.1	42	2.6
1961-62	24	79	3.3	19	0.8	0	0	69	2.9
1962-63	28	109	3.9	19	0.7	2	0.1	66	2.4
1963-64	33	150	4.5	26	0.8	0	0	83	2.5
1964-65	17	6	0.3	3	0.2	0	0	15	0.9
1965-66	16	17	1.1	4	0.2	0	0	13	0.8
1966-67	25	22	0.9	9	0.4	0	0	45	1.8
1967-68	---	---	---	---	---	---	---	---	---
1968-69	22	14	0.6	10	0.4	207	9.4	64	2.9
1969-70	53	33	0.6	32	0.6	75	1.4	82	1.5
1970-71	59	25	0.4	9	0.1	29	0.5	60	1.0
1971-72	61	23	0.4	8	0.1	18	0.3	9	0.1
1972-73	65	76	1.2	24	0.4	111	1.7	48	0.7
1973-74	81	40	0.5	26	0.3	334	4.1	160	2.0
1974-75	52	6	0.1	8	0.1	21	0.4	33	0.6
1975-76	70	34	0.5	13	0.2	82	1.2	25	0.4
1976-77	86	24	0.3	7	0.1	8	0.1	39	0.4
1977-78	86	19	0.2	9	0.1	140	1.6	33	0.4
1978-79	96	22	0.2	6	0.1	73	0.8	25	0.3
1979-80	104	83	0.8	17	0.1	127	1.1	57	0.5
1980-81	102	82	0.8	30	0.3	191	1.9	111	1.1
1981-82	104	61	0.6	26	0.2	183	1.8	119	1.1
1982-83	122	93	0.8	18	0.1	227	1.8	202	1.6
1983-84	114	43	0.4	18	0.2	39	0.4	268	2.3
1984-85	107	103	1.0	20	0.2	121	1.1	392	3.7
1985-86	114	86	0.8	24	0.2	209	1.8	322	2.7
1986-87	109	55	0.5	21	0.2	85	0.8	088	0.8

The decline in harvest was due to poor weather conditions, lower furbearer numbers, and lower snowshoe hare populations.

Overall reported harvest was down, for all species except wolverine, from previous years.

11. Wildlife Observation

In late 1985, the refuge awarded a contract to Land Design North, Incorporated of Anchorage, to provide a conceptual plan for campgrounds and interpretive media within the proposed Skilak Wildlife Recreation Area. Contractors visited the refuge throughout 1986, and interviewed staff as well as local professionals including Dr. Alan Boraas, professor of Geology and Anthropology at Kenai Peninsula College, and Boyd Shaffer, professor of Biology and Art.

After several reviews, the concept plan was completed and submitted to the refuge at the end of December, 1986. The plan calls for redesigned campgrounds, wildlife viewing areas, and interpretive media throughout the 42,000 acre Skilak Loop with most development concentrated along the 18-mile gravel road.

Skilak Loop was classified as an "intensive management zone " in the Kenai Comprehensive Conservation Plan and proposed as the major wildlife viewing area of the refuge. The refuge took steps to restrict hunting and trapping within the area via refuge regulations and state hunting changes. A trapping closure took effect in 1985, and the Alaska Board of Game closed (by a 5-2 vote) the area to most hunting during 1987. The area remains open during fall and winter months for small game hunting with bow and arrow.

The Land Design North, Incorporated, plan was reviewed during 1987, and two additional contracts were prepared during 1987. One contract involved an architectural and engineering firm to prepare site design and contract bids and a second involved developing a detailed interpretive theme for the area. The architectural and engineering contract was awarded at years end while negotiations continued with several potential interpretive contractors.

An application for a \$5 million, federal highway funding request to pave the Skilak Loop Road on the refuge was sent to Washington D.C.

12. Other Wildlife-Oriented Recreation

The non-motorized opportunities on the Upper Kenai River continued to improve as a result of the motor boat closure on that portion of the river. The vast majority of comments were positive to the new program and user conflicts appeared to drop.



New information/regulation sign helping visitors to learn non-motorized sections of the Kenai River.

JEF

Canoeists within the Swan Lake and Swanson River Canoe routes were required to register during 1987, and compliance with the previously voluntary registration increased slightly.

An estimated 23,600 visitor days occurred on the canoe trails with 18,408 visitor days on the Swan Lake/Moose River System and 5,192 on the Swanson Lakes/Swanson River system. Canoe trail users are primarily noncampers/users, however fishing is a major secondary activity. Hunters also used the system extensively during September, particularly the lower Swanson River section. Approximately 50-75 hunting parties floated the river through the 1969 burn area ending at Captain Cook Recreation Area.

Refuge ski trails continue to be quite popular on winter weekends. Volunteers and staff groomed the trails several times during 1987.



A group of schoolchildren prepare to use the Kenai National Wildlife Refuge Headquarters ski trails.

RKJ

During November and December the refuge headquarters area experienced the heaviest snowfall since November 1982. Excellent snow conditions brought numerous cross-country skiers to the Visitor Center's ski trails. Signs were quickly installed and trails groomed in time for the winter rush. By the end of November, ski trails were averaging 300 skiers on the weekend and 50 each weekday.

13. Camping

An estimated 70,000 overnight visits occurred within refuge campgrounds or access areas during 1987. An additional 45,000 overnight stays occurred at non-developed and backcountry settings.

A draft cabin management plan was completed during 1987, and at year's end was being reviewed by the refuge staff.

All waysides, parking areas, and campgrounds along the Swanson River and Swan Lake roads were graveled by a local contractor. The gravel source was rehabilitated material from ARCO's Wolf Lake drill project and was utilized as "payment-in-kind" on adjacent refuge access areas.

A significant portion of the maintenance effort during spring was focused on preparing facilities for the Memorial Day weekend. All camping pads at Tustumena Campground were graveled, raked, and fire grates installed. Additional improvements (screened gravel, permanently anchored fire grates, and parking barriers) were also completed.



Camping pad at Tustumena campground prior to renovation.
JEF



Camping pad after renovation. All pads were graveled
and raked, and old, broken barrier posts removed
JEF

Refuge Manager Doshier and Supervisory Recreation Planner Boylan led Art Wemmerus and Chuck Ditters from the Regional Office on a tour of proposed developments within the Skilak Wildlife Recreation Area and the Swanson River Road. The day-long visit provided Regional Office personnel with insight into objectives for the area and gave refuge staff some worthwhile feedback regarding future campground rehabilitation and construction.

A new cement boat ramp was installed at the popular lower Skilak Campground this month, replacing vintage the World War II aircraft landing mat which had been used as the launch surface. We hope the concrete lasts as long as the landing mat (20 + years).

The refuge sign shop fabricated and installed large routed wood signs identifying the "Skilak Wildlife Recreation Area" as closed to hunting. In addition, smaller signs were installed at each campground indicating prohibitions against loose dogs, all terrian vehicle's, and firearms discharge. Laborers Bud Marrs and Donna Bartman deserve much credit for efficiency in producing durable, high-quality routed signs that surpass anything heretofore available.



A sampling of high quality wood routed signs produced in our sign shop by Bud Marrs and Donna Bartman. JEF



Signs were also made for several other Alaska refuges during the year. JEF

A second hazardous tree removal project was planned during 1987, for Upper Skilak campground. Numerous large white spruce trees have been killed by spruce bark beetles. Three hundred trees were originally removed in 1984, however most of the remaining trees have also died and become significant safety hazards. Approximately 400 additional trees were prepared for removal. By years end a local logger had begun the project.

A significant but smaller hazardous tree removal project was also planned during 1987, for Jim's Landing for mature trees killed by bark beetles. The project was initiated at the end of 1987.

The Kenai-Russian River access area was operated for the second year under a private concession contract. Approximately 15,000 vehicles and 65,000 persons utilized the facility. Many persons parked at the adjacent private Sportsman's Lodge and refuge roadside areas and walked into the facility for day use. An estimated 46,000 persons utilized the facility for overnight camping.

see p40

Approximately 35,000 visitors rode the Russian River Ferry which is located at the facility.

Two Anchorage meetings were attended in October, by Assistant Refuge Manager Bob Richey and other participants representing the Bureau of Land Management, the Alaska Department of Natural Resources, the U.S. Forest Service, the Alaska Department of Transportation, and the Alaska Department of Fish and Game, to identify, reconsider, and determine justifiable 17(b) easements proposed within the Cook Inlet Region Incorporated Russian/Kenai River campground area under selection application AA-11096-EE. Although only a limited area south of the Kenai River has been certified by the Bureau of Indian Affairs at this time and subject to 17(B) easements, this group has identified all 17(b) easements that may be necessary to protect public access through lands which are proposed to be conveyed to the private native corporation.

14. Picnicking

The refuge received a large supply of fire rings and picnic tables purchased with year-end money. The tables and fire rings will be installed during 1988.

15. Off Road Vehicles

The 1987, refuge snowmobiling season was opened on January 10, after Refuge Manager Doshier determined that adequate snow cover was present to protect underlying vegetation. The January 10 opening was the first snowmobile opening in two years.

The season closed in early April after snows within the refuge lowlands began to melt.

The winter of 1987, was the first winter that snowmobiling had been closed within the Headquarters Ski Trail area, Swan Lake/Swanson River Canoe routes area and within Alpine areas for three years while traditional access regulations were pending. A new closed area within The Skilak Wildlife Recreation Area was also in affect for the first time. Large lakes remained open within the Skilak area for the purpose of ice fishing.

The past Alaska Lands Act regulations were published under the permanent closure provisions of 50CFR 36.42 for protection of resources and public safety.

Compliance with the new regulations was excellent with few incidents of illegal snowmobile use. A revised hand out was developed and available to snowmobilers and several news releases informed the public of the closures.

The 1987-88 season opened to snowmobile use on December 1. Snow cover was several feet deep on most portions of the refuge due to a near-record November snowfall. Lakes remained unsafe in several areas due to an insulating cover of deep snow preceded by only a thin ice cover. The majority of the 1987, snowmobile use occurred north of the Kenai Airport, near the City of Kenai, and within the Caribou Hills. Snow was so deep in many areas that snowmobilers had difficulty traveling off previously packed trails.

Use of three wheelers and associated resources damage continues to occur at certain refuge locations. Unauthorized use associated with the Inholder permit route to Bear Creek on Tustumena Lake continues to be a problem. Permit holders and non permit holders appear to be operating off the designated route. Also several off road users are utilizing seismic lines to encroach on refuge lands. Problem areas are Torpedo Lake, Alaska Gas pipeline, Fox River Valley, Tustumena Lake Beach, Caribou Hills, Moose River, The Alaska Gas Pipeline Corridor from Sterling, powerline right-of-way adjacent Strawberry road, the utility corridor from North Kenai to Swanson River Oil Field, and the Chickaloon Flats. A single party of 3 and 4 wheelers caused significant scarring of the estuary marshes on the western portion of Chickaloon Flats during late September.

Routed signs prohibiting off road vehicles were installed during 1987 at most refuge campgrounds and at known problem areas.

17. Law Enforcement

Kenai National Wildlife Refuge utilized five commissioned Refuge Officers from the permanent staff and two seasonal officers during 1987. Uniformed staff conducted approximately 2,800 patrol hours during 1987.

Kenai National Wildlife Refuge commissioned two seasonal Law Enforcement Officers under the newly established program utilizing seasonals for enforcement of Refuge Administration Act regulations. The program was a success with the seasonal officers experiencing a substantial case load. Assists to the public and other law enforcement agencies also increased due to the enhanced field capability.

The first seasonal law enforcement position for Kenai and Alaska under the Fish and Wildlife Service' new authority began March 15, when Park Ranger Dave Kenagy entered on duty. Holder of seasonal commissions with National Parks Service and Alaska State Parks in the past, Kenagy served as backcountry ranger at Kenai 1983-84, but without a law enforcement commission.

Outdoor Recreation Planner Johnston received Office of Aircraft Services flight approval which increased the ability of the head Law Enforcement officer to respond to incidents and patrol refuge boundaries.

The vast majority of regulation violations were handled with compliance contacts and warning, however, several cases were made during 1987. State Fish and Wildlife protection officers provided excellent support during the early salmon run by working several evenings of plain clothes patrol. At least three incidents of theft occurred at refuge facilities during June. These included a car break-in at Fuller Lake Trail, a stolen outboard at Hidden Lake, and a fishing pole theft at Russian River.



An aircraft makes a low pass over a newly posted illegal landing area along the Chickaloon River. An eagle roost is located 150 yards to the west of the location.

RKJ

Illegal aircraft landings on the Chickaloon Flats were a major problem during late July and early August of 1987. Several overland and aerial trips were made to mile seven of the Chickaloon River to install closure signs and replace vandalized closure signs. Dozens of aircraft pilots were contacted on site and dozens of phone inquiries were responded to regarding this closure. At least one notice of violation was issued, however, warnings and compliance at the popular de facto landing area was the rule.

By far the most troublesome and potentially dangerous problem has been unauthorized parking on the shoulders of the Sterling highway so as to obstruct the roadway and vision. Alaska State Troopers had several vehicles towed and Outdoor Recreation Planner Johnston developed an impound form and procedure for refuge officials to tow offending vehicles. Also several new "no parking" signs were erected. Highway parking problems showed signs of improvement as the summer visitor season progressed.

Significant cases or incidents during 1987 are as follows:

1. Refuge trapper cited for violation of the Bald Eagle protection act. The trapper killed three bald eagles by utilizing site exposed baits and failing to comply with his refuge trapping permit for trap check time and other provisions. The subject forfeited a substantial fine and received probation.
2. Two individuals were apprehended and issued a violation notice for having cut and removed over 90 trees from the frozen shoreline of Jean Lake.
3. A refuge trapper [REDACTED] was cited for the second year in a row for violation of his refuge trapping permit. Indvik was in possession of a radio-collared lynx while the season was closed and was operating a snowmobile in a closed area.
4. Staff Law Enforcement personnel continued to deal with inquiries, complaints, Congressionals, and illegal landings at a de facto airstrip which has developed in recent years along the Chickaloon River. During August the area had been closed by signs, large white "X's", and obliterated by debris to render it unusable. Several warnings and at least one citation were issued before the situation was controlled.

5. Refuge law enforcement and seasonal Park Rangers patrolled approximately 350 hours during the 20-day moose hunting season, including road and backcountry patrols. Several patrols were conducted cooperatively with State Fish and Wildlife Protection officers.

There appeared to be an increase in the illegal taking of cow moose and sub-legal bull moose during the regular season. Refuge staff assisted, or responded to, approximately 13 incidents of unauthorized take of moose involving cows or sub-legal bulls. Refuge staff also made cases on several other illegally taken animals. The increased illegal kill was due in part to confusion and/or carelessness regarding new Game Management Unit 15a antler restrictions.

6. On September 12-13, Outdoor Recreation Planner Johnston observed and apprehended two same-day airborne hunters in Game Management Unit 15A. Park Ranger Ron Levy also assisted State Fish and Wildlife Protection Officer Gary Titus in apprehending a person who took a sub-legal bull moose the day before the moose season. The airborne hunters forfeited the illegally taken moose and forfeited the maximum big game violation bail. The pilot () of Sterling had been cited previously by refuge staff for unauthorized aircraft landings and his passenger who shot the moose () had been apprehended previously for trapping within a closed area.

7. Refuge staff responded to several other incidents during the hunting season, including vandalism, unauthorized target shooting, a wounded trumpeter swan, several unauthorized motor vehicle usages, several low flying aircraft, and a shotgun wounding of a brown bear.

8. The 1987, season is the first year Skilak Wildlife Recreation Area has been closed to big and small game hunting and compliance with the new regulation appeared to be excellent with no Violation Notices issued and only isolated incidents of persons being contacted prior to initiating a hunt in the newly closed area.

9. A sub-legal Dall sheep was taken near Round Mountain. In addition, six legal rams were taken near the Cooper Landing closed area boundary on Round Mountain. The multiple harvest by walk in hunters renewed concern over an indistinguishable closed area boundary and questions whether several rams were not in fact taken within the closed area. All harvested animals on Round Mountain utilize the closed area herd which is readily observed by thousands of persons along the Sterling Highway. Ironically, rams are harvested when they venture on to the Kenai National Wildlife Refuge from Chugach National Forest.

10. Special Agent Wally Soroka assisted by seasonal Law Enforcement officer Eickhoff, and Deputy Refuge Manager Hedrick arrested a disorderly man with a long criminal history at the Russian River access area.

11. A small island in Skilak Lake that harbors a gull colony was half burned by a wildfire started by an abandoned campfire. The fire was extinguished by Refuge Ranger Ron Levy and a crew from State Forestry.

12. Refuge trapping permit compliance work continued during 1987, with several unmarked snares and unauthorized traps being discovered by refuge officers. Three incidents of unauthorized beaver trapping occurred after the February 1 opening of beaver season. Two Violation Notices were issued during February to refuge trappers and several snares and beaver sets seized.

Search and rescue capability was improved during 1987, and refuge staff participated in several cooperative search incidents.

13. Several aircraft owners and pilots were contacted in late July and early August at a de facto airstrip at mile seven of the Chickaloon River. Closure signs were vandalized and replaced several times. [REDACTED], piloting a Cessna 180, was issued a federal notice of violation for multiple landings on July 29, 1987. Mr. [REDACTED], an employee of Cook Inlet Native Corporation, was also reported to the Federal Aviation Administration for careless flying.

Table 30. Violations on the Kenai National Wildlife Refuge for years 1979 through 1987.

<u>Violation</u>	<u>'79</u>	<u>'80</u>	<u>'81</u>	<u>'82</u>	<u>'83</u>	<u>'84</u>	<u>'85</u>	<u>'86</u>	<u>'87</u>
Snagging of fish	--	--	27	24	26	23	10	1	15
Fishing in closed water	--	--	13	4	13	4	3	3	3
Overlimit of fish	--	--	3	3	6	3	4	1	4
Fishing without a license	3	6	12	4	1	1	2	1	1
Other fishing violations	--	--	--	--	7	4	2	0	2
Snowmobiling violation	1	0	0	4	6	2	0	0	2
Motor boat in prohibited area	1	0	0	0	0	0	0	0	1
Unauthorized use of motor vehicle	4	11	7	10	9	20	28	15	13
Parking in No Parking Zone	21	15	19	13	2	12	2	0	3
Dropping objects from airplane	1	0	0	0	0	0	0	0	0
Lndg. aircraft in prohibited area	4	4	1	4	6	0	0	0	4
Shooting fireworks/selling	1	0	0	1	4	2	2	0	2
Target shooting/weapons viol.	--	--	--	--	--	--	2	6	3
Violation of State game regs.	1	1	3	0	1	1	0	0	4
Migratory Bird hunting violations	--	--	--	--	10	2	2	1	2
Littering	0	0	5	0	3	2	3	4	1
Illegal camp/boats/cabin	0	9	3	1	0	0	0	2	0
Unauthorized advertising	0	1	0	0	0	0	0	0	0
Illegal wood cut/cut green trees	0	3	3	4	5	2	9	3	4
Speeding	0	0	1	0	5	3	0	2	1
Reckless operation of machine	0	0	1	0	0	0	0	0	0
Unattended fire	0	0	1	0	0	0	0	0	0
Interference with employee	0	0	1	0	0	0	0	0	1
Destruction of Gov't property	0	0	0	1	0	0	0	0	0
Failure to comply with refuge SUP	0	0	0	1	2	2	2	1	3
Violation of Coast Guard Regs.	--	--	--	--	5	0	0	0	0
Violation of other Refuge Regs.	--	--	--	--	--	--	2	1	5
Unauthorized trap/viol./trap permit								4	4
Bear baiting									
Interference/public/theft								1	5
Totals	37	50	100	74	111	83	74	46	83

Table 31. Kenai NWR incidents (Nov-Nov) 1985/1987.

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

Search and rescue capability was improved during 1987, and refuge staff participated in several cooperative search incidents. Refuge staff, Central Peninsula Emergency Services, the Department of Natural Resources, and the Alaska State Troopers are utilizing the Incident Command System for search mobilization and coordination.

The Alaska State Troopers, Search and Rescue program on the Kenai Peninsula, coordinated by Sargent Tom Sumey, made dramatic improvements in inventorying, organizing, and utilizing other agency resources during 1987.

Refuge staff participated in the following Search and Rescue incidents:

1. On November 9, Outdoor Recreation Planner Rick Johnston and Park Ranger Kenagy responded to a request for assistance from the Alaska State Troopers regarding two overdue hunters on Skilak Lake. The hunters were located later the same day after an all-day boat search.
2. On June 17, Johnston responded to a request for assistance from Alaska State Troopers to get an over due boat on Tustumena Lake. Johnston provided a tow for a disabled boat in the Crescent Creek area approximately 11 miles up Tustumena Lake. The boat's passengers were overdue but unharmed.
3. On June 19, Fire Management Officer Larned provided search support to the Alaska State Troopers after a helicopter spotted an unmanned wind surfboard off of the Kenai Peninsula. Larned was already in the air and searched the beach between Nikiski and Point Possession for signs of the board's passenger, but none were found.
4. The second drowning of the summer occurred in the Kenai River during August, when an Anchorage woman without a life jacket capsized her canoe late at night. Despite several hundred hours spent by 42 searchers, including 5 refuge staff, her body wasn't recovered until weeks later. Her husband was revived from hypothermia by refuge staffers Jim and Karen Farrar, who initiated the search effort.
5. Three incidents of lost hunters occurred during September. Two involved initiation of a formal search. Refuge staff assisted.

Outdoor Recreation Planner Johnston prepared comments on the Department of Natural Resource regulations affecting refuge portions of the Kenai River Special Management Area. Generally, the proposed Department of Natural Resources regulations were compatible with refuge regulations, however, there were several minor exceptions. Comments focused on minor discrepancies which included regulations related to gold panning, camping on islands, water skiing on Skilak Lake, and permits for commercial services.

18. Cooperating Associations

The refuge's Alaska Natural History Association sales outlets experienced a surge of sales growth in 1987, with a final tally of \$23,600, an increase of over \$5,000 over 1986, sales of \$18,300. This 22% increase is a result of expanding the variety of sales items offered at our outlet, keeping inventory well-stocked, and maintaining a cordial relationship with the Kenai and Soldotna Chambers of Commerce, who referred travelers to our visitor center.

Visitation to Alaska increased in 1987, and the Kenai Peninsula felt the impact. The refuge's Sterling Highway log cabin visitor contact station experienced stable visitation. During the Memorial Day to Labor Day period 5,555 people visited the Visitor Contact Station and sales rose to a new high of \$4,730.

Our Soldotna visitor center experienced increased growth in 1987, with visitation reaching 28,000. Sales proceeds totalled \$18,870. The local Chambers of Commerce provided excellent referrals to the center which helped overcome access problems that make it so difficult for first-time visitors to find. With a good access road, it is anticipated that visitors center attendance would increase by as much as 50 percent.

New sales items included: Bear Attacks, Alaska Science Nuggets, the Alaska Department of Fish and Game Wildlife Notebook Series, Grizzly, and Bears of Alaska. In addition to books, Carl Freeman's wildlife bookmarks were a huge success as were long sleeve T-shirts.

Kenai's most ambitious sales project was a 1988, full color 9" X 12" photo calendar entitled, "A Wild Year". The calendar featured wildlife of the Kenai Peninsula with written captions highlighting natural history events of the Kenai Peninsula. The calendar received critical acclaim by placing second in the publications competition of the Association of Interpretive Naturalists at their national conference in St. Louis.

Proceeds from cooperating association sales were used for awards to volunteers, honorariums for outstanding volunteer contributions, resource books for the refuge library, and to support teacher training in wildlife and environmental education. In addition, funds were carried over to support a visitor center wildlife mural exhibit entitled, "How Do You Measure Up to Alaskan Wildlife?".

19. Concessions/Commercial Operations/Special Use Permits

The majority of refuge outfitter/guides special use permits were completed during June. The number of permittees increased slightly from 1986 primarily due to the addition of several new permittees authorized to conduct sportfishing guide trips on the upper Kenai River and the addition of several air taxis. There were 48 commercial outfitter/guide special use permits issued during 1987. Approximately 58,000 refuge visits were supported by refuge special use permittees according to use forms sent in by permittees.

Several permit addendums were revised during 1987 in order to respond to problems or reduce conflict with other recreational users.



Commercial raft guide leads river float on Upper Kenai River. RKJ

Outdoor Recreation Planner Johnston prepared an option decision paper regarding the issuance of special use permits for outfitter/guides utilizing the upper Kenai River. The paper contained a discussion of historical perspective on permit issuance, analysis of visitor use data, chronology of regulatory changes, proposed management objectives, various management options, and a preferred management strategy, accompanied by staff discussion.

After examining options, several new management actions were initiated during 1987:

1. The number of sport fishing guides on the Upper Kenai River was increased from 11 to 20.
2. Each permittee was restricted to ten starts per week and no more than 4 per day.
3. Sundays in July were not authorized for commercial sport fishing floats.
4. An incidental permit program was initiated which allowed sportfishing guides who had already obtained a Kenai River Special Management Area permit, to float the Upper Kenai River up to three times during the year.

Guides utilizing portions of the Lower Kenai River have never been comprehensively involved in the refuge Special Use Permit program. During 1987, all sportfishing guides were informed of the Kenai National Wildlife Refuge Special Use Permit program, and who among them had to obtain a Special Use Permit. The letter sent to all Kenai River Guides states the following:

"Several portions of the Kenai River are within the Kenai National Wildlife Refuge (see attached map). These sections include:

1. River Mile 25.1 to 28 between Sterling and Soldotna.
2. River Mile 45.4 (Thompson's Hole) upstream to Skilak Lake.
3. Skilak Lake.
4. Skilak Lake upstream to Russian River Mile 74.

For some years, guides using the upper Kenai River and other refuge lands and waters have been required to obtain a refuge special use permit. The requirement that guides obtain a special use permit for portions of the Kenai River within the refuge downstream from Skilak Lake was waived while State of Alaska Kenai River Special Management Area guide requirements were developed.

The Alaska Division of Parks and Kenai National Wildlife Refuge now have a cooperative agreement. To avoid duplication of permits, certain refuge permit requirements were waived. Guides with a valid Kenai River Special Management Area permit were informed that they do not need a refuge permit for operations downstream from Skilak Lake to the refuge boundary (river mile 45.4) or from river mile 25.1 to 28 between Sterling and Soldotna as long as activities are confined to the Kenai River water column and/or incidental upland stops. Guides using refuge upland areas adjacent to the Kenai River for overnight camping were required to obtain a refuge permit. Guides using Skilak Lake or Upper and Lower Skilak Lake boat launches or parking areas were required to obtain a refuge permit. Guides using Kenai River upstream from Skilak Lake continued to be required to obtain a permit."

Table 32. Special Use Permittees and Categories of Service, 1986.

AIR TAXI/DESTINATION TENT CAMPS

Alaska Air Guides
 Alaska Bush Carriers
 Alaska High Adventure
 Alaska West Air Service
 Big Red's Flying Service
 Harbor Air Service
 Ketchum Air Service
 Kenai Lake Air Service
 Kenai Air Service
 Maritime Helicopters
 Regal Air Service
 Rust's Flying Service

BACKPACKING/BACK COUNTRYCANOE GUIDE SERVICE

Alaska Outdoor Services
 Alaska Pioneer Canoeing Ass.
 Frontier River Safaris
 GreatAlaska Fish Camp
 Hugh Glass Backpacking
 Guides
 Kenai Guide Service
 Kenai Paddle Excursions
 Boaters
 Waterstriders

EQUIPMENT RENTALS

Alaska Outdoor Services
 Alaska Pioneer Canoeing Ass.
 GreatAlaska Fish Camp
 Kenai Paddle Excursions
 Service
 Waterstriders

GAME MEAT TRANSPORTING

Alaska Outdoor Services
 Bear Creek Outfitting/Packing
 Eugene Hanson
 Hope Trading Post
 Charters
 Jones Guide & Outfitting Service
 Running W Outfitters
 Service
 Savage Outfitters
 Strawberry Stables
 Charters
 Willard's Moose Lodge
 Voyageur Charters & Excursions

HORSE PACKING GUIDE SERVICES

Jones Guide/Outfitting Service
 Running W Outfitters
 Hansen Outfitters
 Hope Outfitters
 Willard Moose Camp

LAKE/OCEAN TOURING

Alaska Fishing & Wilderness Adv.
 Alaska Outdoor Services
 Alaska Pioneer Canoeing Ass.
 Alaska Wildlife Adventures
 GreatAlaska Fish Camp
 Hugh Glass Backpacking
 Kenai Guide Service
 Kenai Paddle Excursions
 Pacific Coast Charters
 Waterstriders

SPORT FISHING GUIDE SERVICES

Alaska Air

Alaska Bush Carriers
 Alaska Drift

Alaska North Flying Service
 Alaska River & Ski Tours
 Alaska River's Company
 Alaska Wildland Adventures
 Andy Szensy Guide Service
 B & B Guide Service
 Big Red's Flying Service
 Bruce Nelson Float Fish

Dave Richards Guide Service
 Kenai River Charters
 Kenai River Sportfishing Camp
 Ketchum Air Service
 King Fisher Guide Service
 Osprey Outfitters
 Ozzie's Guide Service
 Pacific Coast

Randa's Guide Service
 Rust's Flying

RW's Guide Service
 Silver King

Sportsman's Lodge, Inc.
 Voyageur Charters & Excursions

RIVER FLOAT TRIPS

Alaska Pioneer Canoe Ass.
 Alaska River & Ski Tours, Inc.
 Alaska River's Company
 Alaska Wildland
 Osprey Outfitters
 Ozzie's Guide Service

HUNTING/OUTFITTER GUIDE SERVICES

Alaska Outdoor Services
 Bear Creek Outfitting/Packing
 Dennis Owen Guide Service
 Eugene Hanson
 Hope Trading Post
 Jones Guide & Outfitting Service
 Kenai Guide Service
 Running W Outfitters
 Savage Outfitters
 Strawberry Stables
 Voyageur Charters & Excursions
 Willard's Moose Lodge

PHOTOGRAPHY GUIDE SERVICES

Alaska River & Ski Tours
 Alaska Wildland Adventures
 Hugh Glass Backpacking Company
 Hope Trading Post
 Kenai Guide Service

WINTER BACKCOUNTRY GUIDE SERVICES

Alaska Outdoor Services
 Alaska River & Ski Tours
 Kenai Guide Service

SCHEDULED BOAT SERVICES

Sportsman's Lodge, Inc.

KAYAK INSTRUCTION & GUIDE SERVICE

Alaska River's Company

COMPETITIVE EVENTS

Peninsula Sled Dog Racing Ass.

The Kenai-Russian River Access area was operated under a contracted agreement for the second year by Robert Haglard of Pacific Coast Charters. Two employees operated a fee booth and collected \$50,469.00. Monthly figures were the following:
June, \$26,323.00; July, \$13,713.00; and August, \$10,433.00.

Recreational users were charged four dollars for entry, and larger vehicles were charged five dollars for a 24-hour use period. The private concession initiated during 1986, was at first rather controversial, but relatively few problems occurred during 1987.

The Peninsula Sled Dog Racing Association conducted several organized racing events during early 1987, including two events during February. The Association holds a Special Use Permit to groom trails, train, and race sled dogs on Kenai National Wildlife Refuge. One activity during the month included a Junior Musher racing event which featured mostly local youths.

I. EQUIPMENT AND FACILITIES

1. New Construction

A much needed storage area was completed along the entire rear wall of the 8-stall cold storage building (100' x 8'). A 16' x 20' storage building was constructed for the biology program, and will be of significant benefit in helping us meet a critical storage "deficit" at the shop complex. Two new 5' x 10' subentrance signs were constructed and installed along the refuge boundary at both the Swanson River and Funny River Roads.

Two new 24" x 24" skylights were installed at the Visitor Contact Station at the east entrance to Skilak Loop. The old World War II steel landing mat boat ramp at the lower Skilak Landing was replaced with new concrete planks. While this was a significant improvement to this popular access area, it remains to be seen how the planks withstand the often severe break-up conditions on Skilak Lake.



Partially completed concrete boat ramp at Lower Skilak landing.

JEF



Equipment Operator Kivi and Maintenance Mechanic O'Guinn
"stringing" 12' X 12" concrete plank for Lower Skilak
boat ramp. JEF

Our new "born again" bone yard was finally completed in November. The 200' x 300' addition has been a real boon to our vehicular and equipment storage problem. One of the axioms in refuge operations is that "bone yards" are "never big enough," and we are already sensing the reality of that prophetic statement made by J. Clark Salyer 50 years ago.

3. Major Maintenance

On July 29, a strong odor of electrical smoke was detected in the Headquarters building - primarily in the restrooms and janitor closet. After several anxious hours of inspection, an electric motor within the vent/duct system was found to be exceptionally hot. Fortunately, the motor was independently wired to a 110 volt outlet and we did not have to shut down the entire circulation system while awaiting a replacement motor.

Mother Nature threw a real curve, during "break up", at the Swanson River Landing. Over the years this has been an annual problem area, but never impassable for any length of time. This spring, the entire stretch of road (about 100 yards) leading to the Swanson River turned into an oozy quagmire - swallowing several cars and a couple of pickups. As of the end of May, the road was still impassable, and Swanson River Oilfield maintenance personnel were still trying to develop a workable repair strategy. In the meantime, travel was restricted to one of our most popular access points until early June.

A new 60 foot 48 inch culvert was installed at the Sucker Creek crossing on Swan Lake Road. The old culvert, which has been in place since the late 1950's, was restricting salmon and rainbow smolt from reaching Sucker Lake. The project was contracted to VECO, Incorporated. Their entire field crew is to be commended for a real conscientious effort in meeting our design specifications. Also, Kudos to the Kenai Fisheries office, namely, Gerry Gray and Dave Faurot for their assistance in project design and monitoring actual construction.



Installation of new 48" culvert on Swan Lake road at Sucker Creek crossing. The new culvert replaced an old "perched" culvert which seriously restricted salmon and rainbow smolt migration into Sucker Lake. JEF



Completed culvert installation at Sucker Creek showing upstream inlet and final grade elevation. JEF

Equipment Operator Dick Kivi completed mowing roadside brush and grading along most of the Skilak Loop Road. The State has relinquished most of their road maintenance responsibilities for the Skilak Loop due to severe budget cutbacks. We will attempt to pick up the slack as best we can with refuge equipment and manpower.

Maintenance Mechanic O'Guinn completed body and fender work on the 1982, Dodge Rampage which was moderately damaged in a rollover. Al did his usual quality job, and saved the Station about \$3,000 in commercial repair costs.



Maintenance Mechanic Al O'Guinn "showing off" his newly renovated 1974 GMC. The old garbage compactor was replaced with tool bed. The entire unit was sandblasted and repainted and is now used as our primary campground maintenance vehicle. JEF

Using our new Plasmar cutting torch, Al also cut out 3/16" steel letters reading "Visitor Center" to be added to the visitor entrance side of the refuge headquarters building.

Maintenance Mechanic Al O'Guinn completely disassembled the brine tank which feeds the dual stage Culligan water softening unit in the Headquarters building. The tank was cleaned, salt plate baffles replaced, and automatic feed system repaired.

All waysides, parking areas, and campgrounds along the Swanson River and Swan Lake roads were graveled by a local contractor. The gravel source was rehabilitated material from ARCO's Wolf Lake drill project and was to be used as "payment-in-kind" on refuge access areas. All camping pads at Tustumena Campground were graveled, raked, and firegrates installed. Additional improvements (screened gravel, permanently anchored fire grates, and parking barriers) were completed by mid-September.

A severe windstorm hit the Kenai Peninsula on February 25 and 26, resulting in a number of downed trees throughout the Headquarters complex. One large black spruce barely missed the Maintenance Shop, but did manage to take out a section of chain link fence just behind the Shop. The wind also tore several shingles off Residence Number 1; however, damage was minimal compared to a number of local businesses and private residences, many of which experienced major roof damage and power outages.

The high winds of late February kept us busy with chain saws through early March, both on the Swan River/Swan Lake Road and the headquarters area. A number of potential "widow makers" were felled around the shop complex.



Perimeter fence damage from 60' spruce behind maintenance shop during severe windstorm in late February.

JEF

Snowfall during January surpassed that of any January in recent years; hence, Equipment Operator Dick Kivi and Maintenance Mechanic Al O'Guinn logged many hours keeping roads passable and parking lots parkable.

4. Equipment Utilization and Replacement

Facilities Manager Jim Frates completed the annual vehicle report. Total fleet mileage for 1987, was 172,000 miles, down about 3,000 miles from 1986. The (7) Chevy S-10 pickups continue to keep our fleet maintenance costs at a reasonable level -- \$.08/mile.

A number of items, ordered in late Fiscal Year 86, for the Skilak Loop Viewing Area (parking barriers, stainless steel risers for outhouses, picnic tables) were received and stored at the Skilak Guard Station.

A total of six new vehicles were received during Fiscal Year 87, and for the first time in several years it appears our vehicle fleet is at a level to meet our total program/operational needs. Nine of the old "veteran" pickups, a suburban, and a station wagon will be put up for bids. Other equipment disposed of during the year included a 1950 vintage Minneapolis Moline tractor, a military 6 x 6 with low boy, Fleco Rollers, and a 1969 Chevrolet pickup.

Major equipment purchased during the year included: (1) 3 dust collecting units for the carpenter shop; (2) 16" radial arm saw; (3) Plasmar cutting torch and wire feed welder; (4) portable sawbuck; and (5) 10 Poulan chain saws.

5. Communication Systems

Processing input data into the Regional Office Financial Tracking System was modified in 1988. All data on the Data General microcomputer is now put on disketts and mailed to the Regional Office rather than the time consuming and expensive method of encoding one keystroke at a time over long distance toll lines.

In an effort to upgrade Office Systems and increase interagency communications, ten new programmable portable radios were ordered with hopes of integrating these into existing communication systems for 1988 field operations. We have thus far been pleased with the reliability, range of coverage, and multi-channel capabilities of the portable King radios used in 1987.

The critical "missing link" in our communications system concerns updating our old tube-type repeater and adding a second solid-state repeater in the Tustumena-Benchland portion of the refuge. Unfortunately, current "dead spots" in our communication network restricts coverage within one of our highest public use areas (Russian River) as well as one of the most remote portions of the refuge (south of Tustumena Lake).

Efforts are still underway to receive permission from the Alaska Department of Public Safety to use their direct line repeater frequency in emergency situations.

As part of our accelerated public use development within the Skilak Wildlife Recreation Area, two RACOM Model 1700 multi-channel voiced storage systems were purchased in 1987. These units will, when operational, permit continuous broadcasts for refuge visitors on a selected FM channel. Potential site locations for antenna systems have been discussed with a factory representative although considerable ground work needs to be done before the system becomes operational.

6. Computer Systems

A new Calcomp model 1041 plotter was received during late 1987, but has not been fully integrated into the Data General and Geographical Information System. The plotter is expected to be a valuable tool in converting raw biological data into graphic displays representing a wide variety of natural resource information.

In conjunction with IRM, work continued on developing the software permitting us to telecommunicate field level information into the MV8000 computer in Anchorage for updating the Regional Office Financial Tracking System.

A major gap still exists in the area of employee training, familiarization and knowledge of system capabilities as well as interfacing with other system components. Training for key personnel should continue to receive a high priority if we are to maximize our computer system capabilities.

7. Energy Conservation

Table 33 shows a comparison of energy consumption between calendar years 1986 and 1987.

Table 33. Energy use comparisons.

Product	Unit of Measure	Comparison		Comparison % Change with 1986
		1986	1987	
Electricity	KWH	158,334	139,888	- 11.7%
Natural Gas	100 Cu. Ft	16,466	16,721	+ 1.5%
Vehicle Gas	Gallon	12,515	11,746	- 6.1%
Aviation Gas	Gallon	8,089	6,348	- 21.5%
Propane	Gallon	492	430	- 12.6%
Diesel Fuel	Gallon	946	1,644	+ 73.8%

The decrease in electricity consumption (-11.7%) was most likely a result of above normal winter temperatures, and the fact that one of two circulating pumps at refuge headquarters was shut down for the entire year. Until we again reach sub-zero temperatures, a single pump can maintain a comfortable internal environment.

The reduction in aviation gas reflects fewer hours flown in both the Cub and Cessna 206. Nearly 100 fewer hours of air time were recorded in 1987. A total of 281.4 hours were tabulated in the Cub, while the 206 accounted for 228 hours.

The nearly 74% increase in diesel fuel is attributed to increased snow removal efforts and added responsibilities for grading the Skilak Loop Road.

8. Other

Local "People Count" enrollee Billy Maal terminated on August 21, to resume classes at Soldotna High School. Billy filled a real void in maintenance operations by keeping lawns mowed, vehicles washed and waxed, painting, and assisting with campground clean up. The highlight of his summer was a flight with FMO Bill Larned in the Cessna 206 to Lake Emma to help drop off supplies for a cabin renovation project. As a 16 year old, it was his first plane ride. Thanks to Larned for making this a special occasion for Billy who, incidentally, hitchhiked nearly 20 miles daily to work and was seldom late.



Billy Maal, our local "People Count" enrollee, shown with Fire Management Officer Bill Larned prior to departing for Emma Lake to drop off cabin renovation supplies. A lifelong resident of the Kenai Peninsula, this was Billy's first plane ride. As a tribute to Larned's piloting skills, Billy even managed a smile after returning to Headquarters Lake. JEF

Equipment Operator Kivi (Regional heavy equipment training officer) certified Alaska Maritime's (Aleutian Islands Unit) maintenance man Bob Schulmeister on the operation of the Bobcat and front end loader on October 30. Scheduling has also been completed for training personnel at Kodiak, Alaska Peninsula, and Yukon Delta Refuges.

As facilities Manager, I would like to thank the entire maintenance staff -- Kivi, Bartman, O'Guinn, Marrs, Koch, and "People Count" enrollee Billy Maal for their dedication and enthusiasm in keeping their "cool" under an increasingly complex maintenance program.

J. OTHER ITEMS2. Other Economic Usesa. Oil and Gas(1) Beaver Creek Oil/Gas Field

Other than normal production activities, Field operations were relatively quiet. The BC#4 well was reperforated, gas wells BC#3 and BC#7 were also reperforated to minimize water production, and former monitor well BC#2 was converted to water disposal. No new wells were drilled.

Because of unauthorized vehicular entry and utilization of the existing powerline right-of-way from adjacent Kenai Native Association lands, Marathon Oil constructed a steel fence immediately along the west edge of the access road, beginning at the gate facility.

This Field's six (6) producing wells include four natural gas and two crude producers. Average daily crude production this year was 416 barrels/day while natural gas produced 46,706 MCF/day. Last year's averages were 432 barrels/day and 48,500 MCF/day respectively.

Cumulative production through December 31, 1986, was:

3,479,400 barrels of crude (wells BC#4 & BC#5RD)
63,307,325 MCF dry gas (wells BC#1A, BC#3, BC#6, BC#7)

Natural gas is pipelined 3 1/2 miles southwest to the 8-inch gathering line facility, then to the parallel 12- and 16-inch transportation lines 10 miles southeast, for utilization in the Anchorage area. Produced crude is trucked several times a week to the North Kenai refinery and storage facilities.

(2) Swanson River Oil Field

ARCO Alaska, Incorporated, became Unit Operator of the Field October 1, 1986. Although no new wells were drilled, the new operator took immediate steps to address each well facility and conduct workovers at several locations increasing daily crude production by several hundred barrels. Eight wells were also plugged and abandoned.

During the year, approximately thirty crude wells were in production at any time. This is a reduction of about a dozen wells over the years as this Field slowly produces less crude. Daily production averaged 5584

barrels/day (6100 barrels/day in December), and cumulative production through December 31 was 207,309,141 barrels. This cumulative total represents a recovery of nearly forty-six percent of the estimated barrels of original oil in place.

Following the minor gas blowout at well Soldotna Creek Unit 11-16 in December 1986, cleanup continued at the adjacent 3-9 Tank Setting/drilling pad. Produced subsurface material and pad soiled gravels were trucked to the approved Field solid waste facility. A workover rig was engaged to plug and abandon three of the four wells located on this well pad.

Without doubt, the most time consuming project for the staff was the continuation of the polychlorinated biphenyl remediation project. American Toxic Disposal of Illinois, ARCO's original contractor for the project, engaged SRH Incorporated as a subcontractor responsible for the excavation of contaminated soils from localized roads and parking areas within the Field.



This is where it all happened January 26, 1972. A natural gas explosion at this plant facility sprayed Therminol containing polychlorinated biphenyl over the snow covered area.

RR

On May 13, Refuge Manager Doshier and Assistant Refuge Manager Richey met with the site contractor John Spencer of SRH, Jim Ives of ARCO, Geoffrey Upson of Ecology & Environment, and dirt contractor Harold Jackson of Jackson Construction, to discuss and approve the proposed development of the contaminated soil stockpile processing site to be located adjacent the Soldotna Creek Unit 14-3 well pad facility. Site development was completed by June 1, followed by the lining of a large contaminated soil holding facility, the installation of a dump truck weighing scale house, and placement of office trailers, generator, and fuel support facilities.

The first truck load of material from the adjacent original pit stockpile was weighed (9 Tons) and dumped into the lined pit June 18. Subsequent hauls by June 26, transferred all 2780 Tons of that stockpiled material into this lined facility. The excavation of contaminated material from the "closed road" near the compressor facility began June 30.



The first load of contaminated material was dumped into the lined stockpile immediately adjacent to the future processing site facility.

RR

Ecology & Environment, Incorporated, contracted by ARCO to conduct chemical analysis of polychlorinated biphenyl levels, screened approximately 300 soil samples in the On-Site Analytical Service Center Lab using approved Environmental Protection Agency Methods 3550 and 8080 to further delineate the extent of polychlorinated biphenyl contaminated areas around the compressor plant facilities and other areas. Five soil samples were randomly selected from about ninety collected. The Ecology & Environment lab splits (5) from these samples were then shipped June 22 to the Patuxent Analytical Control Facility, Laurel, Maryland, for duplicate Method 8080 comparison analysis to resolve any analytical differences that might have occurred between the Ecology & Environment and Service Labs. Results of these comparisons were extremely close, thereby supporting the field lab analysis.



More than 6000 soil samples were collected for polychlorinated biphenyl analysis and delineation mapping of contaminated areas, both vertically and horizontally.

RR

An agency meeting at the Anchorage Regional Office June 5, was attended by Refuge Manager Doshier and Assistant Refuge Manager Richey to review for approval the proposed errata for the Mitigation and Restoration Plan for PCBs, Swanson River Field. An agency meet was held June 16, with representatives from Alaska Department of Environmental Conservation, Environmental Protection Agency, Bureau of Land Management, ARCO Alaska, Incorporated, and the on-site contractor, SRH, Incorporated. The status of the required Environmental Protection Agency Toxic Substances Control Act permit for the thermal unit proposed for the on-site polychlorinated biphenyl separation process at Swanson River was discussed.

By August, the access roads contaminated with polychlorinated biphenyl within the Swanson River Oil Field had been cleaned up and reopened for vehicular use. However, the original site characterization indicated the general location of contamination but underestimated the quantity (15,145 tons). Contamination material on the roadways was deeper and extended further down the shoulders than earlier information indicated, in addition to other contaminated areas located at the compressor complex facilities. This nearly doubled the amounts of contaminated soils to be excavated, necessitating an extension of the constructed 17,500 ton lined stockpile holding facility to now accommodate almost 29,000 tons.



Polychlorinated biphenyl contaminated road gravel was excavated in rows to facilitate recovery operations.

RR



Excavated gravel was trucked to the contaminated material stockpile area for future processing.

RR



The volume of contaminated material deposited in the lined stockpile approached 33,000 tons.

RR

The Soldotna Creek Unit 14-3 pit was excavated including approximately 2920 tons of solidified muds intermixed with Type III cement and placed in a separate lined and bermed containment facility to allow separate or blended feed for the processing unit.



The polychlorinated biphenyl contaminated snow of 1972 was originally trucked to this central holding pit authorized to accept oil-soiled sand and gravel generated during normal field operations. RR

During the regulatory meeting held on October 9 to provide a project status overview by ARCO for representatives from the Service, Bureau of Land Management, Alaska Department of Environmental Conservation, and Environmental Protection Agency, a verbal time extension was granted for this project until December 31, 1988. This group also learned that the previously approved extraction unit demonstration test site at Argonne National Laboratory as required under the Toxic Substances Control Act, had been withdrawn.

The main stockpile now holds 32,770 tons of excavated material. A total of 6098 samples were collected and analyzed by Ecology & Environment during the year's screening program. An additional 1360 release samples were also collected and analyzed. In addition, 320 samples were reanalysed this season, under the Quality Assurance program by Ecology & Environment's On-Site Analytical Service Center Lab.



Soils, after weathering many years, then excavated and stockpiled from the 14-3 holding pit facility, were spread on certain oil field roads as dust control without knowledge of contamination.

RR

The contractor was unable to complete the total required cleanup this season, therefore extending this project into summer 1988. This season's polychlorinated biphenyl cleanup project was curtailed November 18, to resume early spring 1988.



Awaiting processing, the contaminated material stockpile was covered with a Shelter-Rite liner and sandbagged to weather the winter season.

RR

A public informational meeting was held on November 19, regarding the polychlorinated biphenyl cleanup. Representatives of ARCO Alaska, Environmental Protection Agency, Bureau of Land Management, Alaska Department of Environmental Conservation, and the Fish and Wildlife Service attended. The meeting was well attended by all concerned agencies and ARCO Alaska's contractors. Only twelve members of the public attended this meeting, and they were mostly concerned about the process to be used in the degradation of the stockpiled contaminated material.

3. Items of Interest

The following VIP's visited the Kenai National Wildlife Refuge during 1987:

David Cline, Regional Vice-President of the National Audubon Society, visited the refuge March 6 to discuss refuge issues with Refuge Manager Doshier.

Acting Regional Director Jim Gritman and Assistant Zone Supervisor Ted Heuer visited the refuge March 20 to discuss refuge issues with the staff.

National Audubon Society Vice-President for Science J.P. Meyers and Regional Representative David Cline visited the refuge to discuss wildlife issues on July 16.

Washington office personnel Marvin Plenart, Joe Doddridge, Sam Marler, Bruce Beard, and Norm Hartis visited the refuge on August 5 and toured Kenai with refuge staff.

Lynn Corn and Norm Bloggett, of the Congressional Research Service, toured the Swanson River Oilfield with Refuge Manager Doshier on August 29.

Fish and Wildlife Service Fire Management Coordinator Frank Cole and professor, author, and fire management expert, Steve Pyne, visited the refuge on October 23 and offered helpful suggestions for future burns.

Regional Director Walter Stieglitz and Assistant Regional Director John Rogers, accompanied by Sharon Janis and Jon Nelson, toured the old Kenai Headquarters, Kenai River Flats, and Refuge Headquarters on November 25. Discussions included a proposal to combine the Kenai Fisheries and Kenai National Wildlife Refuge facilities at the Ski Hill Road Headquarters and disposal of the old headquarters site.

4. Credits

All staff members took part in writing and photography of the narrative. It was typed entirely by Brenda Marsters, coordinated by Bob Winkelman, and edited, jointly, by Brenda Marsters and Bob Winkelman.

K. FEEDBACK

Kenai Refuge has been very fortunate in the past several years to have had an excellent group of experienced high-quality seasonal employees. This seems to be the case on refuges throughout Alaska. For the most part these employees are well-educated, dedicated and very motivated self-starters that perform assigned tasks with minimal supervision. Recently Kenai lost four seasonal employees with over 20 years of combined refuge experience. Managers need to be made aware of all the tools at their disposal for incorporating the very highest of these performers permanently into the Service. Perhaps this would be a good topic for the project leader's meeting.