

KODIAK NATIONAL WILDLIFE REFUGE

Kodiak, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1983



LIBRARY

USFWS

Anchorage

U.S. Department of the Interior

Fish and Wildlife Service

NATIONAL WILDLIFE REFUGE SYSTEM

US FISH & WILDLIFE SERVICE--ALASKA  
3 4982 00021261 2

R

KODIAK NATIONAL WILDLIFE REFUGE

Kodiak, Alaska

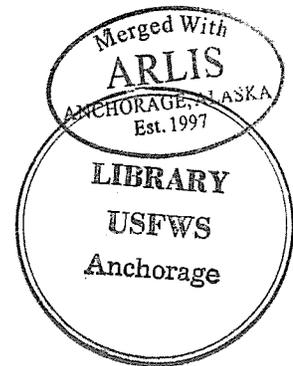
ANNUAL NARRATIVE REPORT

Calendar Year 1983

U.S. Department of the Interior

Fish and Wildlife Service

NATIONAL WILDLIFE REFUGE SYSTEM



Personnel

Refuge Staff

1. Charles W. Strickland, Refuge Manager, GS-12 PFT  
(Deceased September 11, 1983)
2. Michael T. Vivion, Wildlife Biologist/Pilot, GS-12 PFT  
(Reassigned December 11, 1983)
3. Harvey A. Heffernan, Assistant Refuge Manager, GS-9 PFT  
(Transferred November 4, 1983)
4. Edward R. Hajdys, Assistant Refuge Manager, GS-7 PFT
5. Donald A. (Tony) Chatto, Fishery Biologist (Mgmt), GS-11 PFT
6. Dennis C. Zwiefelhofer, Wildlife Biologist/Vessel Operator, GS-7 PFT  
(Reassigned April 3, 1983)
7. Judith A. Barnett, Administrative Clerk, GS-5 CS (Resigned July 1, 1983)
8. Geraldine M. Castonguay, Administrative Clerk, GS-4 PFT  
(EOD February 7, 1983)
9. Judy K. Tomberlin, Clerk-Typist, GS-3 PFT (EOD December 27, 1983)
10. Ronny D. Bowers, Maintencenceman, WG-9 PFT (EOD April 3, 1983)
11. John P. Cossick, Maintencenceman/Boat Operator, WG-10 PFT  
(Transferred March 20, 1983)
12. Rasmus G. Anderson, Maintenance Helper, WG-2 PPT (EOD June 12, 1983)

Denver Wildlife Research Center - Kodiak

1. Victor G. Barnes, Jr., Research Biologist, GS-12 PFT

Volunteers

1. Mikey King (EOD April 20, 1983 to August 26, 1983)
2. Neill Hunter (EOD April 29, 1983 to August 26, 1983)
3. Michael Aronson (EOD July 5, 1983 to August 23, 1983)

Review and Approvals

Jay R. Bellini 4/6/84  
Submitted By Date

Jay R. Colvert 4/20/84  
Regional Office Review Date





Charles W. Strickland  
January 30, 1935 - September 11, 1983

Charles W. Strickland was born January 30, 1935. He grew up in Arkansas and attended high school and college there. During the summer months of his college years, 1955-59, Charles worked for the U.S. Fish and Wildlife Service, Bureau of Commercial Fisheries, as a Fishery Aid in King Salmon and Juneau, Alaska. Following graduation in 1959, Charles began his full-time career with the Bureau of Commercial Fisheries as a Fishery Aid stationed at Brooks Lake, Alaska. He was transferred to King Salmon Fishery Station in 1962 and remained there until 1966. Charles then transferred to the lower 48 to work on the Norfolk Fish Hatchery in Arkansas. He joined the Division of National Wildlife Refuges in 1968 with an assignment to the Wapanocca National Wildlife Refuge. Following stints of service on the Loxahatchee, Santee and Felsenthal National Wildlife Refuges, Charles returned to Alaska in 1978 to manage the 20,000,000 acre Yukon Delta National Wildlife Refuge in Bethel Alaska. In April 1982, Charles transferred to the Kodiak National Wildlife Refuge at Kodiak, Alaska where he was manager at the time of his death.

Charles' dedication to the resources, the Service and Refuges will be greatly missed. Those of us who were privileged to know him deeply regret his passing.



Left to Right: Anderson, Tomberlin, Barnes, Chatto, Bowers,  
Castonguay, Vivion, Zwiefelhofer.

## INTRODUCTION

The Kodiak National Wildlife Refuge was established by Executive Order No. 8657 on August 19, 1941 "for the purpose of protecting the natural feeding and breeding range of the brown bears and other wildlife on Uganik and Kodiak Islands, Alaska". A one mile wide shoreline strip was made part of the Refuge but remained open to the public laws, resulting in numerous small coastal inholdings. In 1958 the one mile shoreline strip was closed to the public land laws and two large peninsulas were removed from the Refuge by Public Land Order No. 1634. These peninsulas were to be removed from the Refuge so that they might be opened to livestock grazing. No leases have ever been let on these areas and in 1982 as part of mitigation for the Terror Lake Hydroelectric Project one of these peninsulas (the Shearwater) was permanently closed to livestock entry.

The Alaska National Interest Lands Conservation Act of 1980 added approximately 50,000 acres of land on Afognak and Ban Islands to the Refuge, bringing the total acreage at this writing to approximately 1.865 million acres, of which approximately 310,000 acres are Native owned, but subject to Refuge regulations per ANCSA Section 22 (g).

The Refuge encompasses roughly the southwestern two thirds of Kodiak Island, all of Uganik Island (which lies off the Northwest shore of Kodiak Island), and Red Peaks area on the Northwest side of Afognak Island, and all of Ban Island which is adjacent to the Red Peaks area. Habitats include salt water estuaries, riparian zones, wet tundra, extensive brushlands, alpine areas, bare rock, permanent snow and, on the Afognak addition, Sitka spruce forest.

The refuge is host to large numbers of Pacific salmon of five species, whose spawning grounds are the relatively short, swift streams characteristic of the island. Approximately 200 breeding pairs of bald eagles nest on the refuge annually and a year round population of several hundred eagles gives Kodiak one of the highest numbers of bald eagle use days on any refuge in the system.

The combination of huge numbers of salmon, the tremendous berry crops found on the island and productive alpine sedge fields provide a virtually endless food supply for brown bears. Kodiak supports one of the highest densities of brown bears known.

Although the salmon, eagles and bears are the most widely known inhabitants of Kodiak, other less spectacular species are abundant as well, including Sitka blacktail deer, red fox, beaver, river otter, tundra swan, many species of sea birds and in off-shore waters, many species of marine mammals.

Several major potential problems exist. One is that in recent years over 30,000 acres of the refuge's best wildlife habitat have been conveyed to Native Corporations under the provisions of the Alaska Native Claims Settlement Act of 1970. Although these lands remain subject to the rules that govern use and development of the refuge (Section 22 (g) ANCSA), no one knows for sure what this means. The bottom line is that much of the best bear, eagle and fisheries habitat on the refuge is now privately owned.

Over 100 commercial fishermen use refuge lands for shore bases to support fishing operations. Over seventy of these have cabins on refuge lands and there is pressure to allow more cabins on refuge lands. Brown bears are a wilderness type animal which will not survive substantial human intrusion into their habitats. Further expansion of cabins and human occupancy into refuge habitats, particularly interior areas, will certainly cause irreparable damage to bear populations.

Refuge staffing is shown elsewhere in this report. The staff occupies a headquarters complex five miles from municipal Kodiak. Headquarters lies approximately 25 air miles from the Refuge boundary and two Service aircraft and a 48 foot motor vessel provide the only transportation to and throughout the refuge. A field headquarters is maintained at Camp Island on Karluk Lake. This camp provides a more centralized base for field operations.

TABLE OF CONTENTS

Page

A. HIGHLIGHTS

B. CLIMATIC CONDITIONS

C. LAND ACQUISITION

1. Fee Title .....	Nothing to Report
2. Easements .....	Nothing to Report
3. Other .....	Nothing to Report

D. PLANNING

1. Master Plan .....	2
2. Management Plan .....	Nothing to Report
3. Public Participation .....	Nothing to Report
4. Compliance with Environmental Mandates .....	Nothing to Report
5. Research and Investigations .....	3

E. ADMINISTRATION

1. Personnel .....	32
2. Funding .....	34
3. Safety .....	36
4. Technical Assistance .....	Nothing to Report
5. Other Items .....	Nothing to Report

F. HABITAT MANAGEMENT

1. General .....	36
2. Wetlands .....	Nothing to Report
3. Forests .....	Nothing to Report
4. Croplands .....	Nothing to Report
5. Grasslands .....	Nothing to Report
6. Other Habitats .....	Nothing to Report
7. Grazing .....	Nothing to Report
8. Haying .....	Nothing to Report
9. Fire Management .....	Nothing to Report
10. Pest Control .....	Nothing to Report
11. Water Rights .....	Nothing to Report
12. Wilderness and Special Areas .....	37
13. WPS Easement Monitoring .....	Nothing to Report

G. WILDLIFE

1. Wildlife Diversity .....	Nothing to Report
2. Endangered and/or Threatened Species .....	Nothing to Report
3. Waterfowl .....	37
4. Marsh and Water Birds .....	38
5. Shorebirds, Gulls, Terns, and Allied Species .....	38
6. Raptors .....	39
7. Other Migratory Birds .....	41
8. Game Mammals .....	41
9. Marine Mammals .....	Nothing to Report
10. Other Resident Wildlife .....	Nothing to Report
11. Fisheries Resources .....	50
12. Wildlife Propagation and Stocking .....	Nothing to Report
13. Surplus Animal Disposal .....	Nothing to Report
14. Scientific Collections .....	Nothing to Report
15. Animal Control .....	Nothing to Report
16. Marking and Banding .....	Nothing to Report
17. Disease Prevention and Control .....	Nothing to Report

H. PUBLIC USE

1. General .....	58
2. Outdoor Classrooms - Students .....	Nothing to Report
3. Outdoor Classrooms - Teachers .....	Nothing to Report
4. Interpretive Foot Trails .....	Nothing to Report
5. Interpretive Tour Routes .....	Nothing to Report
6. Interpretive Exhibits/Demonstrations .....	Nothing to Report
7. Other Interpretive Programs .....	Nothing to Report
8. Hunting .....	58
9. Fishing .....	58
10. Trapping .....	59
11. Wildlife Observation .....	Nothing to Report
12. Other Wildlife Oriented Recreation .....	Nothing to Report
13. Camping .....	Nothing to Report
14. Picnicking .....	Nothing to Report
15. Off-Road Vehicling .....	Nothing to Report
16. Other Non-Wildlife Oriented Recreation .....	Nothing to Report
17. Law Enforcement .....	59
18. Youth Programs .....	Nothing to Report
19. Cooperative Associations .....	Nothing to Report
20. Concessions .....	Nothing to Report
21. Volunteers Program .....	Nothing to Report

I. EQUIPMENT AND FACILITIES

1. New Construction .....	59
2. Rehabilitation .....	62
3. Major Maintenance .....	63
4. Equipment Utilization and Replacement .....	Nothing to Report
5. Communications Systems .....	Nothing to Report
6. Energy Conservation .....	Nothing to Report
7. Other .....	Nothing to Report

J. OTHER ITEMS

1. Cooperative Programs ..... Nothing to Report
2. Items of Interest .....62
3. Credits .....63

K. FEEDBACK

#### A. HIGHLIGHTS

Construction continued at a hectic pace on the Terror Lake Hydroelectric Project, with on refuge work essentially completed by years-end. (Sec. F-1)

Refuge shop, oil house, four residences and a bunkhouse were completed this year, leaving an aircraft hangar as the only outstanding construction project in the headquarters complex. (Sec. I-1)

In contrast to 1982, 1983 provided a bumper crop of berries, but relatively lower fish runs. (Sec. G-8)

A major brown bear study was instituted by Refuge staff and Denver Wildlife Research.

A record number of steelhead kelts was counted down the Karluk River this year. (Sec. G-11)

Scoping meetings were held in area villages in May for Comprehensive Planning. (Sec. D-1)

Once again the brown bear harvest exceeded harvest quota guidelines for Subunit IV. (Sec. G-8)

Numerous personnel changes occurred this year. (Sec. E-1)

#### B. CLIMATIC CONDITIONS

Weather conditions on the whole were considerably wetter but warmer than normal in Kodiak. January, February and March were considerably wetter than normal, April was near normal, May approached an all time high for the month for precipitation. The summer was quite dry (for Kodiak) including a record low precipitation of .73 inches in August. November, on the other hand, set a record high precipitation for the month at 15.36 inches. The high average precipitation was accompanied by much higher than normal average temperatures. The only month which averaged below normal in temperature was January with -1.2 departure from the norm. December was a balmy 8.5 degrees above normal.

The result of these weather conditions was a tremendous berry crop this year which contrasted dramatically with the 1982 near total failure of the berry crop. Dry conditions in late summer prevented many salmon from spawning in the upper reaches of some streams. Brown bears reacted to these conditions by spending little time on refuge streams and concentrating their late summer feeding in the berry fields.

The 1982-83 winter was mild and resulted in very little winter kill on deer. By year's end very little snow and warm temperatures had continued, making it an easy winter to that date for deer.

A summary of weather data from National Weather Service, Kodiak follows:

	<u>Snowfall</u> (Inches)	<u>1983</u> <u>Precip.</u>	<u>Longterm</u> <u>Avg. Precip.</u>	<u>Temperature</u> <u>Departure From</u> <u>Norm. Degrees F°</u>	<u>Temperatures</u> <u>Max</u>	<u>(F°)</u> <u>Min</u>
January	6.4	9.09	5.01	-1.2	44	2
February	1.0	7.56	7.56	+7.6	43	17
March	-	8.44	3.85	+ .8	49	26
April	.18	2.25	3.81	+3.8	62	26
May	-	12.67	4.85	+3.4	51	41
June	-	7.88	4.12	+2.2	73	37
July	-	2.16	3.54	+3.4	72	44
August	-	.73	4.30	+3.2	78	40
September	-	2.93	6.11	+1.5	70	28
October	6.1	5.36	6.28	+1.6	62	20
November	7.2	15.36	5.41	+3.4	48	16
December	Trace	2.43	5.03	+8.5	53	23
Totals	20.88	76.86	56.70			

#### D. PLANNING

##### 1. Master Plan

Refuge Comprehensive Conservation Planning began in earnest this year. The staff spent considerable time mapping and consolidating data for the computer data base.

Scoping meetings were held in the following locations:

Kodiak - May 17  
 Old Harbor - May 18  
 Akhiok - May 20  
 Larsen Bay - May 23  
 Karluk - May 24  
 Anchorage - June 7

The contracted computer data base was complete by year's end.

Delays in the planning effort have resulted from lack of personnel (both in planning and the refuge staff) and from attention required by other plans.

## 5. Research and Investigations

### Kodiak NR 83 - "Seasonal Migration and Movements of Kodiak Island Bald Eagles" (74530-1)

The following segment updates the progress of the bald eagle migration and movements study begun during July 1982. The study was initiated to: (1) determine and compare seasonal movement patterns of sub-adult and adult bald eagles on Kodiak Island, and (2) to identify possible emigration and immigration patterns between the Kodiak population of bald eagles and other Alaskan or North Pacific bald eagle populations. We also hoped to document local winter movements in relation to the Kodiak state airport in an effort to minimize bird strike hazards from wintering bald eagles in that area in past years.

Winter marking of sub-adult eagles was carried out from March 3 to April 1, using a 16 foot aluminum skiff for transportation and to set snares. After numerous attempts with different types of traps and snares, successful capture of eagles was accomplished with a floating platform snare utilizing a single herring as bait. The major factor affecting capture efficiency was disturbance of snares by glaucous-wing gulls.

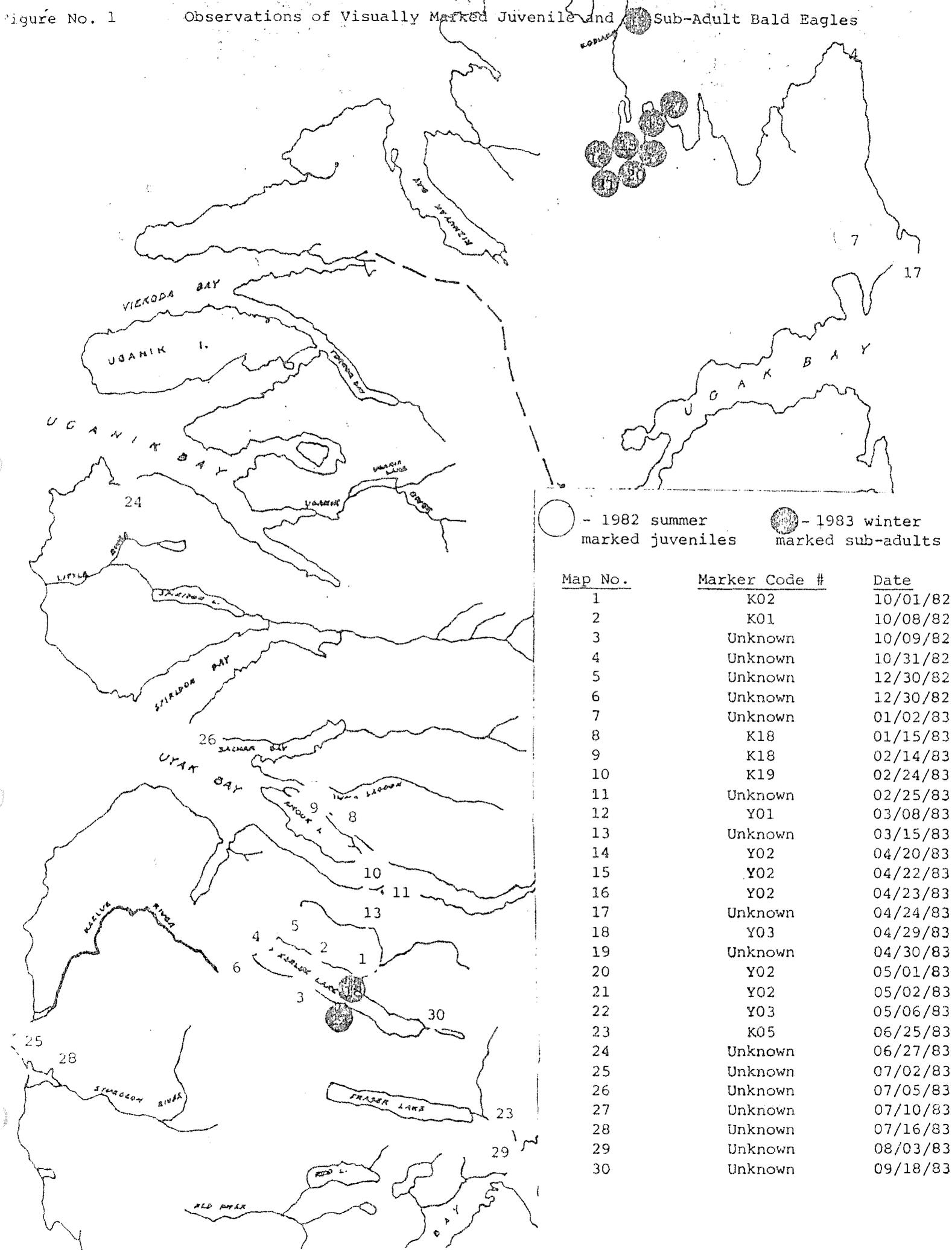
Seven sub-adult eagles were snared and tagged with visual color markers during winter 1983. Sub-adults captured were marked with white patagial flags on both wings, a blue acrylic leg band and a standard Fish and Wildlife Service (FWS) riveted aluminum leg band. The white patagial markers used follows winter marking protocol established by the Bird Banding Lab. Black individual codes were painted on the patagial flags. Ten observations (figure 1) of the seven sub-adults were received in 1983. All but two of the reports were from the Chiniak Bay area and only two of those reports did not allow individual identification of the bird.

Adult eagles captured were fitted with radio transmitters (weighing less than 55 grams) using a back pack attachment configuration. No visual markers other than a blue acrylic leg band and a standard aluminum leg band were placed on the adult eagles. The five adult bald eagles radio-tagged in 1983 did not provide as much movement data as hoped. A problem with the design of a break-away harness attachment resulted in the loss of two of the transmitters less than two weeks after placement. The remaining three radioed adults have not been located since mid-April and it is suspected these birds also lost their transmitters. If they were shed in or over water the transmitter signal would not be picked up. These adult birds may have moved to breeding areas off Kodiak Island and may return during the winter 1983-84. Their frequencies will be monitored throughout the winter 1983-84 to determine if this is the case.

Summer marking fledglings occurred July 8 to July 28 and was accomplished by climbing nest trees or sea stacks, placing the young eagles in a canvas bag and then lowering them to the ground for placement of the markers. Twenty-eight fledglings from 17 nests were marked in July of 1983. Twenty of the young eagles were marked from coastal nests located in Uyak, Spiridon, Uganik, and Terror Bays. Four eaglets from the Frazer Lake area were color marked and fitted with radio-transmitters. The remaining four color-marked

Figure No. 1

Observations of Visually Marked Juvenile and Sub-Adult Bald Eagles



○ - 1982 summer marked juveniles  
 ● - 1983 winter marked sub-adults

Map No.	Marker Code #	Date
1	K02	10/01/82
2	K01	10/08/82
3	Unknown	10/09/82
4	Unknown	10/31/82
5	Unknown	12/30/82
6	Unknown	12/30/82
7	Unknown	01/02/83
8	K18	01/15/83
9	K18	02/14/83
10	K19	02/24/83
11	Unknown	02/25/83
12	Y01	03/08/83
13	Unknown	03/15/83
14	Y02	04/20/83
15	Y02	04/22/83
16	Y02	04/23/83
17	Unknown	04/24/83
18	Y03	04/29/83
19	Unknown	04/30/83
20	Y02	05/01/83
21	Y02	05/02/83
22	Y03	05/06/83
23	K05	06/25/83
24	Unknown	06/27/83
25	Unknown	07/02/83
26	Unknown	07/05/83
27	Unknown	07/10/83
28	Unknown	07/16/83
29	Unknown	08/03/83
30	Unknown	09/18/83

TABLE 1

## 1983 WINTER MARKING LOCATIONS AND MARKER CODES

<u>Capture Location</u>	<u>Date</u>	<u>FWS Band # (Left Leg)</u>	<u>Color Leg Band Code # (Right Leg)</u>	<u>Patagial Markers<sup>1</sup> Code # (Both Wings)</u>	<u>Est. Age</u>
Near Island	3/3/83	629-13521	Y01	Y01	3 yrs.
Dog Bay Harbor	3/7/83	629-13522	Y02	Y02	4 yrs.
Near Island	3/9/83	629-13523	Y03	Y03	2 yrs.
Near Island	3/10/83	629-13524	Y04	Y04	2 yrs.
Near Island	3/15/83	629-13527	Y05	Y05	3 yrs.
Near Island	3/23/83	629-13529	Y06	Y06	4 yrs.
Near Island	4/1/83	629-13531	Y07	Y07	2 yrs.

1 - Patagial markers are white in color on both wings.

TABLE 2

## 1983 SUMMER MARKING LOCATIONS AND MARKER CODES

<u>Map No. &amp;<sup>1</sup> Locations</u>	<u>Date</u>	<u>FWS Band # (Left Leg)</u>	<u>Color Leg Band Code # (Right Leg)</u>	<u>Patagial Markers<sup>2</sup> Code # (Both Wings)</u>	<u>Est. Age</u>
1.	7/8/83	629-13532	K22	K22	9 wks.
1.	7/8/83	629-13533	K23	K23	9 wks.
2.	7/9/83	629-13534	K24	K24	6 wks.
3.	7/9/83	629-13535	K25	K25	7 wks.
3.	7/9/83	629-13536	K26	K26	7 wks.
4.	7/9/83	629-13537	K27	K27	8 wks.
4.	7/9/83	629-13538	K28	K28	8 wks.
5.	7/9/83	629-13539	K29	K29	8 wks.
5.	7/9/83	629-13540	K30	K30	8 wks.
6.	7/11/83	629-13541	K31	K31	7 wks.
7.	7/12/83	629-13542	K32	K32	8 wks.
8.	7/12/83	629-13543	K33	K33	9 wks.
9.	7/12/83	629-13544	K34	K34	10 wks.
9.	7/12/83	629-13545	K35	K35	10 wks.
9.	7/12/83	629-13546	K36	K36	10 wks.
10.	7/13/83	629-13547	K37	K37	7 wks.
11.	7/13/83	629-13548	K38	K38	9 wks.
12.	7/14/83	629-13549	K39	K39	9 wks.
13.	7/14/83	629-13550	K40	K40	7 wks.
13.	7/14/83	629-13551	K41	K41	7 wks.

TABLE 3

## 1983 SUMMER MARKING LOCATIONS AND MARKER CODES (CONT.)

<u>Map No. &amp; Locations</u> <sup>1</sup>	<u>Date</u>	<u>FWS Band # (Left Leg)</u>	<u>Color Leg Band Code # (Right Leg)</u>	<u>Patagial Markers<sup>2</sup> Code # (Both Wings)</u>	<u>Est. Age</u>
14.	7/23/83	629-13552 <sup>3</sup>	K42	K42	11 wks.
14.	7/23/83	629-13553 <sup>3</sup>	K43	K43	11 wks.
15.	7/26/83	629-13554 <sup>3</sup>	K44	K44	11 wks.
15.	7/26/83	629-13555 <sup>3</sup>	K45	K45	11 wks.
16.	7/28/83	629-13556 <sup>3</sup>	K46	K46	10 wks.
16.	7/28/83	629-13557 <sup>3</sup>	K47	K47	10 wks.
17.	7/28/83	629-13558 <sup>3</sup>	K48	K48	11 wks.
17.	7/28/83	629-13559	K49	K49	11 wks.

1 - Numbers correspond to location numbers on Figure

2 - Left wing patagial marker green in color.  
Right wing patagial marker yellow in color.

3 - Fitted with radio transmitters.



fledglings were from Karluk Lake nests and three of the four also received radio transmitters. Each bird received a yellow wing flag (Alaska Regional color-BBL) on the right wing and a green wing flag (assigned project color-BBL) on the left wing. A blue acrylic leg band on the right tarsus and a standard FWS riveted aluminum band on the left leg. (Table 2).

Twenty reports have been received from 18 eaglets marked during the summer of 1982. All of the observations were on Kodiak Island. Unfortunately, most observers (70%) did not see or look for the wing flag codes so that identification of individual eagles was not possible. Fifteen (70%) of the observations occurred less than 10 miles from the area in which the eagles were marked, three observations (15%) were less than 20 miles from the marking area and only two (10%) were more than 60 miles from the marking area.

Initial movements of the juvenile eagles marked in 1983 appear to be similar to observations made in 1982. The juveniles seem to spend the majority of their first month flying within a mile or two of the nest. They feed on late run salmon until carcasses are no longer available. The young eagles then start utilizing coastal habitats but may return to interior areas during winter thaws. As of January 1984, no movement out of the Kodiak Archipelago has been seen or reported in any of the bald eagles marked or radioed.

Kodiak NR 83 - "Raptor Observations Associated With Terror Lake Hydroelectric Project" (74530-2)

Potential impacts on raptors by construction of the Terror Lake Hydroelectric Project (TLHP) were identified in a 1980 study. The two species of raptors found to be most abundant and nesting in the project area were bald eagles and rough-legged hawks which utilize different habitat within the project area. In 1983, a pair of golden eagles unsuccessfully attempted to nest within the project area.

The greatest potential for project related impacts on bald eagles will result from construction and operation of the project's main camps and jetty on Kizhuyak Bay also the Kodiak and Port Lions transmission line. Impacts on those foraging and nesting areas located along the lower portions of the Terror River and inner Terror Bay areas are expected to be minimal!

Impacts affecting rough-legged hawks should be limited to those caused by construction of the dam and access road. The loss of foraging habitat caused by inundation may cause indirect long-term detrimental effects on individuals of these species by reducing their available food supply.

The bald eagle nesting population survey was completed on May 25 with a follow-up productivity survey of the active nests on August 2. The rough-legged hawk nesting survey was completed on June 10. No follow-up productivity survey was required since no active nests were located during the initial effort. Survey sectors used were identical to those used in 1980 and 1982 (figures 3 and 5).

Observations received from project personnel were analyzed. Observed behavior described in those sightings were divided into four categories; perched, flying/soaring, foraging, and nesting.

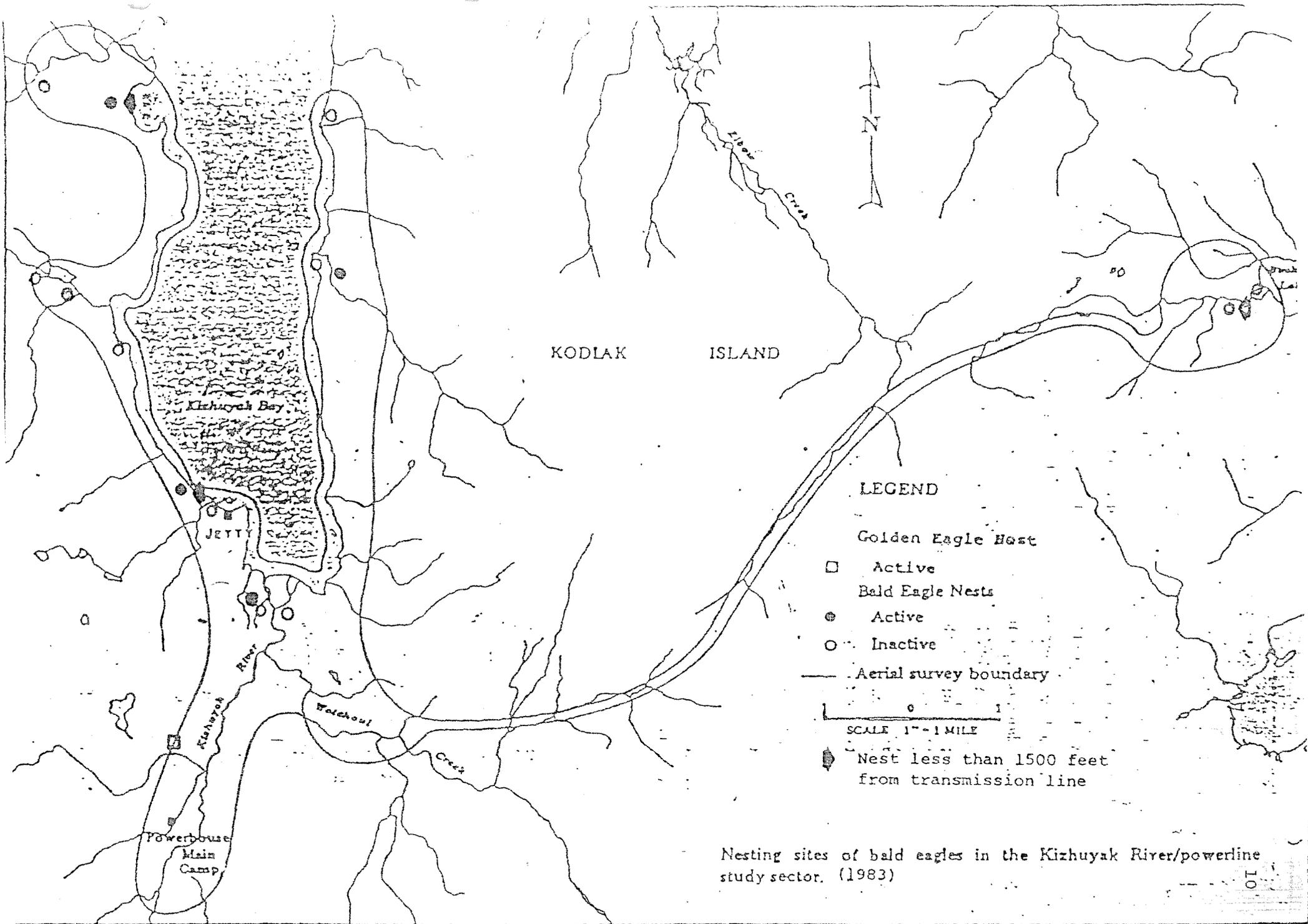


Figure 3

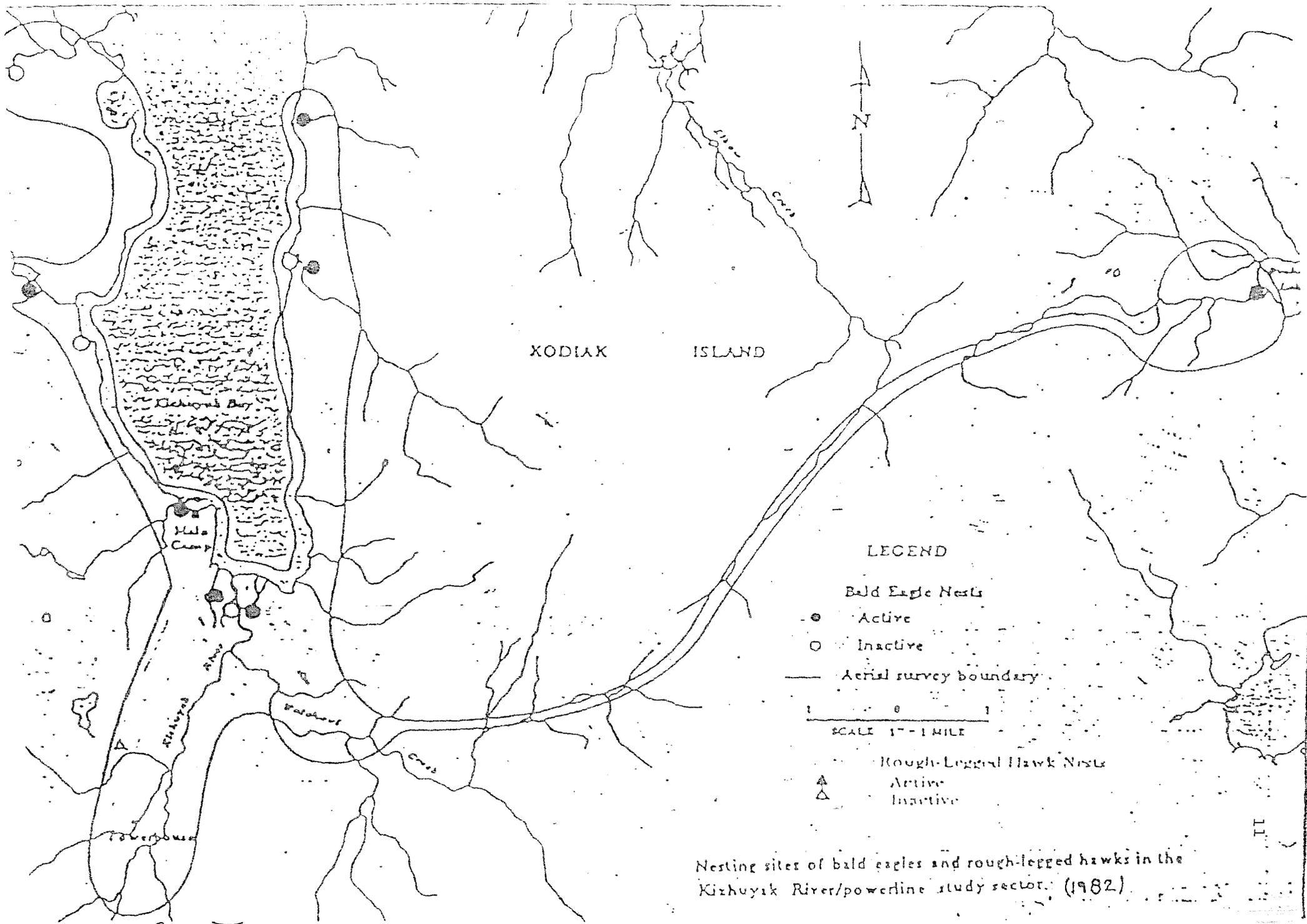


Figure 4

Two raptor species, bald eagle and golden eagle were found nesting within the Terror Lake Hydroelectric Project area during the 1983 survey period. A total of 17 bald eagle nests and 1 golden eagle nest was located within the study area. Eleven eaglets were fledged from seven active bald eagle nests with the single golden eagle nest failing to fledge any young. No rough-legged hawk nesting activity was discovered, even though this species nested within the project area in 1980 and 1982. A summary of survey results from 1980, 1982 and 1983 is contained in Table 4. The following narrative describes the results of the 1983 surveys by survey sector:

Survey Sector No. 1

Kizhuyak River, Kizhuyak Inner Bay, Powerline Routes, Buskin Lake

Fifteen bald eagle nests and one golden eagle nest were found in this survey sector (figure 3). Six of the 15 bald eagle nests were active producing a total of 10 eaglets. Four of the active nests produced two fledglings each with the remaining two nests fledging one young each. In 1982 a total of 11 nests were found in this sector (figure 4) with seven active nests fledging a total of 11 bald eaglets.

Concomitant with the construction of the Kodiak and the Port Lions transmission lines of the TLHP a modification of nesting behavior in as many as three pairs of bald eagles was observed. Two of the three pairs constructed new nest platforms with the remaining pair rehabilitating an old nest platform within their respective territories.

Right-of-way (ROW) surveying and clearing activity around Buskin Lake during the critical bald eagle courtship period (late March to early April) is likely responsible for the new nest construction by the Buskin Lake bald eagles. Low level helicopter flights associated with work crew movement also is assumed to have been a factor.

Because of increased disturbance during 1982, it had been projected that the pair of bald eagles near the Kizhuyak Bay jetty would attempt to avoid the disturbance in this area and modify their nesting behavior. Field camps had been located near this nest in 1979 and 1980 plus the initial construction staging camp in 1982. The bald eagles using the nest in previous years had already begun nesting before activity associated with the camps commenced. The construction of the new nest platform approximately 1/2 mile from the jetty during 1983 is assumed to be due to the activity in the jetty area during the courtship and early nesting period.

A bald eagle nest platform located adjacent to the Port Lions transmission line ROW along Barabara Creek was destroyed by wind. An old nest platform approximately 1/4 mile from the destroyed platform was consequently rejuvenated and utilized during 1983. The destroyed nest had last been active in 1980. It could not be discerned if ROW clearing had made the nest more susceptible to wind damage.

Even though changes in nesting behavior were observed, individual nest productivity was not affected as each of the three nests fledged two eaglets.

Survey Sector No. 2  
Terror River, Inner Terror Bay

Only one pair of bald eagles were found nesting in this sector in 1983. No other nesting raptors were located in sector two this year. One active and one inactive bald eagle nest platform were located during the survey flight (figure 5). A single eaglet was fledged from the active nest. In 1982, this survey sector had two active bald eagle nests producing two eaglets each (figure 6).

Survey Sector No. 3  
Terror Lake Basin

A comprehensive survey of known rough-legged hawk nesting habitat in the project area located no nests or adult birds. The Terror Lake basin contained three active rough-legged hawk nests which fledged a total of six young in 1980 and one active nest producing two young in 1982.

Intensive construction activity around the lake area during 1983 displaced rough-legged hawks from historic nesting areas to less desirable locations. It is suspected lateral tributary canyons along the Terror River several miles below the dam site were utilized by rough-legged hawks during the 1983 nesting season but this was not verified.

An area near the upper construction camp on the southwest corner of Terror Lake was examined for tundra vole numbers. Tundra voles are considered to be the primary food source available to foraging rough-legged hawks on Kodiak Island. Three sample plots revealed in 1983 tundra vole populations to be at or near 1982 levels. The plots are in an area where rough-legged hawk foraging activity was observed in the past and had been examined in 1982.

The diminished use of the Terror Lake basin and upper Terror river valley by nesting rough-legged hawks is therefore apparently not related to food availability in the survey sector during 1983.

The anticipated use of the Port Lions transmission line ROW by off-road vehicles may result in nesting behavior modification of bald eagles adjacent to the ROW in the future. The right-of-way is most likely to be used by ORV's during the late spring and early summer when vegetation is minimal. Nesting bald eagles are sensitive to disturbance throughout the breeding season but are particularly sensitive in the early stages of courtship, nest selection, and egg laying. Since the Port Lions transmission line was not part of the original Terror Lake Hydroelectric Project, the consequences of the addition of the transmission line were not identified in the project environmental impact statement nor were they mitigated for. The extent and timing of usage of the right-of-way will determine the long term effects its presence will have on bald eagles nesting along the westside of Kizhuyak Bay.

Raptor Observations

A total of 291 individual raptors of six different species was reported in the 122 observations made by project personnel during the period March 19 to October 20. Bald eagles were the most frequently observed raptor,

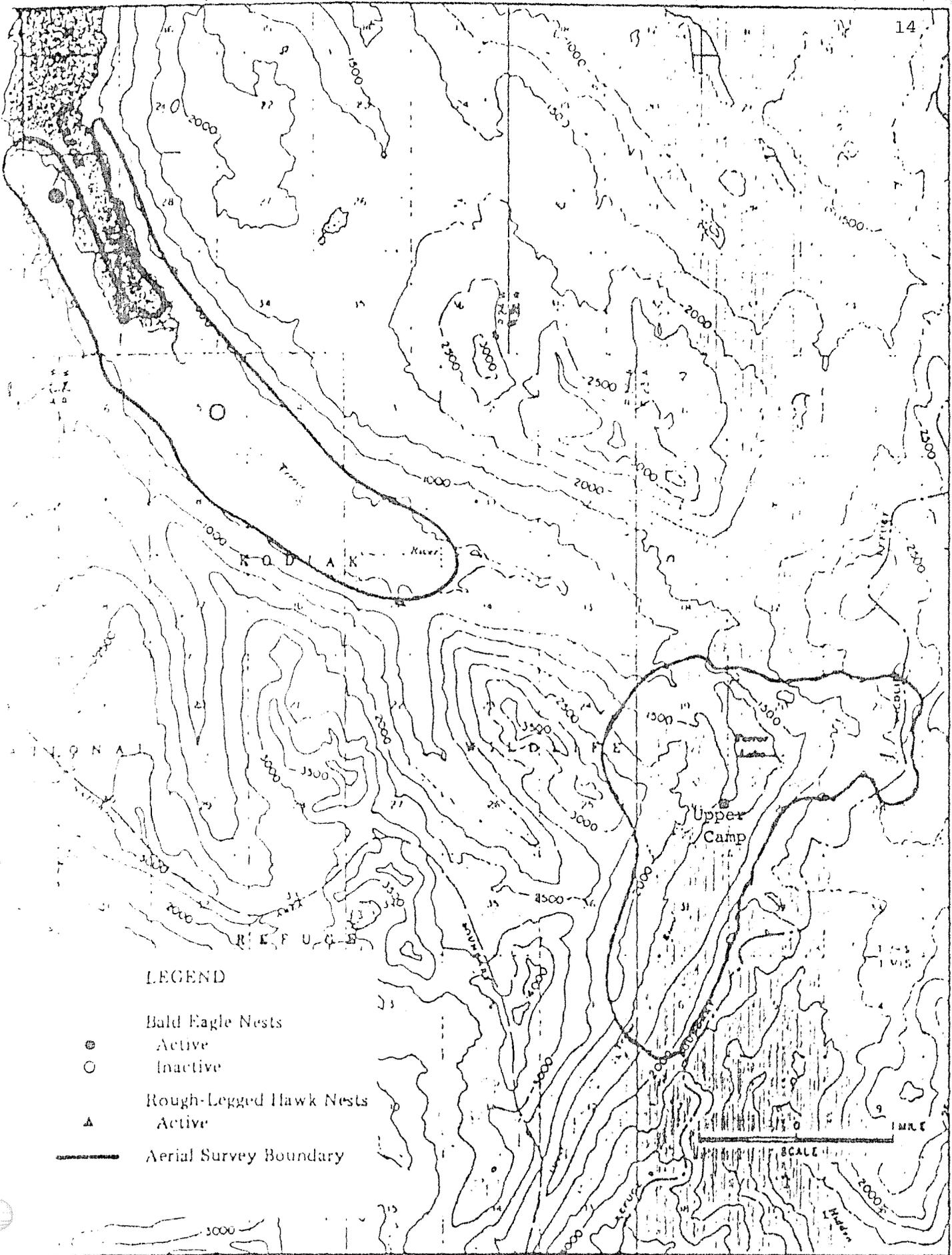


Figure 5. Nesting sites of bald eagles and rough-legged hawks in the Terror River and Terror Lake basin study sectors. (1983)

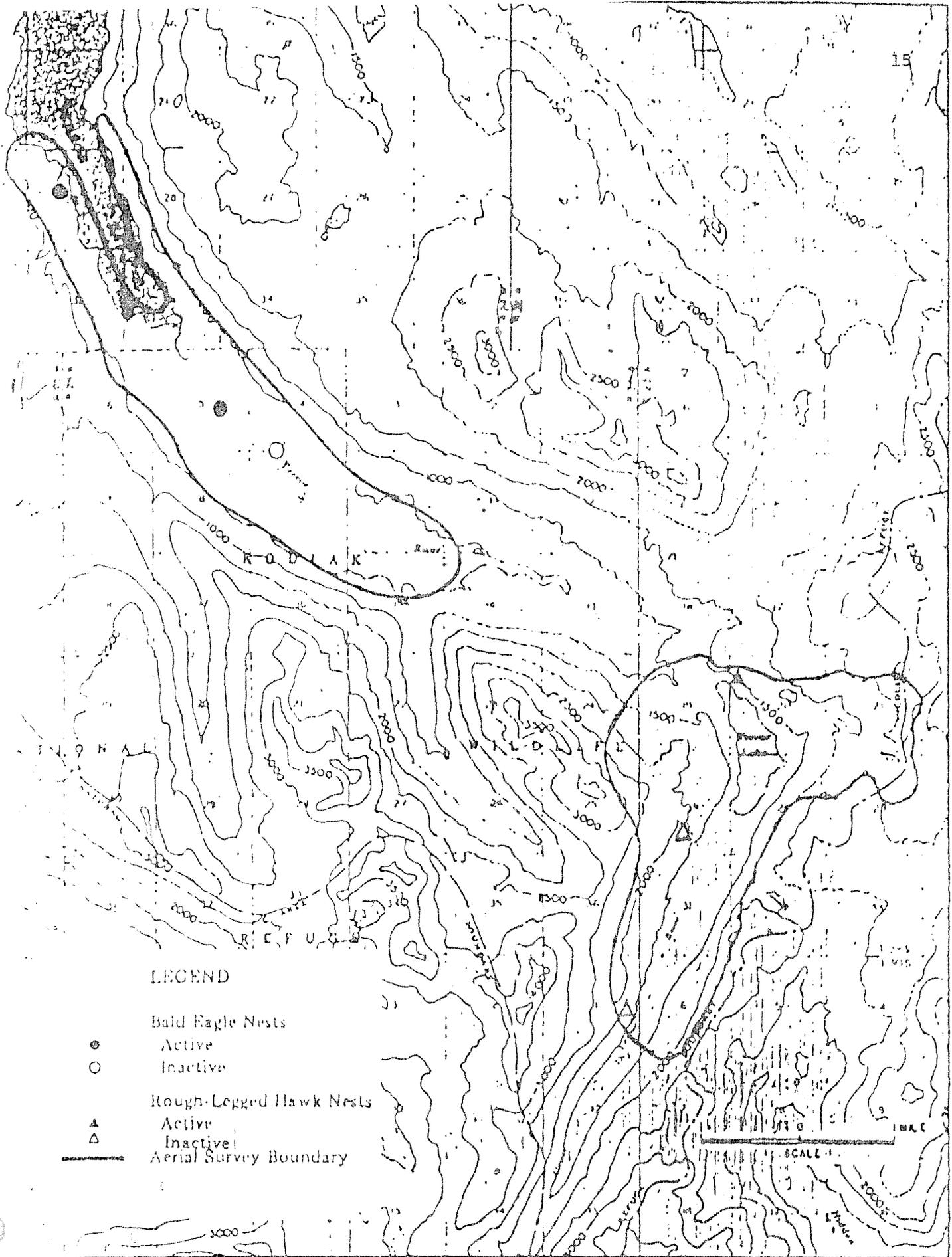


Figure 6 . Nesting sites of bald eagles and rough-legged hawks in the Terror River and Terror Lake basin study sectors. (1982)

TABLE 4

## TERROR LAKE PROJECT RAPTOR NESTING SURVEY

SUMMARY 1980, 1982, AND 1983

Species <sup>1</sup>	Year	Survey Sector	No. Active Nests	No. Inactive Nests	No. of Nests Fledging The Following No. of Young				No. Young/ Active Nests
					0	1	2	3	
Bald Eagle	1980 <sup>2</sup>	1	6	6	6	0	6	0	2.0
Bald Eagle	1982	1	7	4	4	3	4	0	1.6
Bald Eagle	1983	1	6	9	9	2	4	0	1.7
Rough-legged Hawk	1982	1	0	1	0	0	0	0	0
Golden Eagle	1983	1	1	0	0	0	0	0	0
Bald Eagle	1980 <sup>2</sup>	2	2	1	3	0	0	0	0
Bald Eagle	1982	2	2	1	1	0	2	0	2.0
Bald Eagle	1983	2	1	1	1	1	0	0	1.0
Rough-legged Hawk	1980 <sup>2</sup>	3	3	0	0	0	3	0	2.0
Rough-legged Hawk	1982	3	1	2	2	0	1	0	2.0
Rough-legged Hawk	1983	3	0	0	0	0	0	0	0

1 - Species not listed in each year or sector were not present in the survey sector during that year.

2 - 1980 Data from AEIDC, 1980, An assessment of environmental effects of construction and operation of proposed Terror Lake Hydroelectric Facility.

TABLE 5

## TERROR LAKE HYDROELECTRIC PROJECT

## RAPTOR OBSERVATIONS

<u>Species</u>	<u>Total No. Observed</u>	<u>Total No. of Observations</u>	<u>Observation Activity</u>			
			<u>Perching</u>	<u>Flying/Soaring</u>	<u>Foraging</u>	<u>Nesting</u>
Bald Eagle	212	57 (47%)	8 (14%)	25 (44%)	18 (32%)	6 (11%)
Rough-legged Hawks	43	38 (31%)	2 (5%)	17 (45%)	19 (50%)	0 (0%)
Golden Eagle	23	14 (11%)	1 (7%)	3 (21%)	5 (36%)	5 (36%)
Peale's Peregrine	8	8 (7%)	2 (25%)	3 (37.5%)	3 (37.5%)	0 (0%)
Merlin	3	3 (3%)	2 (66%)	0 (0%)	1 (33%)	0 (0%)
Northern Goshawk	2	2 (2%)	0 (6%)	1 (50%)	1 (50%)	0 (0%)

constituting nearly half of all observations. Although rough-legged hawks did not nest in the project area in 1983, this species made up approximately a third of all observations. The rank by frequency of observation in the remaining four raptor species was golden eagle, Peale's peregrine falcon, merlin, and northern goshawk. A summary of all observation information is contained in Table 5. All observations were made within the primary project area.

#### Summary

Modifications to both bald eagle and rough-legged hawk nesting behavior were seen in the Terror Lake Hydroelectric Project area during 1983. A decreased usage of the upper Terror River valley by foraging rough-legged hawks was also noted. The changes which were observed are apparently caused by increased activity associated with project construction. These behavior modifications are hopefully not permanent and a return to historic patterns are expected as construction activities wind down.

#### Kodiak NR 83 - "Investigation of the Instream Distribution and Movement of Karluk River Steelhead Trout" (74530-3)

As part of the Kodiak National Wildlife Refuge (KNWR) development of a data base on Refuge based anadromous fish populations and habitat, a steelhead trout study was initiated in the fall of 1982. Major objectives of the study were to:

1. Determine movement and habitat use of adult steelhead in the Karluk River drainage.
2. Determine the susceptibility of these fish to the sport and subsistence fishery in the drainage.

With assistance from both Alaska Department of Fish and Game (ADF&G) Sport and Commercial Fish Division-Kodiak, adult steelhead were captured in the Karluk Lagoon (figure 7) as they entered the river in the Fall of 1982 and radio tags were implanted surgically.

Subsequent to tagging, aerial tracking flights were periodically conducted through the fall, spring and summer of 1982-83 and movements were plotted with respect to river mile and lake location. Adult steelhead were again radio tagged in the Fall of 1983 with assistance from ADF&G during the coho salmon commercial fishery in the Karluk Lagoon. Exceptional cooperation was received from both the Native and non-Native commercial fishermen who provided the steelhead for tagging.

A progress report was submitted in January 1984. Movement and distribution of steelhead tagged in 1982-83 were compared with estimated sport and subsistence fishery timing. Approximately 80% of the radio-tagged steelhead, monitored from November 1982 to March 1983, overwintered between river mile (rm) 14.0 to 20.0 and no significant movement was detected (figure 8). Preliminary results indicate the heaviest impact from sport fisheries occurs in November between rm 15.0 to 17.0, and at the same location by the subsistence fishery during November through March (figure 9). Two general areas of spawning use were detected, between rm 5.5 to 7.5 and rm 14.0 to 17.5 (figure 10). Additional analysis will be dependent upon results of the 1983-84 tagging.

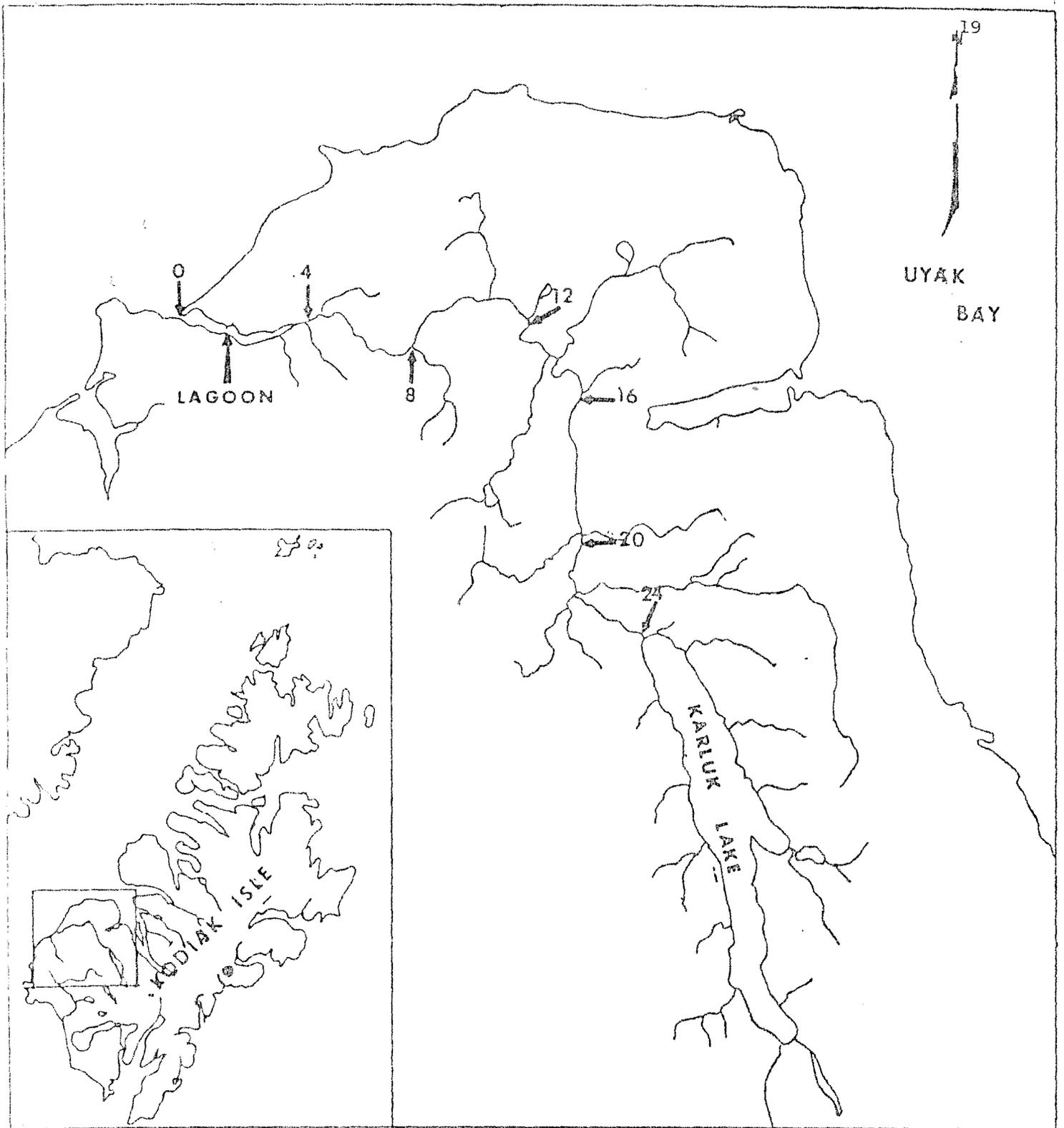


Figure 7. Karluk River drainage, southwest Kodiak Island, arrows depict river miles upstream from mouth of Karluk Lagoon.

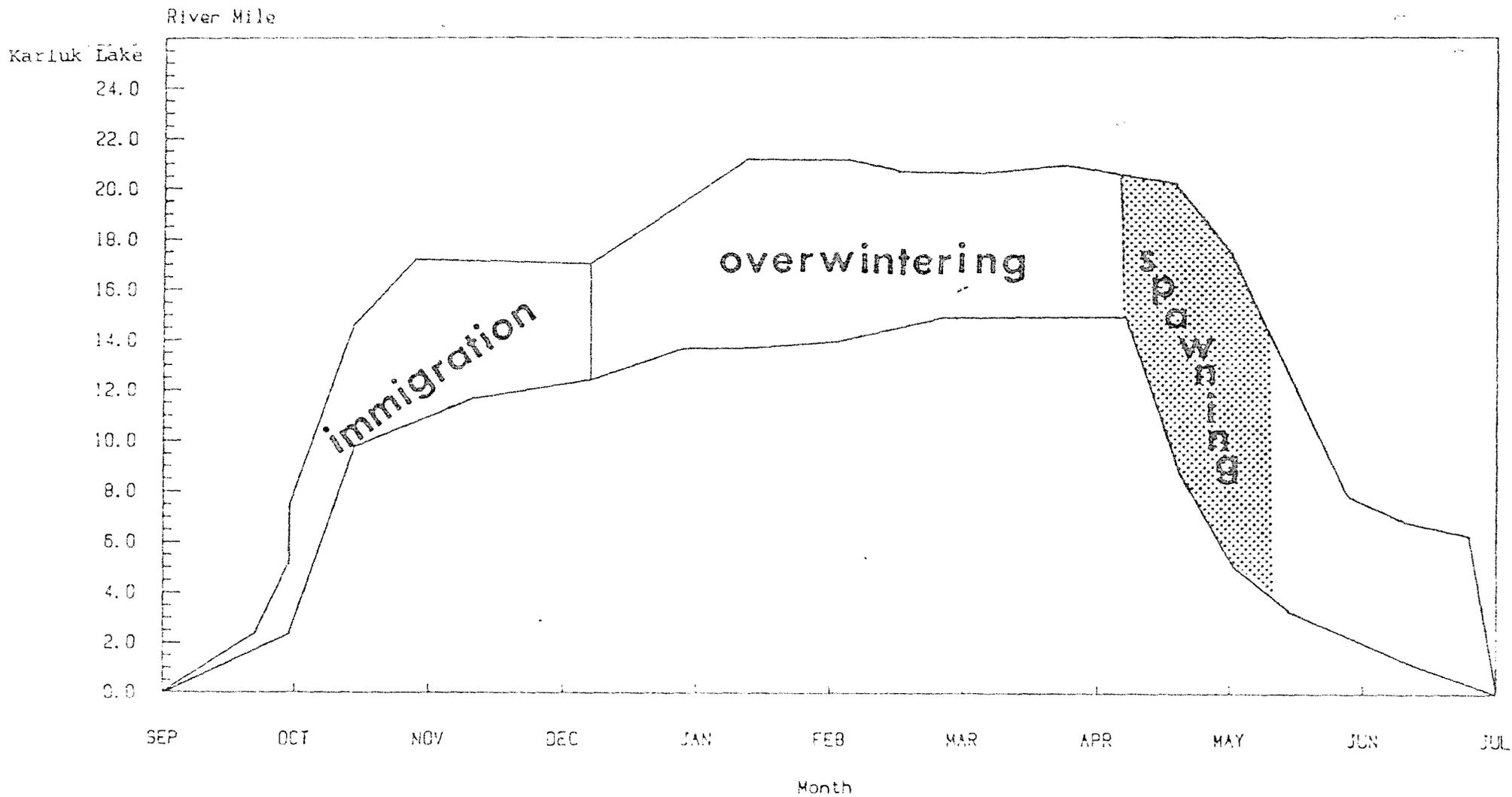


Figure 8. Upper and lower river mile boundaries where greater than 75 percent of radio-tagged Karluk River steelhead were located, September 1982 - July 1983. Approximate freshwater phases are indicated in bold type.

 - Subsistence  
 - Sport

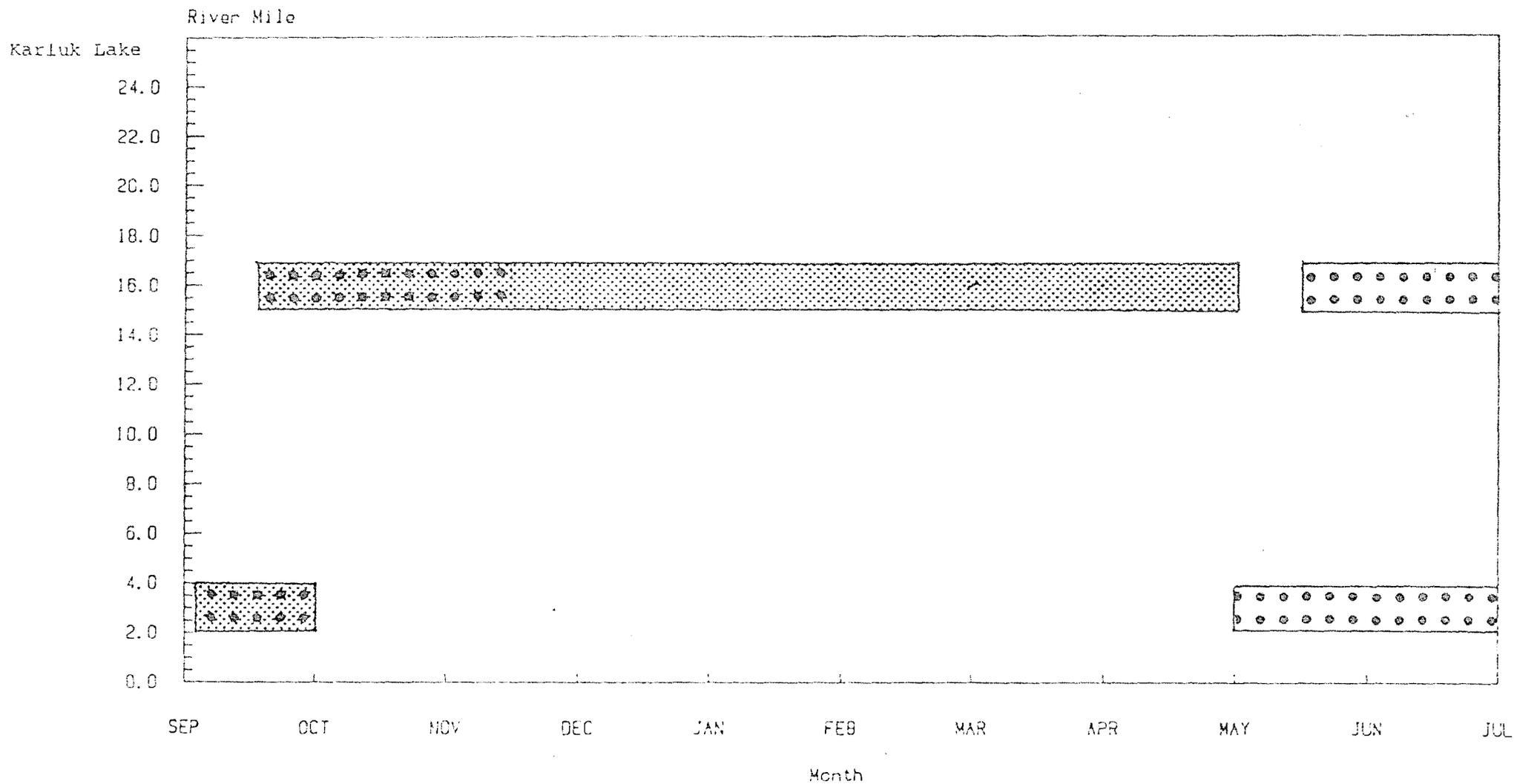


Figure 9. Spatial and temporal distribution of subsistence and sport fishing effort on the Kariuk River drainage, Kodiak Island, Alaska, compiled from KANA (1983), Murray (Pers. Comm.).

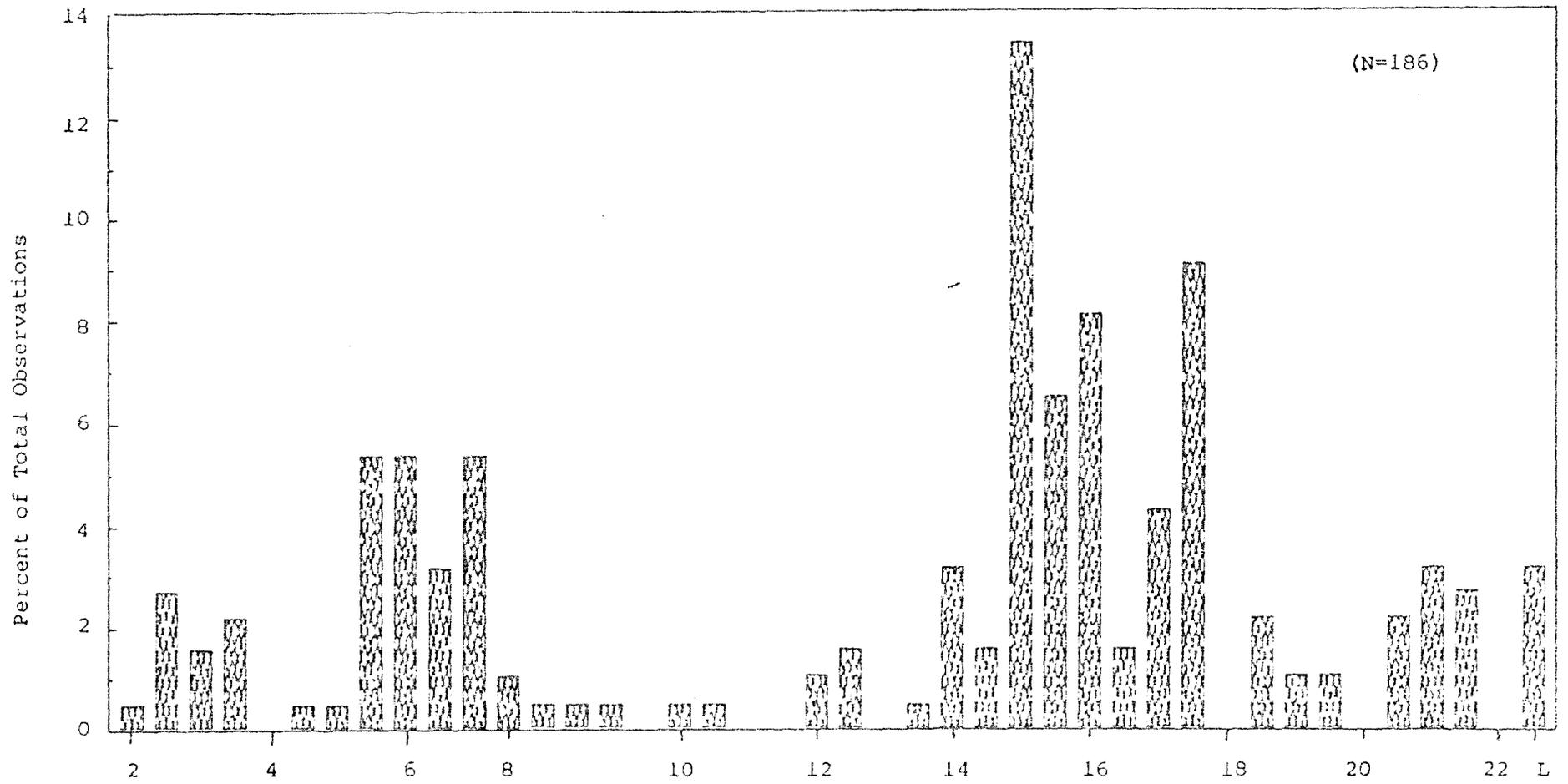


Figure 10 River mile locations of male and female Karluk River steelhead expressed as a percent of total observations, September 1982 - June 1983.

L  
A  
K  
E

Kodiak NR 83 - "Karluk Lake Sockeye Smolt Enumeration" (74530-4)

In support of the Karluk Lake Sockeye Salmon Restoration Project and as a cooperator in the joint ADF&G-USFWS effort, the Refuge fishery program conducted a study in 1983 to determine the number and age structure of sockeye salmon smolts leaving Karluk Lake. A study proposal was drafted and approved in the spring of 1983 and the project was carried out during May and June 1983. A final report was completed in January 1984. Smolts were captured using a Canadian fan trap placed instream approximately 150 meters downstream from the Karluk Lake outlet (figure 11), and covered approximately 40 percent of the river width.

The trap was fished 24 hours per day (0900 hours one day to 0900 hours the next day) from May 14 through June 16, 1983. All smolts captured were tallied each morning and released. A random sample of approximately 10 percent of the total catch for each morning was sampled for age, weight and length data.

A mark-recapture method was utilized for population estimation whereby a percentage of smolts captured during the night were marked using a caudal clip and released at the lake outlet the same night. Those fish recaptured the same night and the subsequent night were utilized as a mark sample.

The total point estimate for the 1983 migration was 941,550 smolts with a 90 percent confidence interval of  $(0.638 \times 10^6, 1.24 \times 10^6)$ . This total estimate and the daily estimates are depicted in figure 12 and given in Table 5. The 90 percent confidence interval for total daily estimates was utilized to be consistent with chi square tests used to derive time periods for population estimates.

A total of 1186 smolts was sampled for age, weight and length data from May 14 to June 16. The 1<sup>+</sup>, 2<sup>+</sup>, 3<sup>+</sup> smolt comprised 1.4, 86.0 and 12.6 percent of the migration respectively (Table 6). Daily age composition of migrants (figure 13) indicate the 2<sup>+</sup> smolts dominated the entire migration period with 3<sup>+</sup> smolts present only in abundance up to the last week in May. The 1<sup>+</sup> smolt were virtually absent and only observed in small numbers during the second week of May and again near the end of the migration period. Although the 1983 estimate indicated an increase of approximately 13 percent in smolt abundance over 1982 the age structure of migrating smolt remained the same.

Although smolt were captured from May 14 through June 16, few smolt were estimated to have moved downstream prior to May 20. From May 20 to 31, approximately 77.5 percent of the migration moved downstream past the trapping site. Daily estimates indicate major peaks of movement occurred on May 21, 26 and 29 when 11.5, 10.8 and 34.4 percent respectively migrated (figure 14).

The 1979-81 parent year escapement of approximately 513, 147 and 221 thousand fish respectively which would produce the corresponding 3<sup>+</sup>, 2<sup>+</sup> and 1<sup>+</sup> smolt in 1983 indicate the 2<sup>+</sup> smolt had extremely good survival compared to 2<sup>+</sup> fish in 1982 produced from the 1979 brood year.

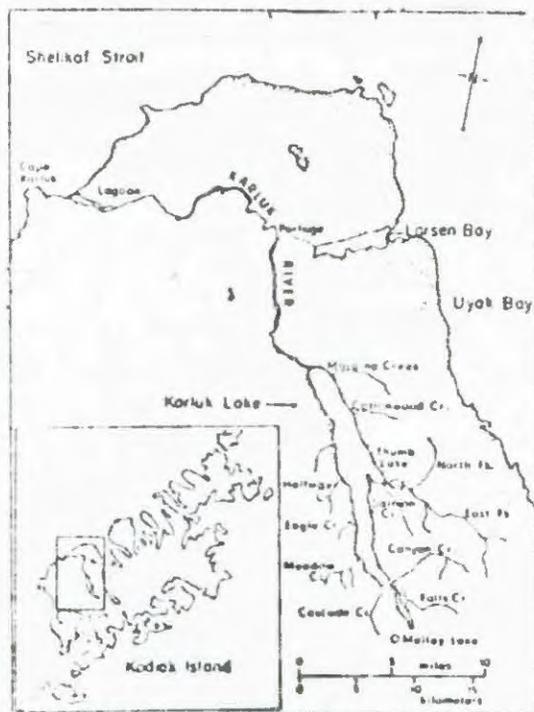


Figure 11. Karluk River/Lake, arrow depicts 1983 smolt trapping location North end Karluk Lake.



Figure 12. Karluk River smolt trap May - June 1983.

TABLE 6

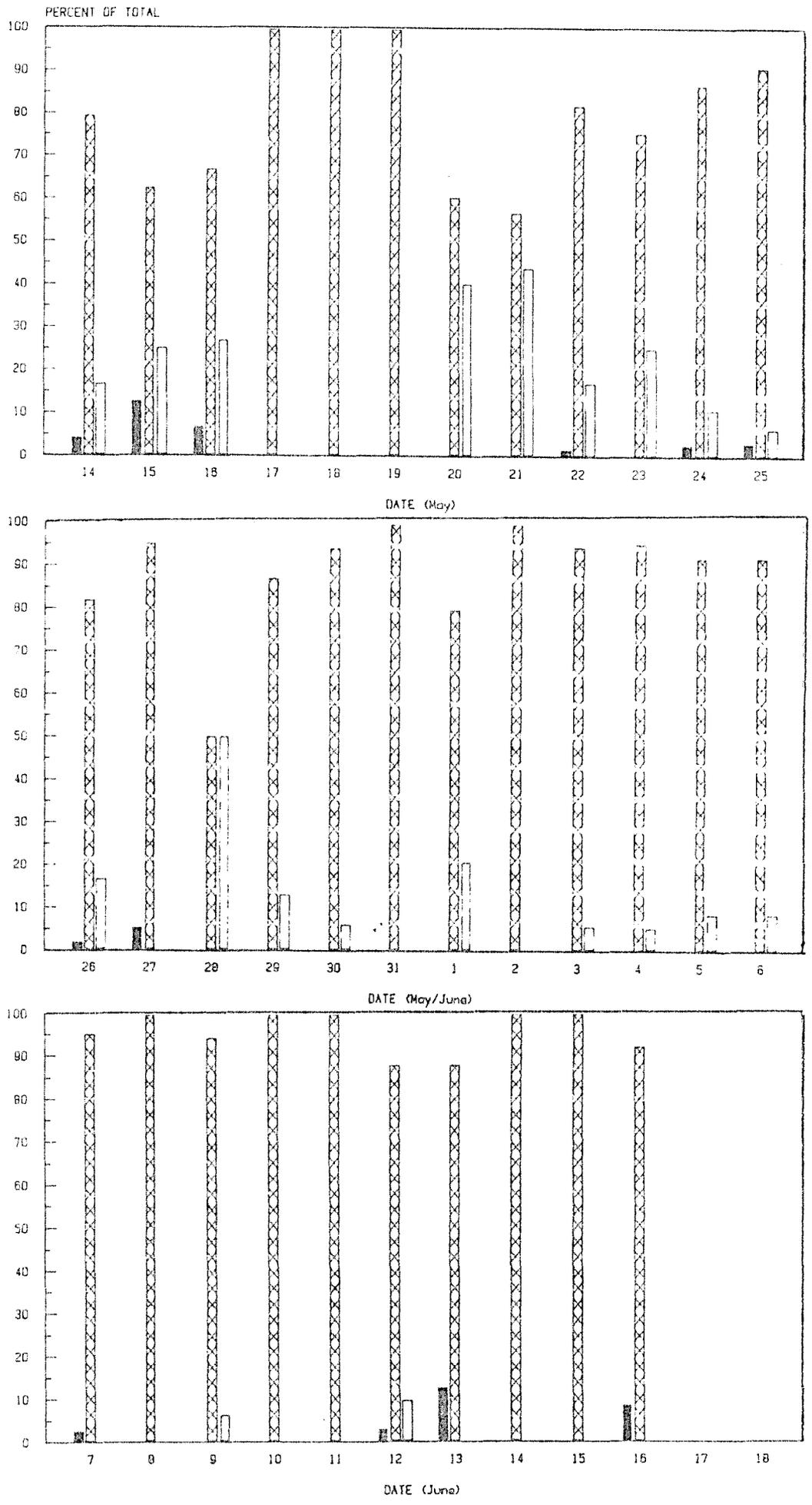
DAILY SOCKEYE SMOLT COUNTS AT THE KARLUK RIVER SMOLT TRAP AND ESTIMATED DAILY SMOLT MIGRATION, KARLUK RIVER 1983.

<u>Date</u>	<u>Smolts Captured</u>	<u>Estimate of Total Run</u>	<u>90% Confidence Interval</u>	
			<u>Lower</u>	<u>Upper</u>
May 14	34	3,850	1,840	5,850
15	8	900	270	1,540
16	15	1,700	690	2,710
17	4	450	60	850
18	4	450	60	850
19	3	340	10	670
20	5	570	110	1,020
21	958	108,410	59,040	157,780
22	745	84,310	45,850	122,760
23	158	17,880	9,510	26,250
24	84	9,510	4,930	14,080
25	78	8,830	4,560	13,100
26	896	101,390	55,200	147,590
27	26	2,940	1,350	4,530
28	10	1,130	390	1,870
29	2,870	324,770	177,420	472,130
30	3,764	54,640	46,560	62,720
31	27	390	270	520
June 1	1,263	18,330	15,560	21,110
2	173	2,510	2,050	2,970
3	1,700	24,680	20,970	28,380
4	500*	17,710	12,230	23,180
5	56	1,980	1,260	2,710
6	573	20,290	14,040	26,550
7	640	22,670	15,700	29,630
8	421	14,910	10,280	19,540
9	941	33,330	23,150	43,500
10	1,080	38,250	26,590	49,910
11	137	4,850	3,250	6,450
12	98	3,470	2,290	4,650
13	64	2,270	1,450	3,080
14	47	1,660	1,040	2,290
15	288	10,200	6,990	13,410
16	56	1,983	1,260	2,710
Total	17,726	941,550	638,670	1,244,430

\* Estimated

Figure 13 Daily age composition of migrating Karluk Lake sockeye smolts May - June 1983.

SMOLT 1+ YRS  
 SMOLT 2+ YRS  
 SMOLT 3+ YRS



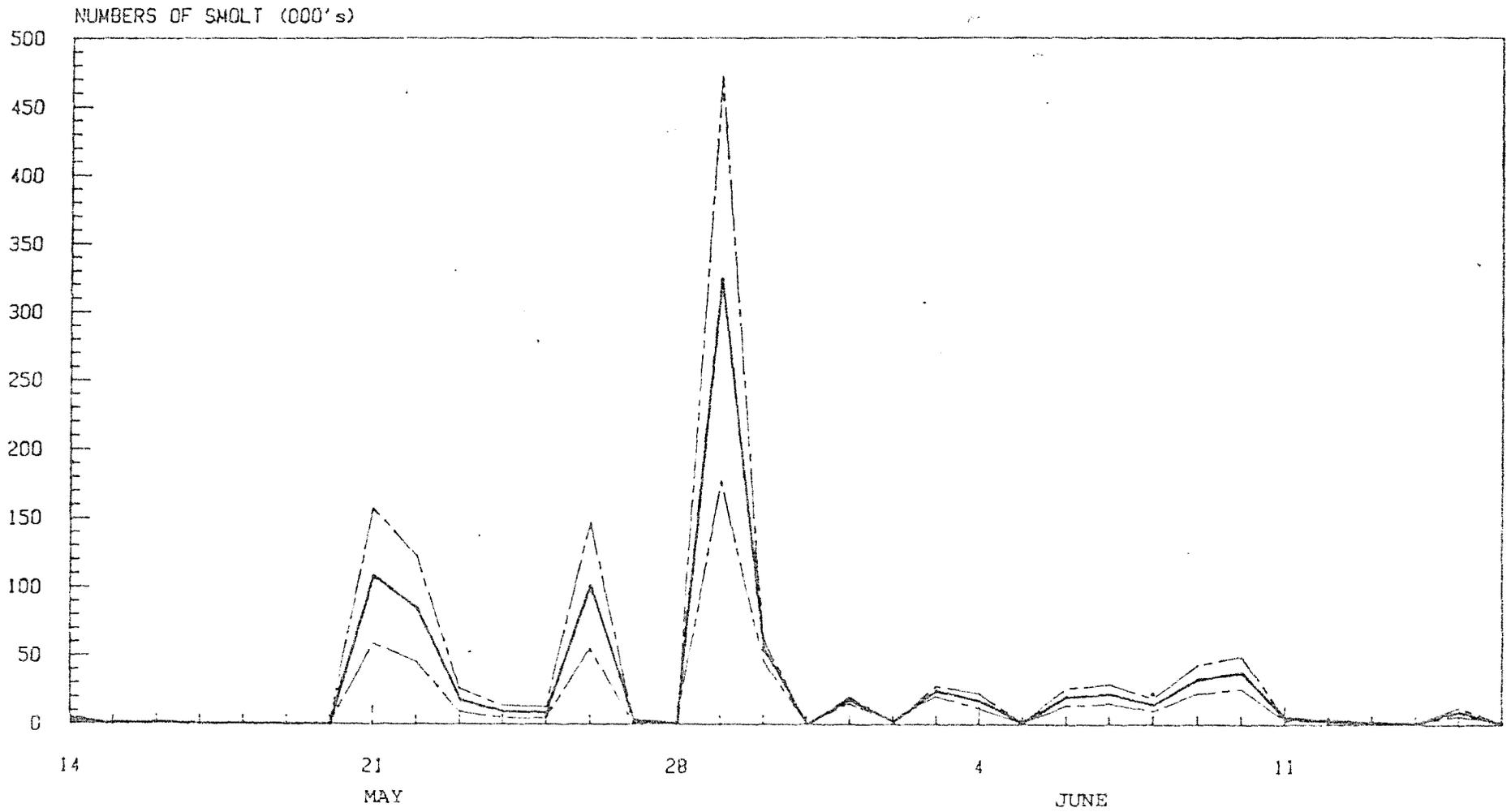


Figure 14. Estimated daily smolt migration (solid line) with 90% confidence intervals (dash lines), Karluk River 1983.

Although the determination of total numbers of smolt leaving Karluk Lake is desirable for predictive capabilities on adult returns, it does not appear to be necessary in the case of Karluk smolt studies since the current ADF&G management strategy for Karluk sockeye does not rely on total smolt numbers for predictive purposes and the major thrust of other components of the Karluk Lake sockeye studies are to measure relative changes in predation, competition and basic productivity. It would seem more productive in both dollars and effort to utilize a single trap as in 1983 to collect age, weight and length data for 1+, 2+ and 3+ smolt, thus indirectly monitor changes in smolt productivity.

Several recommendations for 1984 were presented in the final report:

1. Study emphasis be changed from one of determining total numbers of smolt to sampling for age, weight and length as an index for smolt productivity.
2. The Canadian fan trap be modified at the terminal end to alleviate backwater conditions. This would increase sample size approximately 30 to 40 percent.
3. The study be conducted through the end of June 1984 since some smolt were still being caught by mid-June 1983.

Kodiak NR 83 - "Investigation of the Reasons for the Decline of the Karluk Lake Sockeye Salmon Run on the Kodiak NWR" (74530-5)

Other FWS management oriented research on the Kodiak NWR during 1982 was targeted on the red salmon stock of the Karluk Lake/River system. Historical data shows that for its size, Karluk Lake was the largest producer of sockeye salmon in the world. Early studies have ranked the Karluk system second only to the Chignik system on the Alaska Peninsula in the primary productivity and first in density of spawners per unit of lake area compared to other Alaska sockeye systems. The commercial catch from the late 1800's to the early 1920's ranged between 1 and 4 million fish annually. A counting wier was installed in Karluk River in 1921 allowing determination of the total escapement. These counts ranged from 0.5 to 2.5 million during the 1921 to 1952 period and declined to 0.1 to 0.5 million from 1954 to present. Unfortunately, for several unknown reasons the Karluk stock, in comparison to other major sockeye systems on Kodiak, has not responded to management efforts directed towards rebuilding the total run size. Basically, the production in the form of adult returns in any given year (escapement and harvest) does not reflect those brood year escapements. Analysis of historical data by research personnel of the Seattle National Fisheries Research Center (SNFRC) has led to the conclusion that an upper level historic "stability" region (stock-recruit analysis) for Karluk red salmon has collapsed and has been re-established at a much lower level. Therefore a cooperative effort was initiated in 1982 and continued in 1983 by the SNFRC with assistance from the Refuge fishery program to examine the hypothesis that the continued depression of the Karluk stock is due to depensatory mortality and/or loss of lake productivity. Some preliminary results of the 1982-83 analysis are presented below:

1. Predation by charr on juvenile sockeye salmon in Karluk Lake is not depensatory but predation by juvenile coho salmon on sockeye juveniles may be.

2. Catch composition of all juvenile species sampled in Karluk Lake indicate an increase in the relative frequency of sockeye juveniles possibly showing a decrease in competition for food and space between juvenile sockeye and other species.
3. Analysis of paleolimnological core samples indicate that Karluk Lake had variable production levels over time and that if sedimentation rates within the drainage are assumed to be similar for both cores examined the trophic status of the lake in the 1890's was similar to that in the 1950's but declined severely in the 1920's. Either trophic status of the lake was independent of the escapement of sockeye salmon to Karluk, or trophic status was controlled by sockeye escapement until a minimum threshold was reached in the 1920's when another controlling factor became operative.

Kodiak NR 83 - "Impacts of construction and post-construction operation of the Terror Lake Hydroelectric Project on brown bears (*Ursus arctos*)" (74530-6)

This study is being conducted by the ADF&G under contract to the Alaska Power Authority (APA). The following report covering 1982 work has been submitted: Smith, R.B. and L.J. Van Daele. 1984. Terror Lake Hydroelectric Project, Report on Brown Bear Studies, 1982. Alaska Department of Fish and Game. 110 pp. The following "Summary of Findings" is taken directly from that report.

"A five year study to determine the impacts of construction and operation of the TLHP on the brown bear population was begun in 1982. Seventy-six brown bears were captured in the Terror Bay and Kizhuyak Bay areas. Radio-collars were installed on 43 bears, 16 males and 27 females. Movements of the radio-collared bears were monitored during scheduled weekly flights.

Mean home range size for 15 males was 141.2 km<sup>2</sup> (range = 14-465 km<sup>2</sup>), nearly five times the 29.9 km<sup>2</sup> (range = 6-132 km<sup>2</sup>) mean home range size for 27 females. Females characteristically occupied drainages into either Kizhuyak Bay or Terror Bay, with considerable overlap into the Viekoda Bay drainages. Only two of 27 females (7%) ranged into both the Terror Bay and Kizhuyak Bay drainages. Two females ranged between the Viekoda Bay drainage and the Uganik Bay drainage, but no females ranged into the Ugak Bay area. Males characteristically ranged over more than one major drainage, although most showed seasonal preferences for one drainage. The home ranges of four males spanned major portions of both the Kizhuyak and Terror drainages. Three males moved into the Saltery Creek area of Ugak Bay and a fourth male spent nearly the entire active season in the Ugak Bay drainages. Two males occupied both the Terror Bay and Uganik Bay drainages.

The existence of somewhat distinct subpopulations of bears in the Kizhuyak and Terror Bay drainages was indicated. Much overlap between the Terror Bay and Kizhuyak Bay bears occurred in the Viekoda Bay drainage, but relatively little movement into the Uganik Bay and Ugak Bay drainages occurred.

The population in the 1300 km<sup>2</sup> study area was estimated at 324 bears or one bear per four km<sup>2</sup>. The density was higher than was previously estimated for the study area, but less than density estimates reported for the Karluk Lake area of southwestern Kodiak Island.

Recorded mortality in 1982 was 24 bears, 17 males and seven females. Three bears were capture mortalities, three bears were killed in defense of life or property and 18 bears were killed by sport hunters. Two radio-collared bears, both males, were killed in 1982.

The elevations at which radio-collared bears were located was a good indicator of seasonal habitat use. Although much variation occurred between individual animals, a general pattern was that bears moved to near sea level in late May and early June to forage on newly developing herbaceous vegetation. Bears generally moved upward as vegetation emerged at progressively higher elevations through early July. In mid-July bears began moving back down to feed on salmon and by mid-August most bears were located near coastal salmon streams. Bears dispersed from the Terror River salmon feeding area in early September. Some bears continued to feed on salmon in the Kizhuyak River until October. Bears were feeding on a mixed diet of berries, salmon and herbaceous vegetation by early September. Progressively higher elevations were occupied by bears after dispersal from salmon streams until denning began in late October.

Dense seasonal concentrations of bears occurred on salmon streams, the most important of which were the Terror River, Kizhuyak River, Hilary Creek and Barabara Lake drainages. Several bears used more than one salmon stream. The movements of six bears, all females appeared to be little related to the availability of salmon.

Females with cubs generally occupied higher elevations than did single bears. Males and females with cubs were most widely separated from early July through early August. Single bears began frequenting salmon streams earlier than did females with cubs which remained longer in alpine areas.

Alpine and sub-alpine habitat north of Terror River and west of Kizhuyak Bay was heavily used by bears from early July through early August. Females with cubs appeared to be more abundant than single bears during that period.

A representative sample of sex, age and reproductive classes of bears frequented the lower Kizhuyak River valley in 1982. Bears were commonly seen by construction personnel in the Kizhuyak River area during daylight hours. Some alteration of approach routes to the lower Kizhuyak valley probably occurred near the camp and jetty, but the access road was not a major barrier to bear movements. Some bears were active nocturnally in the Kizhuyak River valley, a suspected adaptation for avoiding the intensive construction activity. Other bears seemed to become habituated to construction activities and road traffic especially when feeding on salmon in the lower Kizhuyak River. Sequential locations of radio-collared bears indicated that no major alteration of interdrainage travel routes occurred.

The presence of an open garbage pit adjacent to the access road did not attract significant bear use. Occasional use of garbage disposal sites occurred elsewhere in the study area.

Infrequent summer feeding by a few unmarked bears occurred in the Terror Lake basin, but the area was considered to be only moderately important habitat compared to adjacent areas. Disturbance by construction activities

may have caused some bears to avoid the Terror Lake area. One radio-collared bear was located in the impoundment area in 1982.

A cold, wet spring in 1982 retarded early development of vegetation and caused a widespread failure of the salmonberry crop and diminished elderberry production. The low availability of berries may have resulted in wider ranging movements of bears searching for food.

Dens of 34 bears located by radio-tracking had a mean elevation of 620 m (range = 152-1006 m). Previous studies suggested that alpine habitat above 610 m was not important for denning. An important denning area was located in a group of peaks 4 km northwest of Terror Lake. Eight bears denned there within an area of 4 km<sup>2</sup>. Sixteen bears denned in the Kizhuyak Bay drainages, 17 denned in the Terror and Viekoda Bay drainages and one bear denned near Sharatin Bay. Previously known denning areas in the Kizhuyak Bay drainage were occupied in 1982, but 59% of the 17 bears denned above 430 m, which was previously considered the probably upper limit of denning habitat in that drainage.

Single bears were the first to emerge from dens in late March, followed by females with yearling to older cubs. Females with newborn cubs were the last to emerge. Females generally entered dens earlier than males, beginning in mid-October. At least three males were still active by December 8, 1982.

Identifying the impacts of construction activities on the brown bear population in 1982 required many subjective judgements in interpreting the relationships between movements of individual bears and potential sources of disturbance. Without comparable pre-construction data on brown bear movements and home ranges it was not possible to establish clear cause and effect relationships. The continued use of the lower Kizhuyak River valley by both radio-collared and unmarked bears indicated that no large-scale population shifts occurred. Eighteen bears, six females and 11 males, had home ranges which intersected sites of active construction in 1982. None of the females and only one male had home ranges which included the Terror Lake dam site and impoundment area.

Although it was suspected that some bears avoided denning in the immediate area of construction near the Terror Lake dam site and near facilities being constructed on the west side of Kizhuyak River, no detectable large-scale shifts in denning could be documented in 1982. The den located closest to a construction site, that of a male, was only 0.6 km from the access road near the Rolling Rock Creek diversion. No dens were located in the Terror Lake impoundment area. Comparing April-May capture locations with den site locations for individual bears indicated that most bears returned to the general vicinity of their capture locations to den. The fact that bears denned in alpine habitats at higher mean elevations than predicted might be interpreted to indicate that disturbance from construction forced bears into marginal habitats to den. An explanation considered more likely is that more accurate den locations were obtained by radio-telemetry than by aerial surveys used in previous studies. Requirements for suitable den sites may be less specific than previously thought. The use of relatively remote alpine habitats for denning seems to suggest that negative impacts of construction on denning may be less serious than was originally believed.

Conclusions about the impacts of construction activities on brown bear movements in 1982 should be considered tentative. More potential sources of disturbance can be expected in 1983 as construction activities are expanded. The Kodiak and Port Lions transmission lines scheduled for construction in 1983 are significant potential sources of disturbance in the eastern drainages into Kizhuyak River and west of Kizhuyak Bay. Continued monitoring of the movements of radio-collared bears through the construction phase and into the operational phase of the project will be necessary to establish more definitely the impacts of the Terror Lake Hydroelectric Project on the brown bear populations."

Kodiak NR 83 - "Investigation of habitat use and evaluation of aerial surveys of brown bear in southwest Kodiak Island" (74530-7)

This study is a cooperative effort involving the Denver Wildlife Research Unit and the Refuge. A report summarizing 1983 field work has been prepared (Barnes, V.G., Jr. 1984. Progress report, brown bear studies. Denver Wildlife Research Center, U.S. Fish and Wildlife Service 28 pp.) The following is the abstract from that report:

"Forty-four brown bears (22 adult female, 22 offspring) were captured in the Ayakulik River, Sturgeon River, and Frazer Lake drainages of Kodiak Island in July, 1983. Twenty-one radio-collared adult females were relocated a total of 242 times. Mean home range size of single females, females with cubs, and females with yearlings was 21.2, 31.7 and 57.1 km<sup>2</sup>, respectively. The largest movement (39.0 km) was recorded for an adult female with one yearling. Most study animals appeared to spend little time feeding on salmon after early August and instead foraged primarily on an abundant berry crop and herbaceous foods. A few radio-collared bears continued to feed on salmon until late September or early October. Most radio-collared bears entered winter dens after mid-November and at elevations between 306 and 610 m. A summary of aerial and ground counts of bear feeding along Connecticut Creek in August, 1982, revealed ground observers were able to identify 30 percent more bear than aerial observers."

E. ADMINISTRATION

1. Personnel

This was a year for great change in staffing at Kodiak. Following is a summary of personnel actions for the year, listed in chronological order:

On February 7, 1983 Geraldine Castonguay entered on duty to fill the vacant Clerk-typist position. Her able typing assistance filled a major need, since the position had been vacant for over a year.

On March 20, Vessel Operator/Maintenanceman John Cossick transferred to the Monte Vista NWR in Colorado as Maintenance Leader.

On April 3, Denny Zwiefelhofer was reassigned from his Biological Technician GS-7 position to a newly created Wildlife Biologist/Vessel Operator position. Although we lost a good vessel operator in John Cossick, we've gained a good one by reassigning Denny. Further, the revision of positions has added a greater flexibility to our operations.

Ronny D. Bowers transferred from the Alaska Maritime NWR (Adak) to Kodiak to fill the Maintenceman position here on April 3.

This overall shift freed the maintenanceman from vessel duties to devote more time to our rapidly growing maintenance program.

In April Judy Barnett was promoted to GS-5 Administrative Clerk.

In late April two of this year's volunteers came on board - Michelle (Mikey) King and Neill Hunter. Both of these young people provided invaluable assistance in our field operations this year.

On May 28, Refuge Manager Charles Strickland suffered a mild heart attack - his second. Charles was placed on leave until July, when he returned to a part-time duty status.

Rasmus (Andy) Anderson was hired as a part-time (20 hour per week) maintenance helper on June 12. Andy had previously served with us as a CETA appointee. Andy's efforts in maintaining our headquarters have been superlative. This is one of the neatest offices in the system thanks to him.

On July 1, Judy Barnett resigned to accompany her husband to Florida.

On September 4, Gerri Castonguay transferred to the Administrative Clerk position, leaving the Clerk-typist position vacant.

On September 11, Charles Strickland suffered a fatal heart attack while on vacation in Hawaii. See the staff photo section for more information on Charles. Suffice it to say here that he is missed.

On November 4, Harvey Heffernan, after nearly five years at Kodiak transferred to Assistant Refuge Manager, Kanuti NWR based in Fairbanks. Just in time for cold weather. Harvey's contributions were very substantial at Kodiak this year. We congratulate him on his promotion.

The Regional Office elected to reorganize the staff and convert the GS-9 Assistant Manager position vacated by Heffernan to a Wildlife Biologist/Airplane Pilot GS-12 position. Assistant Refuge Manager/Pilot Mike Vivion transferred into the new Wildlife Biologist/Pilot position effective December 11. Thus Vivion finished the year as Wildlife Biologist/Pilot, Acting Refuge Manager, Assistant Refuge Manager, and confused all at the same time.

Judy Tomberlin entered on duty December 27 as Clerk-typist.

By year's end Edward Hajdys had stated his intention to resign in early 1984.

Jay Bellinger was selected as the new Refuge Manager at Kodiak by year's end. Jay is currently manager at Yukon Delta NWR in Bethel, Alaska. Jay will not enter on duty until March 1984, due to complications on the Delta. The primary assistant position had not been advertised by year's end. Looks like early 1984 will be very short handed.

The following chart displays staffing levels of Kodiak over the past seven years:

	<u>Full-time*</u>	<u>Part-time</u>	<u>Temporary</u>
1983	9	1	0
1982	8	0	1
1981	8	0	1
1980	8	1	1
1979	8	1	2
1978	7	1	2
1977	4	1	0

\*Includes Career-Seasonals (50-week) appointees.

## 2. Funding

The chart below depicts Kodiak NWR funding in thousands of dollars by program for seven fiscal years\*:

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>
MB-1210	42.0	87	68.0	65	100	100	--
MNB-1220	181.4	180	160.0	160	188	322	--
I&R-1240	40.0	40	40.5	48	48	48	--
WR-1260	0	0	0	0	0	0	475
FR-1300 (1360)	0	0	0	95	60	95	125
ARMM	0	0	0	0	0	0	100
Totals	263.4	370.0	268.5	368	396	565	700

\*All the above figures are original AWP figures; several were modified downward after the fact.

Although the above reflects major increases in funding the reader should consider the following facts:

1. From 1978 to 1984 two full time and one part time position have been added (GS-11, WG-8 and WG-2) and three other positions have increased grade (GS-11 to GS-12, GS-5 to GS-7, and GS-5 to GS-9).

2. In this time period, five additional residences have been acquired or built and a major office/visitor center, shop, and bunkhouse built.

Utility bills in 1983 were: Telephone - \$11,904, heating oil - \$11,722, electric - \$15,010, for a total of \$38,636. These figures are much lower than they will be in FY 1984, since in 1983 we only occupied our office and four residences the full year. The shop and bunkhouse were operational approximately nine months and the last two houses were not completed until near the end of the year. With all facilities fully operational for the entire year our utility bills will probably approach \$50,000.

Upkeep costs on all these new facilities will be relatively low initially but will increase as time passes.

In 1978 we were in GSA leased office space (costs did not come out of our budget) and occupied two houses. We had no shop facility of consequence.

3. In 1984 funding \$100 K is ARMM funding, which is earmarked for specific projects and is not available for base operations, routine maintenance or other projects.
4. Although the Research Biologist position is funded out of Denver Wildlife Research Center, his funds are very limited. To assure the effectiveness of this position the refuge provides office space, housing, vehicle and aircraft support, clerical and administrative support and last fiscal year provided \$20 K to initiate a multi-year brown bear research project. Although we feel this cooperative venture is a critical and much needed program, the point of this discussion is that it adds once more to our base level costs.
5. Personnel actions will result in at least three costly PCS moves charged to this station in FY 1984.
6. Several vital field projects have been initiated in the past few years in an attempt to get this station back into a more active data gathering and management role.
7. ANILCA not only added a remote parcel of land to our management (Red Peaks/Ban Island) but it's mandates included the requirement for comprehensive planning and numerous other requirements which require more complex management procedures, which in turn requires more baseline data be gathered to justify management decisions.

The bottom line is that although funding at this station has increased markedly in the past few years, our base operational costs have increased exponentially. With our new staffing pattern, we should be able to meet our management goals better than ever before, if our funding levels remain adequate to cover base costs and the necessary field work. Any erosion of base funding must result in a severe reduction in field work and an inability to achieve management objectives.

### 3. Safety

Monthly safety meetings were held on various topics throughout the year.

Vivion completed Emergency Medical Technician (A) training at the Kodiak Community College.

A multi-trauma kit, medical oxygen kit and collapsible stretcher were acquired for Camp Island field headquarters.

No lost-time accidents occurred on the refuge this year.

### F. HABITAT MANAGEMENT

Habitat management on Kodiak consists primarily of managing large areas of de facto wilderness in the interior and regulating human use along the coast.

Construction of the Terror Lake Hydroelectric Project continued at a hectic pace throughout the year. By year's end the dam and spillway were complete and only minor valve and gate work remained on refuge lands. The upper camp was burned and buried per FWS specifications in the inundation area.

The major problems with project construction this year related to power line construction in proximity to bald eagle nests. Construction at two towers was ordered halted until the young had left the nest. Details are found in Section 5 of this report.



Completed Terror Lake Dam.

A major archaeological reconnaissance of the Karluk drainage was initiated this year by Bryn Mawr College of Bryn Mawr, PA. Several misunderstandings between these researchers and refuge staff were eventually ironed out and they conducted their reconnaissance in 1983. They propose to return to Kodiak in 1984 for further reconnaissance and more in-depth studies of the sites located in 1983. Their stated aim is to conduct one or more major archaeological excavations in the Karluk drainage in the future. When informed that this refuge would probably not permit a major excavation in prime bear habitat during the peak bear use period (summer) the Bryn Mawr group informed us in no uncertain terms that they would if necessary seek a political resolution to this "obstructionist" attitude, since we are "mandated by law" to allow such endeavors. This misunderstanding has not, as yet, been resolved.

In 1983 FWS continued to pursue payment by Alaska Power Authority of \$.50 per yard for fill material taken from the refuge for construction of the Terror Lake Dam. APA contends that free use of the material was granted by the permit to construct and that no payment is required. FWS contends that this is not true and that APA must pay for products of the land. The fill was appraised at \$.50 per yard and the total bill will approximate nearly \$1 million (APA has not given us exact figures on the amount used). FWS position was upheld at the Interior Secretary's office level. APA has since appealed to a higher level appeals board in the Administration. No resolution had been reached at year's end.

A major helicopter-borne operation to survey Native claimed historic sites was conducted by Bureau of Indian Affairs (BIA) in 1983. No major problems were noted with their operation although several reports of illegal helicopter use were received - none were verified.

## 12. Wilderness and Special Areas

As reported in the 1982 Annual Narrative Report, Kodiak Electric continued to seek political remedies to allow their access into the Mt. Glottof Research Natural Area for the purpose of constructing a water diversion facility into Terror Lake. Regional Director Schreiner rejected Kodiak Electric Association's (KEA) appeal and was upheld by Interior. Hopefully this is a dead issue at this point, but it's not likely. KEA has identified several small watersheds for further diversions, most in the Mt. Glotoff Research National Area.

## G. WILDLIFE

### 3. Waterfowl

1983 waterfowl nesting conditions were very good as above average rainfall and temperatures combined for an early spring. Evidence of an early brood hatch were seen in several species of waterfowl nesting on the refuge.

A tundra swan nesting population survey was conducted on June 8 and 9. Coverage of all past refuge nesting areas tallied 95 adult swans and 20 nest sites. Six broods with a total of 23 cygnets were also counted. The family groups appeared to range from one to 10 days in age.

1983 also was the first year tundra swans were documented as overwintering on the Kodiak Refuge. A flock of 12 to 14 swans was present on the upper Karluk River throughout the winter. It could not be determined if these were resident birds or winter migrants from the Alaska Peninsula or other western Alaska tundra swan populations.

Several large migratory flocks of tundra swans were reported during the fall of 1983. An elk hunter counted six flocks totaling approximately 500 swans in the Raspberry Straits area on November 1. A flock of 60 tundra swans was seen on the Karluk River during a steelhead trout radio tracking flight on October 26.

A smew, a rare Eurasian visitor to Alaska similar to a merganser, was again seen during the annual Christmas bird count on December 31. It is suspected this is the same bird present during Christmas bird counts the past two years.

Twenty black brant were seen in Middle Bay on February 6. Brant are often seen in the Kodiak area during spring and fall migratory periods but rarely during the winter months.

A local waterfowl propagator obtained a permit to collect common eider eggs. He obtained 16 eggs from Women's Bay area and hatched out 10 young. He plans to raise other Alaskan species of waterfowl as well as the eiders.

Along the same vein, the Kodiak Sportsman's Club has made a request to transplant Vancouver Canada geese on to the refuge. ADF&G and the Regional Office are both reviewing the proposal. However, current policy discourages transplanting any species on the refuge which is not indigenous. An attempt to introduce this species to Terror Bay in 1975 was thought to be unsuccessful. In 1979, a flock of seven dark-bodied Canada geese was seen in Zachar Bay approximately 30 miles from Terror Bay. The flock appears to be resident and now totals nine but by all indications habitat for Vancouver geese in Zachar Bay area is marginal at best.

#### 4. Marsh and Water Birds

Two different loon family groups were observed on the refuge during July. A pair of adult common loons was seen on a beaver pond in the Upper Dog Salmon drainage with two downy young on July 1. An adult common loon with two nearly grown young were present on Frazer Lake throughout the last week of July.

A great blue heron was reported several times around the city of Kodiak throughout the winter of 1983. Great blue herons are rare or accidental migrants to Kodiak Island.

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

Phenology of Kodiak shorebird spring migration was approximately one to two weeks early with the first dunlins and short-billed dowitchers appearing in Women's Bay on May 3.

A single Bonaparte's gull was observed on the north end of Frazer Lake during the week of July 20 to 27. This species is an uncommon summer visitor to Kodiak.

A widespread die-off of surface-feeding marine birds over a large portion of southwest Alaska occurred during the month of August to September. Black-legged kittiwakes, sooty and short-tailed shearwaters were the primary species affected most by the die-off. Dead seabirds were reported from Kotzebue, Bristol Bay, Dutch Harbor, all along the Alaska Peninsula to Homer and Kodiak Island. The exact magnitude of this mortality is hard to estimate, but by all indications could be either high tens of thousands or low hundreds of thousands. The dead birds examined were emaciated with little body fat and atrophied pectoral muscles indicative of starvation.

In the Kodiak area, behavior exhibited by both species of shearwaters supports the starvation hypothesis. Numerous sport fishermen reported shearwaters attempting to eat bait from their hooks, chasing artificial lures, and climbing into boats to help themselves to the bait supply. The normally pelagic shearwaters were swimming in Kodiak harbor and channel well into September. Starving and dead black-legged kittiwakes were not found in the Kodiak area to the extent they occurred in other areas along the Alaskan coast. Migrating shearwaters were more affected by the die-off in the Kodiak area than the kittiwakes. However, the depressed or absence of normal food supplies is likely responsible for the nearly complete reproductive failure of black-legged kittiwakes nesting colonies on Kodiak Island and the Gulf of Alaska.

1983 marks the fifth year in which wintering seabird baseline data has been collected from the waters around Kodiak Island. Analysis and interpretation of these data will be completed and a comprehensive report will be furnished prior to the Outer Continental Shelf lease sale No. 88. Tract leases for offshore oil exploration in Shelikof Straits, lower Cook Inlet, and northern Gulf of Alaska are scheduled to be offered in October 1984. Areas identified by data analysis as being representative of island-wide trends will continue to be monitored.

West side bays were surveyed from November 11 to 21 via ADF&G's F/V Smolt. East side bays were completed December 10 to 14 using the refuge vessel Ursa Major. Doug Forsell, Migratory Bird Research-Anchorage, assisted Biologist Zwiefelhofer with the survey.

A total of 257 transects were completed with 22,065 total birds counted. This number is up from the 4 year average of 20,739 total birds. A summary of the 1983 survey data results is presented in Table 7.

The bird densities on the west side bays were down from 1982 survey results while densities in the east side bays were up slightly from 1982.

A noticeable absence of nesting Arctic and Aleutian terns was reported by several Old Harbor residents. Sheep Island, which normally supports up to 500 nesting Arctic terns and 200 Aleutian terns had no nesting activity. Other areas around Kodiak Island also had reduced nesting tern populations. The absence or depressed food supply is likely responsible for the lack of nesting.

## 6. Raptors

A total of five bald eagle carcasses was gathered off the Kodiak road system by refuge personnel in 1983. This compares to 10 bald eagle carcasses

TABLE 7

## 1983 PELAGIC SEABIRD SURVEY DATA

<u>Survey Area</u>	<u>Surface Area</u>	<u>No. Transects</u>	<u>km<sup>2</sup> of Area Surveyed</u>	<u>Total Birds Counted</u>	<u>Birds/km<sup>2</sup></u>	<u>Estimated No. Birds in Survey Area</u>
Uyak	305	77	66.1	4,100	61.4	18,700
Uganik, Terror	277	49	42.3	3,112	74.2	20,500
Whale Pass/Afognak Straits	82	30	24.5	5,928	266.0	21,800
Eastern Sitkalidak Straits/Kiliuda Bay	287	51	42.8	4,726	110.0	31,500
Western Sitkalidak Straits	327	39	33.9	2,337	69.33	22,700
				-----		-----
All Areas		257	217.7	22,065	104.97	115,200

in 1982. The number of dead bald eagles found has been on the decline for the last few years. Accidents and natural mortality are now the most common causes of death instead of gunshot wounds as in the past. Two additional mortality reports regarding dead bald eagles found on Afognak Island by sportsmen, were received during 1983. No attempts to recover the carcasses were made.

An injured adult bald eagle was found swimming by the fishing vessel Norseman. The bird was unable to fly and was brought into the refuge during mid-January. After examination by a local veterinarian and several weeks of recuperation the eagle was released on February 6.

On August 22, an adult male northern goshawk with a broken wing was found at Fort Abercrombie State Park and brought to the refuge headquarters. Arrangements for treatment were made with Dr. James Scott D.V.M. in Anchorage. Dr. Scott is well known throughout Alaska for his raptor rehabilitation work. Unfortunately, the goshawk's wing was too severely damaged to be repaired and had to be amputated. Dr. Scott and Anchorage Regional Law Enforcement personnel made arrangements for the hawk to be placed in a captive breeding program.

A total of eight sightings of Peale's peregrine falcons were made from June to September by the TLHP construction personnel. All the observations were within the project area and were single adult birds. An additional sighting of a Peale's falcon was made during the refuge's fall seabird surveys in Kupreanof Straits on November 20. The peregrine was seen harassing an adult bald eagle.

A local birdwatcher spotted a light phase gyrfalcon off Narrow Cape on March 15. It is thought the bird was an early migrant and not a winter resident, since gyrfalcons are some of the earliest raptor migrants to return north.

#### 7. Other Migratory Birds

A "red-breasted" phase of the yellow-bellied sapsucker was observed in the city of Kodiak on March 15. Although common in southeast Alaska, Kodiak is normally too far west for this Pacific Northwest species and is considered an accidental visitor during the fall and winter months.

Two other accidental or rare bird species were observed during the annual Christmas bird counts on December 31. Fifteen ruby-crowned kinglets and twenty Bohemian waxwings were seen in the Kodiak city limits.

#### 8. Game Mammals

##### a. Brown Bear

Brown bears received a good deal of attention in 1983 as a result of hunting and research activity. The 1983 sport harvest of bear (112) was four greater than last year but mortality from non-sport causes declined by an equal number. Total documented mortality of bears has remained constant for the past three years. Research in 1983 included continuance of ADF&G's study

assessing impacts of the TLHP and initiation of FWS investigations of habitat use by bears in southwest Kodiak Island (see Research and Investigations).

### Surveys

Aerial stream surveys were not conducted in 1983 because (1) Refuge personnel were kept busy capturing and marking bears for the research project in late July and (2) few bears were observed fishing along survey streams after the first week of August. Overall, bear concentrations along salmon-spawning streams of the Refuge seemed below-average and persisted for a relatively short period of time. We suspect this pattern of use was largely due to low-density runs of salmon in combination with a bumper berry crop that began to mature in early August.

A few drainages, however, attracted large numbers of bear. This was particularly true for streams flowing into the heads of Uyak and Deadman Bays. Abundant salmon in those streams may have attracted bears from areas where fish were not as productive.

Two complete and three incomplete aerial surveys were conducted in the Uganik alpine this year. The average count for complete surveys was 14% higher (65 vs. 57) than in 1982. Compared to 1982, 1983 alpine surveys show an increased proportion of yearlings and decreased proportion of cubs (Table 8). If the same adult females feed in the Uganik alpine year after year, then the large representation of yearlings in 1983 probably reflects the high production of cubs indicated by 1982 counts. It can also be hypothesized that the low tally of cubs in 1983 may be partially related to the poor berry crop of 1982. This type of correlation has been demonstrated for black bears. These questions are some of the reasons the Refuge is interested in conducting brown bear investigations in the Uganik (Mt. Glottof Research Natural Area) country.

### Mortality

Brown bear mortality on the Refuge included 112 animals taken for sport, two killed in defense of life and property (DLP) and four deaths attributed to other causes (natural, study, unknown) for a total of 118 (Table 9). Females comprised 37% of the harvest.

Generally favorable weather conditions in both spring and fall provided hunters with good opportunities to take animals. The spring season (April 1 to May 15) produced a harvest of 78 bear on the Refuge, including five large males with skull measurements (length plus width) that exceeded 28 inches and thereby qualified for listing in the Boone and Crockett record book. An additional 34 bears were harvested in the fall season (October 25 to November 30).

The sport kill was within harvest quota guidelines in two of the three ADF&G subunits that include most of the Refuge. In subunit 4 the quota was exceeded by 12 (20%) animals. Subunit quotas and their 1983 harvests are as follows:

TABLE 8

## COMPARISON OF AERIAL ALPINE COUNTS OF BROWN BEAR, 1978-1983

<u>Year</u>	<u>No. Complete Surveys</u>	<u>Single Bear</u>		<u>Maternal Female</u>		<u>Yearling</u>		<u>Cub</u>		<u>Total</u>
		<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>	
1978	1	40	29	30	22	24	17	44	32	138
1979	1	20	22	22	24	18	20	30	33	90
1980	2	87	52	27	16	32	19	20	12	166
1981		No Counts								
1982	3	94	33	60	21	35	12	96	34	285
1983	2	59	37	36	23	37	23	28	18	160
G-year Average			36		21		17		26	

TABLE 9  
 SOURCES OF BROWN BEAR MORTALITY ON KNWR, 1976-1983

<u>Year</u>	<u>Sources</u>			<u>Total</u>
	<u>Sport</u>	<u>DLP</u>	<u>Other*</u>	
1976	88	-	2	90
1977	98	3	-	101
1978	106	2	-	108
1979	105	3	-	108
1980	101	5	1	107
1981	112	3	2	117
1982	108	7	3	118
1983	112	2	4	118

1976-1983 Average = 108.4

\* Includes accidental study deaths and mortality from natural or unknown causes.

	<u>Quota</u>	<u>1983 Harvest</u>
Subunit 3	20	16
Subunit 4	60	72
Subunit 5	30	24
	<hr/>	<hr/>
Total	110	112

Fortunately, 1983 did not see a repeat of the high DLP mortality that was recorded in 1982 (Table 9). Nevertheless, Refuge personnel recognize that increased human activity on the Refuge represents the potential for excessive DLP mortality and we continue to devote considerable time informing Refuge visitors on how to avoid confrontations with bear.

#### Cooperative Work

Research Biologist Barnes assisted the ADF&G in capturing and marking bears for the TLHP study and on trips to locate/photograph den sites, and radio-track bears. ADF&G biologists, in turn, contributed to FWS bear studies with help during the marking operation, assistance with alpine surveys, and loan of equipment.

Refuge personnel devoted substantial effort to the brown bear research project and made possible the successful start of field studies. The benefits of this cooperative venture are becoming apparent in the form of data showing (1) areas of extensive home range overlap that indicate high quality habitat, (2) areas that appear particularly suitable for winter denning and (3) apparent differences in time of den entrance between bears in northeast and southwest Kodiak Island. A summary of 1983 bear research appears in the Research and Investigations Section while the following photos provide a more visual portrayal of the study.



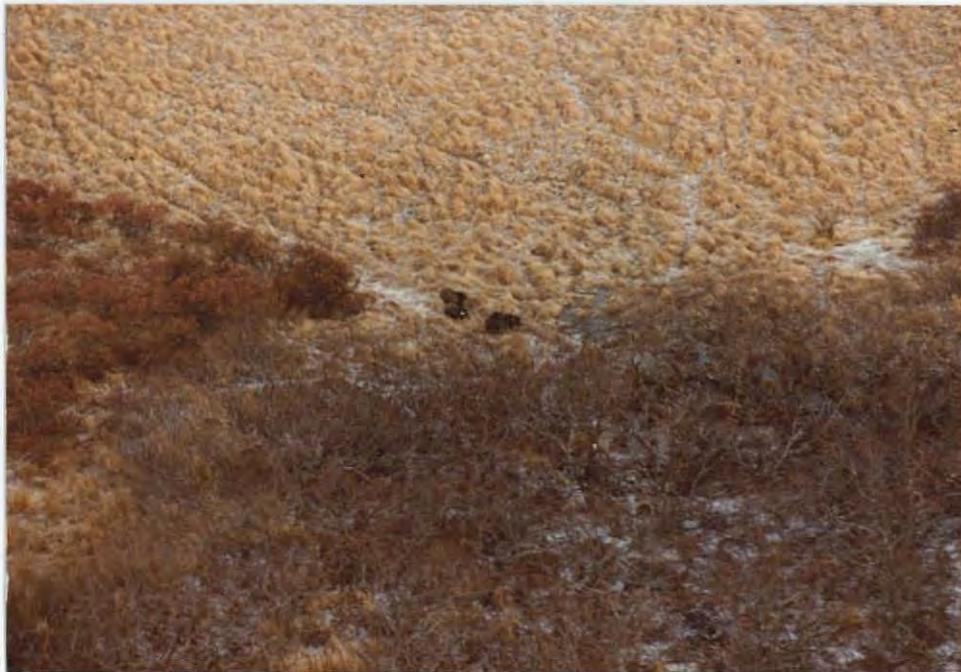
The flat lowlands and brush-covered slopes of this valley in the Connecticut Creek drainage typify much of the study area. Study objectives are to improve understanding of habitat use and the variables that affect results of aerial stream surveys.



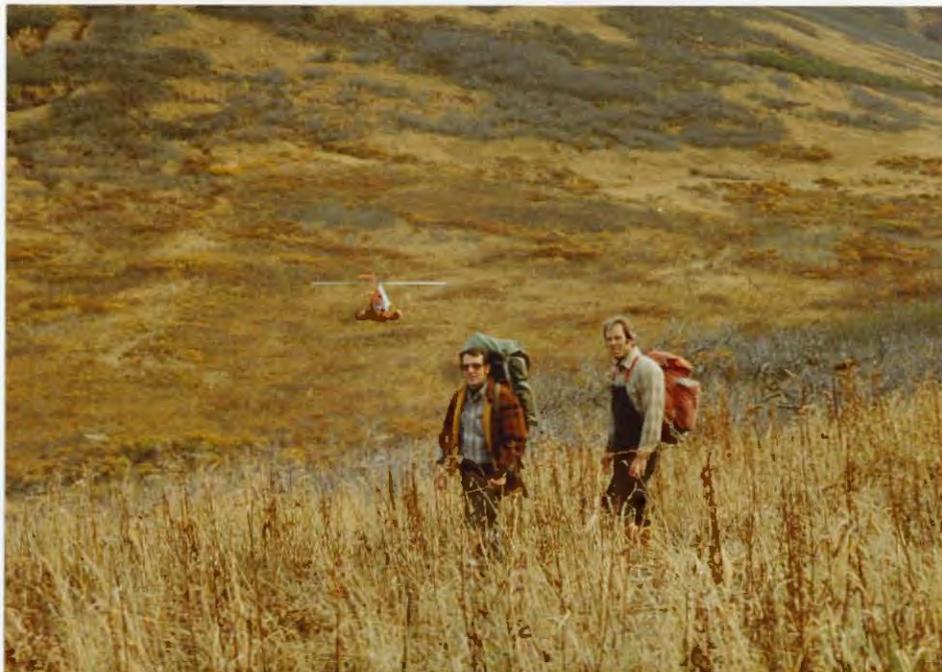
Helicopter capture techniques allowed us to select and mark family groups. Note female and yearling on right side of helicopter.



Immobilized bears were ear-tagged, marked with lip and groin tattoos, and measured. Adult females were fitted with radio collars.



Study animals were sighted on about one-half of the aerial relocations; ear flags, visible on an adult female and one yearling in this photo, enhanced the ability of observers to spot bears in dense brush.



U.S. Coast Guard helicopter support allowed us to recover the remains of a 16.5 year old female that died of natural causes in this remote canyon of the Sturgeon River drainages.



Most radio-collared bears denned after mid-November, below 2,000 feet (arrow) elevation and in or near brush. K07 and her yearling entered this den during the last week of December, 1983 or the first few days of January, 1984.

b. Sitka Blacktail Deer

The deer population on the Refuge benefited from a mild 1982-83 winter and all indications are that herds are stable or increasing. Aerial surveys of selected beaches were flown in April and May and we found no evidence of winter mortality or concentrations of animals. This is not surprising because the 1983 winter did not produce the heavy snows that would force animals onto the beaches. Data on production and survival of fawns were not collected but general observations pointed to a good recruitment of fawns.

The deer season on the Refuge extended from August 1, 1983 to January 7, 1984 and the bag limit was five. Hunting pressure continued to increase over previous years and hunter success was good. ADF&G biologists projected a record harvest of over 6000 deer for all of Game Management Unit 8 and roughly half of those animals were taken on Refuge lands. Hunters reported taking an average of 2.4 deer each and about 75% of the animals were bucks. Hunter success was particularly good in the Uganik Bay, Uyak Bay and Spiridon Bay areas. Hunters were almost unanimous in their reports of the excellent condition of deer killed in late summer and fall.

c. Mountain Goat

Aerial surveys by the ADF&G indicate Kodiak Island's mountain goat population is continuing to grow and expand into new habitat. The 307 animal tally for 1983 is the highest count on record and represents a 23% increase over the 1982 census. Most of the range extension by goats is occurring within Refuge boundaries.

The 1983 mountain goat hunting season (permit drawing) extended from September 1 through October 31 and produced a harvest of 15 goats by 37 hunters. Age composition of the kill was 11 males and four females. An estimated one-third to one-half of the harvest occurred on the Refuge.

d. Roosevelt Elk

Each year there are a few reports of elk sightings on the west side of Kodiak Island and 1983 was no exception. In fact, a bull reportedly was killed this year in the Port Lions area (off Refuge lands). Elk inhabit the Afognak Island portion of the Refuge but data on numbers or seasonal use patterns are lacking. The ADF&G estimates that fewer than 10 animals were taken from that part of the Refuge during the 1983 elk hunting season.

e. Furbearers

ADF&G records indicate that in 1983 overall trapping effort in Game Management Unit 8 declined from levels recorded in recent years. During the 1982-83 trapping season 224 land otter were harvested in Game Management Unit 8 and we estimate that roughly 60% of those were caught on Refuge land. The harvest was 21% lower than that recorded the previous season. Harvest data on beaver and red fox are not available.

Data on population trends of land otter, beaver and red fox are lacking although we believe populations are stable.

#### f. Reindeer

An aerial survey of lowland habitat on the south end of the Island in February yielded a count of 176 reindeer. This is the first time the count has fallen below 200 in recent years and suggests the herd is at best stable and perhaps is on the decline. These animals are hunted by a few individuals but the number harvested is unknown. Reindeer can be hunted year-round and there is no bag limit.

#### 11. Fishery Resources

The freshwater fishery habitat of Kodiak NWR encompasses over 300 streams and 270 lakes, some of which provide important spawning and/or rearing habitat for eight species of native salmonids. These include: king salmon, (Onchorhynchus tshawytscha), coho salmon (O. kitsutch), chum salmon (O. keta), pink salmon (O. gorbuscha), red salmon (O. nerka), alpine charr (Salvelinus aplinus), Dolly Varden (S. malma), and rainbow/steelhead trout (Salmo garidneri).

Management of the Kodiak fishery resources historically was by the Bureau of Commercial Fisheries, but after Statehood in 1958, the State of Alaska assumed full management responsibility for all fishery resources in the State. Management of the Kodiak salmonid resources is conducted by the ADF&G, Commercial Fish (CF) and Sport Fish (SF) Divisions. In addition, the ADF&G Fisheries Rehabilitation, Enhancement and Development (FRED) Division, established in 1972, has on-going projects targeted for enhancement of sockeye stocks on the Kodiak NWR.

#### The Commercial Fishery

Refuge fishery resources contribute to the support of a broad based Kodiak area commercial salmon fishery having a preliminary estimated total value to fishermen in 1983 of approximately 14.5 million dollars. The dominant commercial species in dollar value and numbers listed in descending order are: pinks, sockeye, chum, coho, and king salmon.

Commercial fishing gear included purse seines, beach seines and set gill nets in the headland, bay, and inlet waters of Kodiak Island. These salmon stocks are harvested within the geographical districts outlined in figure 15. The preliminary ADF&G estimate of total salmon harvest in the Kodiak management area by all gear types from June through November 1983 is approximately 7,076,000 fish. Estimated Refuge based salmon stock harvest during this period was approximately 4,631,145 fish with an ex-vessel value of 8.34 million dollars (Table 10). These figures indicate that Refuge stocks in 1983 contributed approximately 68 to 58 percent of the total numbers harvested and ex-vessel value respectively of the area wide Kodiak harvest.

Adult salmon escapements to stream and river systems on the Refuge in 1982 were monitored through ADF&G-CF Division wier counts and aerial surveys. Preliminary composite escapement numbers are presented in Table 11.

The species specific catch-to-escapement ratios computed for Refuge based stocks in Table 12 are for illustrative purposes only and do not reflect true

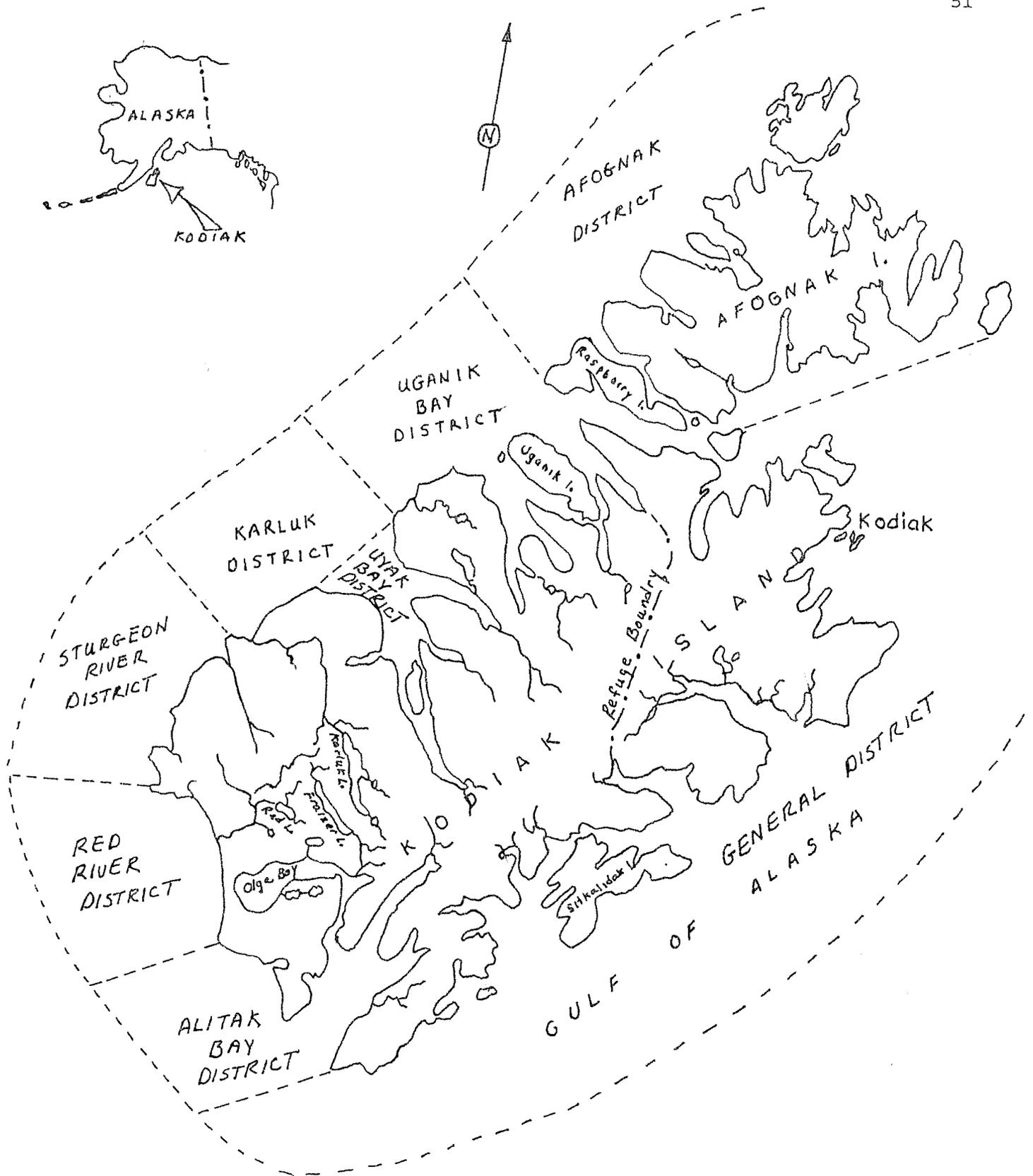


Figure 15. ADF&G geographical districts where Refuge based salmon stocks are harvested.

Table 10. Estimated numbers, species composition and dollar value of commercially caught salmon by all gear types during 1983 calculated to be of Kodiak-NWR origin. (1)

Species	ADF&G Geographical Harvest Districts								Total	Ex-Vessel Value (\$)
	Afognak	Uganik	Uyak	Karluk	Sturgeon	Red	Alitak	General		
Chinook	1	328	466	206	0	662	157	128	1,948	5,786
Sockeye	2,168	88,340	26,508	16,081	4	31,956	439,489	8,718	613,264	3,201,238
Coho	1,229	7,795	2,293	3,739	3,318	16,060	26,878	7,026	68,338	310,938
Pink	3,314	629,934	508,326	43,451	0	496	1,428,526	727,755	3,341,802	2,767,012
Chum	321	141,335	143,519	6,172	84	567	105,963	207,832	605,793	2,108,160
Total	7,033	867,732	681,112	69,649	3,406	49,741	2,001,013	951,459	4,631,145	8,393,134

(1)....Data compiled from ADF&G 1983 catch statistics for the Kodiak Management Area. Ex-Vessel values are preliminary projections of actual value.

Table 11. Peak 1983 salmon escapement counts in Refuge streams by ADF&G geographical district and species. <sup>(1)</sup>

Species	ADF&G Geographical Districts								Total
	Afognak <sup>(2)</sup>	Uganik	Uyak	Karluk	Sturgeon	Red	Alitak	General	
Chinook	--	0	0	11,747	0	15,511	169	0	27,427
Sockeye	--	34,000	0	436,145	0	171,415	467,305	50	1,108,915
Coho	--	1,000	0	34,778	100	17,702	10,754	8,700	73,034
Pink	--	214,950	314,920	38,190	94,000	19,102	449,958	234,325	1,365,445
Chum	--	35,050	104,700	67	85,100	22	108,317	41,970	375,226
Total	--	285,000	419,620	520,927	179,200	223,752	1,036,503	285,045	2,950,047

(1) Data compiled from ADF&G 1983 peak salmon-escapement fish wier and aerial survey counts.

(2) No surveys conducted.

Table 12. Estimated cumulative catch/escapement for Kodiak-NWR based salmon stocks from 1981-83. (1)

Species	1981			1982			1983		
	Catch	Escapement	Approx. Ratio	Catch	Escapement	Approx. Ratio	Catch	Escapement	Approx. Ratio
Chinook	667	15,615	1:23	516	7,952	1:15	1,950	27,427	1:14
Sockeye	337,834	1,159,431	1:3	867,463	1,316,273	2:3	613,264	1,108,915	1:2
Coho	40,596	38,347	1:1	113,412	464,412	1:4	68,338	73,034	1:1
Pink	5,095,643	235,536	20:1	5,771,462	4,070,690	3:2	3,341,802	1,365,445	3:1
Chum	509,363	271,845	2:1	679,765	429,175	3:2	605,793	375,226	3:2
Total	5,984,103	1,720,774	--	7,432,618	6,288,502	--	4,845,299	2,950,047	--

(1) Data compiled from ADF&G 1981-83 catch statistics and peak salmon escapement counts.

values since escapement figures are a composite of known data on some streams and peak counts on others.

Overall, escapement for sockeye salmon on the major and minor systems within the Refuge during 1983 fluctuated within location of the system. The Karluk River minimum escapement goal (Table 13) was met for the first time since 1979, whereas sockeye escapement on the Dog Salmon/Frazer system was only 38 percent of the 1982 escapement and only 55 percent of the minimum established ADF&G goal. The Upper Station system again exceeded the maximum escapement goal. Escapement into the minor systems, except for the east Uganik River, was roughly equivalent to 1982 (Table 13).

### Sport Fishing

Sport fishing on Refuge streams occurs in late May through July for king salmon, rainbow trout and charr, then again in September through November for coho salmon, steelhead trout, and charr. Although coho salmon and charr are present in all major and some minor systems on the Refuge, king salmon and steelhead are only known to be abundant in the Karluk and Ayakulik/Red River systems. Table 14 depicts the known and peak escapement counts on Refuge streams which supported species of major interest to sport fishermen during 1983. Since most of the ADF&G fish wiers on the major systems are pulled in mid-September and aerial surveys are terminated on the minor systems in late September, actual numbers of coho salmon and steelhead trout which continue to enter the system throughout the Fall months is unknown.

Record returns of king salmon were observed for both the Karluk and Ayakulik/Red Rivers during 1983. Escapement of king salmon into the Karluk River was approximately 85 percent above the 1976-81 average of 7838 fish and in the Ayakulik/Red River approximately 265 percent above the 1976-81 average of 4251 fish.

Although the sport harvest levels for the above species on the Refuge are not available for 1983, harvest of king salmon on the Karluk River based on the 1982 level of 5.8 percent is estimated to range between 500 and 800 fish.

In addition to king salmon, near record counts of downstream migrating adult steelhead (kelts) from the 1982 Fall run were observed passing through fish wiers on both the Karluk and Ayakulik/Red Rivers. Total sport harvest of steelhead during the Fall of 1982 and spring of 1983 is unknown but based on 1982 harvest levels is estimated to be ranged between 100 and 200 fish.

Sport fishing guide activities on the Refuge during 1983 were above levels observed in 1982. During 1983 the refuge developed an interim policy for issuance of sportfish guiding permits. This was basically in response to approximately twenty requests during the spring of 1983 by guides for permits to operate on the major river systems of the refuge. The problem of permit issuance was compounded by some requests to operate on the Karluk River which has been selected and conveyed to the Natives under 22 (g).

A total of six Special Use Permits (SUP) were finally issued to commercial guides in 1983, most of whom targeted on king, coho salmon and steelhead trout on the Karluk, Ayakulik/Red River and Uganik River systems.

TABLE 13

SOCKEYE SALMON ESCAPEMENT TO MAJOR AND MINOR SOCKEYE SYSTEMS ON THE  
KODIAK NATIONAL WILDLIFE REFUGE 1982-83

<u>River System</u>	<u>Escapement Goal</u>	<u>Actual</u>	
		<u>1982</u>	<u>1983</u>
East Uganik	Unknown	50,000	23,000
Little	Unknown	11,500	11,000
Karluk	460,000-775,000	164,407	436,145
Red	200,000	169,562	171,415
Akalura	Unknown	5,000	3,300
Upper Station	100,000-180,000	470,732	289,250
Horse Marine	Unknown	7,500	7,500
Dog Salmon (Fraizer)	300,000-400,000	437,474	166,655

TABLE 14

KNOWN AND PEAK ESCAPEMENT COUNTS ON REFUGE STREAMS WHICH SUPPORTED  
SPECIES OF MAJOR INTEREST TO SPORTFISHERMEN DURING 1983

<u>River System</u>	<u>King Salmon</u>	<u>Coho Salmon</u>	<u>Steelhead Trout</u>	<u>Charr</u>
Little (3)	Unknown	1,000	Unknown	Unknown
Browns Lagoon (3)	Unknown	Unknown	Unknown	Unknown
East Uganik (3)	Unknown	Unknown	Unknown	Unknown
Karluk (4)	11,746	34,778	(1) 173 (2) 4,204	Unknown
Ayakulik/ Red (4)	15,511	17,702	(1) 181 (2) 1,351	Unknown
Upper Station (4)	0	4,521	(1) 2 (2) 1	Unknown
Dog Salmon/ Fraizer (4)	169	5,033	(1) 279 (2) 39	Unknown
Horse Marine (3)	Unknown	1,200	Unknown	Unknown
Midway (3)	Unknown	8,000	Unknown	Unknown

- (1) Immigrant adults passing upstream through wier  
(2) Outmigrant (kelts) adults passing down through wier  
(3) Peak aerial surveys only  
(4) Fish wier count

An interim policy was in effect for the calendar year 1983 and may be utilized in 1984 or until a comprehensive plan addressing all aspects of commercial recreation guiding will be developed in conjunction with the Refuge Comprehensive Conservation Plan.

The interim policy was determined by examining:

- a. Current Refuge Rules and Regulations.
- b. Consultation with Koniag, Inc. for those Native selected lands within the Kodiak NWR.
- c. Known high density bear use areas.
- d. Size of river or lake systems.
- e. Known fish stock population levels.

A Refuge Special Use Permit was issued to applicants under conditions specified below:

1. The applicant must be a licensed and registered State of Alaska Class A, Registered or Master Guide.
2. Only one permit was issued to each registered guide.
3. A Special Use Permit was not to be issued for more than two (2) lake/river systems where guide activities were authorized.
4. Each lake/river system had a maximum of two guides.
5. Each permittee with a Special Use Permit for Recreational guiding must have complied with a list of Special Conditions which was discussed with the permittee and attached to the permit.
6. This policy did not apply to Native lands on the Karluk system.

#### Fishery Habitat

During 1983 the Refuge Fishery Program provided assistance to the ADF&G-CF Division in locating a new fish wier site on the Dog Salmon River on the south end of the Kodiak NWR. The new wier will allow a more rapid assessment of sockeye salmon returns to Frazer Lake.

Assistance was also provided to the USFWS monitor for the TLHP in monitoring turbidity on the Terror River due to construction activities.

In cooperation with the Regional Office planning team, information was provided and draft working maps were prepared depicting fishery resources on the Refuge. Streams were mapped to delineate known species distribution, spawning, holding, and rearing areas for salmon, trout, and Dolly Varden/Arctic charr. In addition, mapping was done to depict areas of human use as it relates to the fishery resources of the Refuge.

Input to the Regional Resource Planning Process concerning Species of Special Interest was provided to the Regional Office for salmon and steelhead trout on the Kodiak NWR. Recommendations for habitat and population management objectives were provided in addition to identifying total spawning and rearing habitat.

Input was provided to the Denver Wildlife Research Center's 1983 Brown Bear Utilization Study on the refuge to integrate salmon-bear interactions into the study proposal.

Input was provided to AIMS for the development of the FIN System network for the Alaska Fishery Resources Program.

A program for annually monitoring refuge fishery resources for anadromous salmonids was completed and is being incorporated into the overall annual Kodiak NWR inventory plan.

#### H. PUBLIC USE

##### 1. General

Public use levels continued at levels similar to past years. Manpower and funding constraints have severely limited our ability to monitor public use levels. Thus our observations are subjective at best. The same constraints have limited our Interpretive and Environmental Education programs to near non-existent levels.

By year's end Refuge staff had received conceptual approval for and was developing criteria for an Outdoor Recreation Planner position here. This position should be on line by mid-1984 and will provide much needed direction and momentum to these programs. This will fill a long term gap in our staff expertise.

##### 8. Hunting

Deer hunting was undoubtedly the most popular visitor activity on Kodiak this year. As in the past several years, the deer hunter population grew tremendously this year. The high deer populations, growing notoriety amongst hunters statewide, and the liberal seasons (six months) and bag limits (reduced to five this year) will undoubtedly continue to increase hunter use in future. Although numerous confrontations between bears and deer hunters were reported this year, no hunters were mauled and the number of bears killed in defense of life and property declined from last year. This will remain a potential time bomb as deer hunting use expands, however.

Harvest levels for deer and bear are reported in section G-8.

##### 9. Fishing

Sport fishing activity on the refuge is regulated by ADF&G regulation.

A sudden interest in Kodiak by commercial sportfishing guides this year resulted in the issuance of several permits and the beginnings of a whole

new form of conflicts with refuge objectives. Several sportfish guides wish to establish semi-permanent (or permanent) sportfishing camps on several refuge streams in the center of the best bear habitat, of course. Refuge staff developed a set of preliminary special conditions to cover the very temporary camps we elected to permit. To date these have been received with some grumbling but at least we're not in court on this matter yet.

Further refinement of conditions and monitoring of this rapidly expanding use will continue in 1984. Hopefully the comprehensive plan will assist in addressing this potentially thorny situation.

#### 10. Trapping

Fourteen permits for trapping were issued for the 1983-84 season compared to 13 last year and 28 in 1981-82.

Trapping levels are very low on most refuge areas. The heaviest trapped areas are near villages. Most trappers are fairly mobile and seldom trap the same area two years in a row.

Low fur prices in 1983 did not encourage intense trapping effort.

#### 17. Law Enforcement

Law enforcement patrols were conducted on an opportunistic basis throughout the year although the press of other duties limited these efforts.

Violation Notices were issued for:

Illegal use of cabin: 2  
Violation of SUP conditions: 1

### I. EQUIPMENT AND FACILITIES

#### 1. New Construction

Construction was completed and beneficial occupancy granted in April of two new three bedroom residences, a bunkhouse, maintenance shop and oil shed. Two other residences were constructed to our specifications by Alaska Department of Transportation in exchange for our transferring to them our administrative site and two houses on Mission Road in downtown Kodiak for construction of a bridge.

Beneficial occupancy of these two houses was granted in November. All these new facilities are located at our headquarters complex on Buskin Beach Road about five miles from downtown Kodiak.



One problem with the new residences is the metal roof, which, while colorful, drove at least one occupant to distraction with the all night "clumps" made by snow sliding off the roof and the (rather loud) sound of rain on the roof. Some enjoy the sound of rain - but not after six years in Kodiak.

In any event, a major problem with snow sliding off the roofs is depicted in this photo:



Snow damage to rain gutters on new residence.

New entrance signs were received and installed at the headquarters. The sign designs were approved by Regional Office staff without considering the refuge staff's request for Service standard redwood signs. Within two months of installation the signs (constructed of plywood boxes coated with epoxy) began to delaminate. The supplier eventually provided aluminum covers with the same logo painted on them to cover the rapidly deteriorating signs.



Main entrance sign.



Directional sign.

The major problem with these signs (other than the \$7000 price tag for four small and one large sign) is that they are not repairable. A gunshot would virtually destroy any of these signs and normal weathering in Kodiak will likely limit life expectancy to a few years at best.

## 2. Rehabilitation

Major roof leaks in the Triplex housing unit developed and will require a major reroofing-a 1984 ARMM project currently awaiting engineering, contracting and perhaps most importantly-weather to complete. Other major rehab projects needed in the triplex are: Rewiring, replumbing, carpeting, insulation and all new bathroom fixtures. The funding originally planned for these projects will likely be absorbed by the roofing project and these may have to be put off until FY 85.

## 3. Major Maintenance

The M/V Ursa Major was essentially put out of commission in late fall awaiting delays in contracting vital hull work. The full work planned for FY 83 was not yet complete by the end of the year due partly to a very cantankerous boat lift operator - who happens to be the only game in town.

Piper N-720 was completely rebuilt by OAS over the winter of 1982-83 and returned to duty in Kodiak in April. The Cub has a new corrosion proofing on all fuselage tubing, new fabric and a fresh coat of orange and white dope. Should be good for another 14 years easily. N-720 was also configured for radio tracking during its rebuild and has now become our primary tracking aircraft.

## J. OTHER ITEMS

### 2. Items of Interest

The original FWS residence at 1011 Mission Road and the neighboring BLHP house constructed in 1978 were turned over to Alaska Department of Transportation in May to make way for construction of the new Near Island bridge to connect the city with the new Dog Bay boat harbor. Previous reports discussed this controversy at some length.

The old house rested on the center line of the bridge and was (after being stripped) burned by the Kodiak Fire Department and used for fire-fighting drills.



FWS residence at 1011 Mission burning  
to clear site for Near Island Bridge.

The old house was one of the oldest structures in Kodiak. Originally constructed in the 1920's as the first Alaska Experimental Farm, it was turned over to the Alaska Game Commission (FWS in territorial days) in the 30's and served as the Kodiak Game Commissioner's office, residence and bunkhouse for many years. In the 50's the house became part of the Refuge's facilities. It survived the Good Friday Earthquake and tidal waves of 1964 unscathed. Over the years this house raised a number of FWS "brats", many of whom showed up to witness the burning of this Kodiak landmark. An appropriate wake was held for former residents after the fire. Progress.

### 3. Credits

This report is a staff effort (what staff is left). Barnes prepared portions of the research section and the game mammals section, Chatto the fisheries section and the fisheries portions of the research section, Zwiefelhofer prepared the sections on migratory birds and the eagle research sections. Vivion wrote the remainder and edited and compiled the entire report. Gerri Castonguay and Judy Tomberlin typed and assembled the report.

Photo credits are noted (where known) in photo captions.

### K. FEEDBACK

The Kodiak salmon set-gill-net fishery is supported by a number of structures along the coast. Over 100 sites are fished which have shore facilities under Refuge Special Use Permit. Of these over 70 are cabin sites, the remainder are tent frames.

One of the major impediments to management has been a total lack of direction on Native selected former refuge lands, which, as outlined in the introduction to this report constitute a very significant portion of the best wildlife habitat on the island.

The crux of this matter is that Section 22 (g) of ANCSA requires that the title to any lands conveyed to a Native corporation from within an existing refuge carry a covenant to the effect that such lands remain subject to the rules and laws governing use and development on that refuge. A 1973 solicitor's opinion advised that FWS must develop rules and regulations specifically for these 22 (g) lands and that rules of general applicability (i.e. - 50 CFR) cannot be applied to these lands in a blanket fashion. Although an entirely new set of regulations (50 CFR part 36) was developed for Alaska refuges as a result of ANILCA (which greatly relaxed current refuge regulations on existing refuges) these regulations specifically did not apply to Section 22 (g) lands. Thus the effective FWS actions in developing regulations for 22 (g) lands since 1973 has been zero. Charles Strickland at the time of his death chaired a committee to develop these regulations. This is admittedly a very simplistic discussion of a very complex subject, but the point is that we must move forward immediately on these regulations.

The result at Kodiak is that set-netters in the Olga-Moser Bay area have refused to sign Special Use Permits for their cabin sites, have initiated major new construction, and in general have flaunted Refuge regulations. The set-netters attorney has told the Solicitor's Office to keep the Refuge staff off his clients' backs, the Solicitor's Office has informed us that without specific 22 (g) regulations we have no regulations on these lands. Regional Office guidance has consisted (for several years) of telling us to do the best we can without causing a major uproar. Although we have attempted to curb further construction on these sites our efforts have been thwarted. It appears that until we have implemented regulations pertaining specifically to 22 (g) lands, we can do virtually nothing to control development on these lands by anyone. We have been told for several years that these regulations will be developed "next year". We must have them now or we risk losing some of the best brown bear habitat on earth forever. The intent of Congress in ANCSA Section 22 (g) was to provide some continuing protection to these lands after conveyance. We are failing rather miserably.