KODIAK NATIONAL WILDLIFE REFUGE

Kodiak, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1985

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

REVIEW AND APPROVALS

U.S. Fish & Wildlife Service
1011 E. Tudor Road
Anchorage, Alaska 99503

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Refuge Manager — Date 12/5/86

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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 land 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 Land Conservation Act (ANILCA) of 1980 added approximately 50,000 acres of land on Afognak and Ban Islands to the Refuge, bringing the total acreage to approximately 1.865 million acres, of which approximately 310,000 acres are Native owned but subject to Refuge regulations per Alaska Native Claims Settlement Act (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), the 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 five species of Pacific salmon 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 of 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 species are abundant as well, including Sitka blacktail deer, red fox, beaver, river otter, tundra swan, many species of sea birds and, in offshore waters, many species of marine mammals.

Several major problems exist. One is that in recent years over 300,000 acres of the refuge's best wildlife habitat have been conveyed to Native Corporations under the provisions of the Alaska Native Claims Settlement Act. 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 60 commercial fishermen use refuge lands for shore bases to support fishing operations. Over fifty of these have cabins on refuge land and there is pressure to allow more cabins on refuge lands and major expansions of existing sites. 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 irrepairable damage to bear populations.

Refuge staffing is shown elsewhere in this report. The staff occupies a headquarters complex five miles from municipal Kodiak. The complex is 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.

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Phase one of Kodiak Fishery Management Plan completed. (D-2)

Interagency Fire Management Plan completed. (F-9)

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Public use on refuge increased to 20,700 visits. (H-1)

Mount Strickland dedicated. (J-3)

Kodiak hosts statewide annual meeting of the Audubon Society and the refuge held an evening program and get together.

The dedication and ceremonial unveiling of the Mt. Strickland plaque took place in July. (85-01) VB

B. CLIMATIC CONDITIONS

Table 1 presents a summary of weather conditions for Kodiak for 1985 (data from National Weather Service). The only weather recording station on Kodiak Island is the National Weather Service office at Kodiak State Airport, near the northeast tip of the island. Weather conditions vary greatly over the island because of exposure, aspect, and terrain. In general, easterly exposures (such as Kodiak State Airport) experience higher average precipitation and warmer average temperatures than westerly or northerly exposures.

There was a cold, late spring and summer which set back phenology two to three weeks. The alpine areas greened up later and use by brown bears was reduced. Fish runs into refuge streams were likewise delayed but were strong when they got going. Summer, what there was of it, was marginal at best. July's precipitation was 6.3 inches above normal. The refuge's berry crop was spotty and poor and bears stayed on streams feeding on salmon later than usual. Fall was dryer than normal and colder. December weather broke many records. There was record rainfall five days out of the month, it was the wettest December on record and the wettest month on record.

Table 1
1985 weather data summary-National Weather Service, Kodiak, Alaska

Month	Snowfall (in.)	Precip. (in.)	Precip. dept. from norm (in.)	Temperatures max F	Temperatures min F	Temperature dept. from norm
January	0.1	14.41	+6.12	48	22	+7.3
February	11.9	1.91	-4.38	51	- 1	-0.7
March	36.0	5.68	+1.62	49	20	+2.7
April	35.0	5.81	+0.97	46	9	+6.2
May	0.8	1.53	-6.20	57	29	-2.5
June	0	6.64	+3.27	68	33	-3.5
July	0	10.21	+6.30	73	40	-1.4
August	0	2.97	-2.24	69	42	-0.6
September	0	8.05	+0.45	73	33	+1.2
October	4.5	3.26	-6.73	57	13	-4.7
November	9.0	4.44	-2.23	44	7	-1.9
December	11.0	19.82	+13.54	46	14	+6.8
Total	108.3	84.73				

C. LAND ACQUISITION

3. Other

Approximately 285,000 acres of Native conveyed lands within the refuge were included in a proposed trade of Native lands within the boundaries of several Alaska refuges for oil and gas rights on the Arctic National Wildlife Refuge. The refuge staff was primarily involved in evaluating areas based on wildlife values, assessing the impact of 22 (g) on the value of land and furnishing logistics for U.S. Fish & Wildlife Service (USFWS) appraisers. Negotiations are presently in progress between the Service and the Native landowners. However, even if the parties involved can agree on land values, the exchange would have to be approved by Congress.

One permittee proposed a land trade of a patented parcel for his permitted site. Inspection of the two sites, (Rohrer's Bear Camp for a site on packers spit), by refuge staff revealed that the trade would not be advantageous to wildlife. Therefore, the proposal was not forwarded to Realty.

D. PLANNING

1. Master Plan

The Kodiak National Wildlife Refuge Comprehensive Conservation Plan (CCP) development absorbed huge amounts of staff time this year. It is estimated that all professional staff members devoted 10 to 25% of their work time toward this effort during 1985. The refuge staff and planning team described affected environments, developed and described management categories and, after much bloodletting, formulated four management alternatives for the refuge. Scenarios for each of the four management alternatives were written and the environmental consequences of implementing each of the alternatives were analyzed. An evaluation of alternatives led to the selection of the Service's preferred alternative (Alternative C).

Wilderness proposals for each alternative ranged from no wilderness (The existing situation - Alternative A) to all wilderness (Alternative D). The Service's preferred alternative in the public review Draft recommends 73% of the refuge for wilderness designation.

Highlights of the planning effort this year were:

- March 5 & 14 - Meetings with local representatives of several divisions of Alaska Department of Fish & Game (ADF&G).
- March 14 - Local public television program on Kodiak CCP process.
- March 15, 16 & 17 - Kodiak public meeting, workshops and open house.
- April 1, 3, 5 & 23 - Village meetings in Karluk, Akhiok, Larsen Bay and Old Harbor.
- June 5th - Presentation of Alternatives to Regional Director Gilmore and Regional Office (RO) staff.
- Late August - Agency Review Draft of CCP available.
- December 20th - Public Review Draft of CCP printed and distributed to about 1500 individuals, interest groups and agencies.

Refuge Manager Jay Bellinger conducted an informal session with Old Harbor residents to discuss the refuge comprehensive conservation planning process. (85-02) DM

The Public Review Draft of the CCP is a 291 page document (plus appendixes). Initial public reaction to the plan was primarily an expression of dismay at the length and complexity of the document. The public comment period for the plan will run until March 21, 1986 with meetings in

Kodiak, Anchorage and villages to be held from mid-January through early February.

2. Management Plan (Fisheries)

Phase one of the Kodiak Fishery Management Plan (FMP) was completed during 1985. The FMP is a stepdown plan from the Kodiak CCP. Phase one details the fishery resources of the refuge, human use and management history, the establishment of refuge fishery habitat management units and fishery issues and concerns of interest to both the State of Alaska and the FWS. In addition, phase one lists all the anadromous fish streams within each of the four refuge habitat management units and presents escapement data for all species of Pacific salmon plus steelhead found within these units for the years 1979 to 1984.

Phase one has been reviewed by the refuge staff, ADF&G Kodiak, and is currently being reviewed by Fishery Resources, RO, in Anchorage. The development of phase two of the plan will begin once the final alternative A, B, C or D in the Kodiak CCP is selected. Phase two of the FMP will delineate refuge based fishery resource management strategies to address the issues and concerns presented in phase one. Those strategies and objectives will focus on the conservation and protection of refuge based aquatic fishery resources and set the tone for management thrust on the refuge for the next five years.

5. Research and Investigations

Kodiak NR 85 - "Seasonal Migration and Movements of Kodiak Island Bald Eagles" (74530-82-01)

The bald eagle migration and movements study began in July 1982 with the placement of colored patagial markers on juvenile bald eagles from 11 nests in Uyak Bay and Karluk Lake. In 1983 and 1984 the same general marking area along the northwest (Shelikof Strait) side of Kodiak Island was utilized. Radio transmitters were used in conjunction with patagial flags on seven juveniles in 1983 and ten juveniles in 1984. Marking efforts were conducted from Kiluida Bay to Cape Alitak on the southeast side of Kodiak Island during July, 1985 (figure 1). Twenty-three fledglings from 15 nests were marked with colored patagial flags. Eleven of the 23 young eagles were also fitted with radio transmitters (table 2). The shift of marking effort may help identify differences in the movements of juvenile bald eagles fledged from different areas should they exist.

Three subadults and one adult bald eagle were captured in the Kodiak harbor area during March and April, 1985. All the birds were fitted with radio transmitters and the 3 subadults were also marked with patagial flags.

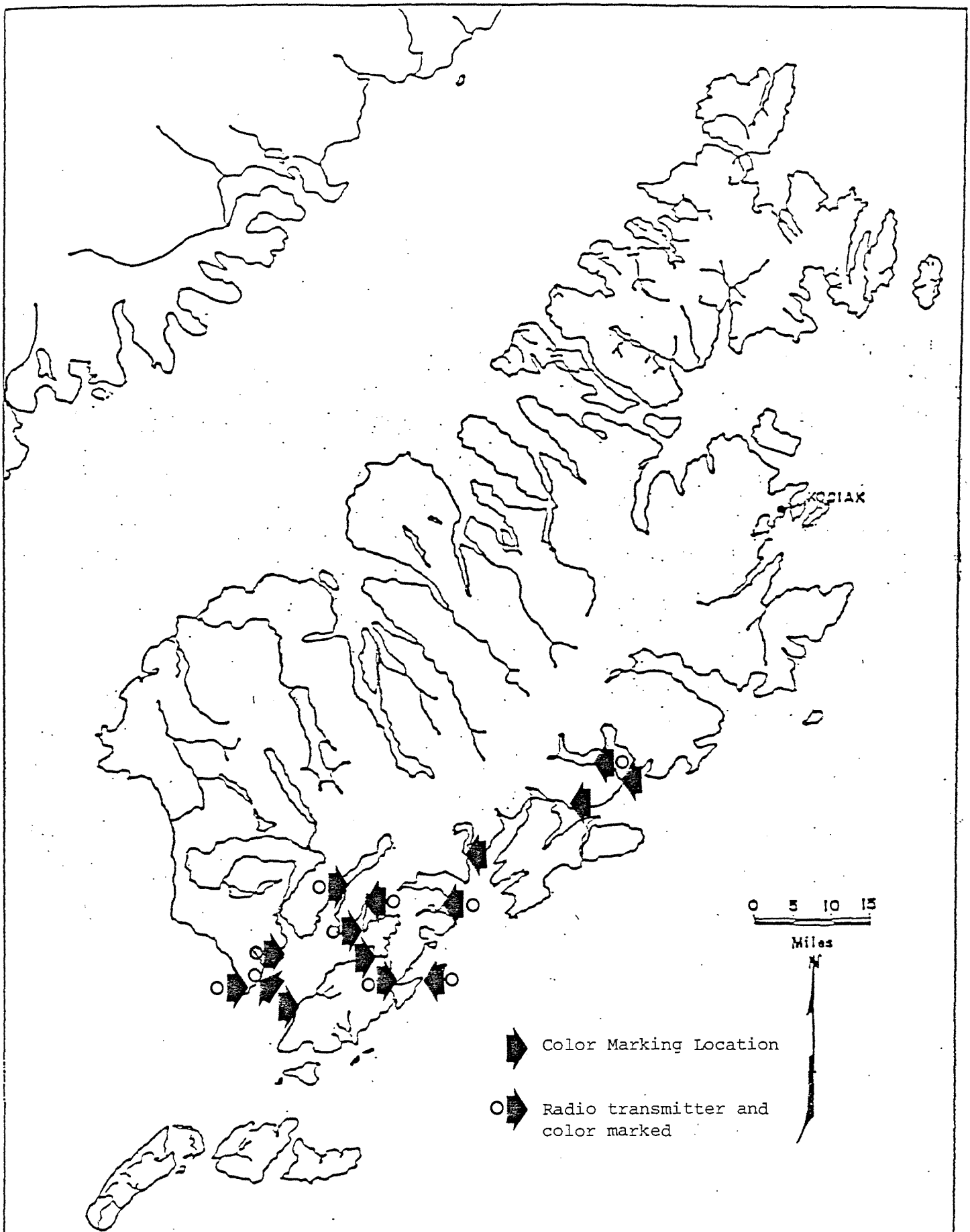


Figure 1 Locations of nests from which 1985 juvenile bald eagles were marked.

Table No. 2 Bald Eagle Color Marking Data 1985

Marking[1] Location	Date	Wing Marker[2] Code/Color	USFWS[3] Band #	Color Leg Band Code	Radio Freq.	Est. Age
Left Cape Kiluida Bay	7/11	K76/GR-L K76/YL-R	13590	K76	N/A	6 wks.
Left Cape Kiluida Bay	7/11	K77/GR-L K77/YL-R	13591	K77	N/A	6 wks.
Bush Pt. East Sitkalidak St.	7/11	K78/GR-L K78/YL-R	13592	K78	N/A	8 wks.
Three Saints Bay	7/12	K79/GR-L K79/YL-R	13593	K79	N/A	9 wks.
Kiavak Bay	7/12	K80/GR-L K80/YL-R	13594	K80	150.782	10 wks.
Cape Kaguyak	7/13	K81/GR-L K81/YL-R	13595	K81	N/A	10 wks.
Cape Kaguyak	7/13	K82/GR-L K82/YL-R	13596	K82	150.642	10 wks.
Kaguyak Bay	7/13	K83/GR-L K83/YL-R	13597	K83	N/A	8 wks.
Kaguyak Bay	7/13	K84/GR-L K84/YL-R	13598	K84	N/A	8 wks.
Ivor Cove	7/17	K85/GR-L K85/YL-R	13599	K85	150.652[4]	9 wks.
Sulua Bay	7/18	K86/GR-L K86/YL-R	13600	K86	150.662	10 wks.
Bert Pt. Sulua Bay	7/20	K87/GR-L K87/YL-R	13601	K87	150.672	10 wks.
Shag Bluff Alitak Bay	7/20	K88/GR-L K88/YL-R	13602	K88	N/A	7 wks.
Shag Bluff Alitak Bay	7/20	K89/GR-L K89/YL-R	13603	K89	N/A	7 wks.
Humpy Cove Alitak Bay	7/20	K90/GR-L K90/YL-R	13604	K90	N/A	6 wks.
Lazy Bay	7/20	K91/GR-L K91/YL-R	13605	K91	150.692	9 wks.
Lazy Bay	7/20	K92/GR-L K92/YL-R	13606	K92	N/A	9 wks.
Lazy Bay	7/20	K93/GR-L K93/YL-R	13607	K93	N/A	9 wks.
Akhiok Island	7/22	K94/GR-L K94/YL-R	13608	K94	150.802	11 wks.
Miller Island	7/22	K95/GR-L K95/YL-R	13609	K95	150.822	11 wks.
Miller Island	7/23	K96/GR-L K96/YL-R	13610	K96	150.841	11 wks.
Kiluida Bay	7/23	K97/GR-L K97/YL-R	13611	K97	150.862	12 wks.
Kiluida Bay	7/23	K98/GR-L K98/YL-R	13612	K98	150.882	12 wks.

[1] - Approximate locations of nest sites are shown on Figure 2.

[2] - GR = green; L = left; YL = yellow; R = right.

[3] - The band prefix 629 is followed by the reported USFWS band number.

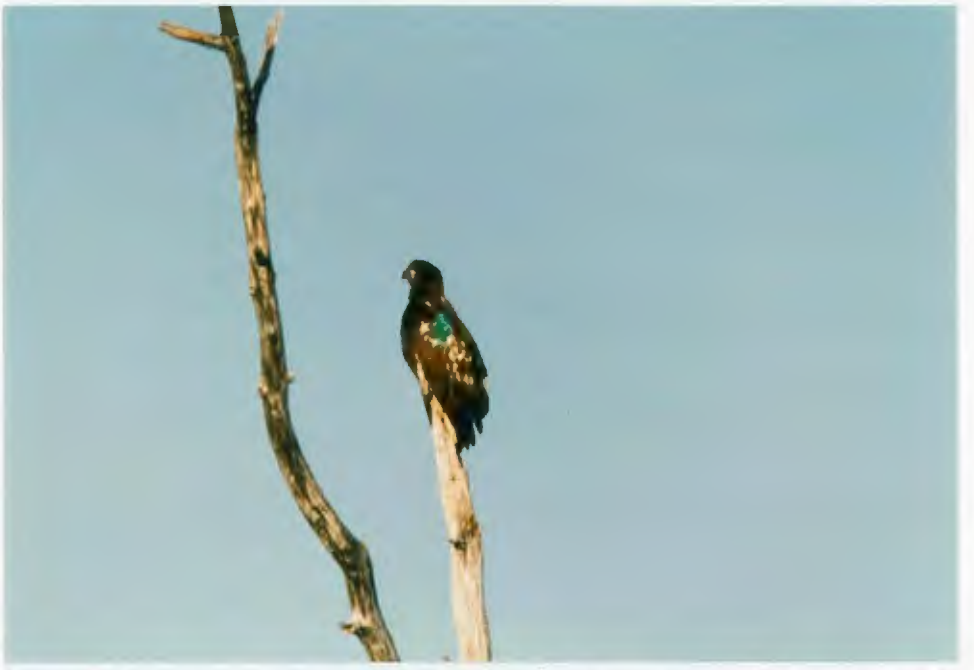
[4] - K85's radio transmitter was recovered on 10/2/85 approximately 100 yards from the marking (nest) site.

Since July of 1982, 105 immature bald eagles on the Kodiak NWR have been color marked with patagial flags. Thirty-one of the 105 were also radio tagged. Ninety-nine visual observations and over 330 radio locations have been made since initiation of the study. Movements of Kodiak Island juvenile bald eagles have been primarily within the Kodiak Archipelago. However, movements to and from the Kenai Peninsula across Shelikof Strait have been documented. Data to date suggest that the majority of bald eagles on Kodiak Island are part of a resident population. Wintering on Kodiak Island by some mainland bald eagles also occurs. Social and foraging behavior described in research from other bald eagle wintering areas such as Noosack River in northern Washington state also exists on Kodiak Island.

Bald eagle productivity overall was down in 1985. This nest on the southwestern tip (Cape Alitak) of Kodiak Island was the exception, producing 3 fledglings. (85-03) DZ

Bald eagle nesting habitat on the east side of Kodiak favors ground nests such as this nest on Cape Kaguyak. (85-04) DZ

Eagle K63 was marked as a fledgling in July, 1984 in Spiridon Bay on the west side of Kodiak Island. The eagle was next observed in January, 1985 near the city of Kodiak and was photographed here on the Homer spit April 30, 1985 by Jean Keane. (85-05)



K63 again returned to Kodiak during the fall of 1985. The bird was photographed in late November in Kalsin Bay and was seen well into winter in the same vicinity. (85-06) DZ

Kodiak NR 85 - "Raptor Observations Associated with Terror Lake Hydroelectric Project" (74530-82-02)

Table 3. Summary of raptor nesting surveys within Terror Lake hydroelectric project area

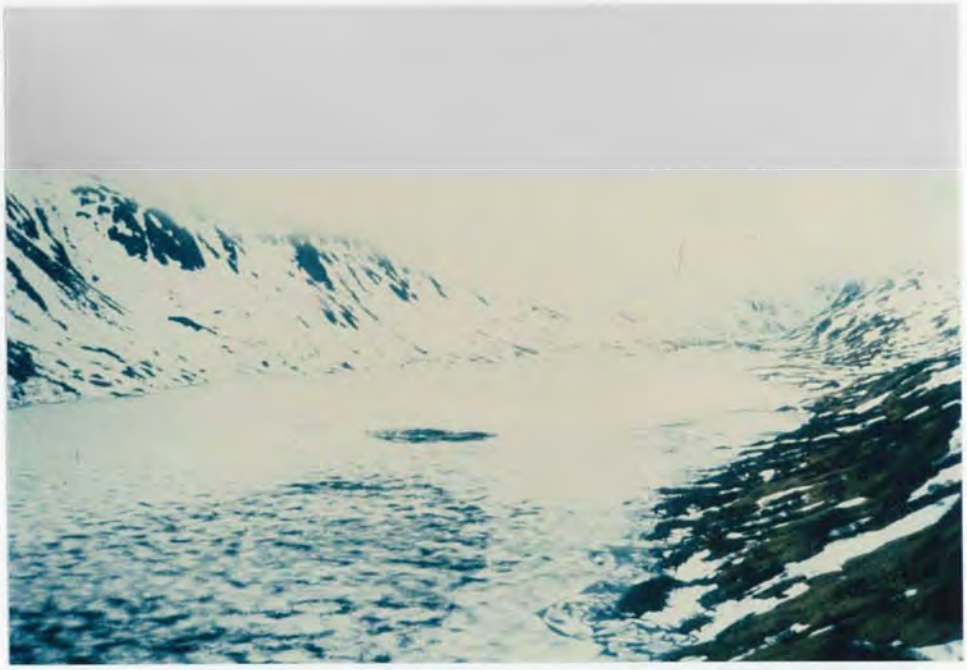
		Survey Sectors		
		sector 1	sector 2	sector 3
	Year	Bald Eagle	Bald Eagle	Rough-legged Hawk
No. of Nests (Active/Total)	1980	6/12	2/3	3/3
	1982	7/11	2/3	1/3
	1983	6/15	1/2	0/3
	1984	8/13	2/3	1/4
	1985	10/14	4/4	4/5
Average No. of yg./ Active Nest	1980	2.0	0.0	2.0
	1982	1.6	2.0	2.0
	1983	1.7	1.0	0.0
	1984	1.6	1.0	2.0
	1985	0.8	0.3	1.3

Survey Sector 1 - Kizhuyak Bay

The number of active bald eagle nests located in sector 1 during 1985 increased by two nests over 1984 (Table 3). The total number of nest trees in sector 1 increased from 13 to 14. During 1985, mean bald eagle productivity in this sector was less than 50% of previous survey years. Of the ten active nests, two nests produced two eaglets each, four nests produced one eaglet each, while the remaining four nests failed to fledge any young eagles. An unusually cold late spring caused reduced or complete reproductive failure in many of Kodiak's bird species including bald eagles.

Survey Sector 2 - Terror River and Upper Terror Bay

The total number of bald eagle nest platforms increased from three platforms to four in survey sector 2 during 1985. Since 1980 there has been at least one active nest in Terror Bay but this increased to two in 1985. The only bald eagle nest territory to successfully produce young in this sector during 1985, however, was the historic nest along the lower Terror River which fledged a single young. The low productivity in this sector is likely weather related as was hypothesized for sector 1. As was also the case with sector 1, a poor pink salmon escapement into the Terror River was also likely a contributing factor.



Snow cover, fog and ice conditions in Terror Lake survey sector 3 during initial rough-legged nest survey June 25, 1985. (85-07) DZ

Nest No. 3 located in the center of this cliff near the end of Terror Lake dam. This type of cliff habitat occurs at Nest No. 4 also. (85-08) DZ

Nest No. 4 is located near the shelf on the right side of the cliff approximately midway from the top. Note the snow cover still present in early August. (85-09) DZ

Close-up of nest No. 4 containing 2 young rough-legged hawks. This was the only nest to produce two young during the 1985 nesting season. (85-10) DZ

Nest No. 1 shows the stream or ravine cut habitat which also occurs at nest No. 2. (85-11) DZ

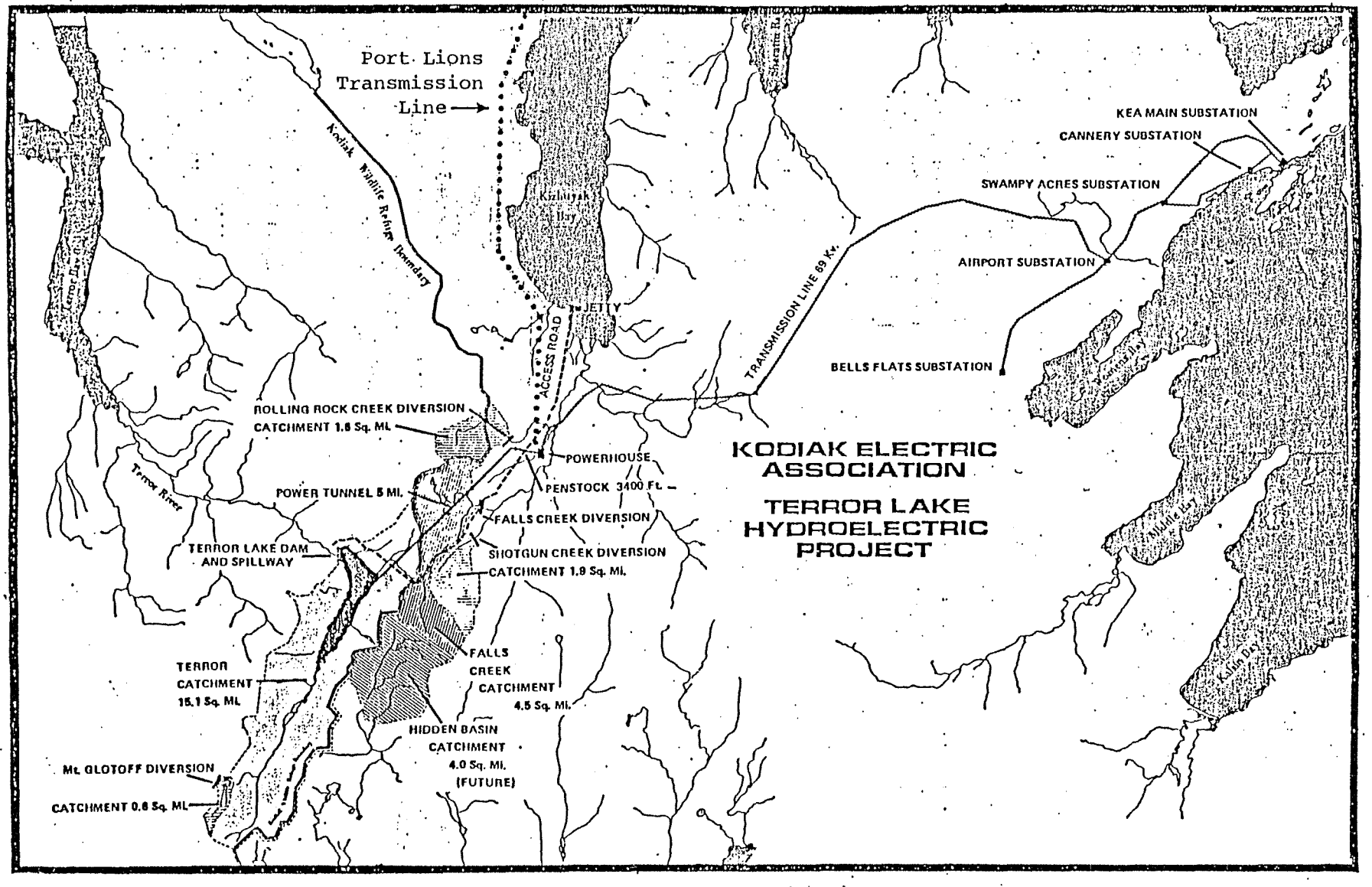


Figure 2. Terror Lake hydroelectric project study area.

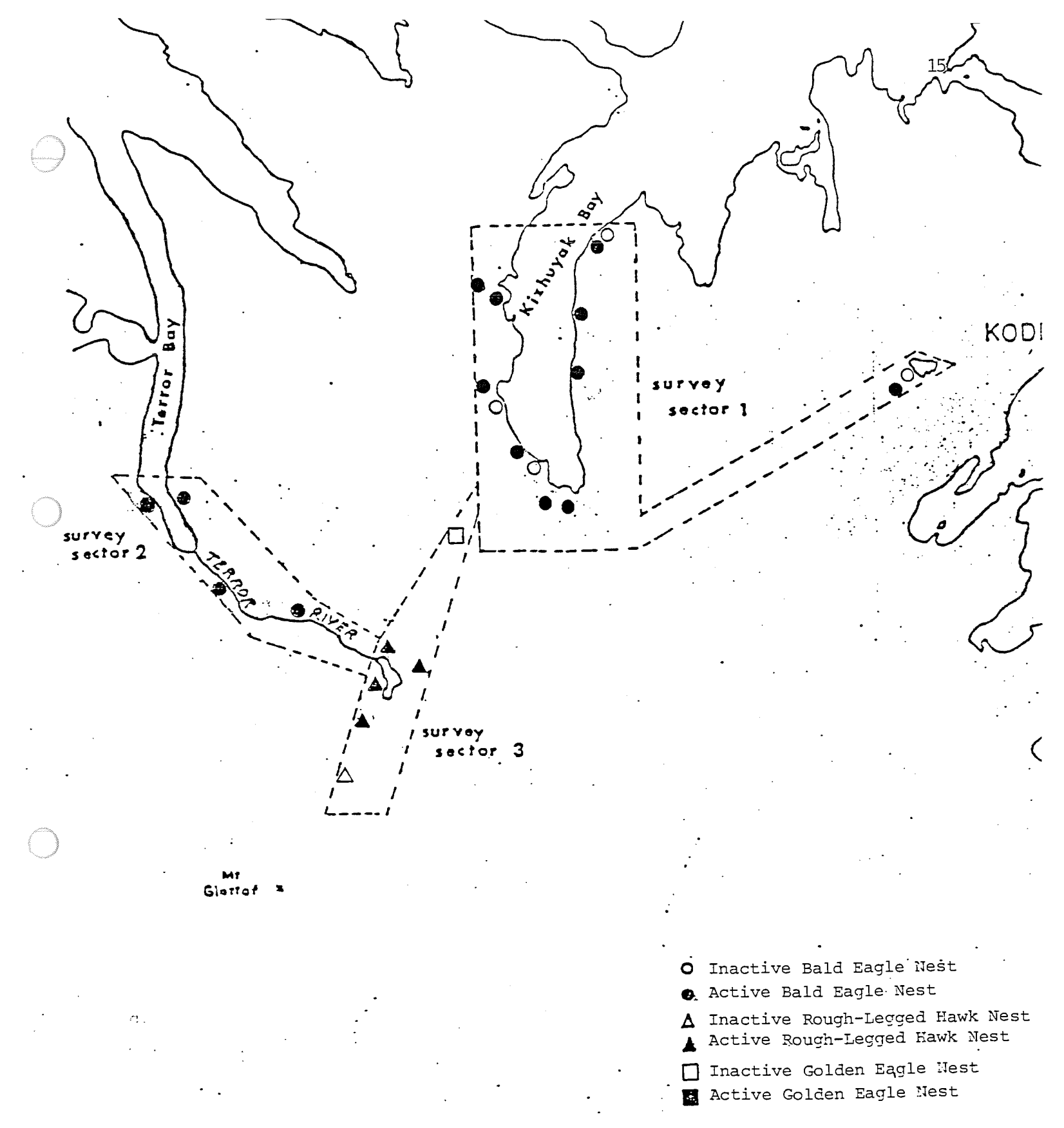


Figure 3. 1985 TLHP raptor nest locations and status.

Close-up of nest No. 1 containing young rough-legged hawk. Note the unhatched egg near the front of the nest. (85-12) DZ

Survey Sector 3 - Terror Lake

There are no bald eagle nest sites in survey sector 3. One inactive and four active rough-legged hawk nest sites were located during the survey. These were found in locations which have had rough-legged hawk nesting activity in past years (Figure 3). The increased nesting attempts by rough-legged hawks noted during 1984 continued in 1985. Average productivity per active nest however, decreased in 1985 as three nests produced a single young each and only one nest was able to match the historic production average of two young per active nest (Table 3). Two of the nests which contained a single young also had an unhatched egg in each nest. In 1980, the only other year since the study began in which more than one rough-legged hawk nest was active, two of the three active nests had young which failed to fledge or eggs which did not hatch. Other researchers have discovered that over the majority of its breeding range, rough-legged hawk productivity is directly dependent on cyclic rodent populations. Nesting density and productivity in these areas flucuate naturally according to prey availability and abundance. It is likely, with the exception of direct construction disturbance while the dam was being built, that this is also the mechanism responsible for the variance of rough-legged nesting success and productivity seen within the TLHP area since the start of the present study.

Daily activity patterns and food habits of the four rough-legged hawk nests active in the TLHP area during 1985 were recorded at each nest for the daylight hours of one and one half days during the period July 30 to August 2. Ninety percent of the observed food items brought to the nest were tundra voles (Microtus oeconomus is the only rodent naturally occurring on Kodiak Is.) while avian species made up the remaining ten percent. The daily activity patterns and behavior exhibited by the four observed pairs of rough-legged hawks was similar to behavior described by other studies.

Kodiak NR 85 - "Investigations of the Instream Distribution and Movement of Karluk River Steelhead Trout" (74530-83-01)

Field work for this study was completed in 1984 and is a result of work started in the Fall of 1982. The project, in addition to determining movement and instream distribution, was also done to determine the susceptibility of Karluk River steelhead to in-river sport and subsistence fisheries. Radio tags were implanted surgically in captured fish and movements were tracked from aircraft from September to July of each year during the study.

Final data analysis was completed in 1985 and a paper was presented at the annual meeting of the Alaska Chapter of the American Fisheries Society in Kodiak, in November 1985.

Data locations from aerial tracking were plotted with respect to river mile and time. Five habitat types were delineated within the Karluk Lagoon, Lake and mainstem river (Table 4) and locations of fish through time were assigned to the various habitat types. A chi square analysis indicated a significant difference between habitat use during both years, but no significant difference between years was detected for locations plotted on the mainstem Karluk River only. Since the lagoon area was utilized only as a transitional area by adults entering the Karluk and only 20 percent of the adults tagged during both years utilized Karluk Lake at one time or another, data analysis was confined to the Karluk mainstem.

Results of the data analysis indicate that major over-wintering areas utilized by steelhead occurred in deep glide habitat from river mile 15.5 to 21.0 during late November through April (figure 4). Although spawning occurred in all sections of the mainstem river during May, the major spawning location was identified as pool/riffle habitat (figure 4) between river mile 5.5 and 7.5 in the lower river, off the refuge (figures 4, 5).

The estimated survival rate (overwintering and spawning) for combined data from both years is 45%. Utilizing a 45% survival rate and kelt counts (down migrant adults returning to the ocean) in May and June, the 1975 to 1983 run size

Table 4. Aquatic habitat classification matrix for the Karluk River, Lake and Lagoon based on general physical characteristics.

Habitat Classification Number	Habitat type	Physical description	Habitat sections by river mile
H_0	Lagoon	Intertidal Area	0.00 - 3.0
H_1	Riffle	Continuous section(s) of shallow (1-2 foot depth) fast flowing water where greater than 80 percent of water surface broken into waves by bed material which is wholly or partially submerged. Bottom composition is estimated to be equal to or greater than 80 percent gravel, cobble or boulder.	3.00 - 5.50 7.50 - 114.50 18.50 - 20.50 21.50 - 24.50
H_2	Shallow Glide	Continuous section(s) of shallow (2-4 foot depth) flowing water (slow to fast) where less than 20 percent of surface area is broken by bed material. Bottom composition is estimated to be equal to or less than 20 percent gravel, cobble or boulder.	17.00 - 17.50 18.50 - 20.50
H_3	Deep Glide	Continuous section(s) of deep (4-10 foot depth) of flowing water (slow to fast) where less than 20 percent of surface area is broken by bed material. Bottom composition is estimated to be equal to or less than 20 percent gravel, cobble or boulder.	15.50 - 17.00 17.50 - 18.50 20.50 - 21.00

Table 4. Continued.

Habitat Classification Number	Habitat type	Physical description	Habitat sections by river mile
H_4	Pool 1 Riffle	Continuous section(s) of variable depth slowing water (1-10 foot depth) with a pool-riffle ratio of approximately 20/80 and a succession of pools and riffles is evident. Bottom composition is estimated to be equal to or greater than 80 percent gravel, cobble or boulder.	5.50 - 7.50 14.50 - 15.50 21.00 - 23.00
H_5	Lake	Lake and Lake outlet prior to construction of river banks. Includes all littoral and pelagic area of Lake.	Lake

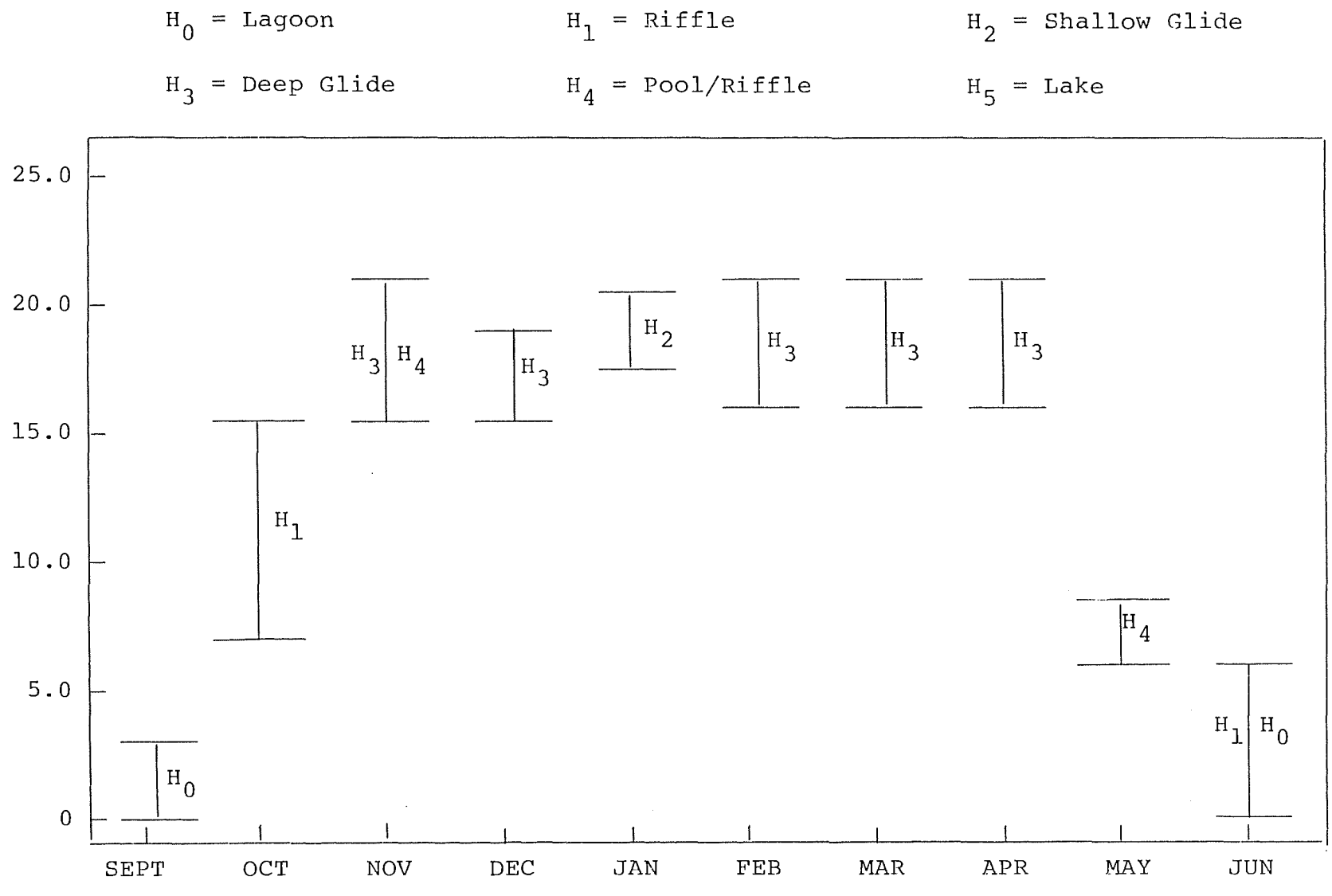


Figure 4. Upper and lower river mile boundaries and habitat types (H_n) where approximately 50 percent of radio tagged Karluk River steelhead were located, September through June, 1982 to 1984.

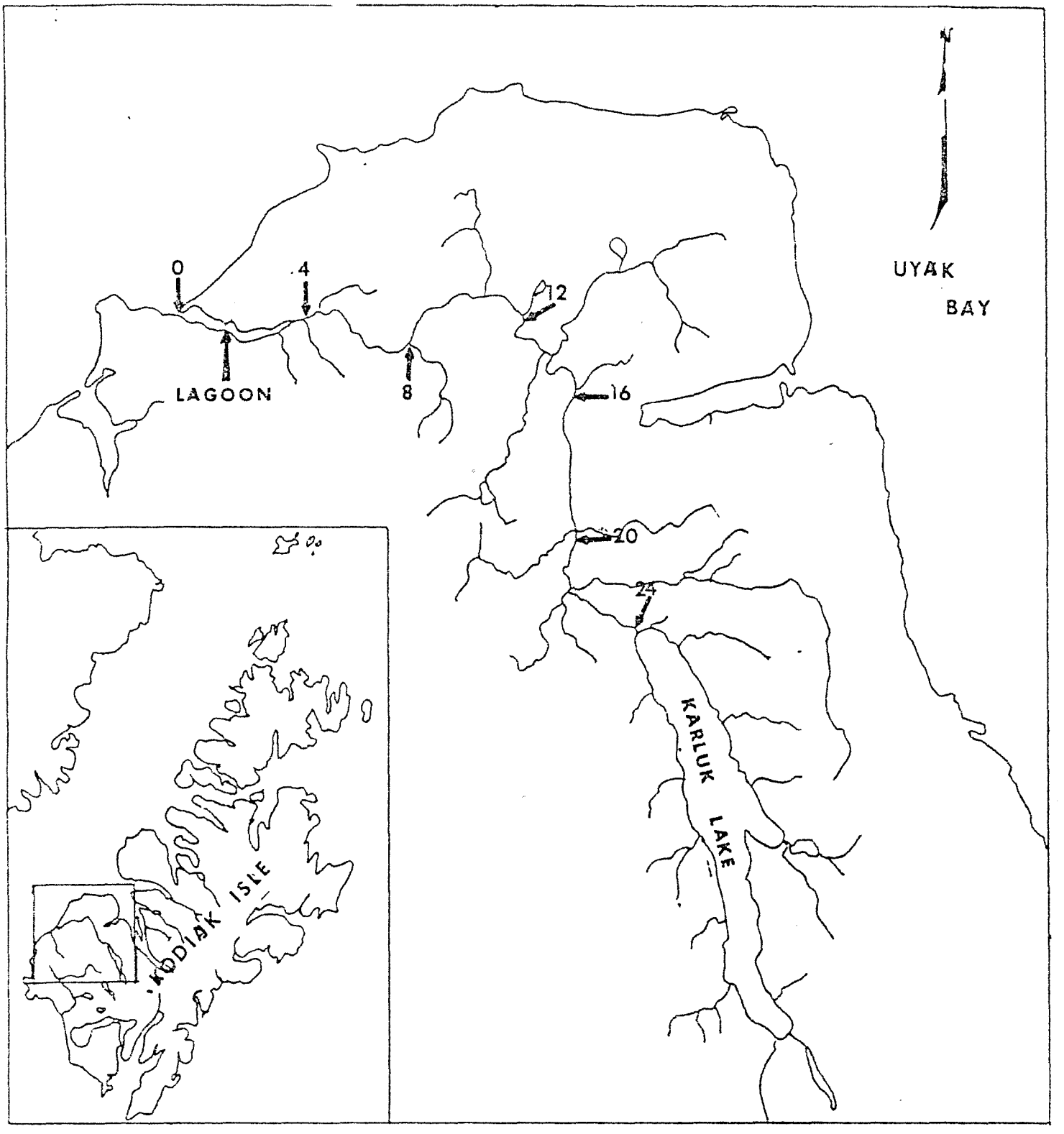


Figure 5. Karluk River drainage, southwest Kodiak Island, arrows depict river miles upstream from mouth of Karluk Lagoon.

estimates for Karluk steelhead ranged from 2,000 to 9,300 adults with a mean of 4,500 fish (figure 6).

The greatest impact from the Karluk River sport fishery could occur from November to December between river mile 15.0 and 17.0. In addition, the greatest impact from the subsistence fishery could occur from November through April between river mile 15.0 and 17.0.

The results of this study will enable the refuge to utilize this data in its FMP to ensure protection of critical overwintering and spawning habitat for Karluk River steelhead. In addition a monitoring program in conjunction with Native landowners and ADF&G should be established to ensure that during low return years (i.e. 1979, figure 6) the sport and subsistence impact on this species is minimized.

Kodiak NR 85 - "Steelhead Trout Movements and Habitat Use in the Ayakulik/Red River System Southwest Kodiak Island" (74530-84-01)

This study was initiated in October, 1984, to map and characterize critical overwintering and spawning habitat of adult steelhead and to locate critical rearing habitat of juvenile steelhead. In addition, movement patterns of adult steelhead are being characterized in order to identify locations where major sport fishing is likely to occur and the susceptibility of adults to be caught at these locations.

This study was initiated because: (1) The Ayakulik/Red River steelhead are an extremely valuable refuge resource and there is no information regarding instream distribution, population dynamics, or critical habitat; and (2) since movement and positioning are unknown, the degree and extent these fish are susceptible to an in-river sport fishery must be identified for proper management alternatives.

Although tagging efforts on the Ayakulik were initiated in the Fall of 1984 only two steelhead were successfully captured for tagging. Subsequent aerial tracking was discontinued after December, 1984 since one fish moved back down to the lagoon and expired and the cost benefit did not warrant continued aerial tracking for the remaining tagged fish after December, 1985. Tagging efforts in the Fall of 1985 were much more successful and a total of 13 adult steelhead was captured. Tagging technique in 1985 was modified and the transmitters were inserted esophageally into the anterior portion of the stomach. Subsequent tracking data indicate that as of December 1985, 12 of the tagged fish were located between river mile 9.0 and 14.5 on the mainstem river and 1 of the fish was in Red Lake. Movement of these fish will be tracked until late June, 1986 when at that time most of the tagged fish are expected to have completed spawning and moved downstream to the ocean.

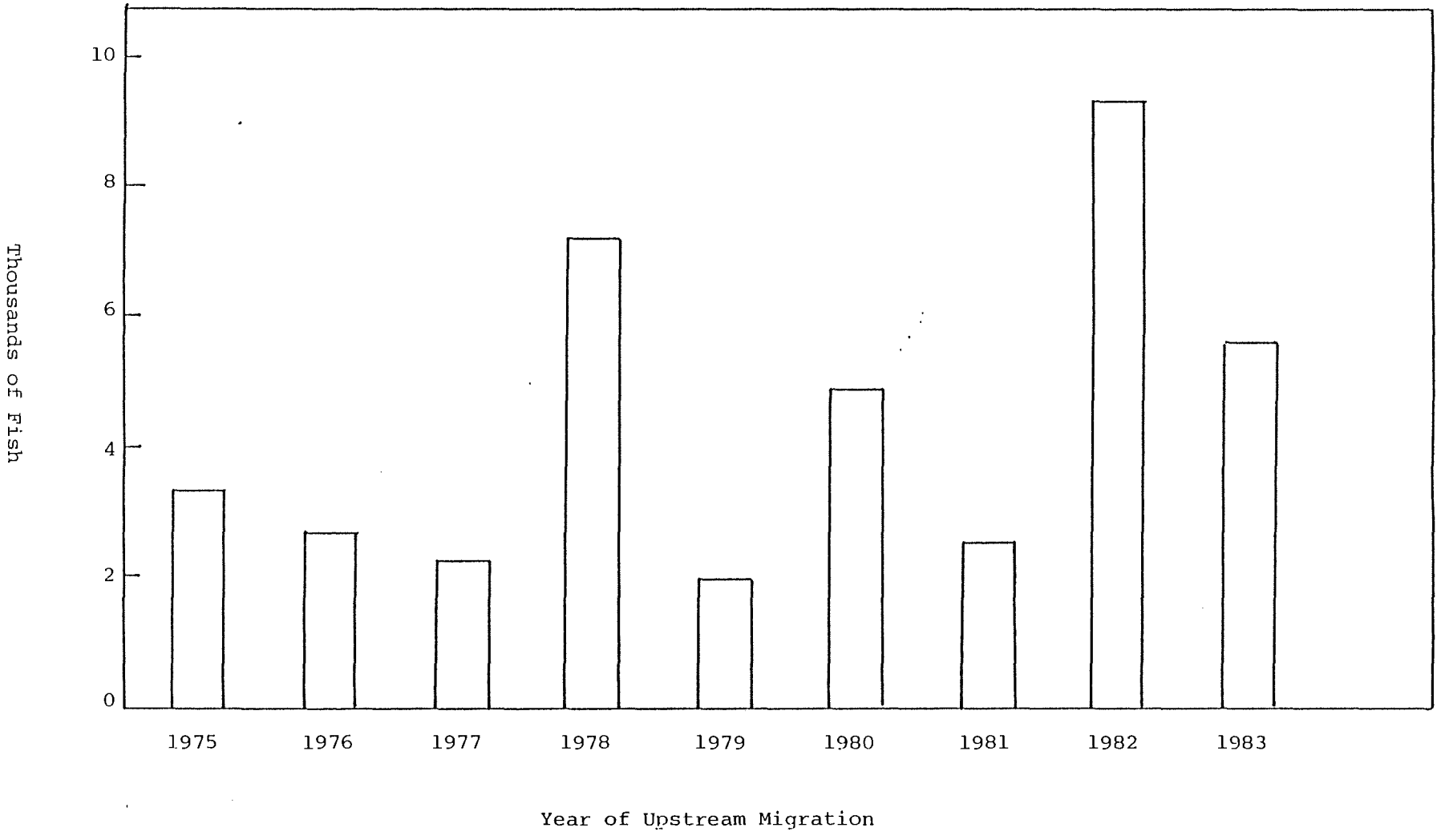


Figure 6. Estimated populations of Karluk River steelhead, 1975-1983, based on 45 percent over winter and spawning survival rate as observed in radio tagged steelhead, Karluk River, 1982-84.

Transmitters were inserted esophageally into anterior portion of stomach on Ayakulik steelhead trout. (85-13) TC

Kodiak NR 85 - "Chinook Salmon Movements and Habitat Use in the Ayakulik/Red River System Southwest Kodiak Island" (74530-85-02)

This study was planned to be initiated in late May 1985 with the objectives of mapping and characterizing critical spawning habitat of chinook salmon, and to determine timing of these fish through the sport fishery on the Ayakulik River. Due to the accelerated Refuge CCP process in late May and June 1985, the project was delayed until FY 1986. Start up is anticipated for late May 1986 when adults entering the Ayakulik River at the lagoon will be instrumented in cooperation with ADF&G personnel at the fish wier and subsequent movements tracked through September 1986.

Kodiak NR 85 - "Karluk Lake Sockeye Salmon Studies" (FWS 81410-02) (ADF&G)

This study is a cooperative effort being conducted by the ADF&G, the refuge and the FWS Seattle National Fisheries Research Center [SNFRC - Now Alaska Office of Fish & Wildlife Research (AOFWR)]. The major goal of the project is to determine the reasons for the low level productivity of Karluk sockeye and to restore annual spawner returns from current levels of approximately 300 to 500 thousand to 800 thousand plus spawners in the system. Basically ADF&G is conducting sockeye culture and evaluation studies plus

hydroacoustic and limnological surveys of Karluk Lake. The FWS, through AOFWR-Anchorage, is conducting competition and prey studies within the system, and sockeye smolt emigration studies.

Overall project results for 1985 are summarized below:

Alaska Office of Fish and Wildlife Research (Fish)

Genetic sampling for Karluk sockeye was completed. This is the 5th and final year for genetic samples at Karluk. Indications are that there is a difference between the early and late run components but no detectible difference between components within either the early or late runs.

Estimates of the 1985 sockeye smolt outmigration range from 500,000 based on an overall percent recovery of marked fish to 3.0 million based on a moving average. Very little confidence is placed in these estimates and subsequent smolt enumeration in 1986 will be based on hydroacoustic analysis in the lake and an index trap operated at the adult fish wier in the Karluk Lagoon. In 1985 a low head sandbag dam was constructed on the O'Malley River (a terminal stream in Karluk Lake) to block the stickleback migration into O'Malley Lake, in order to assess the changes in stickleback-juvenile sockeye interactions within O'Malley Lake. This project will continue during 1986. In addition, the stomach contents of 740 juvenile coho salmon were examined to determine predation by coho on juvenile sockeye fry. Stomach contents of charr were also examined for fry consumption.

Alaska Department of Fish and Game

The 1985 adult sockeye escapement of 995,000+ was well distributed over the season and met the escapement goal. This is the best escapement since 1937. The catch, estimated at 145,500 was 12.9% of the 1,129,000 return. Karluk sockeye contributed 7.9% of the Kodiak harvest of 1.8 million sockeye salmon.

Escapement age composition, projected from a sample, was primarily (63.1%) 5 year old (2.2) fish from the 1980 brood year. A high percentage (10.9%) of Jacks (2.1 and 3.1) is noteworthy and might indicate strong returns of age 2.2 and 3.2 fish in 1986.

Approximately 5.7 million sockeye fry were enumerated migrating from the Upper Thumb River egg plant project sites, from April to May 1986. Of these 2.5% or 141,000 fry were tagged with half-length coded wire tags. Eighteen million sockeye eyed-eggs were planted in the Upper Thumb River during the Fall of 1986. Evaluation of this egg plant will occur during the Spring of 1986.

The final year for limnological analysis of Karluk Lake and hydroacoustic analysis was 1985. The results of this study indicate lake fertilization may be recommended to synchronize zooplankton food abundance with fry recruitment into the lake.

Kodiak NR 85 - "Alaska Department of Fish and Game Monitoring Program to Assess Project Effects During Construction and Operation of the Terror Lake Project on Salmon Egg and Fry Survival, and Trends in Salmon Escapement, Magnitude and Distribution" (ADF&G) (74530-82-05)

This study was initiated by ADF&G in 1982 due to the development of the Terror Lake Hydroelectric Project (TLHP) on Kodiak Island. The purpose of the study is to assess the magnitude of change, if any, in pink and chum salmon populations utilizing the Terror and Kizhuyak Rivers. The length of the study is three years during construction and three years post-construction.

A progress report for work done in 1983 was completed in March, 1984. Basic objectives so far have been to build a data base from fry and egg deposition sampling and observations on escapement magnitude and distribution. A progress report for work done in 1984 was to be available March, 1985, but to date has not been received.

Kodiak NR 85 - "Investigation of Habitat Use and Evaluation of Aerial Surveys of Brown Bear in Southwest Kodiak Island" (74530-83-02)

The following summarizes progress and third year (1985) results of a 6 year cooperative study involving the Denver Wildlife Research Center [DWRC - Now Alaska Office of Fish and Wildlife Research (AOFWR)] and the Kodiak NWR. A more thorough progress report is in preparation.

Thirty-five radio-collared brown bears were monitored all or part of 1985 and additional data were acquired for other marked bears that either were not radio equipped or carried inoperative radio-collars. Approximately 1,025 relocations of marked bears were recorded during the year. In late June, ten adult females originally captured in 1983 were recaptured and fitted with new radio collars, 6 adult females were captured and radio equipped for the first time, and 3 juveniles (1 cub, 1 yearling, 1 2-yr-old) were captured, ear-tagged, and tattooed. In 3 years of study 87 bears have been captured 97 times; 42 adult females have been radio-collared, including 27 bears that still carried operative radios at the end of 1985.

Study animals departed winter dens from late March until late June, with nearly 60% exiting dens from mid-April to mid-May. Females with cubs were the last to leave den sites; 6 of 7 departed den sites after May 20. Movement of bears from midland and upland denning areas to lowland

habitat appeared somewhat delayed in 1985. This was probably caused by a low availability of early spring forage. Emergence of vegetation this spring was 2 to 3 weeks later than in 1984 because of below average temperatures and above average snowfall. By early June the spring green-up was in full progress and bear use of lower elevations was increasing.

From June through August almost 65% of bear relocations were in lowland habitat. A major factor contributing to high use of lowlands was the availability of spawning salmon. Bear use of salmon streams, as indicated by frequency of marked bear sightings along streams and movement between streams, was greater in 1985 than 1984. Below average spring forage and a relatively poor berry crop may have contributed to this pattern.

Lowland and midland habitats were equally important to bears in the September to December period (51 and 45% of relocations, respectively). Forage that was obviously important to bears during that period included elder berries in midslope brush fields, coho salmon in the Ayakulik River, Sturgeon River, Karluk River and Akalura Lake drainage systems and sockeye salmon along the shores of Karluk Lake.

The Research/Refuge study has produced over 1,700 relocations of marked bears and has provided a strong information base on habitat use, movements, and population ecology. 6/84 (85-14) VB

No. 20, a 13-year-old female, is one of five study animals that have succumbed to natural mortality. Fighting with another bear has been strongly indicated as cause of death in three cases. 6/85 (85-15) VB

Radio-collared bears began entering winter dens in late October but 5 (19%) of 27 bears had not begun denning by December 24. Nearly 45% of the bears initiated winter denning between November 25 and December 24.

Aerial stream surveys flown during July and August provided a good accounting of bear movement between survey routes as well as observability of individually marked bears. Several animals were sighted on two different survey routes and one female with a yearling was sighted on 3 of the 5 routes.

Seven of 8 bears that were single in 1984 produced cub litters in 1985. There were 4 litters each with 3 cubs and one litter each of 1, 2 and 4 cubs. Seven (37%) of 19 cubs were apparent mortalities by the end of the year. Eleven females weaned juveniles in spring, 1985. Of known-age litters, family break-up occurred at 3.3 and 2.3 years for 7 and 3 litters, respectively.

Four adult or subadult marked bears were recorded as mortalities in 1985. Female K20 (13 years old) died in late May, apparently from natural causes, and orphaned 2 yearlings. Bear 782 (17 years old) succumbed in late September from wounds that were undoubtedly inflicted by another bear. Evidence at the kill site suggested that her 2-year-old juvenile (No. 783) also may have been killed. Two subadult bears, a 4-year-old female (K26) and a

3-year-old male (748), were taken by sport hunters in May, 1985.

Rumors that insects are a minor problem on Kodiak may be exaggerated - they could have an important effect on accuracy of bear measurements. 7/85 (85-16) DM

Kodiak NR 85 - "Impacts of Construction and Post-construction Operation of the Terror Lake Hydroelectric Project on Brown Bears (Ursus arctos)" (74530-82-03)

The Terror Lake brown bear study is being conducted by the ADF&G under contract to the Alaska Power Authority (APA). The following paragraphs are taken verbatim from the summary of findings in the 1985 progress report (Smith, R.B. and L.J. Van Daele. 1986. Terror Lake Hydroelectric Project Report on Brown Bear Studies, 1985. 39pp).

This report covers the results of the 4th year (1985) of a 5-year investigation of the impacts of the Terror Lake hydroelectric project on brown bears. The operational phase of the hydroelectric project began in 1985.

Twenty brown bears were captured (12 recaptures, 8 new captures) in 1985. One hundred thirty-three bears have been captured during the study and radio-collars have been placed on 77 bears (29 males, 48 females).

Reproduction data were collected for 35 females in 1985. Nine females were single: 10 had newborn cubs; 13 had yearling cubs; 2 had 2.5 year old cubs; and 1 had 3.5 year old cubs. Age of parturition in 1985 ranged from 9.5 to 23.5 years. Mean litter size in 1985 was 2.9. Survival of

newborn cubs into the denning period was estimated at 79%. Survival of cubs born in 1984 to the 1985 denning period was estimated at 66%.

Eleven marked bears (7 males, 4 females) died in 1985. Four females died of natural causes. Cumulative mortality (1982 to 1985) of marked bears was 26 (16 males, 10 females). Sport harvest was the most common source of mortality (46%).

An unusually cold, late spring and early summer resulted in late initial green-up, retarded vegetative development and poor berry crops in 1985. Habitat use by bears was influenced by the state of vegetative development through late July. Alpine feeding was not extensive until late July, about 3 weeks later than usual. Salmon was a more important food source in 1985 than in previous years. Salmon escapement was high in the study area in 1985 except in the Barabara Lake system where no spawning of sockeye salmon (Oncorynchus nerka) was observed.

The incidence of bear/human encounters was unusually high in 1985, possibly the result of reduced natural foods. Deer hunters reported numerous incidents of nuisance brown bears in hunting camps and a high incidence of bears was reported near the village of Port Lions.

Denning activities of 35 radio-collared bears were monitored throughout the 1984-85 denning period. Denning periods ranged from 0 to 256 days. Two males did not den. Females with newborn cubs had the longest denning periods. Bears began entering 1985-86 dens by November 1, 1985. Unusually warm and rainy weather in December 1985 may have been a factor in the movement of 9 bears to second den sites between November 17, 1985 and January 6, 1986. Distribution and characteristics of 1985-86 dens were similar to those noted in previous years. Bears continued to exhibit a high degree of fidelity for previously used denning areas.

Movements data were collected for 48 radio-collared bears in 1985. Thirty-seven radio-collared bears were still being monitored at the end of 1985. Analysis of bear movements during the 2-year post-construction phase (1985, 1986) will be presented in the final report. Analysis of construction impacts will also be presented in the final report.

Gentle topography and relatively open slopes along the East Fork of Ayakulik River are representative of the FWS study area in southwest Kodiak Island. 7/83 (85-17) VB

Dense brush and steep slopes at the head of Terror Bay typify the ADF&G study area in northern Kodiak Island. 7/85 (85-18) VB

E. ADMINISTRATION

1. Personnel

Left to right; back row: 6, 3, 2, 7
middle row: 12, 8, 10, 4
front row: 11

Personnel

1. Jay R. Bellinger, Refuge Manager, GS-12, PFT
2. Kevin Ryan, Assistant Refuge Manager, GS-11, PFT
3. Michael T. Vivion, Wildlife Biologist/Pilot, GS-12, PFT
4. Donald A. Chatto, Fisheries Biologist/Pilot, GS-12, PFT
5. Dennis Zwiefelhofer, Wildlife Biologist/Boat Operator, GS-9, PFT
6. David W. Menke, Outdoor Recreation Planner, GS-9, PFT
7. Ronny D. Bowers, Maintenance Mechanic, WG-9, PFT
8. Geraldine M. Castonguay, Refuge Clerk, GS-5, PFT
9. Judy K. Tomberlin, Clerk-Typist, GS-3, Separated 8/17/85, PFT
10. Evangeline Lamb, Clerk-Typist, GS-3, EOD 10/28/85, PFT
11. Rasmus G. Anderson, Laborer, WG-2, PPT

Alaska Office of Fish and Wildlife Research

12. Victor G. Barnes, Jr., Wildlife Biologist (Research), GS-12, PFT

Youth Conservation Corps

13. Derek Artherton, EOD 6/22/85, Separated 8/17/85

14. Jaycene Reyes, EOD 6/22/85, Separated 8/31/85

Volunteers

15. Eric L. Connell, EOD 1/7/85, separated 4/12/85

16. Greg DeBella, EOD 6/15/85, separated 8/26/85

17. Scott Wilbor, EOD 6/3/85, separated 8/24/85

Left to Right; 17, 16, 13

Judy Tomberlin separated in August to accept a higher paying position with the U.S. Coast Guard. Evangeline Lamb was hired to fill the Clerk-Typist position in October.

Tony Chatto completed his training and became fully qualified for the pilot section of his job. Tony was promoted to GS-12 on October 27, 1985.

Table 5 compares on board strength for the last five years.

Table 5
Staffing 1981-1985

	(number of employees) Permanent full time*	part time	Temporary	Total FTE
FY 1985	9	1	0	9.5
FY 1984	9	1	0	9.5
FY 1983	9	1	1	9.5
FY 1982	8	0	1	8.3
FY 1981	8	0	1	8.2

* Includes career-seasonal (50 week) appointees.

2. Youth Programs

Two Youth Conservation Corps (YCC) enrollees were employed in 1985. Derek Artherton was employed from June 22 until August 17 and Jaycene Reyes worked from June 22 until August 31. Derek was involved in a variety of maintenance type jobs and environmental education. Jaycene was a tremendous help in the office and was also exposed to such exciting maintenance type duties as scraping and painting the refuge vessel Ursa Major. This program continues to be beneficial to both the refuge and the individual enrollees if we can limit the number of enrollees comensurate with the work needed to be done.

4. Volunteer Program

The volunteer program continues to be one of the most successful programs to date. We were again fortunate this year to have very good people who accomplished a number of key biological and operational tasks. Eric L. Connell, a student majoring in Outdoor Recreation at Capilano College, Vancouver, B.C., volunteered his services and fulfilled his practimum requirement for his degree. R. Greg DeBella returned and was actively involved in the brown bear research program. Scott Wilbor, an intern from Colorado State University, worked with WB Zwiefelhofer on the bald eagle studies and Terror Lake rough-legged hawk surveys. As part of his intern program, Scott did some independent research on rough-legged hawks which culminated in a report entitled "Daily Behavioral Activity and Food Habits of Nesting Rough-legged Hawks on Kodiak Island, Alaska" which is in refuge files.

YCC'ers Derek Artherton and Jaycene Reyes at Chief Cove recreation cabin. (85-21) DM

Derek and Jaycene painted the inside of Chief Cove cabin, constructed steps and a path to the cabin and received EE training. (85-22) DM

An additional thirteen local volunteers served as weekend hosts in the visitor center donating over 500 hours to keep the facility open on Saturday and Sunday afternoons. Volunteers contributed over 300 hours toward maintenance of public recreation cabins and the Camp Island field camp. Volunteers also assisted the refuge staff with display preparation, report writing, audio visual projects and environmental education programs.

Volunteer Greg DeBella encountered one of Kodiak's side benefits while on a boat trip to band and radio tag eagles. (85-23) DM

Volunteer Scott Wilbor assisted with documentation of rough-legged hawk nesting use in the Terror Lake area. The scenic Terror Lake hydro-electric dam serves as a backdrop for this picture. (85-24) DZ

5. Funding

Table 6 depicts Kodiak NWR funding in thousands of dollars by progams for the last five fiscal years.

Table 6

Kodiak NWR funding levels

Program	Fiscal year 1982	1983	1984	1985	1986*
MB-1210	100	100			
MNB-1220	188	322			
I&R-1240	48	48			
WR-1260			526	617	586
FR-1300	60	95	125	115	120
EFS-1510				1.4	
YCC-1520			4.9	3.4	3.4
Totals	396	565	655.9	736.8	709.4

* These figures represent planning totals for FY 86. As of this writing, these totals have already changed to a degree and will undoubtedly continue to change through the first part of the fiscal year. The 1986 Narrative Report will list the final funding allocations.

6. Safety

One lost time accident which occurred on November 8, 1984 continued through 1985. Laborer Rasmus Anderson injured a deformed hip in a fall and returned to work for only a couple of days in August after Office of Workman's Compensation Programs (OWCP) discontinued his compensation payments effective August 3, 1985. Rasmus made an attempt to work but could not because of pain. Rasmus was filing an appeal to OWCP at year's end.

No other accidents or incidents occurred in 1985.

7. Technical Assistance

Technical assistance was again provided to ADF&G Sport Fish Division, in November 1985, to radio tag adult steelhead trout in the Buskin River, near the town of Kodiak. Little is known of this fish stock and the objectives are to identify overwintering and spawning areas. In addition, the refuge provided the services of our volunteers to ADF&G for a week in early June to assist in the Buskin River fish counting wier operation.

F. HABITAT MANAGEMENT

1. General

Kodiak NWR is managed essentially as de facto wilderness. Most of the habitats on Kodiak remain in a relatively undisturbed state, the major exception being the coastline, where considerable human development has occured. As usual, a major portion of this year was spent dealing with the numerous commercial users of Kodiak's coastal area. Over fifty commercial set-net fishermen have privately owned cabins on refuge lands and about ten more have temporary structures on refuge lands. These facilities are permitted only to support the valid commercial use (fishing) and use outside the commercial fishing season is prohibited. This year, as usual, the users with temporary facilities want to convert them to cabins and the ones with cabins want to expand both the size of their facilities and their season of use. One set-netter group publicly stated (and in writing) that their minimum needs on a set-net site are 2500 square feet of living space and 2,500 square feet of support facilities (gear sheds, work shops, etc, etc). At present a few sites probably approach that size. Set-netters on Native lands continue to build while we are told not to enforce any regulations on Native lands (see 1984 N.R. Feedback section). The set-netters have made it clear that they will not accept any restrictions on their use of refuge lands unless forced to do so. Once again considerable interest was shown in developing permanent or semi-permanent camps for sport fishing guides and deer hunting outfitters, many of which would of course be located in the interior of the island.

The reality which we must face is that there is virtually no end to the numbers of commercial operators who would like, at some point, to establish facilities on refuge lands. Further, once a facility is established, there is virtually no limit to the size and extent which the user will eventually "require" to support his use. At least one set-net site on Kodiak, (not on refuge lands) now has a satellite dish, for example. Set-netters contend that the set-net fishery has become a family-oriented venture and set-netters with seven children (a real example) should be

allowed to build sufficient housing on refuge lands to comfortably house their wife, seven children plus the several hired hands it takes to do the fishing. There are individuals in Kodiak who would like to establish lodge-type facilities on refuge lands for sport fishing, hunting, etc. Since FWS only charges $100 per year for a SUP and private land is selling for $5 to $10 thousand per acre there is certainly incentive to move onto refuge lands if possible.

Our job as habitat managers is primarily to ensure that the Kodiak NWR is preserved for the primary purposes for which it was established - i.e. the preservation of this unique aggregation of wildlife and fish populations. Certainly some level of human use and exploitation has been and can continue to be compatible with this purpose. The most difficult problem of all is achieving an acceptable balance between human use and exploitation on the one hand and the continued existence of the rich natural heritage which itself is the major attractant to humans.

Certainly the earlier managers of Yellowstone National Park did not perceive that the encouragement of high human use in backcountry areas or even the development of major visitor facilities would severely infringe upon the possible survival of the grizzly bear in the Yellowstone ecosystem. Nor did the people who encouraged the growth of towns like West Yellowstone or built summer homes or grazed their sheep in grizzly country believe their use would impact the potential survival of the great bear. And in fact, it is likely that any one such development or use might not significantly affect the species or its habitats. The cumulative effects of all these uses and developments may, however, cause severe impacts.

Although Kodiak is certainly not yet as developed as the Yellowstone area, we are certainly headed in that direction.

The answer, of course, is simply to draw the line at the acceptable level of use and allow no more. Unfortunately defining that acceptable level of use is far from a simple matter, as the Yellowstone controversy clearly demonstrates.

Efforts continued this year to define acceptable types and levels of use. The situation is far from resolved, however and becomes more complex almost daily.

Resolution of this situation will require strong support from the Regional and Central offices to counter the major political lobbying in support of developers.

The bottom line is that if we fail in this and allow continued development based on what types of use were permitted (or in many cases were simply tolerated) in past - we may have nothing left to protect in future. Habitat protection must be our first priority. Without habitat there is no refuge.

6. Other Habitats (Aquatic)

Stream surveys to collect baseline data were conducted on the East Fork and mainstem Ayakulik River in the spring of 1985. Refer to section G-11.

9. Fire Management

The Interagency Fire Management Plan was completed and partially implemented this year, although by year's end it had still not been signed by the powers-that-be. Essentially the plan outlines a let-burn strategy, with suppression used only to prevent damage to private property or human life.

There were two small fires on refuge lands this year, totalling 480 acres burned.

10. Pest Control

Alder invasion around refuge headquarters identified by the RO as a problem in 1984 were mechanically controlled by cutting in the spring and fall in 1985. It is hoped that grass and spruce will become more firmly established to improve aesthetics of the headquarters area.

11. Water Rights

A revised weighting scheme for the refuge streams which are being considered for federal reserve water rights was provided to Habitat Resources (HR) during the fall 1985. The refuge staff felt that the current weighting scheme provided by HR did not reflect the conditions found on Kodiak and a revised numerical weight was suggested. The refuge has approximately 90 anadromous fish streams within its boundary and four fish species of National and Regional Special Interest (chinook, coho, and sockeye salmon and steelhead).

G. WILDLIFE

3. Waterfowl

A waterfowl breeding pair and habitat use survey was conducted on the Ayakulik River from May 13 to 27 (Table 7). The river was floated by inflatable raft from a point 16.0 river miles up the East Fork of the Ayakulik to where the East Fork joins the main river (RM 23.6) and down to the lagoon (RM 0). In addition, 11.4 miles of lateral tributaries were walked. A total of 453 waterfowl comprised of 190 pairs and from 11 species were tallied during the course of the approximately 50 miles of surveyed stream or nearly four breeding pairs of waterfowl per mile of stream. Spring phenology appeared to be 3 to 4 weeks later than normal in 1985. The majority of Kodiak's early nesting waterfowl such as mallards and green-winged teal were still

Table 7
Total Birds Counted on Ayakulik River May 13-27, 1985

Birds	Total Counted	Prs.	Sng.	Birds	Total Counted	Prs.	Sng.
Common Loon	2			Lesser Yellowlegs	20		
Red-throated Loon	1			Common Snipe	42		
Tundra Swan	17	7	3	Northern Phalarope	5		
Mallard	114	42	30	Parasitic Jaeger	1		
Pintail	5	2	1	Glaucous-winged Gull	139		
Green-winged Teal	83	34	15	Mew Gull	106		
American Wigeon	50	24	2	Black-legged Kittiwake	9		
Northern Shoveler	1		1	Arctic Tern	11		
Greater Scaup	24	12		Short-eared Owl	1		
Barrow's Goldeneye	3		3	Barn Swallow	1		
Bufflehead	11	5	3	Violet-green Swallow	10		
Harlequin Duck	50	21	8	Tree Swallow	136		
Common Merganser	18	9		Bank Swallow	151		
Golden Eagle	2			Black-billed Magpie	28		
Bald Eagle (22 adults, 19 subadults)	43			Black-capped Chickadee	4		
Marsh Hawk	1			Common Raven	11		
Willow Ptarmigan	25			Northwestern Crow	9		
Semipalmated Plover	4			Dipper	5		
Western Sandpiper	23			Northern Shrike	1		
Least Sandpiper	82			Savannah Sparrow	17		
Semipalmated Sandpiper	2			Golden-crowned Sparrow	75		
Short-billed Dowitcher	5			Fox Sparrow	109		
Greater Yellowlegs	26			Lapland Longspur	5		

Total Species - 47

Total Birds - 1,566

paired and exhibiting courtship behavior indicating nest initiation had just started or had not yet begun. The most abundant and frequently observed waterfowl were: mallard, green-winged teal, red-breasted merganser, American wigeon, and harlequin ducks. Waterfowl usage of the Ayakulik drainage is generally dispersed along the entire area covered by the survey route. The area of the river with the highest usage occurred from RM 8 of the East Fork downstream to RM 12 of the main Ayakulik River. This section of the river and the areas adjacent have the largest amount of wetland habitats so this higher use would expected.

The late cold spring also kept many migrant waterfowl from passing quickly through Kodiak. Small numbers of emperor geese winter around Kodiak Island and normally the majority of migrating emperors begin moving into the area during March and leave by the end of April. However, during 1985 approximately 120 emperors stayed in the Womens Bay area from early March through the middle of May. Among this flock were 4 birds which had been marked with neck collars on the Yukon Delta in July of 1984. Two of the collared emperors were again seen in the same area on December 1, 1985. Migrating geese rarely stop in Kodiak during the fall migration, which indicates the two collared emperors seen may be winter residents in the Womens Bay area.

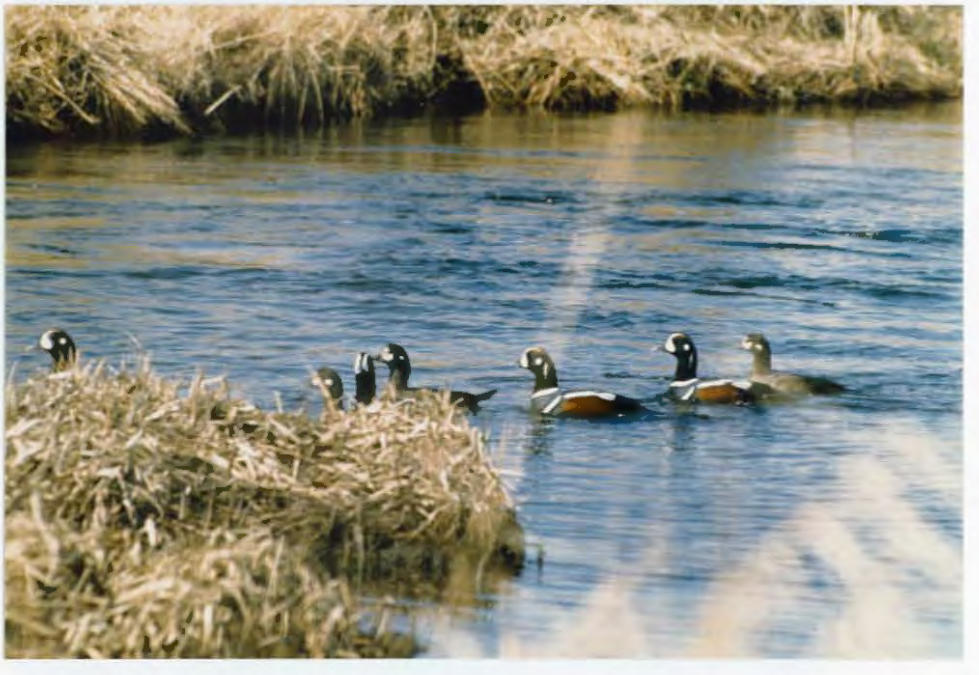
Two white-fronted geese with neck collars were seen in the Womens Bay area with as many as 86 other white-fronts from April 12 to April 18. The two collared geese (males) were marked in Tule Lake, California in September of 1981.

Black brant also "short stop" on Kodiak during the spring migration in numbers seldom exceeding 1,000 to 2,000 birds. Kalsin Bay, along the Kodiak road system is a favorite spring stop and 300 to 600 brant were observed in this area from April 9 to May 10. A brant with a dull yellow or tan neck collar was observed in Kalsin Bay on May 1 with a flock of 150 brant. On May 10 another collared black brant was seen at the same location but with a blue collar coded "Y5C" in a flock of 200 other brant. The second brant had been collared on July 14, 1979 near the Manokinak River on the Yukon Delta. Unfortunately, the origin of the first brant could not be ascertained.

The late spring freeze adversely affected nesting waterfowl. June 17 marked the last day freezing temperatures were recorded in the city of Kodiak. (85-25) DZ

Snowstorm on May 18 along the east fork of the Ayakulik River. (85-26) DZ

Backwater waterfowl nesting habitat along the east fork of the Ayakulik River. (85-27) DZ



Harlequin ducks were the most abundant diving chick found along the Ayakulik River during the waterfowl survey. (85-28) DZ

The annual refuge tundra swan nesting survey was conducted on June 19. Despite the unusually cold spring weather, 9 broods had been hatched out by this time. However, the number of nests and/or broods counted in the June survey decreased from 26 in 1983 to 23 in 1984, and then to 18 during 1985. Total numbers of tundra swans counted has remained nearly the same indicating little change in habitat utilization despite the decrease in nesting effort. A follow-up productivity survey was conducted on August 26 to determine average brood size and total production. Results of both 1985 surveys are compared with 1984 data in Table 8.

Approximately 12 tundra swans including 2 cygnets were still on the Ayakulik River at the end of December.

A tufted duck, an Old World cousin of the scaup, was seen at Narrow Cape during the Pasagshak portion of the Christmas Bird Count.

Ponds with nesting tundra swans tend to be the most productive having at least 4 other species of waterfowl and/or shorebirds besides the swans present. (85-29) DZ

4. Marsh and Waterbirds

The first pair of nesting red-throated loons was seen on a Kalsin Bay pond May 10, approximately two weeks later than normal.

A smew, a Eurasian species of merganser rarely found in Kodiak, was observed during the annual Christmas Bird Count at Womens Bay on December 28.

Table 8
1985 Kodiak National Wildlife Refuge Tundra Swan Surveys

Date	Birds In					Clutch Size							Birds In		Brood Size						Total Adults	Total Young	Total Birds
	Sng	Pr	Flk	Sng W/Nest	Pr W/Nest	1	2	3	4	5	6	Unk	Sng W/Bd	Pr W/Bd	1	2	3	4	5	6			
June 1984	13	32	4	8	12	-	-	1	3	1	-	15	0	3	-	2	-	1	-	-	87	8	95
June 1985	8	38	13	3	6	-	-	-	-	-	-	8	0	9	2	3	4	-	-	-	97	20	117

Date	Birds In						Brood Size						Total Broods	Total Young	Average Brood Size	Total Birds
	Sng	Pr	Flk	Total Adults	Sng W/Bd	Pr W/Bd	1	2	3	4	5	6				
August 1984 *	3	34	8	45	0	10	4	3	0	1	1	1	10	25	2.5	70
August 1985	0	30	21	79	0	12	1	6	3	1	1	0	12	31	2.6	112

* Not all refuge nesting area surveyed.

5. Shorebirds, Gulls, Terns and Allied Species

Spring shorebird migration through the Kodiak area was generally one to two weeks later than average in 1985. Some arrival dates for the more frequently observed migrants are: black turnstone-May 5; greater yellowlegs-April 21; semipalmated plover-May 4; marbled godwit-May 3; western sandpiper-May 10; and short-billed dowitcher-May 1.

A rare North American sighting of a lesser black-backed gull was made by ORP Menke on April 20 in Womens Bay. There is only one other west coast (North America) observation report of this European gull.

The annual wintering seabird and seaduck survey was conducted aboard the refuge research vessel, Ursa Major. The survey covering Uyak and Uganik Bays began on February 4 in Uganik. After completing this bay and trying for 6 additional days in strong winds and heavy freezing spray to reach Uyak Bay to finish the survey we were forced to return to Kodiak to resupply on February 13. On February 25, we again left for Uyak Bay and successfully completed the survey on March 1. Results of the survey can be found in Table 9.

The black-legged kittiwakes returned to the Gibson Cove nesting colony approximately one month later than usual on April 4. All the gull breeding colonies in Chiniak Bay suffered total reproductive failure during 1985. Most seabird colonies around Kodiak Island suffered the same fate.

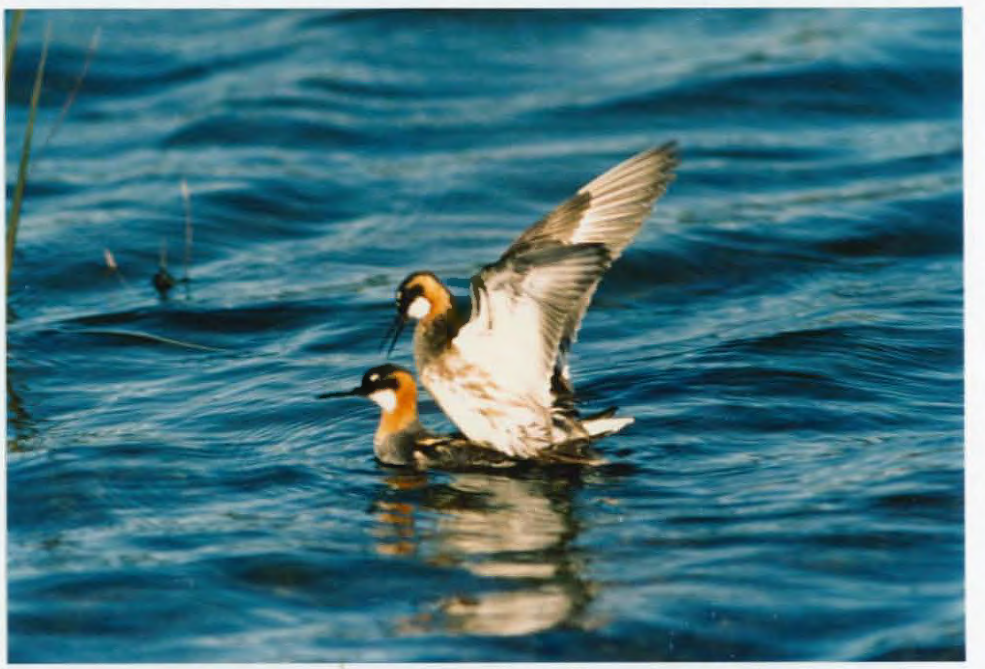
Shorebirds such as these short-billed dowitchers nest in limited numbers on the refuge in areas like the Ayakulik River. (85-30) DZ

Table 9
Densities of the most frequently occurring species or species groups observed in five bays of Kodiak Island, 1980 - 1985

Species	Winter 1980	1981	1982	1983	1984[a]	1985[a]
Loons	0.47	0.87	0.76	0.85	0.56	0.54
Grebes	0.79	0.63	0.92	1.58	1.45	0.97
Cormorants	5.20	7.13	7.05	6.08	5.12	4.55
Goldeneyes	2.00	2.54	1.97	1.18	3.25	2.82
Oldsquaw	25.37	19.67	12.82	11.51	10.68	5.42
Harlequin Duck	3.24	3.25	3.35	3.01	3.81	3.14
Eiders	3.74	2.87	3.43	5.80	0.49	0.10
Black Scoters	10.54	12.18	10.58	12.59	7.55	8.31
White-winged Scoters	7.51	6.56	4.33	6.53	4.57	4.43
Surf Scoters	1.19	1.04	1.18	1.08	1.75	0.73
Unidentified Scoters	2.90	0.00	0.00	0.00	0.58	0.00
Total Scoters	22.14	19.78	16.09	20.20	14.45	13.47
Mergansers	0.84	0.53	0.40	0.45	0.96	0.82
Glaucous-winged Gull	1.94	1.95	1.16	3.71	8.75	1.80
Mew Gulls	2.61	4.20	4.49	3.23	4.07	2.26
Black-legged Kittiwake	0.14	0.12	11.72	0.46	3.40	0.13
Murres	106.57	49.23	71.95	38.26	31.28	14.35
Pigeon Guillemots	2.51	3.08	2.40	2.26	3.18	1.50
Brachyramphus Murrelets	7.93	4.90	10.29	4.30	9.82	1.70
Crested Auklets	6.99	0.44	0.40	13.82	0.07	4.26
Total Birds[b]	194.63	122.17	149.84	117.93	102.13	59.84

a - Data includes only Uyak Bay, Uganik Bay and Kupreanof Strait

b - Includes all species observed, not just species in above table.



Red-necked phalarope. (85-42) DM

Rock sandpiper. (85-43) DM

Red faced cormorant. (85-44) DM

Aleutian Tern. (85-45) DM

6. Raptors

A Peale's peregrine falcon eyrie was found at a Chiniak Bay seabird colony on June 18 by Wildlife Assistance biologists conducting colony nesting surveys. The eyrie was empty, although an adult falcon was seen at the nest site.

Northern harriers were observed along the Ayakulik River on May 5 and October 17. This species is not known to nest on the refuge and is not a commonly seen raptor.

A bald eagle nest survey on a representative sample of 49 randomly selected and located nest sites was conducted on May 29 and June 12. The nests are all to be found on the Kodiak National Wildlife Refuge (Afognak Island Unit included). The experimental survey design was initiated to better sample the 3 primary nest habitat types found on the Kodiak refuge. The habitat types are coastal tree type, coastal ground type, and the freshwater (interior) tree type. Historically these types have occurred on the refuge in the following percentages: coastal tree nests (53%), coastal ground nests (25%), and freshwater (interior) tree nests (22%). Of the 21 coastal tree nests, 14 (67%) were active during the initial May survey. There were 11 (75%) of 15 coastal ground nests and 8 (62%) of 13 freshwater (interior) tree nests active in May. Past surveys have had an average of 58% of coastal tree nests, 77% of coastal ground nests, and 77% of freshwater (interior) tree nests active in May. The overall percentage of active nests of all types was 67% both historically and during May, 1985. The late spring may have shifted some freshwater nesters to the coastal areas where food sources are not as affected by cold weather.

The productivity of the active nests was checked on August 17 and 23 with the following results: Eleven of fourteen (79%) coastal tree nests fledged a total of 17 young for an average of 1.21 young per nest in this habitat type. Seven of eleven (64%) coastal ground nests produced a total of nine young for an average of .82 eaglets per active coastal ground nest, while five of eight (62%) freshwater nests contained a total of six eaglets for an average production of .75 young per active nest. Overall, a total of 32 young bald eagles were fledged from 33 nests or .97 young per active nest as compared to a 17 year mean of 1.4 young per active nest. Undoubtedly, the cold late spring weather is the main reason for this decrease.

During 1985, four (1 adult and 3 subadults) dead bald eagles were found and turned in at refuge headquarters. In addition, three injured adult bald eagles which later died of their injuries were brought in. All of the mortalities were of either natural or unknown causes. The carcasses of six of the dead eagles were shipped to the Pocatello Supply Depot while one specimen was turned over to the Regional Law Enforcement division to be used as a scientific mount.

Two injured bald eagles were shipped to the Raptor Rehabilitation Center at Sitka, Alaska during 1985. The first, an adult, had sustained a severe wing injury. Unfortunately, the injury would never allow the eagle to fly again so it was placed in a captive breeding program. The second injured eagle was a subadult (weighing nearly 15 lbs.) with a partial paralysis of left wing and leg. Initially the bird could not fly, but by year's end personnel at the Raptor Center informed us that the eagle was now able to fly the 40 feet between perches and had regained about 75% of normal flight capability. Further examination of the bird (nicknamed "Queenie" because of her size and temperament) found she had sustained a previous shoulder injury which had not healed correctly so that she would never have normal flight capabilities. To make matters worse, Queenie had also developed severe arthritis in both hips. A highly unusual condition in a bald eagle only 2 years old but it also means a captive breeding program will be Queenie's destiny also.

Pirating is a food acquistion tactic practiced by many species. Outdoor Recreation Planner Menke had an opportunity to observe an interesting sequence of this type of behavior in three species of raptors not once but twice during March. It began with a Peale's peregrine falcon killing a female bufflehead. After feeding only a short time a roughlegged hawk began harrassing the falcon until it abandoned its meal. The hawk was only able to enjoy a small portion of the kill before a subadult bald eagle finished the sequence by taking over the remains. Several days later this process with the same species involved but in a different area was observed again by ORP Menke.

7. Other Migratory Birds

The first yellow warbler of spring was seen on June 3, 1985 reflecting the late spring. A barn swallow was observed at the Ayakulik Lagoon on May 26 feeding with numerous bank and violet-green swallows. These are rare visitors to Kodiak even though the Asian form of this species is seen regularly in western Alaska.

Song sparrow. (85-46) DM

8. Game Mammals

A. Brown Bear

This section reports results of aerial composition surveys, sport and non-sport bear mortality and other general items related to brown bear habitat and management on the refuge. Summaries of brown bear research activities are provided in Section D-5.

Surveys

Aerial composition surveys of bears concentrated along salmon spawning streams spanned the period of July 23 to August 6. Six flights that included all five survey routes (Sturgeon River, Red Lake/Frazer Lake Pass, and Pinnell, Connecticut and Dog Salmon Creeks) produced a mean count of 100 bears, with peak counts (108) occurring on the morning of July 24 and the evening of August 5. The distribution of bear concentrations changed over the survey period, with Sturgeon River providing high counts in July, and Connecticut and Pinnell Creeks accounting for most bear sightings in August. Radio-tracking studies indicated that much of the change was due to interdrainage movement of bears rather than an influx of new animals.

Deep trails and worn banks attest to intensive use of Connecticut Creek by bears in 1985. 8/85 (85-31) VB

This portion of Sturgeon River is considered critical bear habitat; chum and coho salmon are readily available in early spring and fall, respectively, and adjacent slopes provide resting cover, elderberries, and winter den sites. 6/85 (85-32) VB

High counts on individual streams were an unmistakable feature of 1985 surveys. The count of 59 bears on Sturgeon River on July 24 is exceeded only by a count of 62 in 1971, the August 5 inventory of 42 bears on Connecticut Creek is second only to a count of 55 in 1980, and the 30 bears sighted on August 5 along Pinnell Creek is the highest on record for that stream. High numbers of bears continued to prey on salmon after the last survey flight on August 6. On August 23, 17 (60%) of 29 radio-collared bears were located on or near either Pinnell or Connecticut Creek. Forty-three bears were sighted along Connecticut Creek on the August 23 radio-tracking flight.

Composition of the 1985 survey counts was similar to that noted over the past few years (Table 10). Fewer cubs were sighted in 1985 than in 1984, but variation in cub composition is a common characteristic of aerial stream surveys.

Poor flying conditions forced cancellation of alpine surveys for the second consecutive year. Data from the ADF&G study indicated that the cold spring of 1985 may have delayed and restricted the period of alpine feeding this year.

Mortality

The 1985 sport harvest on the Refuge was 125 animals (6 less than that recorded for 1984). The spring season extended from April 1 through May 15 and produced a kill of 76 bears. The fall season (October 25 through November 30) yielded a harvest of 49 bears. Sport harvest guidelines were exceeded in two of the three ADF&G subunits that essentially comprise the Refuge (Table 12). Compared to 1984, the kill decreased by 10 animals in subunit 3, increased by 1 in subunit 4, and decreased by 8 in subunit 5.

The 1985 harvest on refuge lands included 81 males (65%) and 44 females (35%). Seven of the males were record-class animals (skull size $\geq$ 28 in.), including an 18-year-old animal taken near the Sturgeon River that was officially scored at just over 30 inches and will rank number 15 in the Boone and Crockett records.

Non-sport mortality was high in 1985 for both the refuge (19 kills) and the entire Game Management Units (GMU) 8 (23 kills). Eleven (58%) mortalities on refuge land were Defense of Life and Property (DLP) actions. Five (45%) of these 11 DLP's were related to deer hunting activity.

Table 10
Comparison of Aerial Stream Counts
of Brown Bear, 1978-1985

Year	No. Surveys Complete	Partial	Single Bear No.	%	Maternal Female No.	%	Yearling No.	%	Cub No.	%	Total No.
1978	3	0	63	44	26	18	33	23	22	15	144
1979	3	0	38	54	12	17	12	17	9	13	71
1980	3	1	134	65	23	11	41	20	7	3	205
1981	7	2	169	55	41	13	79	25	21	7	310
1982	7	3	430	48	150	17	207	23	107	12	894
1983	---------- No Counts ----------										
1984	6	1	186	51	56	15	69	19	56	15	367
1985	6	4	434	54	110	14	189	24	67	8	800
Average				52		15		23		10	

Table 11
Sources of brown bear mortality on Kodiak NWR, 1976 to 1985

Year	Source			Total
	Sport	DLP*	Other**	
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	5	119
1984	131	4	3	138
1985	125	11	8	144

1976 to 1984 Average = 101

* Defense of Life and Property.
** Includes accidental study deaths and mortality from natural or unknown causes.

Table 12
Brown bear harvest by subunit

	Harvest guidelines	1985 Harvest
Subunit 3	20	28
Subunit 4	60	68
Subunit 5	30	29
Total	110	125

General

Because the brown bear is a key species on the refuge, considerable effort was expended towards brown bear aspects of the Refuge CCP. This included developing seasonal habitat maps, drafting issue papers, drafting relevant portions of the draft plan, and meeting frequently with the planning team members, ADF&G biologists, big game guides and other interested parties.

One of the most noteworthy developments of the year concerned a pair of sibling brown bears that took up residence on Camp Island. Activities they particularly seemed to enjoy included digging beneath the fuel sheds, tearing up rolls of paper on the beach, biting into oil cans, pulling shingles off the work shed and surprising

visitors on the way to the outhouse. Several attempts to discourage them with rocks, flares, and rubber bullets fired from riot guns were, at best, only temporarily effective. Although they were at times entertaining, their presence was a classic example of how quickly bears can habituate to humans and create potentially dangerous situations.

A pair of 3-year-old siblings separated from their mother in early 1985 and subsequently proclaimed our field headquarters at Camp Island as their own. (85-33) VB

Affectionately named the "Resident Dummies," our Camp Island bears had an unquestioned influence on the activity patterns of the Island's human occupants. (85-34) VB

B. Mountain Goats

An island-wide survey of suitable mountain goat habitats was conducted by ADF&G in August, 1985. Goats were observed from Kaiugnak Bay on southwestern Kodiak Island to the Chiniak Bay drainages in northeastern Kodiak. Three hundred sixty goats were counted with most found in the Kizhuyak, Terror and Ugak Bay drainages. Goat numbers in these northeastern areas of Kodiak appeared to be relatively stable prehunt but the small pioneering populations in the southwestern portion of the island appear to be slowly increasing.

Figure 7 portrays ADF&G mountain goat hunt areas on Kodiak. As can be seen from the map, ADF&G mountain goat hunt area boundaries have no relationship to the refuge boundary, hence it is impossible to accurately define the goat harvest for refuge only. The following discussion of goat harvest applies to all of Unit 8 (Kodiak Island).

Prior to 1984 goat hunting was closed by emergency order when 15 goats were killed. In addition, goat permits were limited and issued by drawing. In 1984 ADF&G changed the largest of the permit hunt areas (876) from a permit system to a registration hunt (with no limit on the number of hunters). Predictably the total kill of goats sky-rocketed from 15 total in 1983 (11 males and 4 females) to 55 in 1984 (32 males, 20 females and 3 sex unknown) of which 29 were killed in hunt area 876.

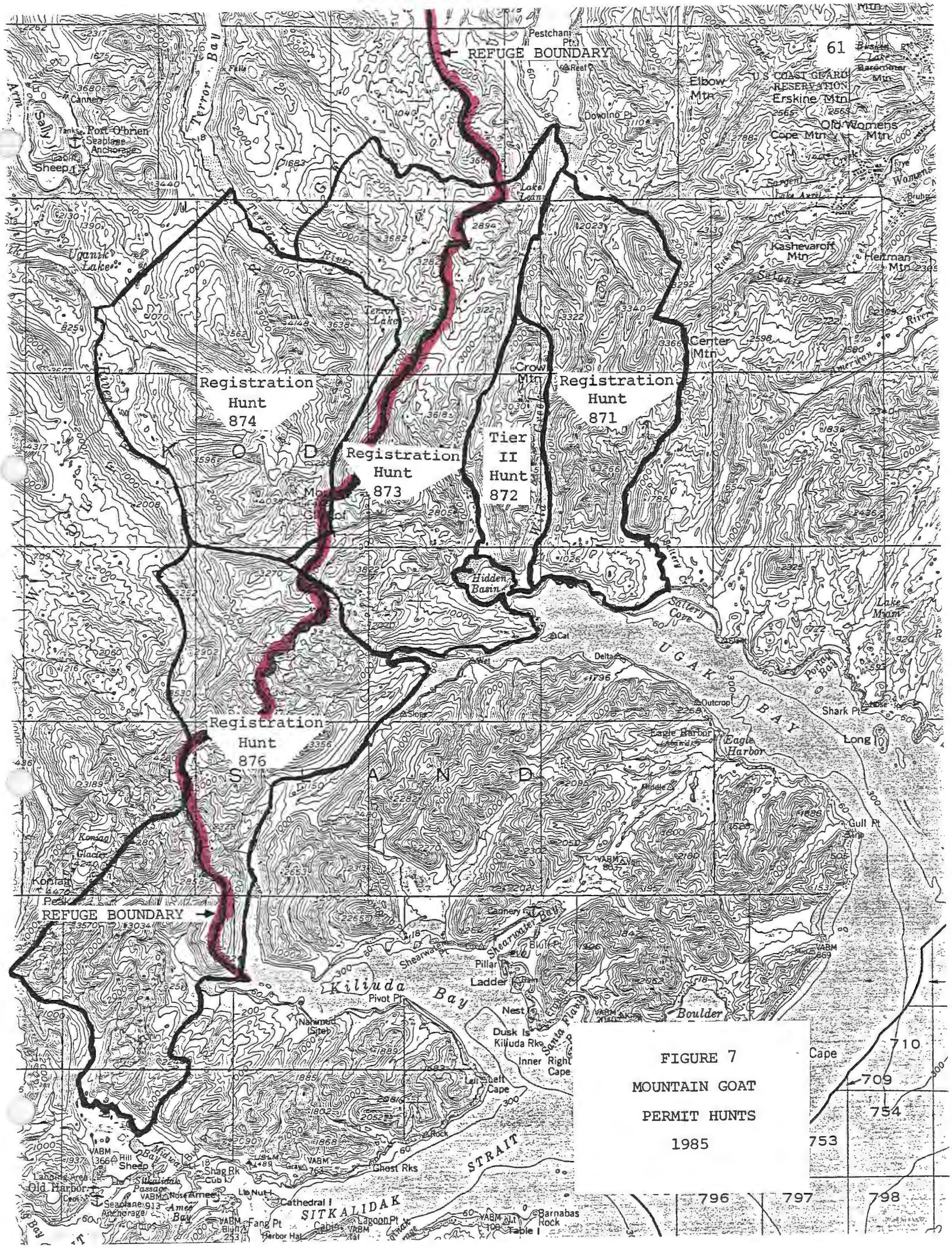


FIGURE 7
MOUNTAIN GOAT
PERMIT HUNTS
1985

In 1985 the Alaska Board of Game instituted new subsistence regulations and listed mountain goats as a subsistence species on Kodiak. The Crown Mountain hunt (872) was classified as a Tier II subsistence hunt with participation limited to qualified Alaskan residents only. Hunt numbers 871, 873, 874 and 876 all were classified as registration permit hunts with no limit on permit numbers. Because of fears of another high harvest the season opening date was moved back from September 1 to October 1 by emergency order. Despite the later season opening and the severe weather conditions in early October hunter participation and success were both high. Another emergency order was issued closing the four registration permit hunts on October 10. Even with the emergency orders, seventy-four hunters participated in Unit 8 goat hunts in 1985. Hunters were 49% successful, killing 36 goats (15 males and 21 females). Of the 74 hunters afield, all but seven hunted the registration hunt areas. Table 13 presents hunter and harvest data for 1985.

Three factors in this harvest data are of most concern:

First, the percent females in the harvest has climbed alarmingly over the past three years; from 26% in 1983 to 38% in 1984, to the 1985 figure of 58% - the first time more females than males were killed.

Second, although the harvest in area 876 was dramatically reduced this year, it is impossible to evaluate that reduction. Area boundaries were changed this year and a major portion of area 876 became part of 874. In any case the kill was reduced in 876 and not greatly increased in 874, indicating either that terrain and weather reduced hunter success - or there simply aren't many goats left.

Third, although no long term or extensive data are available for comparison, the age structure of this year's harvest is of concern.

Of the males in the harvest, only one was over 4.3 years of age (at 9.3), and the harvest included at least two yearling and five two-year-old males. Of the females, at least five were yearlings, but several older animals were taken as well (three at 6.3 years, two at 8.3 years, one at 9.3 years and one at 11.3). One possible interpretation of this data is that we have cropped off most of the adult males already, consequently hunters are now killing more females and as a result more breeding age females are being killed.

We fear that these levels of harvest cannot be sustained indefinitely. Although ADF&G attempted this year to limit the harvest by emergency orders, the harvest was

Table 13
1985 Kodiak Island mountain goat harvest statistics
Harvest summary (hunts # 871-876)

	Number	Percent
Permits issued	161	100%
Hunts afield	74	46%
Successful hunters	36	49%
Male kill	15	42%
Female kill	21	58%
Total kill	36	100%
Days hunted	180	----
Mean days hunted (68 responded)	2.6	----

Hunt #	Males	Females	Total
871	2	6	8
872	2	4	6
873	4	6	10
874	3	4	7
876	4	1	5
Total	15	21	36

Mean age of harvest

Registration hunts (871, 873, 874, 876)	Males (n=12) = 3.1 years Females (n=14) = 5.2 years Total (n=26) = 4.2 years
Subsistence (Tier II) hunt (872)	Males (n=2) = 3.8 years Females (n=3) = 3.6 years Total (n=5) = 3.7 years
Total GMU harvest	Males (n=14) = 3.2 years Females (n=17) = 4.9 years Total (n=31) = 4.1 years

Data from ADF&G - R.B. Smith - 1985 Permit Reports.

still high. Furthermore, we believe that heavy reliance on emergency orders for game management and harvest controls is a risky business at best. We will continue to work with ADF&G in an attempt to stabilize the goat harvest at sustainable levels.

C. Sitka Black-tail Deer

The ADF&G did not conduct a hunter survey to estimate harvest size in 1985 for budgetary reasons. In the absence of any actual harvest data it is assumed that the total kill was similar to that which occurred in 1984. The refuge narrative report for 1984 gave an estimated deer harvest on the refuge of 2,180 deer, based upon preliminary harvest data from the State's questionnaire survey. The deer season on Kodiak runs from August through January 7, hence many mail questionnaires are not received until late spring. In any case, the total refuge deer harvest for 1984 was finally increased to an estimated 2,938 (i.e. about 3,000). The 1985 kill is estimated to be similar in number.

Some harsh spring weather may have caused limited mortality in the more northern areas of Kodiak NWR, but certainly there was no major winter kill of deer this year. Deer are now essentially ubiquitous on Kodiak. Sport hunting has a negligible effect on the overall population. The most likely cause of future mortality is winter kill.

9. Marine Mammals

Sea Otter:

As in 1984, the Refuge staff assisted Regional Office Wildlife Assistance personnel in conducting sea otter surveys in the Kodiak area. In 1985 only a partial survey was completed because of adverse weather during the survey period. Survey results had not been completely tabulated by year's end, but following is data from the 1984 survey report; completed in March of 1985:

> Surveys were conducted between October 11 and 16, 1984. Wildlife Biologist/Pilot Vivion served as pilot/observer, Dale Taylor and Scott Schliebe, Wildlife Assistant - Anchorage served as observers. The survey was conducted along the coastline, islands, and offshore rocks of Shuyak, Afognak and northern Kodiak Island. Southern Kodiak Island was not surveyed, since very few observations of sea otters have been made there.
>
> A total of 2,947 sea otters was observed in 1984. The only other sea otter survey on Kodiak was done in 1975-76 by ADF&G and produced a total count of 1,977 animals. Major distribution shifts were observed between the two surveys with apparent changes in population centers

(Figure 8). In the 1975-76 survey population centers appeared to be located at Sea Otter Islands, Peronosa Bay, Seal Bay, Tonki Cape, and Marmot Island. Of these, only Sea Otter Islands shows an increase in numbers in 1984. All others decreased, some dramatically (Seal Bay, Tonki Cape, Marmot Island). Major population centers for the 1984 survey appear to be located in Kupreanof Strait, Raspberry Strait, Bluefox Bay, Shuyak (west), Latax Rocks, Shuyak (north) and Sea Otter Islands.

Although many variables can affect surveys of this species it appears from this survey data that sea otter numbers and distribution have markedly changed since 1975-76. The population appears to be increasing and continuing expansion into suitable, unoccupied habitats. A total of 1,050 otters was observed in areas not surveyed in 1975-76 because at that time there were virtually no otters present. Overall numbers of sea otters appear to have increased by 49% over the nine year period between surveys. Complete survey results and discussion are on file at refuge headquarters.

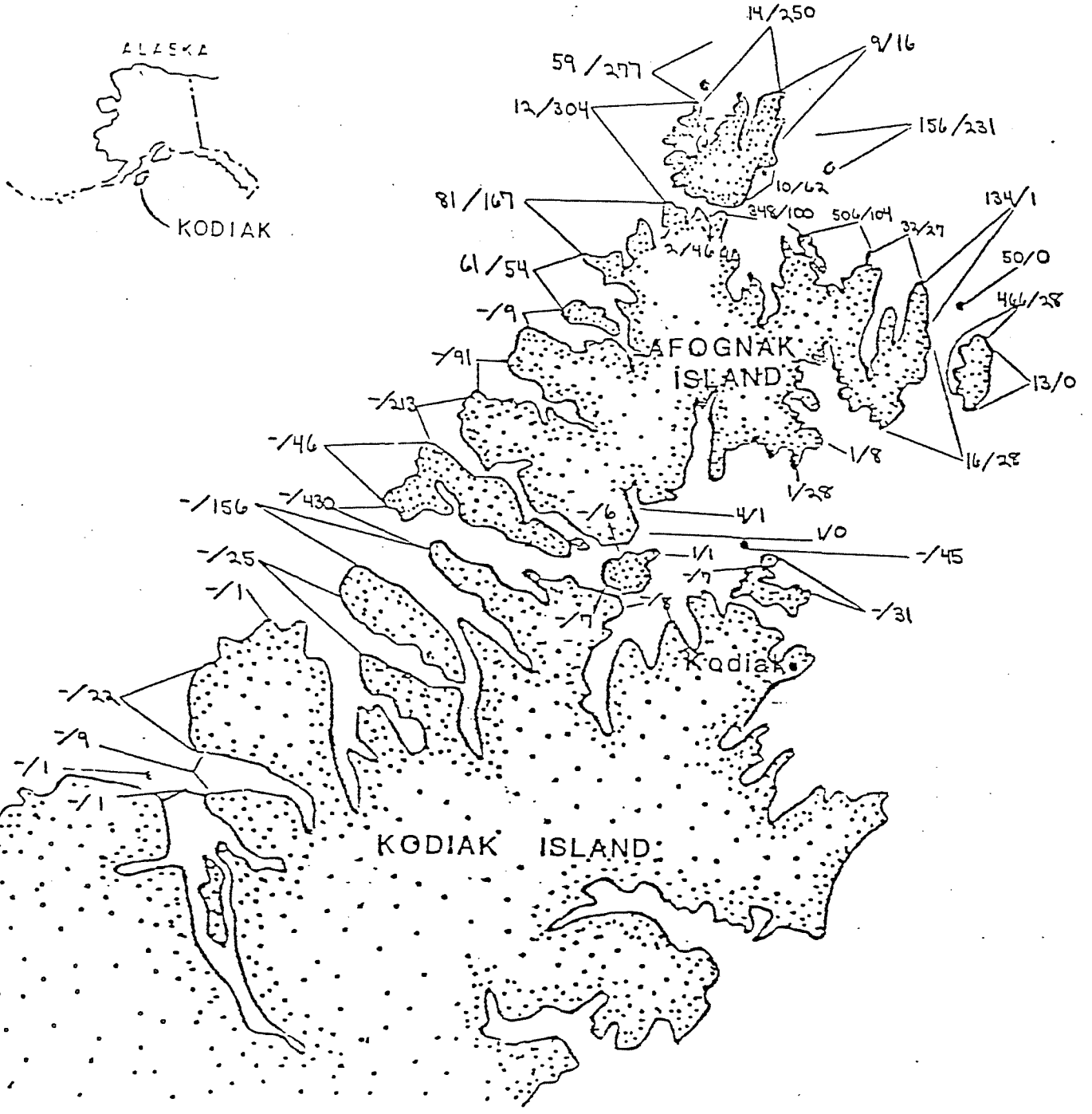
We intend to continue the sea otter survey on an annual basis into the immediate future. It now appears that the State of Alaska no longer has any intention of reassuming management of marine mammals.

Two controversies surrounding sea otters have been growing rapidly in the last two years. First, otter populations have been expanding steadily and pioneering into ranges not occupied for years. At the same time most local shellfish stocks (primarily king and tanner crab) have been declining dramatically (Kodiak's king crab fishery has now been closed for three seasons - and Kodiak is known as the King Crab Capital of the World) for a number of reasons. Naturally, commercial fishermen are eager to place at least part of the blame for declining crab stocks on sea otter. Secondly, a Regional Solicitor's opinion last year opened the door for Native take of sea otters for subsistence purposes. This opinion essentially reversed an earlier Solicitor's opinion which said Native take of sea otters would not meet the traditional and historic use criteria of the Marine Mammal Protection Act.

As a result, this year saw a significant but unknown harvest of sea otters by Natives. The Service is now promulgating regulations which will require that sea otter hides be sealed by FWS within 30 days of taking. Hopefully the combination of annual surveys (which we hope will improve with experience) and mandatory reporting of harvest will provide the essential first step in practical management of this species in the Kodiak area.

Figure 8. Comparison of the distribution and relative abundance of sea otters along the Kodiak Archipelago, 1975-76/1984.

#/# = numbers observed 1975/number observed 1984.
-/# = area not surveyed in 1975.



10. Other Resident Wildlife

A. Reindeer

No surveys on this species were completed this year for several reasons, including primarily time and weather constraints, funding problems, and the fact that suitable snow cover conditions never existed for a good survey.

Segments of the small population of reindeer were observed periodically during the year. Population levels are thought to be steady or slowly declining. No information on harvest is available although the relative difficulty and cost of hunting reindeer versus deer on Kodiak limits this activity to a very few individuals.

Hopefully a comprehensive survey can be completed in 1986.

B. River Otter

In the 1984-85 trapping season, a total of 187 river otters was taken in Game Management Unit 8 (Kodiak Archipelago). Of these, 64 were harvested on Kodiak NWR. Following is a breakdown by area:

	Sex			
Area	Males	Females	Unknown	Total
202-Blue Fox Bay	6	3	0	9
307-Uyak-Zachar Bay	10	8	1	19
308-Inner Uyak Bay	3	14	0	17
312-Olga Bay	11	6	0	17
313-Frazer Lake	2	0	0	2
Total	32	31	1	64

A proposal for a river otter study on Kodiak NWR, entitled "Habits, Movements and Habitat Use of River Otter on Kodiak National Wildlife Refuge" was submitted to the Regional Office for consideration. The study was rejected in the new regional ranking process, since it did not rank highly enough in regional priorities.

11. Fisheries Resources

The Kodiak National Wildlife Refuge provides freshwater habitat for populations of all five species of Pacific salmon, steelhead, rainbow trout, arctic charr, and Dolly Varden. These refuge-based fishery stocks support a viable and active commercial, sport and subsistence (personal use)

fishery which is managed by the ADF&G-Commercial Fish, Sport Fish and Fishery Enhancement Divisions located in Kodiak. Species distribution, habitat use, escapement and harvest, and public use is monitored by the refuge fishery program utilizing data collected by ADF&G and field programs carried out by refuge personnel.

The Commercial Fishery

The 1985 commercial salmon catch in the Kodiak area totalled approximately 9.9 million fish worth an estimated ex-vessel value of approximately 20.7 million dollars. The estimated contribution of refuge based stocks was approximately 4.7 million salmon with an ex-vessel value of approximately 14.4 million dollars (Table 14). Harvest of refuge based chinook, coho and sockeye salmon was 158, 106 and 62 percent above the 1981-84 average (Table 15). Harvest of odd year pink salmon and chums was only 63 and 55 percent of the 1981-84 average respectively. Overall refuge based stocks contributed 47 percent of the Kodiak area harvest compared to the 1982-84 average of 78 percent, and 69 percent of the ex-vessel value, compared to a 1982-84 average of 64 percent. Although the overall percent contribution of refuge based stocks was below the 1981-84 average by 31 percent the ex-vessel value was above by five percent. This was mainly due to good returns of sockeye and coho to the refuge during 1985, and the higher price paid per pound for these fish compared to previous years.

Sport Fishing

Sport fishing on refuge streams occurs in late May through July for chinook 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, chinook salmon and steelhead are only known to be abundant in the Karluk and Ayakulik/Red River systems. A smaller but accessible number of chinook and steelhead also occur on the Dog Salmon River which drains Frazer Lake. Table 16 depicts the known and peak escapement counts on refuge streams which supported species of major interest to sport fishermen during 1985. Because most of the ADF&G fish wiers on the major systems, such as Karluk and Ayakulik are removed by mid-September and aerial surveys are terminated on the minor systems, actual numbers of coho salmon and steelhead trout which continue to enter the systems throughout the fall months is unknown.

Returns of chinook salmon to refuge waters in 1985 provided ample fish for sport fishermen. Escapement for chinook salmon into the Karluk River was approximately 5,367 fish (66 percent of the 1979-84 average). The Ayakulik/Red River chinook escapement was approximately 8,132 fish (35 percent above 1979-84 average) (Table 16). Total sport harvest of

Table 14

Estimated numbers, species composition and dollar value of commercially caught salmon by all gear types during 1985 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	-0-	440	383	122	54	3,074	199	40	4,312	114,912
Sockeye	152	100,357	78,754	114,979	7,144	577,537	699,098	9,670	1,587,691	10,040,805
Coho	2,313	11,393	12,537	13,170	4,009	41,872	42,859	9,231	137,393	1,124,170
Pink	221	713,566	587,569	132,481	2,929	82,735	1,057,792	63,577	2,640,870	2,241,093
Chum	136	69,372	98,848	14,461	2,486	7,836	84,754	17,891	295,784	863,273
Total									4,666,050	14,384,253

(1) Data compiled from ADF&G 1985 catch statistics for the Kodiak Management Area. Ex-Vessel values are preliminary projections of actual value.

Table 15
Estimated average annual harvest and escapement values
for Kodiak NWR based salmon stocks 1981-84 compared to 1985 values. (1)

Species	Harvest		Escapement		Total Returns	
	Average 1981-84	1985	Average 1981-84	1985	Average 1981-84	1985
Chinook	1,674	4312	16,345	13,840	22,099	18,152
Sockeye	770,082	1,587,691	1,184,050	2,394,060	1,954,132	3,981,751
Coho	84,406	137,393	64,706	85,377	139,527	222,770
Pink (Even Yr.)	8,290,958	-	3,745,560	-	-	-
Pink (Odd Yr.)	4,218,723	2,640,870	1,527,941	1,607,521	5,746,663	4,248,391
Chum	533,806	295,784	396,762	148,982	871,684	444,766

(1) Data compiled from ADF&G 1981-85 catch statistics and peak salmon escapement counts for Kodiak area.

chinook salmon on both river systems combined is estimated to be less than 1,000 fish.

Counts of steelhead (kelts) migrating downstream during 1985 (Table 16) in both the Ayakulik/Red and Karluk Rivers indicate approximately 1,540 and 4,275 adults respectively had entered the systems during the fall 1984/winter 1985 period. These estimates are derived from extrapolated data gathered during the Karluk River steelhead project (74530-83-01) discussed in Sec. D-5. Total sport harvest of steelhead on both river systems and other minor river systems is estimated to be less than 200 fish.

Sport fishing harvest figures for rainbow trout and charr on the refuge are unknown. Sport fishing guide special use permits issued during 1985 totaled 14, compared to the 9 permits issued during 1984 (Sec. H-9). Most of the guide activities targeted on chinook, coho salmon and steelhead on the Ayakulik/Red and Karluk River systems, and on coho salmon and rainbow trout on the Uganik River system.

In addition to sport fish guiding permits, three other permits were issued to ADF&G to conduct routine fishery management projects on refuge waters.

Salmon Escapement

Adult salmon escapements to the river systems on the refuge were monitored through ADF&G fish wier counts and aerial surveys. Preliminary composite escapement numbers for 1985 are presented in Table 15. Overall salmon escapement into refuge streams for sockeye, coho and odd year pinks was 102, 32 and five percent above the 1981-84 average respectively; but escapements for chinook and chum salmon were only 85 and 38 percent respectively of the 1981-84 average. Most noteworthy in escapements this year was the 1985 escapement of sockeye into the Karluk system of 0.98 million fish where the desired ADF&G escapement goal of 0.9 million spawners was met for the first time since 1938. Most other sockeye systems met or exceeded escapement goals in 1985 (Table 17). The exception to good escapements was the 1985 chum salmon run on the Sturgeon River. This system has had an average 1979-84 index of 91 thousand spawners, but only produced a 1985 index of 5,500 fish. It appears that the 1979 and 1980 brood years which would have produced the 1985 four and five year old Sturgeon chums was a failure. These early run Sturgeon River chums are extremely important as a food source to both brown bear and eagles which concentrate in large numbers in the upper Sturgeon River.

During 1985 efforts continued to enhance fishery baseline data on the Ayakulik River. As in 1984, approximately 40 miles of the east fork and mainstem Ayakulik River plus the Red River were surveyed in the spring. Data on migrating pink salmon smolt, coho salmon juveniles and charr juveniles were collected at the same 13 selected sites where stream

Table 16
Known and Peak Escapement Counts on Refuge Streams Which Supported Species of Major Interest to Sport Fishermen During 1985

River System	King Salmon	Coho Salmon	Steelhead Trout	Charr
Little (3)	Unknown	800	Unknown	Unknown
Browns Lagoon (3)	Unknown	Unknown	Unknown	Unknown
East Uganik (3)	Unknown	Unknown	Unknown	Unknown
Karluk (4)	5,367	37,871	(1) 573 (2) 1,924	Unknown
Sturgeon	0	1,300	Unknown	Unknown
Ayakulik/Red (4)	8,132	30,000	(1) 387 (2) 693	Unknown
Upper Station (4)	1	3,714	Unknown	Unknown
Dog Salmon/Frazer (4)	340	3,434	(1) 30 (2) 239	Unknown
Horse Marine (3)	0	1,000	Unknown	Unknown
Midway (3)	0	100	Unknown	Unknown

Table 17
Sockeye Salmon Escapement to Major and Minor Sockeye Systems on the Kodiak National Wildlife Refuge 1983-1985

		Actual		
River System	Escapement Goals	1983	1984	1985
East Uganik (3)	Unknown	23,000	40,000	40,000
Little (3)	Unknown	11,000	12,000	15,000
Karluk (4)	560,000-900,000	436,145	420,268	995,948
Ayakulik/Red	200,000-300,000	171,415	283,215	388,759
Akalura (3)	Unknown	3,300	20,350	3,000
Upper Station (4)	150,000-250,000	289,250	319,226	435,817
Horse Marine (3)	Unknown	7,500	3,000	9,000
Dog Salmon/Frazer (4)	300,000-400,000	166,655	53,524	506,336

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

morphometry and flow was collected in 1984. In addition, observation of spawning steelhead and redd sites were again mapped; but due to high water during the first part of the 10 day survey only 54 adult steelhead and 58 steelhead redds were observed. The major difference between the 1984 and 1985 survey was that during 1985 the lower 2 miles of the Red River were surveyed, 1985 results indicate that both the Red River and the east fork Ayakulik are major spawning areas for steelhead.

16. Marking and Banding

In conjunction with the refuge bald eagle migration and movements study (74530-82-01), 23 juvenile bald eagles were color-marked with patagial flags (green on left wing and yellow on right) in the nest during 1985. In addition to the patagial flags a blue study leg band and a standard FWS metal leg band were placed on these birds. Eleven of the 23 were also fitted with radio transmitters.

Nineteen brown bears were ear-tagged and tattooed on the inside upper left and right lip, central lower lip, and groin as part of brown bear studies (74530-83-02) being conducted on the refuge by the Office of Fish and Wildlife Research (formally DWRC). Ten of the bears were recaptures and were refitted with new radio collars and 6 new bears were collared.

H. PUBLIC USE

1. General

Public use on the refuge increased to 20,700 visits and 124,300 activity hours in 1985 (compared to 16,500 refuge visitors and 106,000 activity hours in 1984). Most of the increase in visitation resulted from a tripling of visitor center use during the past year. Table 18 summarizes public use levels for selected activities during the year 1983 through 1985.

Table 18
Refuge public use for selected activities from 1983 to 1985.

Category	1983 Use	1984 Use	1985 Use
Interpretive center			
Visits	1331	2217	6707
Activity hours	1066	1329	3353
Environmental education			
Visits	216	307	826
Activity hours	26	179	1209
Deer hunting			
Visits	1875	1386	1513
Activity hours	32850	36728	41435
Sport fishing			
Visits	1390	1445	1675
Activity hours	19820	13940	22800

Fourteen sport fishing guides operated on the refuge in 1985. Use levels for fishing guides are documented in the following sections of this report. Both deer hunting and sport fishing use increased in the refuge during the past year. Fees charged for use of Karluk River by Koniag Inc. (the corporation which manages Native conveyed lands along the river) were not imposed in 1985. As a result some of the sport fishing use which has shifted away from the Karluk system in recent years seems to be returning to the Karluk.

Two types of public use are recorded on the refuge. People stopping at the visitor center headquarters building, located about four miles from the town of Kodiak, spend an average of one-half hour viewing films and exhibits, obtaining leaflets, and asking questions about the refuge. Visiting the refuge proper involves the expense of chartering a small aircraft or boat to get to an activity site. Visitors spend an average of four to seven days on the refuge during hunting and fishing trips.

A major effort to upgrade information services was initiated in 1985. All three refuge publications (general leaflet, bird list and cabin leaflet) were redrafted this year. The revised and reprinted general leaflet was received in October. The other two publications should be available early in 1986. A general refuge slide orientation program with tape narration and Coast Guard orientation slide program were prepared during the year. A visitor guide to outdoor

recreation opportunities on Kodiak Island was prepared by volunteer Eric Connell. This guide is handed out to many tourists who come to the visitor center. All refuge transparencies were sorted, numbered, and filed this year (nearly 4,000 slides in all).

Dave Patterson, Janet Ady and Bev Grafel from the Regional Office staff worked on a comprehensive Public Use Standards Review for the refuge. Their findings will be presented to the refuge staff in a review and development prospectus early in 1986.

Regional Office staffer Janet Ady served on a team to review public use standards on Kodiak. (85-35) DM

2. Outdoor Classrooms

Over 800 students and teachers were involved in outdoor classroom activities during 1985. Most of the students in all four villages bordering the refuge (Karluk, Larsen Bay, Akhiok and Old Harbor) participated in activities conducted by the refuge staff in cooperation with village teachers. Teachers bringing classes to the visitor center are encouraged to use environmental education worksheets prepared by the refuge staff to supplement information children see in exhibits and films.

6. Interpretive Exhibits/Demonstrations

1985 was the first year that the interpretive center was opened on weekends. Opening weekends, offering a regular schedule of wildlife films and a sales area tripled visitor center use this year compared to 1984.

Exhibits in the center include a large topographic relief map and display which identify the unique characteristics of Kodiak Island. Permanent displays feature information on natural and cultural history, weather, geology, marine life, salmon spawning, native and introduced mammals, birds, and refuge management and public use opportunities. A fifteen minute video on Kodiak's wildlife is shown to visitors upon request. A variety of Service, ADF&G and Chamber of Commerce leaflets are distributed in the center. Duck Stamps were offered for sale in the visitor center starting in August. Approximately 40 sales items are provided in the small sales area. No staff members are assigned to the visitor center; but clerical and public use staff members attend to visitor needs on weekdays. Volunteers staff the center on weekend afternoons.

7. Other Interpretive Programs

Regularly scheduled weekend wildlife films have proven a popular feature, attracting nearly 1,500 visitors during 1985. The films are shown at 1:00, 2:00 and 3:00 p.m. both Saturdays and Sundays. The refuge owns 16 films and videos which are shown to any and all requesting groups. Panels for temporary displays were fabricated by refuge volunteers for use in the visitor center.

8. Hunting

The entire refuge is open to hunting. Species hunted include brown bear (permit only), mountain goat (permit and registration), Sitka black-tailed deer, reindeer, fox, ptarmigan, snowshoe hare, and waterfowl. Hunting seasons and regulations are set by ADF&G.

Approximately 338 hunters used the refuge during the spring and fall bear hunts in 1985. Bear hunting on the refuge accounted for nearly 19,000 hours of public use. Fifteen big game guides are registered for hunting areas on the refuge. All non-resident bear hunters are required by state regulation to use guides.

Deer hunting use, both on and off-refuge, has increased dramatically in the past several years. Liberal bag limits and a six month long hunting season combined with Kodiak's high population of Sitka black-tailed deer attract many hunters to the island. An estimated 1,600 deer hunters spent nearly 41,500 activity hours hunting on the refuge in 1985. Harvest levels for deer and bear are reported in Sec. G-8. Other than a small number of mountain goat hunters using the

refuge, most other hunting (i.e. ptarmigan, small game and waterfowl) occurs in conjunction with other activities.

9. Fishing

Sport fishing is the single most popular activity taking place on the refuge. This year, 1,675 fishermen participated in 22,800 activity hours of freshwater fishing on the refuge. Popular fishing locations and species fished include:

1. Karluk River and Lake - king salmon, steelhead silver and and red salmon, Dolly Varden.

2. The Ayakulik River - king salmon, steelhead and silver salmon.

3. Uganik River and Lake - silver and red salmon, Dolly Varden.

4. Frazer Lake and Dog Salmon Creek - red salmon, Dolly Varden and rainbow trout.

Interest in sport fish guiding has grown by leaps and bounds during the past several years. In 1983, the first year any interest was shown, six sport fishing guides operated under Special Use Permit. By 1984 the number of guides reached nine and this year fourteen guides were permitted on the refuge. By all indications sport fish guiding will exceed 20 permittees in 1986. The upper limit for sport fishing guides in the preferred alternative in the comprehensive conservation plan is 24 guides.

Conditions of sport fish guiding permits impose a 7 day limit on camping at any location. Only two guides are permitted to set up overnight camps on a given drainage. Guides may, however, conduct day use operations at any location on the refuge. Several guides conduct exclusively day use operations.

As conditions of the Special Use Permit guides are required to submit reports of their use and the number of fish caught and released by their clients. The 1985 guided sport fishing use on the refuge totalled nearly 500 visits and 9,000 activity hours. Over half of the guided sport fishermen using the refuge are day use visitors.

Day use sport fishing guides promote Karluk Lake as a "wilderness" experience. Two plane loads of clients makes one wonder though. (85-36) DM

10. Trapping

Twelve Special Use Permits were issued for trapping on the refuge in 1985. Trapping effort and success remained at a very low level on the refuge this year. Trapping on Kodiak appears to be primarily a recreational rather than an economic activity both on and off the refuge.

12. Other Wildlife Oriented Recreation

Use of refuge recreation cabins for photography, sightseeing and wildlife observation has been on the increase for several years. Because these recreational uses frequently occur in conjunction with hunting or fishing trips, the extent of photography and wildlife observation is difficult to document.

The refuge has nine public use cabins which are available to recreational users for a maximum stay of seven days per cabin per year. Use of the cabins is highest during the peak deer hunting and fishing periods. A fee system was imposed for cabin use starting in July ($10.00 per party/per night). Two refuge volunteers spent two weeks painting, reroofing and repairing stoves in four refuge cabins. The YCC crew also spent two days painting the inside of the Chief Cove Cabin. The new cabin leaflet is contained in the information packet at the end of the narrative.

Hiking and wildlife observation are increasing each year on most of the refuge. (85-37) DM

Typical spring collection of trash around one of the refuge recreation cabins. (85-38) C. Provost

17. Law Enforcement

Three deer hunters were issued violation notices for unlawful trespass when they were found using a refuge administrative cabin. A refuge set-net permittee was cited for violations of special refuge regulations when he was found conducting an outfitting operation out of his set-net cabin outside of the permitted season of use. One case of waterfowl hunting without a federal duck stamp was made off-refuge. Refuge officers assisted special agents with seizure of sea otter items offered for sale by a retail store in Kodiak.

18. Cooperating Associations

This was the first full year of operations for the Kodiak Branch of the Alaska Natural History Association outlet in the visitor center. Sales this year totalled $5,225.00. Over forty different items were offered for sale with the most popular being wildlife posters retailing for $2.00 each. Projects which will be accomplished in the coming year using Association "profits" include bookshelves for the sales area, donations to the refuge library and local schools and a set of five slides to be sold in the visitor center.

I. EQUIPMENT AND FACILITIES

1. New Construction

Construction began on the refuge aircraft hangar located on U.S. Coast Guard land at Kodiak State Airport. The building had been purchased and shipped in 1984. Construction was completed and the hangar accepted in mid-December. Total cost of the project was $130,040.35 from FY 85 funds. The hangar site development included erection of the hangar, drilling and development of a water well site, construction of a gas/oil house and black topping of access to taxiway. This project was contracted. A well house was constructed at the site by force account.

Refuge aircraft hangar at Kodiak State Airport. (85-39) TC

2. Rehabilitation

The Uganik Island, Chief Cove, Little River and Viekoda Bay recreation cabins were painted, stove parts replaced as needed, and surrounding area cleaned up. The refuge administrative facilities on the south side of Camp Island at Karluk Lake were painted and a new fuel shed constructed.

Volunteers spent two full weeks on cabin maintenance performing a full range of needed improvements. (85-40) C. Provost

4. Equipment Utilization and Replacement

The refuge research/patrol vessel, Ursa Major, was placed on the Kodiak City harbor drydock grid in June for a hull inspection and cleaning. The hydraulic auxillary power supply for the autopilot was installed in April. The entire outer hull, wheelhouse, superstructure, flying bridge, and main engine were scraped and painted. The decks were also scraped and recoated with waterproof deck sealant. A new aluminum main boom was installed to replace the heavy and sometimes dangerous in heavy seas steel boom used for launching the power skiff and handling freight. This work, other than installation of the hydraulic power supply, was accomplished by force account.

Major equipment purchased this year included a 16 foot Strong Boy trailer, a Yardman Tractor, Snow Chief snow thrower, 3 portable dishwashers (for Triplex), and two Honda generators (MDL # EX 650 and EM 2200).

A replacement vehicle for the 1978 Dodge stationwagon and 1975 Dodge 4x4 with snow plow attachment were ordered in 1985.

6. Computer Systems

A Data General 10 SP desktop micro-computer and associated hardware and printers were installed in 1985. Refuge staff spent many long frustrating hours trying to "get the bugs out" of the system. Personnel from Information Resources Management (IRM) came from Anchorage to assist us and ended up taking the disk drive back with them for repair. The system was still functioning intermittently at year's end.

8. Other

The Refuge Accelerated Refuge Maintenance Management (ARMM) budget was $193,000 ($148,000 large projects and $45,800 small projects). Approved large projects in the Annual Work Plan were $118,000 for airplane hangar erection (Sec. I-1) and $30,000 for Cultural Resources Inventory. The Cultural Resources Inventory was canceled at the last minute because no one bid on the contract. Table 19 shows actual funding expenditures.

Table 19
Actual FY 85 ARMM projects

Project	Amount
Construct hangar	120,000
Topsoil	2,300
Telemetry collars for bears	10,010
Auto pilot for Ursa Major	1,760
Telemetry collars for eagles	2,560
Fuel efficiency kit	380
Trailer, Strong Boy	3,850
Portable Radio, VHF (2 each)	1,290
Tractor (Yardman)	2,650
Replacement vehicle for station wagon	12,000
Develop well at hangar site	3,200
Copy machine (Savin)	3,300
Flight charges for cabin maintenance	2,500

J. OTHER ITEMS

1. Cooperative Programs

Kodiak NWR "houses and hosts" Vic Barnes, a Research Biologist from AOFWR. Vic's meager budget was augmented with $20,000 from the refuge for studies, $10,010 for collars for bear telemetry work plus all logistical and clerical support. Both Vic and the refuge benefit from his research (Sec. D-5). Vic provided valuable assistance during the drafting of the RCCP and has provided input on various compatibility determinations.

A Special Use Permit (SUP) was again issued to the ADF&G-FRED, Kodiak for chum salmon egg take from the Sturgeon River. This egg bank is being utilized by ADF&G's Kitoi Bay Hatchery to establish a broodstock program there. A SUP was also issued to ADF&G-Commercial Fish Division for operation of fish counting wiers on Lower Dog Salmon River and Olga Creek.

SUP's were issued to BLM for reconnaissance for photo interpretation to identify vegetation types representing ordinary high water shorelines for various water bodies and to the Alaska Department of Public Safety (State Troopers-Fish & Wildlife Protection) for a tent frame in the NE Arm of Uganik Bay.

2. Other Economic Uses

Kodiak NWR is mandated by Public Law 96-487, ANILCA to provide land based support facilities for commercial fishing activities subject to reasonable regulations, if they are consistent with the purposes for which the refuge was established and not a significant expansion of commercial fishing activities within the refuge beyond the levels of such activities during 1979. There were at least 65 of these sites within the exterior boundary of the refuge in 1985. This use continues to have the largest impact on refuge resources.

The refuge presented a check to the Kodiak Island Borough for thirteen ($13.00) dollars in February 1985 under the revenue sharing provisions of Public Law 95-469. This represented Kodiak's share of refuge receipts for FY 84.

3. Items of Interest

On September 11, 1983 Charles W. Strickland, Refuge Manager of Kodiak NWR, died of a massive heart attack while on vacation with his family in Hawaii. Charles 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 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 National 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, Sautee and Felsenthal National Wildlife Refuges, Charles returned to Alaska in 1978 to manage the 20,000,000 acre Yukon Delta NWR in Bethel, Alaska. In April 1982, Charles transferred to the Kodiak NWR at Kodiak, Alaska where he was manager at the time of his death.

In July, 1985, after a year and one-half of efforts by refuge and Regional Office folks, the Service dedicated a mountain by Karluk Lake on the refuge to Charles. Mt. Strickland will now be identified on U.S.G.S. Quads. Regional Director Robert Gilmore, Refuge Supervisor (South) Larry Calvert and Refuge Manager Jay Bellinger joined family members at the Camp Island administrative facility for a dedication ceremony on July 12, 1985. Charles used to sit on the porch there in the evening and gaze at the mountain that now bears his name and remark "this is what it's all about..."

4. Credits

This report was a team effort. Bellinger wrote section C-3 and feedback. Vivion wrote the Introduction, portions of section D-5, section F-1, F-9, portions of section G-8, section G-9, G-10, and assisted in editing. Chatto wrote section B, section D-2, portions of section D-5, section E-7, F-6, F-11, and G-11. Menke wrote section D-1, all of section H, worked up the information packet and also assisted in editing. Zwiefelhofer contributed to section D-5, G-3 through G-7, portions of G-16 and I-4. Barnes wrote portions of D-5 and G-8. Ryan wrote section A, E-1, E-2, E-4, E-5, E-6, F-10, portions of G-16, I-1, I-2, I-4, I-6, I-8, and all of section J. The hard work of typing was done by Castonguay and Manfredi.

"I shall never tire of looking at the mountain...it is God's best work and should be preserved in its natural state forever..."

Charles M. Strickland
United States Fish and Wildlife Service
Kodiak National Wildlife Refuge
Kodiak, Alaska (85-41) KR

K. FEEDBACK

Refuge Comprehensive Conservation Plan

Our frustration level increased a significant degree in 1985, as we continued to work on the Refuge Comprehensive Conservation Plan (RCCP) which was mandated by the Alaska National Interest Lands Conservation Act (ANILCA). By the time you finish the public and other agency workshops, public hearings and look at the feedback from the public review draft, you begin to wonder if anyone else other than the field staff believes that resource protection should be the number one objective on Alaska NWR's.

However, we can see the light at the end of the tunnel and the final plan for Kodiak will be printed in November, 1986. The process is good in that it makes the staff take a closer look at the area and why we are here and what the future may bring. The bad part of the process is that the public involvement gives people the impression that they can dictate management direction on public land in a way that will benefit their special interest. It seems at times that everyone other than the refuge staff has "tunnel vision" and are not willing to look at the needs of the entire ecosystem.

Section 22 (g) Regulations

In the 1983 and 1984 Narrative Reports, we reported on the lack of special 22 (g) regulations and the potential and presently occuring resource problems caused by same. Therefore, we will not plow old ground again in this year's report. However, we did make an initial cut at defining 22 (g) and laid the ground work for future regulations in our RCCP draft this year. Feedback from the various Alaska Native groups and others throughout the state on our Public Review Draft of the RCCP indicate that they are very unhappy with our approach to 22 (g). They feel that we are being too conservative in our approach and that 22 (g) in general places undue hardship on the Native landowners, (will not allow significant economic development of their lands). The problem is that a significant percentage of the Native lands, which have been conveyed within the refuge, contains critical bear habitat and development with long term human presence on these lands will be incompatible with brown bear.

When we look at potential development on lands over which we have no control (patented sites, Native 160 acre allotments allowed under the Native Allotment Act of 1906, and private, state, borough and Native lands outside the refuge boundary), the Kodiak Archipelago brown bear populations will be adversely affected by human encroachment in the near future. Therefore, it is imperative that the 22 (g) section of the Alaska Native Claims Settlement Act (ANCSA) not be deleted by Congress and that the U.S. Fish and Wildlife Service maintain a conservative approach in the regulation development for these lands as outlined in our RCCP.

If we lose control on these critical interior areas we are looking at the real potential of severely impacting brown bear within the boundary of the refuge. If this loss is combined with the inevitable loss of bear habitat outside the refuge, Kodiak Brown Bear populations as we know them today, will be a memory.

Increasing Public Use

Kodiak has been experiencing a significant increase in visits during the last few years. The best guess by Alaska Department of Fish and Game personnel and refuge staff is that visits have increased at a rate of 10 percent annually from 1981 through 1984. If this rate of increase continues, we can expect 20,000 visits by 1995. Based on lower 48 use, this level of visitation does not appear excessive (especially on 1.8 million acres). However, most of the increase has been and will continue to be in sport fishing and deer hunting. This type of visitation has a direct impact on the brown bear resource. A total of 14 defense of life and property (DLP) bear kills was reported in game management unit 8 (Kodiak Archipelago) this year. Of this total eight DLP kills were attributed to deer hunting (57%). Eleven (79%) of the kills occurred on the refuge. The number of bear that are shot at and/or killed but not reported is unknown. In the near future, we may have to attempt limiting some types of public use by the general public on Kodiak which will be very unpopular politically.

Administrative Support by Regional Office

Although we continue to experience frustration on refuge field stations in Alaska (this is to be expected when you realize that we are operating under relatively young legislation - ANILCA was passed in 1980 and many portions of this law are open to interpretaton), I believe support to the field by the Regional Office definitely improved this past year and would like to give a "qualified kudo" to whoever wants to take the credit.

	S	S	F	W
Blackpoll Warbler		+		
WILSON'S WARBLER *	U	A	U	
AMERICAN TREE SPARROW	U		U	U
SAVANNAH SPARROW *	A	A	A	+
FOX SPARROW *	A	A	C	R
SONG SPARROW *	C	C	C	C
Lincoln's Sparrow	+		R	R
White-throated Sparrow			+	
GOLDEN-CROWNED SPARROW *	A	A	C	R
WHITE-CROWNED SPARROW	R	+	R	R
Harris' Sparrow	+		+	+
Dark-eyed Junco	U	+	U	U
LAPLAND LONGSPUR *	A	A	C	+
SNOW BUNTING *	C	C	C	U
McKay's Bunting				+
Red-winged Blackbird			+	
RUSTY BLACKBIRD	R		R	R
Brambling			+	
ROSY FINCH *	U	U	U	U
PINE GROSBEAK *	C	C	C	C
Red Crossbill *	R	R	R	R
WHITE-WINGED CROSSBILL *	U	U	U	U
COMMON REDPOLL *	C	C	C	C
Hoary Redpoll	+			+
PINE SISKIN *	C	C	C	C

If you find any birds not recorded on this checklist, Please report along with complete field observation notes to:

Kodiak National Wildlife Refuge
1390 Buskin River Road
Kodiak, AK 99615
(907) 487-2600

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Prepared by Richard MacIntosh

	S	S	F	W
Hairy Woodpecker		+	+	+
THREE-TOED WOODPECKER *	R	R	R	R
NORTHERN FLICKER			+	
Eastern Kingbird		+		
Horned Lark	+		+	
TREE SWALLOW *	C	C	R	
VIOLET-GREEN SWALLOW *	C	C	R	
BANK SWALLOW *	U	A	U	
Cliff Swallow	R	+		
BARN SWALLOW		R		
BLACK-BILLED MAGPIE *	C	C	C	C
NORTHWESTERN CROW *	C	C	C	C
COMMON RAVEN *	C	C	C	C
BLACK-CAPPED CHICKADEE *	C	C	C	C
RED-BREASTED NUTHATCH *	U	U	U	U
BROWN CREEPER *	U	U	U	U
WINTER WREN *	C	C	C	C
AMERICAN DIPPER *	C	C	C	C
GOLDEN-CROWNED KINGLET *	A	A	A	A
Ruby-crowned Kinglet	+	+	R	R
GRAY-CHEEKED THRUSH *	R	C		
Swainson's Thrush		+		
HERMIT THRUSH *	A	A	C	
AMERICAN ROBIN	R	R	R	R
VARIED THRUSH *	C	C	C	U
Yellow Wagtail		+		
WATER PIPIT *	C	C	C	R
BOHEMIAN WAXWING			R	R
NORTHERN SHRIKE *	C	C	C	C
European Starling	+		+	+
ORANGE-CROWNED WARBLER *	C	C	R	
YELLOW WARBLER *	R	C	R	
YELLOW-RUMPED WARBLER	R	U	R	

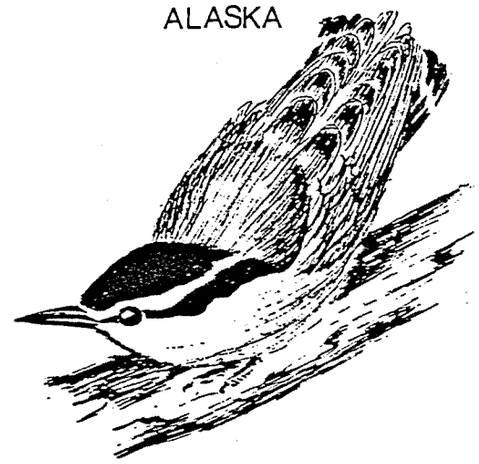
	S	S	F	W
Pomarine Jaeger	C	U	C	
PARASITIC JAEGER *	C	U	C	
LONG-TAILED JAEGER *	U	U	U	
South Polar Skua		+	+	
BONAPARTE'S GULL	U	U	U	
MEW GULL *	C	C	A	A
Ring-billed Gull	+	+		
California Gull	+		+	
HERRING GULL	U	R	R	R
Thayer's Gull	R		R	R
Slaty-backed Gull	+		+	+
GLAUCOUS-WINGED GULL *	A	A	A	A
GLAUCOUS GULL	U	R	U	U
BLACK-LEGGED KITTIWAKE *	A	A	A	U
Red-legged Kittiwake	+	+	+	+
Sabine's gull	U	U	U	
ARCTIC TERN *	C	C	R	
ALEUTIAN TERN *	U	U	+	
COMMON MURRE *	C	C	A	A
Thick-billed Murre *	R	R	R	R
PIGEON GUILLEMOT *	C	C	C	C
MARBLED MURRELET *	C	C	C	C
Kittlitz's Murrelet	R	U	R	R
ANCIENT MURRELET *	U	U	R	R
Cassin's Auklet *	U	U	U	+
Parakeet Auklet *	R	R	R	+
Least Auklet	+	+	+	+
CRESTED AUKLET	+	+	C	A
Rhinoceros Auklet	R	U	R	R
TUFTED PUFFIN *	A	A	A	R
HORNED PUFFIN *	C	C	C	R
MOURNING DOVE		+	+	
SNOWY OWL			+	+
NORTHERN HAWK-OWL *	U	U	U	U
SHORT-EARED OWL *	U	U	U	R
BOREAL OWL *	C	C	C	C
BELTED KINGFISHER *	C	C	C	C
Red-breasted Sapsucker		+	+	+
DOWNY WOODPECKER *	U	U	U	U

Birds of KodiakNational Wildlife Refuge

AND THE

KODIAK ISLAND ARCHIPELAGO

ALASKA



Kodiak National Wildlife Refuge was established in 1941 to preserve and protect the pristine habitat of the brown bear and other wildlife. The refuge comprises more than two-thirds of Kodiak Island and a small portion of Afognak Island.

Kodiak is the largest Island in the Gulf of Alaska. A thirty mile span of notoriously treacherous ocean the Shelikof Straits, separates the Island from the Alaska mainland.

Eight hundred miles of coastline with associated shallows and marshes exist on Kodiak refuge which makes the area important to seabirds and waterfowl.

Though the Kodiak archipelago is not an important waterfowl or passerine nesting or staging area, it is a major wintering area for seabirds whose combined population number well over a million birds.

Summer brings many nesting songbird species to Kodiak Island.

Coastal islets and sea stacks become nurseries for thousands of seabirds of many different species. Shorebirds live and nest in the moist areas around lakes and potholes, moving freely between these areas and salt water bays.

This list contains 211 species that have been recorded on the refuge and the Archipelago. Some species are rarely seen and are marked as such. A few Asiatic and European species are also observed particularly during migration periods, and are considered accidental visitors to the area.

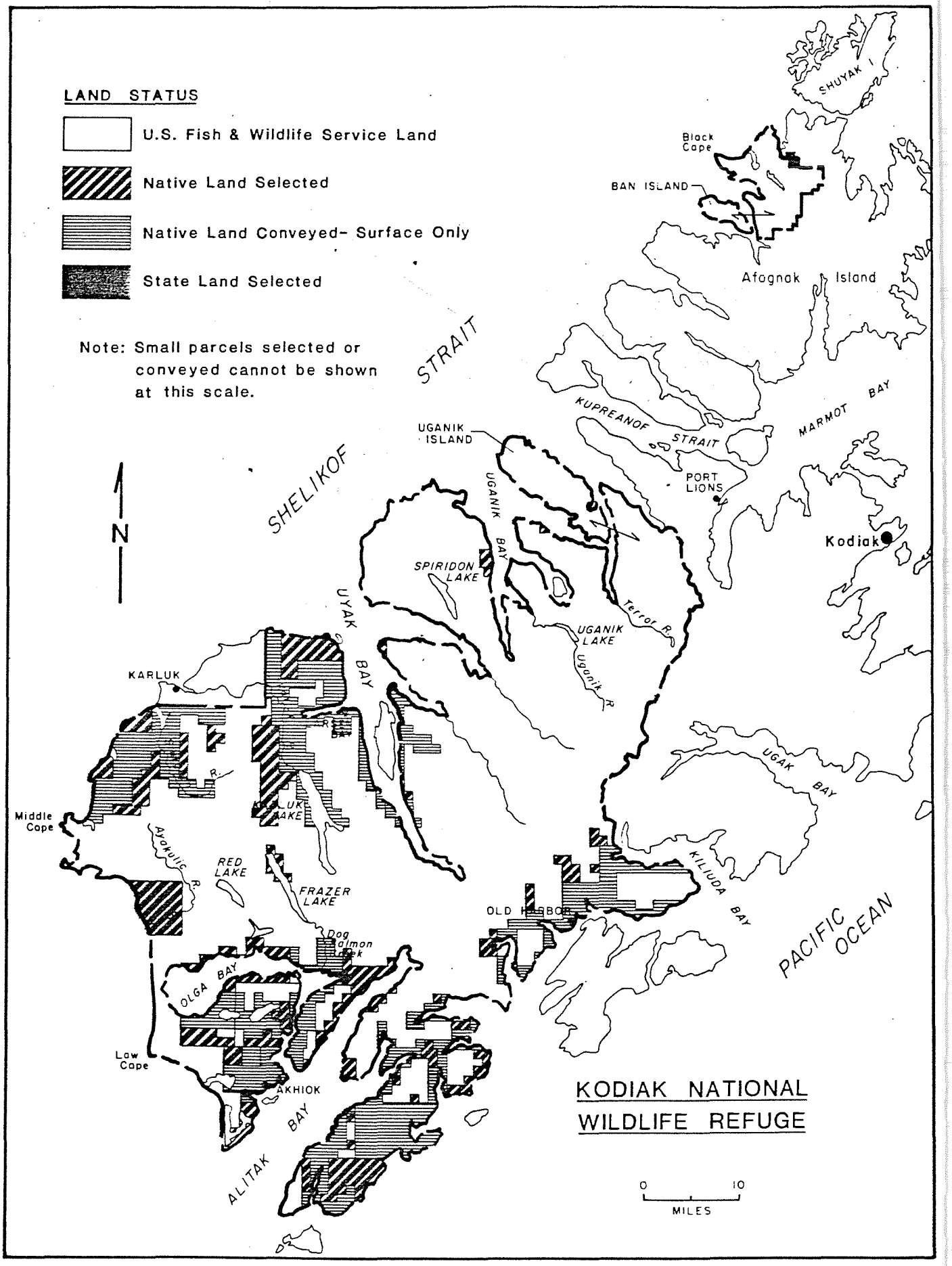
A = Abundant
C = Common
U = Uncommon
R = Rare
\+ = Casual or Accidental
* = Nesting
_ = Divides Families

Spring — March - May
Summer — June - August
Fall — September - November
Winter — December - February
Capitals — Birds recorded on the Kodiak National Wildlife Refuge

	S	S	F	W
RED-THROATED LOON *	U	U	U	U
Arctic Loon	U		U	U
COMMON LOON *	U	U	U	U
Yellow-billed Loon	R	+	R	U
HORNED GREBE	C	R	C	C
RED-NECKED GREBE *	U	R	U	U
Short-tailed Albatross	+	+		
Black-footed Albatross	C	C	C	
Laysan Albatross	U	U	U	
Northern Fulmar	C	C	C	C
Mottled Petrel	U	U	U	
Pink-footed Shearwater	+			
Flesh-footed Shearwater	+	+		
Buller's Shearwater	+	+		
Sooty Shearwater	A	A	A	R
Short-tailed Shearwater	A	A	A	R
Fork-tailed Storm-Petrel *	C	C	C	C
Leach's Storm-Petrel *	U	U	U	
DOUBLE-CRESTED CORMORANT *	U	U	U	C
PELAGIC CORMORANT *	C	C	C	C
RED-FACED CORMORANT *	C	C	C	U
GREAT BLUE HERON	R	+	R	R
TUNDRA SWAN *	C	C	C	R
Trumpeter Swan	+			
Greater White-fronted Goose	U		U	
Snow Goose	+		+	
EMPEROR GOOSE	C		U	C
BRANT	A	+	+	+
CANADA GOOSE	U		U	+
GREEN-WINGED TEAL *	C	C	C	U
MALLARD *	A	A	A	A
Spot-billed Duck			+	
NORTHERN PINTAIL *	A	C	C	U
BLUE-WINGED TEAL	R			
NORTHERN SHOVELER	C	R	R	+

	S	S	F	W
GADWALL *	U	U	U	C
EURASIAN WIGEON	U		R	R
AMERICAN WIGEON *	C	C	C	U
Canvasback	+		+	+
Redhead	+		+	+
RING-NECKED DUCK	R		R	R
Tufted Duck	+			+
GREATER SCAUP *	A	C	A	A
Lesser Scaup	R	+	R	R
COMMON EIDER *	U	U	U	U
KING EIDER	C	R	U	C
Spectacled Eider				+
STELLER'S EIDER	C	+	U	C
HARLEQUIN DUCK *	A	C	A	A
OLDSQUAW	A	R	A	A
BLACK SCOTER *	A	U	A	A
SURF SCOTER	C	R	C	C
WHITE-WINGED SCOTER	A	C	A	A
COMMON GOLDENEYE *	C	U	C	C
BARROW'S GOLDENEYE *	C	U	C	C
BUFFLEHEAD	C	+	C	C
Smew	+			+
HOODED MERGANSER	+	+	R	R
COMMON MERGANSER *	C	C	C	C
RED-BREASTED MERGANSER *	C	C	C	C
OSPREY	+	+	+	
BALD EAGLE *	C	C	C	C
STELLER'S SEA-EAGLE		+		
NORTHERN HARRIER	U	R	U	+
Sharp-shinned Hawk	R	R	R	R
NORTHERN GOSHAWK *	C	C	C	C
Red-tailed Hawk	+			
ROUGH-LEGGED HAWK *	C	C	C	+
GOLDEN EAGLE *	U	U	U	U
American Kestrel			+	+
MERLIN	R	R	U	R
PEREGRINE FALCON *	U	U	U	U
GYRFALCON	R	R	R	R
WILLOW PTARMIGAN *	C	C	C	C
ROCK PTARMIGAN *	C	C	C	C

	S	S	F	W
SANDHILL CRANE	+	+		
BLACK-BELLIED PLOVER	C	U	U	
LESSER GOLDEN PLOVER	C	U	C	
SEMIPALMATED PLOVER *	A	A	U	
KILLDEER		+		
AMERICAN BLACK OYSTERCATCHER *	C	C	C	C
GREATER YELLOWLEGS *	C	C	C	
LESSER YELLOWLEGS	R	C	C	
Solitary Sandpiper		R		
WANDERING TATTLER	C	C	U	
SPOTTED SANDPIPER *	R	U	R	
WHIMBREL	U	R	R	
Bristle-thighed Curlew		+	+	
Hudsonian Godwit		+		
Bar-tailed Godwit	R	+	+	
Marbled Godwit	R			
RUDDY TURNSTONE	R	R	R	
BLACK TURNSTONE	C	C	U	U
SURFBIRD *	C	U	U	U
Red Knot	+	+		
SANDERLING	R	R	R	R
Semipalmated Sandpiper		R		
WESTERN SANDPIPER	U	A	U	
Temminck's Stint		+		
LEAST SANDPIPER *	A	A	R	
Baird's Sandpiper		U	P	
Pectoral Sandpiper	R	U	C	
Sharp-tailed Sandpiper		R	C	+
ROCK SANDPIPER *	C	U	C	C
DUNLIN	C	R	U	U
Curlew Sandpiper		+		
Stilt Sandpiper		+		
Buff-breasted Sandpiper		+	+	
Ruff			+	
SHORT-BILLED DOWITCHER *	C	C	U	
Long-billed Dowitcher	+	+	R	
COMMON SNIPE *	C	C	C	R
RED-NECKED PHALAROPE *	C	C	C	
Red Phalarope	U	U	U	


LAND STATUS
U.S. Fish & Wildlife Service Land
Native Land Selected
Native Land Conveyed- Surface Only
State Land Selected
Note: Small parcels selected or conveyed cannot be shown at this scale.
N
SHUYAK I.
Black Cape
BAN ISLAND
Afognak Island
KUPREANOF STRAIT
MARMOT BAY
PORT LIONS
Kodiak
UGANIK ISLAND
UGANIK BAY
SPIRIDON LAKE
Terror R.
UGANIK LAKE
Uganik R.
SHELIKOF STRAIT
UYAK BAY
KARLUK
Middle Cape
Ayakulik R.
RED LAKE
FRAZER LAKE
Dog Salmon Creek
OLGA BAY
Low Cape
AKHIOK
ALITAK BAY
OLD HARBOR
KILIUDA BAY
UGAK BAY
PACIFIC OCEAN
KODIAK NATIONAL WILDLIFE REFUGE
0
10
MILES

K. FEEDBACK

Refuge Comprehensive Conservation Plan

Our frustration level increased a significant degree in 1985, as we continued to work on the Refuge Comprehensive Conservation Plan (RCCP) which was mandated by the Alaska National Interest Lands Conservation Act (ANILCA). By the time you finish the public and other agency workshops, public hearings and look at the feedback from the public review draft, you begin to wonder if anyone else other than the field staff believes that resource protection should be the number one objective on Alaska NWR's.

However, we can see the light at the end of the tunnel and the final plan for Kodiak will be printed in November, 1986. The process is good in that it makes the staff take a closer look at the area and why we are here and what the future may bring. The bad part of the process is that the public involvement gives people the impression that they can dictate management direction on public land in a way that will benefit their special interest. It seems at times that everyone other than the refuge staff has "tunnel vision" and are not willing to look at the needs of the entire ecosystem.

Section 22 (g) Regulations

In the 1983 and 1984 Narrative Reports, we reported on the lack of special 22 (g) regulations and the potential and presently occuring resource problems caused by same. Therefore, we will not plow old ground again in this year's report. However, we did make an initial cut at defining 22 (g) and laid the ground work for future regulations in our RCCP draft this year. Feedback from the various Alaska Native groups and others throughout the state on our Public Review Draft of the RCCP indicate that they are very unhappy with our approach to 22 (g). They feel that we are being too conservative in our approach and that 22 (g) in general places undue hardship on the Native landowners, (will not allow significant economic development of their lands). The problem is that a significant percentage of the Native lands, which have been conveyed within the refuge, contains critical bear habitat and development with long term human presence on these lands will be incompatible with brown bear.

When we look at potential development on lands over which we have no control (patented sites, Native 160 acre allotments allowed under the Native Allotment Act of 1906, and private, state, borough and Native lands outside the refuge boundary), the Kodiak Archipelago brown bear populations will be adversely affected by human encroachment in the near future. Therefore, it is imperative that the 22 (g) section of the Alaska Native Claims Settlement Act (ANCSA) not be deleted by Congress and that the U.S. Fish and Wildlife Service maintain a conservative approach in the regulation development for these lands as outlined in our RCCP.

If we lose control on these critical interior areas we are looking at the real potential of severely impacting brown bear within the boundary of the refuge. If this loss is combined with the inevitable loss of bear habitat outside the refuge, Kodiak Brown Bear populations as we know them today, will be a memory.

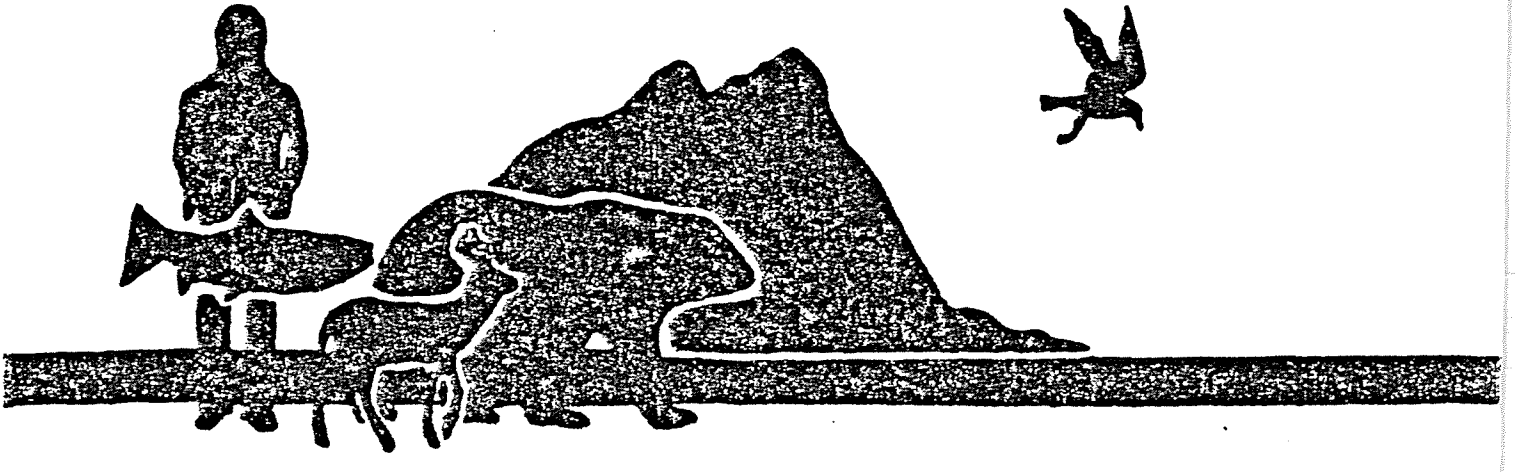
Increasing Public Use

Kodiak has been experiencing a significant increase in visits during the last few years. The best guess by Alaska Department of Fish and Game personnel and refuge staff is that visits have increased at a rate of 10 percent annually from 1981 through 1984. If this rate of increase continues, we can expect 20,000 visits by 1995. Based on lower 48 use, this level of visitation does not appear excessive (especially on 1.8 million acres). However, most of the increase has been and will continue to be in sport fishing and deer hunting. This type of visitation has a direct impact on the brown bear resource. A total of 14 defense of life and property (DLP) bear kills was reported in game management unit 8 (Kodiak Archipelago) this year. Of this total eight DLP kills were attributed to deer hunting (57%). Eleven (79%) of the kills occurred on the refuge. The number of bear that are shot at and/or killed but not reported is unknown. In the near future, we may have to attempt limiting some types of public use by the general public on Kodiak which will be very unpopular politically.

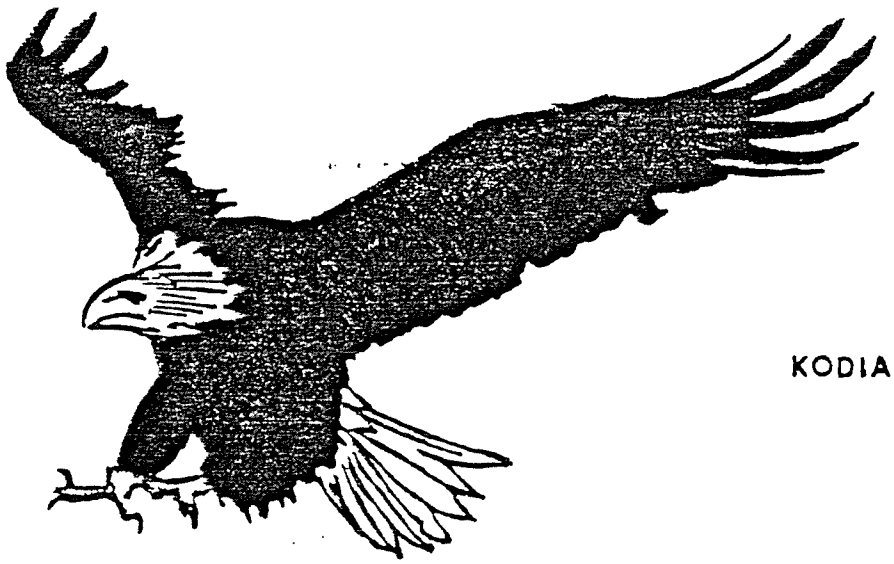
Administrative Support by Regional Office

Although we continue to experience frustration on refuge field stations in Alaska (this is to be expected when you realize that we are operating under relatively young legislation - ANILCA was passed in 1980 and many portions of this law are open to interpretaton), I believe support to the field by the Regional Office definitely improved this past year and would like to give a "qualified kudo" to whoever wants to take the credit.

KODIAK ISLAND VISITOR GUIDE



KODIAK N.W.R.
U.S. FISH AND WILDLIFE SERV

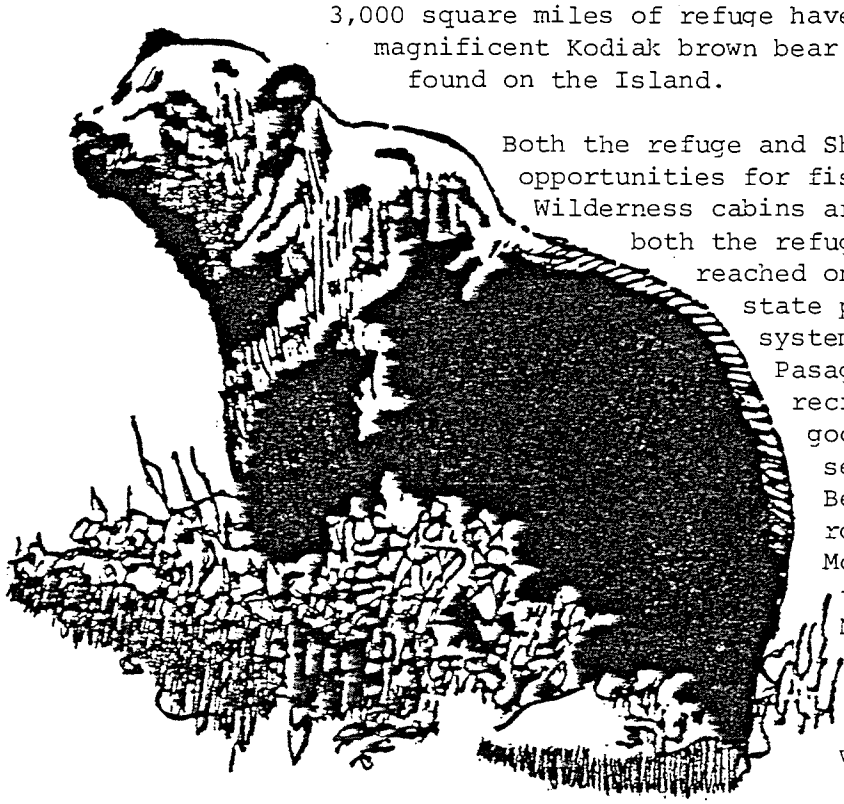


KODIAK ISLAND

The Kodiak Island Archipelago is situated in the northern Gulf of Alaska. The unique habitat and rich coastline of the Kodiak Island group provides abundant living space and resources for both wildlife and man. Commercial fishing provides work for the majority of people living of Kodiak Island while resource management, services, native villages, and the U.S. Coast Guard Support Center offer other work opportunities.

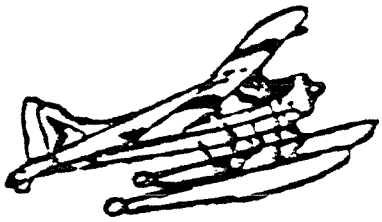
As Kodiak blossoms into spring and summer, the landscape turns into an unbelievably green carpet, well adorned with flowers. Lupine, wild geranium, shooting star, Indian paintbrush, and hundreds of other beautiful flowers and berries grow in abundance, providing food for the birds and wildlife while treating the eye to a spectacular display of color.

Kodiak Island attracts recreationalists year round. Hunters, photographers, sport fisherment, bird watchers, and others who are willing to endure the hardships of rough terrain and the vagaries of the weather will be enriched by a unique experience while visiting Kodiak. Roughly two-thirds of Kodiak Island is a national wildlife refuge. The nearly 3,000 square miles of refuge have been set aside to protect the magnificent Kodiak brown bear and the diverse wildlife resource found on the Island.



Both the refuge and Shuyak State Park offer excellent opportunities for fishing, hunting, and photography. Wilderness cabins are available by advance reservation on both the refuge and state park. Both areas can be reached only by boat or float plane. The three state parks located along Kodiak's road system, Fort Abercrombie, Buskin River and Pasagshak, have campsites and a variety of recreational facilities. Fishing is very good during salmon spawning runs in several streams along the road system. Beachcombing is popular all along the road. Scenic hiking up Pillar Mountain, Barometer Mountain or under the spruce groves at the end of Monashka Bay road will provide some rewarding views and interesting discoveries. Don't miss the opportun to enjoy Kodiak's varied and beautifu wildflowers during the summer months.

ACCESS TO AND AROUND KODIAK ISLAND



Access to Kodiak Island is possible either by boat or air services. The Alaska Division of Marine Transportation provides ferry services to and from Kodiak Island. Contact their main office at Pouch R, Juneau, Alaska 99811 for more specific information on sailing schedules and fees. The ocean ferry, "Tustumena", serves Kodiak Island the year round except for winter months when weather and public demand make services impractical. The "Tustumena" is boarded at Seward, Homer, or Seldovia, the most common embarcation points being either Homer or Seward. It serves Kodiak twice a week. The twelve hour journey to Kodiak takes the traveler past the white mountain peaks of the Kenai and Alaska Peninsula. The visitor will sail through the sea lion and bird rookeries of Marmot and the Barren Islands with possible sightings of whales and porpoises. Once on Kodiak, small boat or plane charter services are available to explore remote areas of the island. There are several private charter services based in the town of Kodiak.

Air transportation to Kodiak Island is possible through one airline, Mark Air, which has regularly scheduled flights to and from Kodiak.

For those who wish to venture into Kodiak's more rugged territory, there are several air charter services offering transportation to hunters, fishermen, travelers, photographers, and beachcombers.

KODIAK, TOWN SITES, ATTRACTIONS, AND EVENTS

The city of Kodiak, Coast Guard Support Center, and villages contain approximately 13,300 permanent residents. There are a number of annual attractions and events held either in or around the City of Kodiak. Kodiak's Baranof Museum, the oldest standing structure on the island, is located below the prominent Russian Orthodox Church in town. The museum displays a brief history of the native way of life and their dramatic change of lifestyle through Russian and American intervention. Gifts, souveneirs, and historical literature are available for sale in the museum. The annual Crab Festival, rodeo and state fairs, and Kodiak's outdoor drama presentation, "Cry of the Wild Ram", are fun and spirit enlightening events held near the City of Kodiak. The May Crab Festival gives the community a chance to unwind and spiritually prepare for the long, hard fishing season. The old-fashioned country fair provides good fun for all.

During the month of August, the Kodiak Jaycee Rodeo and State Fair put on an exciting three-day event which attracts young and old. Amateurs and professionals all join in on the fun of calf roping and milking the wild cow contest.

KODIAK, TOWN SITES, ATTRACTIONS, AND EVENTS

The "Cry of the Wild Ram" is Alaska's only outdoor play put on by the residents of Kodiak. An evening of "living history" will wrap itself around spectators who marvel at the colorful and dramatic presentation of the founding of Alexander Baranof's Russian colony in Alaska. The audiences will feel every sight, sound, and emotion of the intriguing story of Kodiak's beginning.

For additional information on any of the above events and more, contact the Kodiak Chamber of Commerce, Box 1485, Kodiak, Alaska 99615.

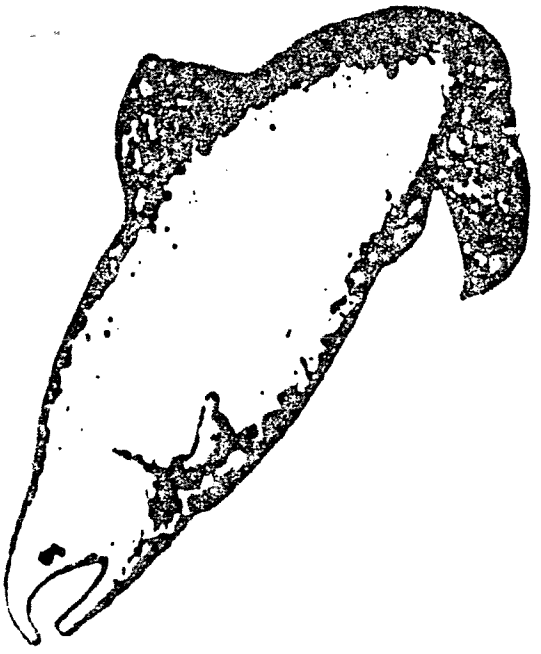
KODIAK'S ROAD SYSTEM

Kodiak's road system offers a variety of experiences. Sightings of the larger land mammals of Kodiak Island are fairly limited from the road system; however, many interesting sights are there for the enthusiast. Ocean birds, whales, sea lions, and sea otters are often observed in the bays and ocean along the road system. Four state parks are located on Kodiak Island, three are accessible by the road system and the other by boat or plane. Fort Abercrombie State Park, 3.5 miles north of Kodiak, offers limited facilities for tents and trailer camping. Fort Abercrombie was an World War II fortification which now commands a beautiful view of the rocky coastline and nearby islands.

Buskin State Recreational Site, four miles southwest of Kodiak, is located at the mouth of Buskin River. A number of recreational pursuits and limited facilities are available to visitors. Buskin State Park is a popular local fishing site in summer and fall.

Pasagshak State Recreation Site is located at the southeast end of the road system. Facilities at Pasagshak are limited, but the scenery provides a very rewarding day excursion.

A portion of Shuyak Island has recently been dedicated as a state park. This unique wilderness at the northern extreme of the Kodiak Island group is only accessible by plane or boat. Recreation cabins and facilities will be available in the near future.



RECREATION ON KODIAK ISLAND

Kodiak Island is an outdoor recreationalists' paradise. If offers varied experiences including hunting, fishing, hiking, wildlife viewing, and photography.

It is the home of the world famous Kodiak brown bear, the largest living carnivorous land mammal in North America. Hunters come from the world over to hunt the trophy size Kodiak brown bear. A full grown male can weigh as much as 1,500 pounds and have a ten foot square hide. Kodiak Island has the greatest densities of brown bears per square mile in the world.

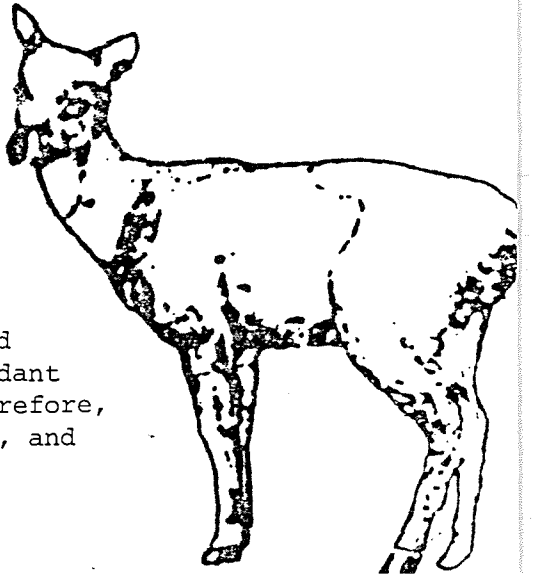
Kodiak's lakes, rivers, and streams are famous for steelhead, Dolly Varden, rainbow trout, and all five species of salmon. Fishermen come from all over the world to test their skills and hopefully land a prize catch. Ocean fishing and crabbing also provide memorable experiences.

The coastline, beaches, and clam beds around Kodiak offer opportunities for those who like to explore inter-tidal zones to the energetic clam digger.

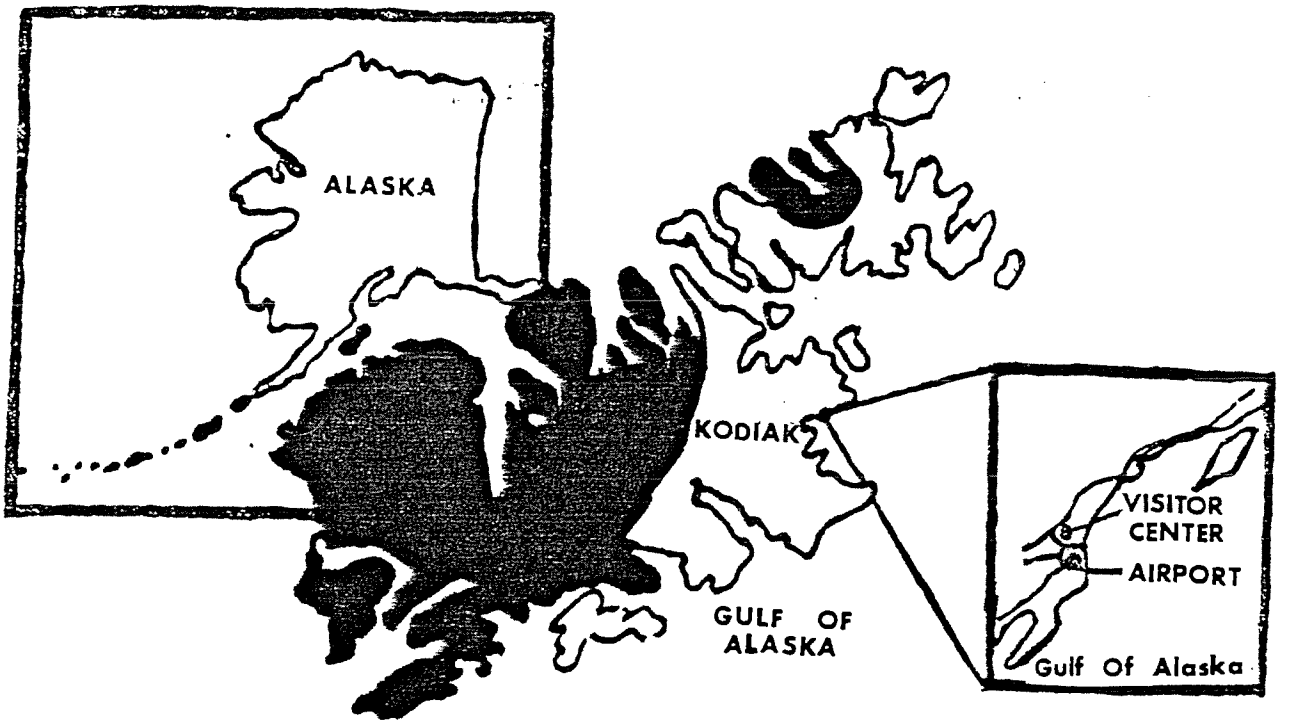
Various guide services are available on Kodiak for the hunter, fisherman, photographer, and explorer.

KODIAK NATIONAL WILDLIFE REFUGE

Kodiak National Wildlife Refuge encompasses the southwestern two-thirds of Kodiak Island and a northwest portion of Afognak Island. The Refuge was established in 1941 to preserve the natural habitat of the famed Kodiak brown bear and other wildlife. The Refuge is remote and accessible only by plane or boat. Float planes are able to land visitors on the larger lakes and on the coastal waters of the refuge. Air charter operators providing transportation to the Refuge are listed in this leaflet. You may communicate directly with one of these operators for more information on charters and fares. Detailed topographic maps of the Refuge may be obtained from the U.S. Geological Survey, Denver, Colorado 80225 and local sporting good shops in Kodiak.



The entire Refuge is open to hiking, camping, fishing, and hunting. There are no established hiking trails or campgrounds on the Refuge. Hiking can be extremely difficult because of the dense ground cover on most of the island. Biting insects are abundant from mid-June to mid-September. Visitors should, therefore, supply themselves with appropriate clothing, headnets, and insect repellent.



The U.S. Fish and Wildlife Service maintains nine public use cabins on the Refuge. Use is limited to a seven day visit and a $10.00 fee per night is charged for cabins. Drawings are held quarterly to cover heavy use periods. Thereafter, reservations are made on a first come, first served basis. Cabin leaflets are available from the Refuge headquarters.

Kodiak National Wildlife Refuge offers a unique wilderness experience for those willing to endure the hardships of rough terrain and the unpredictable weather conditions of Alaska.

For the less adventuresome, the Refuge headquarters visitor center offers many displays including movies and slide programs. The headquarters is located on the Buskin Beach Road approximately 4.5 miles from the city of Kodiak or .75 miles from the state airport. Office hours are Monday through Friday, 8:00 a.m. to 4:30 p.m. The visitor center is open during office hours and also on Saturdays and Sundays, 12:00 p.m. to 4:30 p.m. Scheduled weekend wildlife films are shown free to the public and organized group tours are conducted providing advance notice is given to the headquarters.

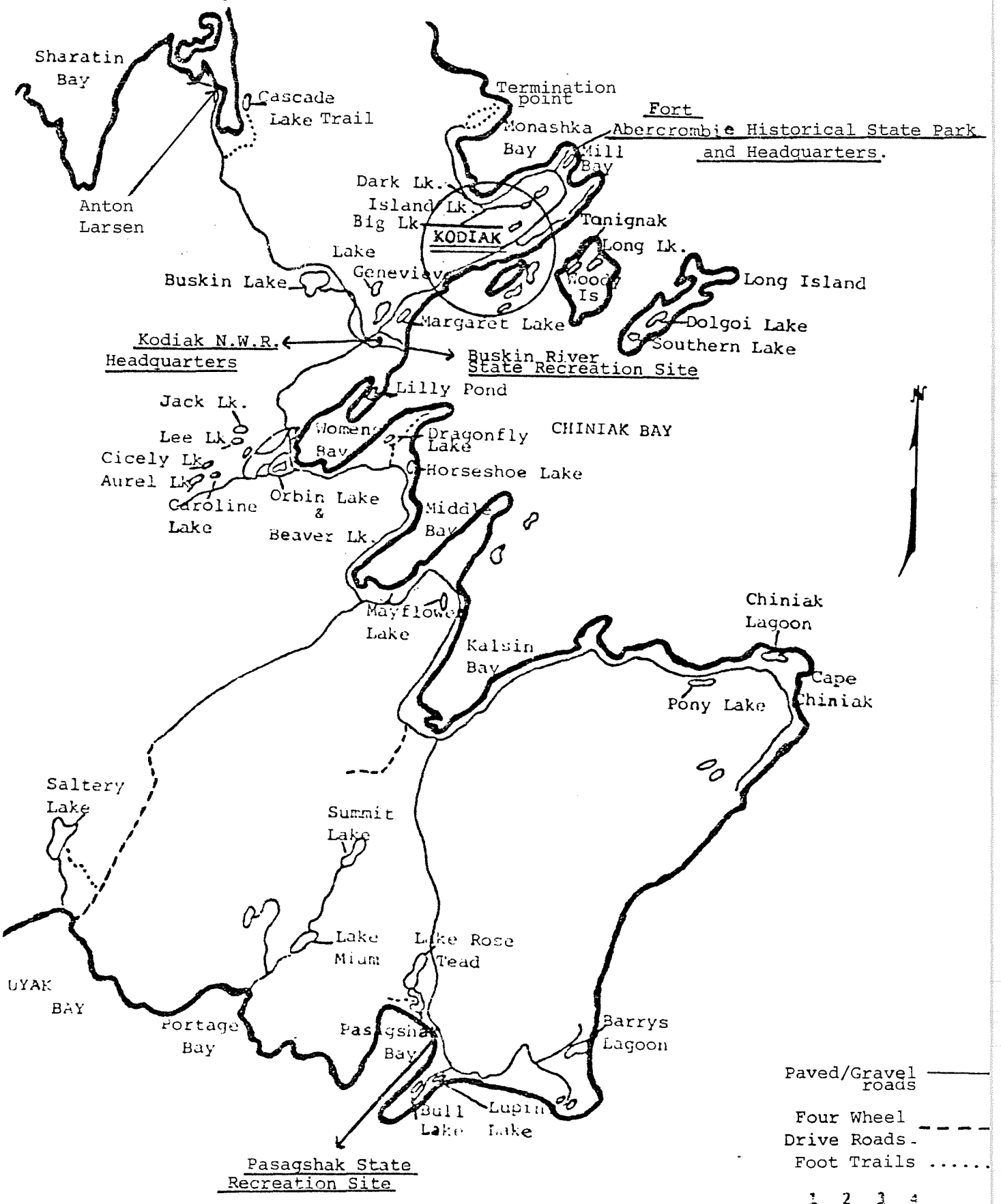
For additional information on wildlife or public use within the Refuge and other areas, contact either the Kodiak National Wildlife Refuge, Department of Natural Resources, or the Alaska Department of Fish and Game at the addresses and telephone numbers listed below.

Kodiak National Wildlife Refuge
1390 Buskin River Road
Kodiak, Alaska 99615
(907) 487-2600

Alaska Department of Fish and Game
211 Mission Road
Kodiak, Alaska 99615
(907) 486-4791

Department of Natural Resources
Fort Abercrombie State Park
Star Route 3800
Kodiak, Alaska 99615
(907) 486-6339

KODIAK'S ROAD SYSTEM



Weekend Wildlife Films at the Kodiak Wildlife Refuge Visitor Center

These Free Films will be shown Saturdays and Sundays
at 1:00 p.m., 2:00 p.m. and 3:00 p.m.

August 2 & 3 - One Arctic Summer - During the brief Arctic summer both wildlife and plant life abound along the north Arctic coastal plain. (26 minutes)

August 9 & 10 - Salmon on the Run - Describes the salmon fishing industry in the Pacific northwest and potential conflicts between Indians, sport and commercial fishermen over this valuable resource. (57 minutes)

August 16 & 17 - Grizzly - Modern electronic tracking instruments allow researchers to gain valuable insight into the life history of North American grizzly bears. (52 minutes)

August 23 & 24 - Osprey - This interesting fish-eating hawk is able to pluck a trout half its own weight from streams with considerable skill. (34 minutes)

August 30 & 31 - Katmai - Provides an explanation to this Alaskan wonder known as the "Land of a Thousand Smokes". (15 minutes)

September 6 & 7 - Private Life of the Swan - Examines the behavior, diet and mating rituals of swans. (26 minutes)

The Kodiak National Wildlife Refuge Visitor Center is open from 8:00 a.m. to 4:30 p.m. on weekdays and noon to 4:30 p.m. on weekend days. This schedule is subject to change. If you have any questions call 487-2600.