

KODIAK NATIONAL WILDLIFE REFUGE

Kodiak, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1990

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REVIEW AND APPROVALS

KODIAK NATIONAL WILDLIFE REFUGE

Kodiak, Alaska

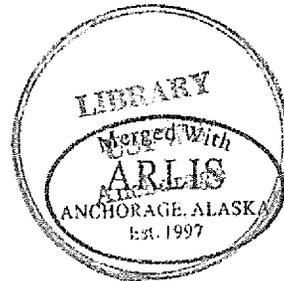


ANNUAL NARRATIVE REPORT

Calendar Year 1990

Joy R. Bellinger      3-8-91      Gyrene      \_\_\_\_\_  
Refuge Manager      Date      Associate Manager      Date

Paul R. Schmitt      \_\_\_\_\_  
Regional Office Approval      Date



## INTRODUCTION

Kodiak National Wildlife Refuge was established by Executive Order 8657 on August 19, 1941 "for the purpose of protecting the natural feeding and breeding range of brown bear and other wildlife on Uganik and Kodiak Island, Alaska" (Figure 1). A one mile wide shoreline strip 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 so that they might be opened to livestock grazing by Public Land Order 1634. No leases have ever been let on these areas and in 1982 as part of mitigation for construction of the Terror Lake Hydroelectric Project in the refuge one of these peninsulas (Shearwater) was permanently closed to livestock entry.

In 1980 the Alaska National Interest Lands Conservation Act added approximately 50,000 acres of land on Afognak and Ban Islands to the refuge, bringing the total acreage to approximately 1.6 million acres. Approximately 310,000 of these acres have been conveyed to Native ownership but are subject to laws and regulations governing the use and development of the refuge as stipulated in the Alaska Native Claims Settlement Act section 22(g) (Figure 2).

Overall the refuge encompasses roughly the southwestern two-thirds of Kodiak Island, all of Uganik Island (which lies off the northwest shore of Kodiak Island), and the Red Peaks and Ban Island area on the northwest side of Afognak Island. Habitats in the refuge include salt water estuaries, riparian zones, wet tundra, extensive brushlands, alpine areas, bare rock, permanent small glaciers and on the Afognak addition, Sitka spruce forest.

The refuge is host to six species of Pacific salmon/steelhead-rainbow trout and Dolly Varden 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, tremendous berry crops and productive alpine sedge fields on the island provide a virtually endless food supply for brown bears. Kodiak supports one of the highest density of brown bears in the world.

Although salmon, eagles, and bears are the most widely known inhabitants of the refuge, other species including Sitka black-tailed deer, red fox, beaver, river otter, tundra swan, and in near offshore waters, many species of marine mammals and sea birds are also found.

Several major management problems exist on the refuge. The most critical problem is the recent conversion of refuge to Native owned private land. Approximately 300,000 acres of some of refuge's best wildlife and fishery habitat have been selected by, or 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) Alaska Native Claims Settlement Act], the level of control and protection the refuge will exert on these lands is unclear. The bottom line is that a significant proportion of the best bear, eagle, and fisheries habitat on the refuge is now privately owned.

If all the 1906 Native allotments on the refuge are implemented the refuge may end up with 15,000 acres of inholdings at approximately 200 different sites within its boundary conveyed to private individuals, resulting in no refuge control over development on the sites.

The refuge and headquarters complex is five miles from municipal Kodiak approximately 25 air miles from the refuge boundary. Two Service aircraft and a 48 foot motor vessel provide transportation to the refuge. A field headquarters is maintained at the southern end of the refuge at Camp Island, Karluk Lake, which provides a base for field operations.

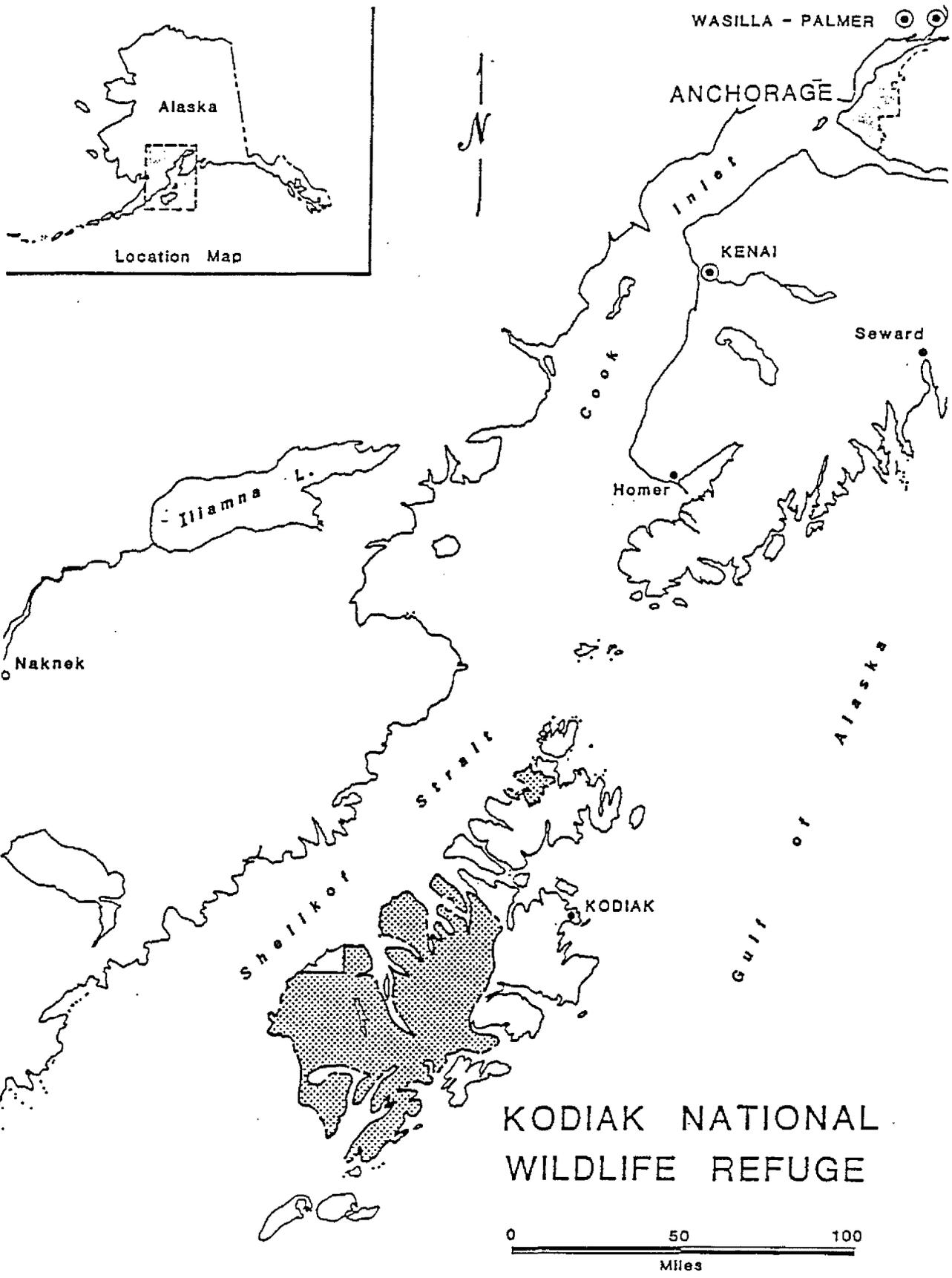


Figure 1

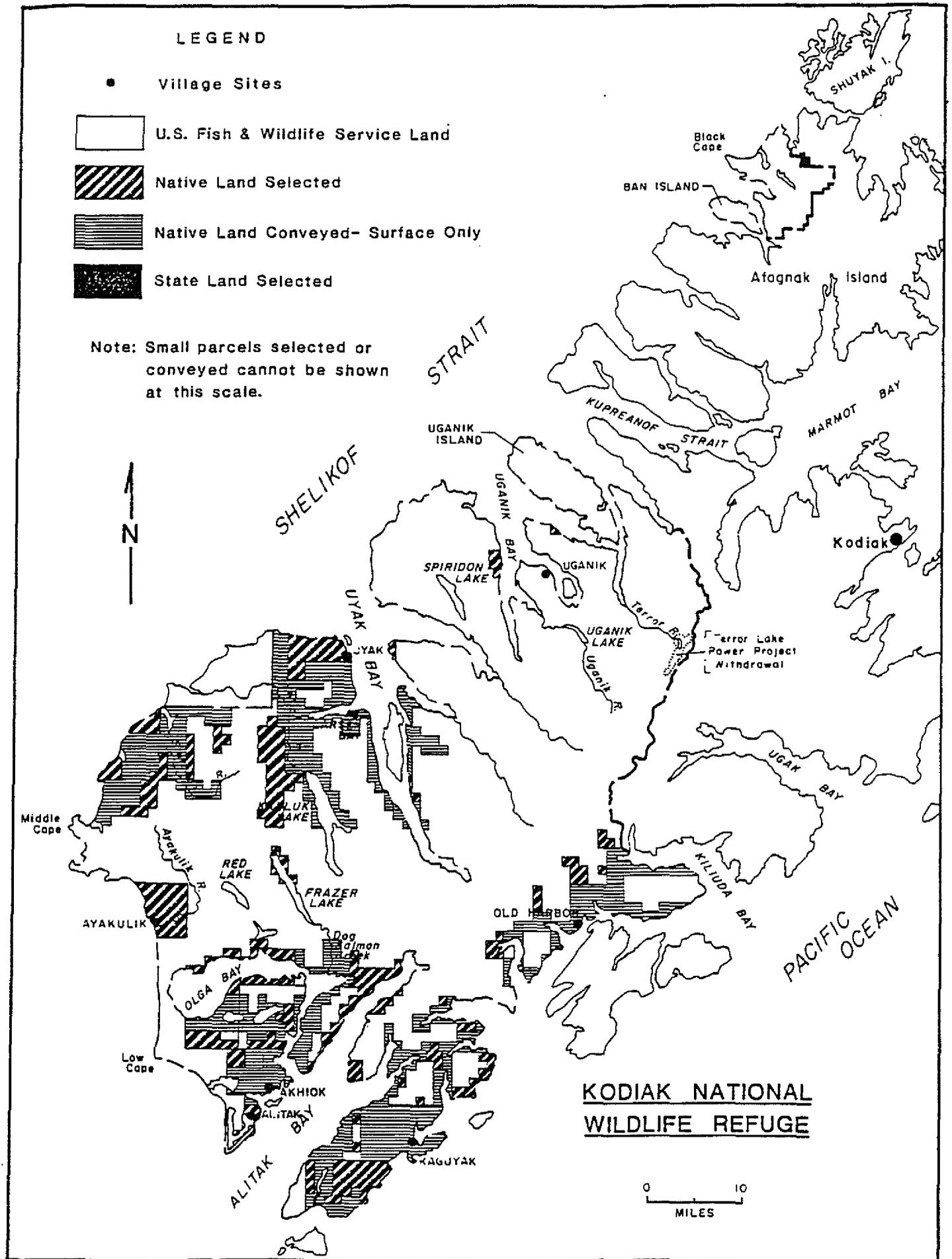


Figure 2

## INTRODUCTION

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L. INFORMATION PACKET - - (Inside back cover)

#### A. HIGHLIGHTS (Munoz)

- Fishery Management Plan approved and is being used. Also, the Public Use Management Plan Draft is prepared. (Sec. D-2)
- Subsistence hunting and fishing issue results in a round of public meetings. (Sec. D-3)
- Spiridon Lake sockeye salmon stocking proposal reaches the environmental assessment phase. (Sec. D-4)
- Installation of the Uganik Weir proves to be very successful. (Sec. D-5)
- Good salmon escapements and an excellent berry crop provide good habitat conditions for bears. (Sec. G-8)
- Sitka black-tailed deer movement study enters telemetry stage. (Sec. D-5)
- Tundra Swan spring count is above the 8 year average. (Sec. G-3)
- Bald eagle oil impact assessment surveys conducted. (Sec. G-6)
- Salmon escapement indexes for sockeye, chinook, and coho salmon above average. (Sec. G-8)
- Bear viewing program is successfully implemented at Upper Dog Salmon Falls. (Sec. H-5)
- The new refuge 48 foot vessel (Ursa Major II) is delivered to Kodiak. (Sec. I-4)
- Employees detailed from Lower 48 assume oil spill response duties. (Sec. J-3)

#### B. CLIMATIC CONDITIONS (Munoz)

The climate of the Kodiak region is dominated by a strong marine influence. Typically, this results in cloudy skies, moderately heavy precipitation, and cool temperatures. During winter, the waters of the North Pacific Ocean provide the moisture that makes clouds and rain the norm. The relatively warm marine waters also provide a relatively mild climate year-round. Weather conditions vary greatly over the island because of exposure, aspect, and terrain. In general, easterly exposures (such as Kodiak State Airport where we get our weather records) are wetter and warmer than north or west slopes.

Table 1 depicts a summary of weather conditions for 1990 as collected by the National Weather Service Office at Kodiak State Airport.

Total rainfall during 1990 was 66.1 inches, or 8.1 inches below average. Total snowfall was 145.5 inches or 71 inches greater than average. Average high and low temperatures during 1990 were 47.6°F and 34.5°F, respectively (normal high and low is 46.3 and 35.1).

Table 1  
1990 Weather data summary\*

Month	Snowfall inches	Precip. inches	Precip. dept. from normal inches	Temperatures		Temp. dept. from normal
				Max °F	Min	
January	35.8	6.8	-1.5	43	12	-2.5
February	35.1	2.9	-3.4	43	2	-5.1
March	15.9	5.6	1.5	52	11	2.5
April	3.6	6.6	1.8	61	24	3.0
May	-	4.7	-3.0	61	31	2.5
June	-	2.1	-1.2	73	38	3.0
July	-	7.9	4.0	71	42	0
August	-	7.9	2.6	77	42	2.3
September	-	9.0	1.4	70	30	1.6
October	3.7	5.4	-4.6	59	22	1.4
November	5.0	2.3	-4.3	52	9	-4.5
December	46.4	4.9	-1.4	49	10	1.5
Totals	145.5	66.1	-8.1	59 (Avg.)	22.75 (Avg.)	.47

\* Data from the National Weather Service, Kodiak, Alaska.



The highest elevation areas on Kodiak Refuge consist of barren rock with small permanent icefields. (90-01) VB

The winters of 1988-89 and 1989-90 were characterized by snowpacks that resulted in heavy winter mortality among deer. The snowfall

figure for January and February reflect the fact that conditions during late winter were especially severe at a time of year when deer were most stressed. The winter of 1990-91 started off with snow conditions that were way above average for December. However, a melting trend developed toward the end of the year and snowpack at the beginning of 1991 was minimal.

#### C. LAND ACQUISITION (Bellinger)

##### 1. Fee Title

Requests for information on acquisition priorities of inholdings were received from several different entities during the year, (Regional Office, Native Corporations, Wilderness Society, and Congressional Delegations). The requested information was assembled and submitted for each of these requests (at least four different requests in 1990). However, we still have made no significant progress in acquiring critical inholdings on Kodiak.

##### 2. Easements

The public 17(b) easements posted in 1989 on Koniag conveyed lands at the Thumb River outlet, were reposted this year, as a result of vandalism by "local residents". Posts were found broken off at ground level and all evidence points to bears as the responsible party. Carsonite, the manufacturer of the posts, was consulted about this problem and they have sent samples of alternate post styles to field test this summer.

#### D. PLANNING

##### 1. Master Plan (Menke)

The Kodiak Refuge Comprehensive Conservation Plan was finalized in December 1987 when Regional Director Stieglitz signed the record of decision to the final document. During the past three years the refuge has been managed according to provisions in the plan. The plan recommends designation of 73% of the refuge as wilderness. According to the last information we received the wilderness proposal is now being reviewed by the Secretary of Interior.

##### 2. Management Plan

###### A. Public Use Management Plan (Menke)

An active public involvement program was conducted to develop the refuge Public Use Management Plan in 1989 and continued through the first half of this year. A Draft Plan was printed and sent out to over 600 agencies, groups, and individuals in March. Meetings were held at Kodiak, Anchorage, and island villages to discuss provisions in the draft. The draft established goals and objectives for the refuge public use program.



Public Easement signs broken off in Karluk Lake area. The posts are supposed to be indestructible, however, tests evidently didn't include brown bear. (90-02) (John Merrick, Koniag, Inc.)

The goal for Kodiak's public use program is "to provide high quality fish and wildlife oriented recreation, interpretive, and educational opportunities consistent with the refuge's resource oriented purposes". The five public use objectives established during the planning process are:

1. To ensure that public use programs are compatible with the natural diversity of refuge resources and habitats.
2. To provide public use programs which minimize possible conflicts between and among subsistence, recreational, and commercial users.
3. To provide opportunities for fish and wildlife oriented recreation emphasizing short-term, low-density public use.
4. To maintain access to and existing uses of the refuge for subsistence, recreation, and commercial users to the maximum extent possible consistent with refuge purposes. Maintaining traditional and non-motorized uses of refuge lands for subsistence users and the general public is recognized as a priority.
5. To develop and maintain facilities for recreational users which are consistent with refuge public safety, natural diversity, and fish and wildlife management concerns. Emphasis will be on providing for fish and wildlife oriented recreation opportunities requiring minimal facility development and habitat alteration.

Based on both written and verbal comments received a final list of issues to be addressed in the Final Public Use Management Plan was developed. The issues include:

1. Snowmachine use.
2. Pack animal use.
3. Access to sensitive wildlife concentration areas.
4. Wildlife viewing programs.
5. Unguided public use.
6. New activities in refuge permitted commercial cabins.
7. Guide and outfitter use.
8. Trail and campsite development.
9. Public use cabin development.
10. Inholdings.
11. Information and education programs.
12. Tent Platform use.
13. Upland Aircraft Landings.
14. Jet Boat Use.

Based on comments received from the public and agencies a comment summary document is being prepared and will be sent out to the public early in 1991. This document also contains a brief summary of changes which will be made in the Final Plan. The Final Plan is expected to be completed in May 1991.

B. Fishery Management Plan (Chatto)

In July 1990, the Fishery Management Plan was finally approved and in August 1990 the plan was received back from the printers and available for distribution. The plan will guide the management direction for fisheries on the refuge from 1990 through 1995, at which time it will be updated.

3. Public Participation (Munoz, Menke)

Public meetings were held at four of six Kodiak Island villages during November and December to give residents an opportunity to comment on subsistence hunting and fishing issues. The meeting at Kodiak on November 16 was one of 58 held throughout Alaska as part of the scoping process coordinated by the Regional Office, Subsistence Division. A major issue at the Kodiak meeting was the possibility of classifying Kodiak as non-rural. Much comment was received on this topic and Kodiak was subsequently determined by the Federal Subsistence Board to qualify for rural designation. Comments received at public meetings were cited by the Board as the major factor that influenced their final ruling. Since village representation at the City of Kodiak meeting was limited, we decided to conduct separate meetings in the villages. Villages visited were Old Harbor, Akhiok, Port Lions, and Ouzinkie. Weather forced cancellation of the Karluk and Larsen Bay meetings on two occasions, however, telephone interviews were conducted with village leaders to give them a chance to make comments prior to completing our reports for the Federal Subsistence Board. Comments centered around the perception that deer numbers are declining, the need for more village representation on the local advisory committee, and subsistence priorities regarding bears.

The Land Protection Planning team from the Regional Office met with refuge personnel on September 18 to explain the process that will be followed in order to identify privately owned land within refuge boundaries that the Service would like to protect for wildlife. This process will include a round of public meetings to hear landowner ideas and to gauge the amount of interest that is out there. Meetings will take place during March, which is the time of year the refuge staff has found results in the best turn out.

Following publication of the Draft Public Use Management Plan a series of meetings were held in the City of Kodiak, Anchorage, Akhiok, Old Harbor, and Larsen Bay. Written comments on the plan were taken for a 90 day period following the March 3 publication day of the plan. Major issues discussed at these meetings included plans to close limited areas on a seasonal basis, management of guides, and plans for a refuge bear viewing program.

4. Compliance with Environmental and Cultural Resource Mandates (Chatto)

In 1990, the Alaska Department of Fish and Game (ADF&G) submitted a proposal to the refuge for stocking a low density of sockeye salmon fry into Spiridon Lake. Spiridon Lake is the third largest lake on the refuge and is barren of salmon due to an impassable series of falls located below the lake outlet. The ADF&G has been investigating this lake as a potential long-term outplanting area for sockeye salmon to enhance the commercial harvest of sockeye in the Kodiak area. The proposed 1990 stocking was to test whether or not the stock of sockeye salmon proposed for production planting would emigrate (smolt) as underyearlings (0-smolt) or yearlings (1-smolt). In April 1990 a compatibility determination and National Environmental Policy Act (NEPA) documentation was completed by the refuge for the proposal. Since the proposed work did not involve production planting and was to evaluate fry response to the lake rearing environment, the action was classified as a research activity and not an enhancement proposal. The action was found to be compatible with the refuge purposes and under NEPA documentation the project was categorically excluded as provided by 516 DM 6 Appendix 1.

In May 1990, ADF&G planted 249,000 sockeye salmon fry into the lake and placed a trap at the lake outlet from June 28 to July 23 to capture any underyearling fish migrating to the ocean as smolts. No fish were captured by ADF&G indicating the fish did not gain the growth or undergo the changes necessary to migrate that first year. The outlet will be monitored again in 1991 to sample for yearling migrant smolts.

In late December 1990, the refuge received a full project proposal for long-term production planting of sockeye fry into Spiridon Lake. This would be a joint effort between ADF&G and the Kodiak Regional Aquacultural Association. Since this proposal involves production planting, construction of an over-the-falls smolt by-pass system below the outlet and a proposed terminal harvest area in the bay, a full NEPA environmental assessment on the proposed action is required and is currently being completed.

## 5. Research and Investigations

Kodiak NR 90 - "Karluk Lake Sockeye Salmon Studies" Fish and Wildlife Service 81410-02 (Alaska Department of Fish and Game) (Chatto)

This project continued in 1990 operating under the last year of a Memorandum of Understanding for cooperative studies on the restoration of Karluk sockeye salmon. Since most of the studies are completed, the continuation of any further monitoring will be conducted under the auspices of the Master Memorandum of Understanding between the Service and ADF&G. The overall objective of the project was to attain a production level resulting in a system-wide escapement of 800,000 to one million sockeye spawners. Inherent in this goal was the expectation that a surplus of fish would be available for commercial harvest in addition to escapement.

Preliminary ADF&G data indicate that the 1990 return of Karluk sockeye was approximately 2.23 million fish. This figure includes an escapement of 192,000 and 546,000 early and late run spawners, respectively. Early run escapement was only 77% of the minimum 250,000 goal by July 15, but the late run minimum was exceeded and the desired goal of 550,000 late run fish was achieved. A majority (> 90%) of the 1.49 million fish harvest was due to the exceptionally strong return of late run fish. Although the return of 5 year old early run fish in 1990 was very low compared to the overall brood year escapement in 1985, it was somewhat expected. Due to the late start in the fertilization effort in 1986, those early run fry emigrating to the lake in 1986 may not have met good survival conditions and the progeny (fry) of late run spawners encountered better conditions when they started feeding in the lake environment. Returns of four and five year old early run fish in 1991 from 1986 and 1987, respectively, are expected to be much better than 1990 because of full benefits of the fertilization efforts. In 1990 the project involved lake fertilization, smolt sampling, and limnological/water quality analysis. Overall ADF&G project results for 1990 are summarized below.

### A. Lake Fertilization

Lake fertilization was begun in 1986 by the ADF&G. Between May and July 1990 a total of 96 tons of fertilizer was applied to the surface of Karluk Lake by a commercial contractor using a Cessna 188 Ag-truck aircraft. This was the final year for this segment of the Karluk restoration effort.

### B. Karluk Lake Sockeye Smolt Monitoring

In 1990 ADF&G sampled sockeye smolt migrating from Karluk Lake. Age-3 smolt comprised a majority (70.3%) with the remainder being age-2 and age-1 smolt. These data were contrary to the norm where approximately 80-90% of the outmigrants are age-2 smolt indicating there may have been a year class weakness within the population that was unknown.

C. Hydroacoustic Estimates of Rearing Sockeye

Hydroacoustic estimates of rearing sockeye abundance have been done by ADF&G since 1983. These surveys are conducted each year. Preliminary ADF&G results indicate that approximately 73 million juvenile sockeye are rearing in the lake. This is a significant increase from the 4 million calculated for 1989 and until the data is finalized this estimate must be viewed as extremely preliminary.

D. Limnological and Water Chemistry Analysis

Data on zooplankton density and abundance and water chemistry were obtained in 1990 at various stations throughout the lake. This information is being analyzed by the ADF&G limnological laboratory and results are not yet available for 1990. Results of the 1989 sampling received in 1990 indicate that water quality parameters stipulated in the Service's Karluk Lake Environmental Assessment, with respect to nitrogen and phosphorus, have not been exceeded. Additionally, the mean annual total zooplankton density for 1980-1983 (pre-fertilization) ranged between 2,800 and 17,100/M<sup>3</sup> compared to post-fertilization values ranging between 6,600 and 14,300/M<sup>3</sup> from 1987 to 1989. This indicates that the overall mean annual density of zooplankton after fertilization is in a more steady state than before.

In early spring 1990 the refuge and ADF&G met to discuss what work would be continued beyond 1990 at Karluk. It was agreed that the post fertilization lake limnology and smolt monitoring would continue through 1992. In addition, escapement surveys for early run fish on Upper Thumb River by ADF&G and aerial surveys on O'Malley, Canyon and Falls Creeks by the refuge would continue through 1995.

Kodiak NR 90 - "Frazer Lake Sockeye Salmon Studies Alaska Department of Fish and Game (Chatto)

This project continued in 1990 with an objective to restore the sockeye salmon rearing base in the lake and refine management of the Frazer sockeye stock.

Preliminary data by ADF&G indicate that the 1990 return of sockeye to this system was approximately 753,000 fish. A total of 254,000 spawners were counted through the Dog Salmon River weir with approximately 226,000 of these fish passing into the lake environment itself. The goal of 200,000 fish into the lake was exceeded by 13%. A majority (79%) of the estimated 499,000 fish harvested were 4 year old fish from the 1986 brood year when approximately 127,000 fish passed into the lake.

In 1990 the project involved lake fertilization, smolt sampling and limnological/water quality analysis. Overall ADF&G project results for 1990 are summarized as follows:

A. Lake Fertilization

Lake fertilization was begun in 1988 by ADF&G. Between May and August 1990 a total of 75 tons of fertilizer was applied to the surface of Frazer Lake by a commercial contractor using a Cessna 188 Ag-truck aircraft. This is the third year of the 5-year fertilization program which is operating under the auspices of an environmental assessment prepared by the Service.

B. Frazer Lake Smolt Studies

In 1990 ADF&G sampled sockeye smolt migrating from Frazer Lake. Results of the sampling are still being analyzed by ADF&G and are not yet available.

C. Hydroacoustic Estimates of Rearing Sockeye

Results for 1990 are incomplete. Tow-net results indicate that approximately 84% of the rearing fish in the lake are sockeye. Results for 1989 made available in 1990 indicate approximately 4.7 million (69%) juvenile sockeye were rearing in the lake.

D. Limnological and Water Chemistry Analysis

Data on zooplankton and water chemistry were obtained in 1990 but the results are still being analyzed by ADF&G. Results of the 1989 sampling received in 1990 indicate that, like Karluk, water quality parameters are meeting the standards set in the Services Frazer Lake Environmental Assessment prepared for the project in 1988. Additionally, the mean (1987) total zooplankton density for pre-fertilization of 2,350/M<sup>3</sup> was boosted to a 5,500 and 4,800/M<sup>3</sup> level for 1988 and 1989, respectively. These latter values compare to the 1971-1977 target level of 3,590/M<sup>3</sup>.

Rehabilitation of Frazer sockeye is proceeding as planned and no changes or modifications of work are anticipated in 1991.

Kodiak NR 90 - "Terror Lake Hydroelectric Project - Fisheries Studies" (74530-82-05) (Chatto)

Monitoring of the Terror Lake Hydroelectric Project post-impact fisheries studies continued in 1990. Biological studies are being conducted by ADF&G and a private contractor is conducting the hydrology program. The annual meeting of the "Fisheries Monitoring Group" was held in June 1990 and a review of the field work supporting the monitoring studies was conducted. These studies will be completed by summer of 1991 and a final report on the effect of the project on the fisheries should be available by December 1992. The overall results of these major studies are summarized below:

A. Salmon Egg and Fry Survival, Escapement Magnitude and Spawner Distribution, 1990 Annual Report Terror Lake Hydroelectric Project (ADF&G)

This report is an annual report prepared by the ADF&G Commercial Fisheries Division and covers work conducted in 1990 on the

Terror and Kizhuyak Rivers. Only the Terror River is located on the refuge and will be reported here. The pre-emergent pink salmon fry indices from the record pink salmon escapement in 1989 were found to be only fair to good compared to other years. High water and excessive rainfall in the Fall of 1989 is suspected to have resulted in heavy scouring and high mortality. Spring climatic conditions in 1990 although were mild and good survival through this period may offset some of the fall loss and result in above average returns in 1991. The peak indexed escapement for pink and chum salmon was 59,000 and 5,000 fish, respectively. The 1990 escapement of chum is the lowest recorded since 1982.

B. Intergravel and Surface Water Temperature

The 1990 report summarizes work by Trihey and Associates from November 1989 through November 1990. This report describes the surface water temperature data in graphic form by month and study site. During the report period a minimum temperature of 1° C was recorded at the Terror Lake outlet in December, March, April, and May while a low of 0.0° C was recorded from December through March at the lower Terror River site. A maximum temperature of 7.5° C was recorded at the outlet in September and October and 11.5° C in July and August at the lower river site.

C. Pink and Chum Salmon Intergravel Spawning Success

The ADF&G report on their spawning dewatering studies details work conducted in August, September, and October 1989 in addition to March 1990 activities. In August and September of 1989 field surveys in representative reaches regarding spawning distribution and density of pink and chum salmon in the Terror River were conducted. In addition, spawning sites were identified and mapped. During the first week of October eyed eggs from 1989 Terror River pink salmon spawners were planted within study sites along the Terror River. In March 1990 pre-emergent pink salmon sampling was conducted at these sites to evaluate the effects of de-watering. Overall, of the three study sites (upper, middle and intertidal) the intertidal area had the highest total survival (4.3%) compared to a 6.3% survival for the control area which was established above the accessible spawning area.

The report indicates that continued egg plants are recommended to obtain a more comprehensive data base before any conclusions regarding de-watering effects on incubating salmon can be made.

Kodiak NR 90 - "Sockeye Salmon Overescapement Study" (Alaska Department of Fish and Game) (Chatto)

This project is being conducted by the ADF&G to examine the effects of a large 1989 sockeye escapement on the rearing capability for progeny in numerous nursery lakes. The overescapement was a result of a closed commercial fishery in 1989 due to the Exxon Valdez oil spill. Two of the systems identified for study are the Ayakulik (Red) and Akalura systems on the refuge. Escapement of sockeye into

the Ayakulik and Akalura in 1989 was 156 and 93% above the maximum desired level, respectively.

During 1990 ADF&G conducted limnological analysis and hydroacoustic surveys and monitored smolt outmigrations from Red (Ayakulik) and Akalura Lakes. The limnological data is still being analyzed by ADF&G. Preliminary hydroacoustic analysis indicate Akalura and Red Lake had rearing densities of 0.7 and 0.5 million juveniles, respectively. Upper Station Lakes which is a control sockeye system, off the refuge and somewhat comparable to the Akalura (Red Lake) system had an estimated total of 6.9 million rearing juveniles.

A total of 2,210 migrating sockeye salmon smolt sampled at Akalura indicated 51% were age-1 and 49% were age-2 smolt. Sampling at Red Lake resulted in capture of 2,622 smolt of which 31 and 68 were age-1 and age-2 smolt, respectively.

Overall, it appears that the increase of age-2 year smolt and the reduction of age-1 smolt observed, coupled with the relatively low hydroacoustic estimates may indicate some problems have developed and the rearing areas may have been stressed.

Work on this project is expected to continue in 1991.

Kodiak NR 90 - "Uganik River Salmon Escapement Investigation"  
(Kodiak NWR) (Chatto)

This project was initiated in late 1989 under a cooperative agreement with ADF&G to investigate the timing and magnitude of sockeye, pink, chum, and coho salmon escapement into the Uganik River on the refuge. A new floating weir was constructed by ADF&G - Commercial Fish Division during the winter of 1989-90 with funding for materials provided by the refuge. The weir sections were completed in early May by ADF&G and logistical transport of sections to Uganik River was completed by the refuge in late May. The weir was installed jointly by the refuge and the Service's Kenai Fishery Assistance Office. The weir was fish tight by June 25, 1990 and operated by Kenai personnel until October 14, 1990. A total of 131,530 sockeye (65,550 weir count plus 65,980 aerial estimate prior to June 25), 77,015 pink, 2,560 chum, 5,261 coho, and 6 king salmon were documented to have entered the system. In addition, 18,121 Dolly Varden char and 1 steelhead were also counted. Daily escapement counts for salmon were provided to the ADF&G for inseason commercial fish management. As a result of low coho salmon escapement through the weir the late season commercial fishery in the Inner Uganik (Mush Bay) area was closed by ADF&G emergency order. This conservation action would not have been possible without the timely escapement information provided by the weir counts.

Preliminary estimates of data from the ADF&G Uganik Bay statistical harvest section indicate approximately 62 chinook, 42,875 sockeye, 1,389 coho, 49,670 pink, and 9,114 chum salmon of Uganik River origin were caught in 1990.



Installation of the floating weir on the Uganik River involved personnel from the refuge and Kenai Fisheries Assistance Office. Fabrication was accomplished by ADF&G-Commercial Fisheries Division during the winter of 1989-90 (90-03) TC



A birds eye view of the completed Uganik River weir showing the camp facilities. (90-04) TC



The Uganik River fish counting weir was operated from June 25 to October 14, 1990 as a cooperative project between the refuge and ADF&G. (90-05) TC

Overall operation of the weir in 1990 was extremely successful. The new floating weir allowed us to sustain operations under river discharges that would have terminated operations using a conventional picket weir.

Kodiak NR 90 - "Survival and Productivity of Female Brown Bears and Survivorship of Cubs on Kodiak Island, Alaska (72104-88-01) (Barnes)

The FWS, the ADF&G, and the Kodiak Brown Bear Research and Habitat Maintenance Trust are cooperators in this long-term (1982-1992) investigation of female productivity and survival. Activities in 1990 included the capture and re-collaring of 2 females, recovery of shed collars and examination of mortalities, and spring and fall radio-tracking flights. As of fall, 1990, the sample consisted of 53 adult females with functioning radio-collars.

In spring, 1990, 20 (69%) of 29 eligible females emerged from winter dens with new cub litters. Mortality to new cubs was 33% by the end of the year. A lower level of mortality (7%) occurred among

yearling cubs. Since 1982, 76 (43%) of 178 new-born cubs have survived to weaning.

Survival rate for females monitored from fall, 1989, to fall, 1990, was 0.88. The 7 mortalities recorded during that period were attributed to natural causes (4), legal sport kills (1), illegal sport harvest (1), and village DLP (1). Since 1982, natural and sport harvest have accounted for 46% and 26%, respectively, of the mortality to adult and sub-adult females.

Kodiak NR 90 - "Brown Bear/Human Interactions Associated with Deer Hunting on Kodiak Island" (74530-88-01) (Barnes)

Objectives of this study are to determine what components of the bear population are affected by deer hunting activity, determine activity patterns of bears influenced by deer hunting, and to quantify observations and attitudes of deer hunters. Activities in 1990 included the capture and radio-collaring of 3 bears (2 new captures, 1 recapture), 30 radio-tracking flights that produced 682 relocations, distribution of hunter survey forms, and preparation of a 1988-1989 progress report (Barnes, V.B., Jr. 1990. Brown bear and human interactions associated with deer hunting on Kodiak Island. U.S. Fish and Wildl. Serv. Unpubl. Rep. 30pp). The abstract from that report follows:

Abstract: Results from the first 2 years of a 4-year investigation of brown bear/deer hunter interactions are reported. Forty brown bears were captured and radio-collared on a 430 mi<sup>2</sup> area on the west side of Kodiak Island; 19 were captured  $\geq$  3 mi from the coast (inland), where little deer hunting occurs, and 21 were captured in the coastal zone that receives most hunting pressure. Over both years, 41% of the bears ranged exclusively in the coastal zone, 21% ranged exclusively inland, and 38% had ranges that overlapped both areas. Ranges of bears during fall (October-November), when most bear/hunter conflicts occur, were smaller than during summer (July-September); 8 of 24 bears tracked for 2 years had fall ranges within the inland zone. Sixty-three and 37% of dens of radio-collared bears were in inland and coastal areas, respectively. Bears began entering winter dens after mid-October and the majority (56%) were in dens by late November. One-third of the bears were classed as having a high potential to interact with hunters for at least a portion of the hunting season. Responses to a hunter survey indicated that hunters averaged about 6 days afield and harvested a mean of almost 3 deer per person. Fifty-one percent of the respondents observed at least 1 bear during their hunt. Eleven percent of the hunters encountered bears in situations they considered threatening and 15% reported losing deer to bears.

Kodiak NR 90 - "Seasonal Migration and Movements of Kodiak Island Bald Eagles" (74530-82-01) (Zwiefelhofer)

The 1990 study efforts focused on cataloguing color marker observations and preparing preliminary data analysis. A total of 5 color marked bald eagle observations were made during 1990. All observations occurred on the Kodiak Archipelago. The completion of the study's final report has been delayed several times but will hopefully be finished during FY 91.

Kodiak NR 90 - "Habitat Utilization and Seasonal Distribution of Sitka Black-Tailed Deer on the Spiridon Peninsula, Kodiak Island, Alaska (74530-89-01) (Zwiefelhofer)

The field work, initiated in 1989 by graduate student Jeff Selinger, was continued during 1990. Spring mortality and pellet transect surveys were conducted during May. The study's compliment of radio-collared deer (3 remaining from 1989) was increased with the addition of 19 adult females collared during a June 18-23 helicopter assisted capture effort. Vegetative collections and habitat mapping were also accomplished during 1990 with the assistance of Regional Botanist Steve Talbot.

Early radio tracking results indicate substantially larger seasonal movement from the study area by a portion of the collared deer than was previously anticipated. Movements of the collared deer will continue to be monitored through FY 91.

6. Other (Chatto)

Meetings of the Kodiak Regional Salmon Planning Team in March and October 1990 were attended by refuge personnel. Fishery Biologist/Pilot Chatto is an ex-officio member of the team. Emphasis in 1990 was to upgrade the draft phase II of the Kodiak Regional Comprehensive Salmon Plan, discussions of a proposed Spiridon Lake sockeye salmon enhancement project and the interest by some Native groups to establish private non-profit hatcheries on the Kodiak Archipelago.



Graduate Student Jeff Selinger is pictured preparing to take a blood sample from one of the 19 Sitka black-tailed does radio-collared during June. (90-06) DZ

E. ADMINISTRATION1. Personnel (Munoz, Castonguay)

Left to right - (Back) Bellinger, Chatto, Munoz, Bowers, Zwiefelhofer, Menke (Front) Barnes, Anderson, Hunter, Castonguay. NOT PICTURED - Patterson, Christian, Rezabeck, Shelton. (90-07) DM

Personnel

1. Jay R. Bellinger, Refuge Manager, GS-12, PFT, EOD 1/8/84
2. John R. Munoz, Asst. Refuge Manager, GS-11, PFT, EOD 1/28/90
3. Donald A. Chatto, Fishery Biologist/Pilot, GS-12, PFT, EOD 3/12/81
4. James A. Patterson, Airplane Pilot, GS-12, PFT (Local Hire), EOD 6/7/89
5. David W. Menke, Park Ranger, GS-11, PFT, EOD 8/16/84
6. Dennis C. Zwiefelhofer, Wildlife Biologist/Boat Operator, GS-11, PFT, EOD 5/78
7. Geraldine M. Castonguay, Refuge Clerk, GS-5, PFT, EOD 2/7/83
8. Sherry G. Christian, Clerk Typist, GS-3, PFT, EOD 11/7/88, LWOP EOD 6/29/90
9. Rene' N. Hunter, Clerk Typist, GS-3, TFT, EOD 6/27/90, Terminated 11/30/90
10. Ronny D. Bowers, Maintenance Mechanic, WG-9, PFT, EOD 4/3/83
11. Rasmus G. Anderson, Jr., Laborer, WG-2, PPT, EOD 6/11/83

12. Catherine A. Rezabeck, Public Use Specialist, GS-7, TFT (Local Hire), EOD 4/18/88, Resigned 9/28/90
13. Raymond F. Hander, Biological Technician, GS-5, TFT (Local Hire) EOD 7/3/88
14. Scott Shelton, Biological Technician, GS-6, Temporary (Local Hire) EOD 6/6/90, Terminated 9/22/90

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15. Victor G. Barnes, Jr., Wildlife Biologist, GS-12, PFT, EOD 6/19/82

VOLUNTEERS

16. Vicki Vanek, EOD 3/1/90 to Present
17. Annette McFarland, EOD 5/7/90, Separated 5/26/90
18. Gillian McKnight, EOD 6/16/90, Separated 8/29/90
19. John K. Myers, EOD 7/12/90, Separated 8/16/90

The primary assistant refuge manager slot vacated by Kevin Ryan was filled by Dick Munoz on January 28. Dick and family arrived on February 14, 1990. Dick is a welcome addition to the staff.

Several of the staff received performance awards this year. They were: Refuge Manager Jay Bellinger, Airplane Pilot James Patterson, Park Ranger Dave Menke, Fishery Biologist/Pilot Tony Chatto, Wildlife Biologist/Boat Operator Denny Zwiefelhofer, Refuge Clerk Gerri Castonguay, and Biological Technician Ray Hander. Congratulations to all.

Public Use Specialist Cathy Rezabeck received a special achievement award for her contribution to the Public Use Management Plan.

Clerk Typist Rene' Hunter was hired on June 27 as a summer hire to fill the position vacated by Sherry Christian, who requested leave without pay for 90 days, effective June 29, to seek other federal employment upon return to her home state of North Carolina. Several attempts were made to fill this position on a permanent basis but no qualified or acceptable applicants were listed on the Office of Personnel Management register. Rene' was extended until November 30, and planned to return to the Lower 48 to attend school. As of the end November there still were no qualified applicants on the register.

Cathy Rezabeck transferred from the Public Use Specialist position effective 9/28/90 to move to an intermittent detail in the Regional Office's Resource Information and Environmental Education Department. Cathy's husband has accepted a new position with the State Department of Parks and Recreation which necessitated the move. Her knowledge and expertise will be greatly missed.

Wildlife Biologist/Boat Operator Zwiefelhofer and Park Ranger Menke were promoted to the GS-11 level during May 1990 in recognition of the advanced work load they have taken on over the years. The promotions were two of several recommendations made by Position Classification Specialist Mary Conner following a desk audit conducted on March 9.



Public Use Specialist Cathy Rezabeck transferred along with her husband and new baby to Anchorage in October. (90-08) DM

The end of fiscal year 1990 budget sequestration exercises and subsequent furlough notices caused alot of paper shuffling and confusion. Hopefully this will not become an annual occurrence.

Wildlife Biologist/Boat Operator Zwiefelhofer and Biological Technician Hander both received awards for their contribution to the oil spill in 1989.

Table 2 shows on board strength for the last 5 years.

Table 2  
Staffing 1986 to 1990

	(Number of employees)			Total FTE
	permanent full time	part time	temporary	
FY 1990	9	1	4	9.5*
FY 1989	9	1	4	9.5*
FY 1988	9	1	3	9.5*
FY 1987	9	1	2	9.7
FY 1986	9	1	1	9.7

\* Local hire appointments do not count toward full time equivalents.

#### 4. Volunteer Program (Menke)

In fiscal year 1990 volunteers donated a total of 2,588 hours of service to the refuge. Thirty-two volunteers participated in refuge programs and 22 volunteers helped staff the visitor center on weekends. Several additional SCA volunteers worked at the Uganik weir on the refuge under the supervision of the Kenai Fisheries Assistance Office. Other work accomplished by volunteers included:

- A. Trail construction.
- B. Winter seabird surveys.
- C. Bear and fisheries research support.
- D. Computer data analysis.
- E. Cabin maintenance and repair.
- F. Assistance with the refuge deer study.
- G. Evaluation of bear viewing program success.
- H. Visitor center exhibit repair.

Listed below are some of the volunteers for 1990:

Vicki Vanek volunteered her time and assistance with seabird surveys and input of computer data off and on from March 1 to present.

Annette McFarland volunteered her assistance to graduate student Jeff Selinger in the Sitka black-tailed deer study from May 7 to 26.

Gillian McKnight reported for volunteer work on June 16 to assist graduate student Selinger on the deer study. However, due to a sprained ankle accident out in the field on July 5, she returned to the office on July 18. Gillian assisted with light office work until August 29.

John Myers volunteered his time and skills out at the Chief Cove area and assisted Stephen Talbot with botany work from July 12 to August 16.

Susan Raabe volunteered her assistance with educational programs during Public Use Specialist Rezabeck's absence for maternity leave. This is in addition to Susan's time that she volunteers for weekend visitor center work.

As indicated above, Kodiak Refuge accomplishes a great deal of work which would otherwise go undone without volunteers. We look forward to continuing these programs in the future.

#### 5. Funding (Bellinger)

Table 3 depicts Kodiak Refuge funding in thousands of dollars by program for the last five fiscal years. The increase in our base funding in 1260 will be totally consumed by the cost of living increase in salaries. The add-on portion of our budget will allow continuation of existing programs plus analysis of expanding the bear viewing program. The danger in allocation of funds in this manner is that the add-on dollars are not guaranteed from year to year, however, funding for base programs (i.e. special use permits, enforcement, and wildlife inventories) are included in this category.

If inflation is ignored, we will be back to our pre-1989 level of operations with the FY 91 fisheries budget.

Table 3  
Kodiak National Wildlife Refuge funding levels

Program	Fiscal Year				
	1987	1988	1989	1990	1991
WR-1260 (Base O&M)	520.3	538.0	520.0	536.0	555.1
WR-1260 (Add-On)	98.0	152.0	139.0	119.0	283.4
WR-1260 (Large ARMM)	170.0				
WR-1260 (MMS)			7.0	18.0	38.0
FR-1300 (Base O&M)	90.0	90.0	90.0	79.0	90.0
EFS-1510	2.0				
Contaminants	1.0	25.0			
Totals	893.0	815.0	756.0	734.0	938.5

#### 6. Safety (Munoz)

Two lost time accidents occurred during 1990. The first occurred when Rasmus Anderson slipped on the ice in the refuge parking lot resulting in a broken tailbone. The second occurred when Gillian McKnight twisted her ankle while out in the field on July 5. Gillian spent the remainder of her time in the headquarters office on light duty.

Safety meeting topics included a session on the proper use of first aid kits put on by a local businessmen. This individual is an Emergency Medical Technician so he had a lot of good insight to share with the staff.

All staff members went through CPR training through an instructor from the local Fire Department and received their certified CPR cards.

Fishery Biologist/Pilot Chatto while flying the refuge's Cessna 206, on July 12, was diverted to assist a local air charter operator with a medical emergency. A refuge visitor staying by himself at the O'Malley Public Use Cabin suffered a stroke. He was paralyzed from his waist down and the charter operator was unable to get him into his airplane without assistance. The man was medivaced via the commercial operator to Kodiak, then on to Anchorage where he died. This incident demonstrates the hazard of going out to isolated camps alone. We are proposing to purchase EPIRB's that visitors with medical problems could check out for their time in the public use cabins.

A representative of the Coast Guard met with the refuge staff to address, and hopefully solve, the problems of safety and wildlife disturbance caused by low overflights of Coast Guard aircraft.

7. Technical Assistance (Zwiefelhofer)

Fishery Biologist/Pilot Chatto and Wildlife Biologist/Boat Operator Zwiefelhofer assisted Western Alaska Ecological Services biologist, Gary Wheeler in checking a number of bald eagle nest sites located in areas of active logging on Afognak Island on September 12. A check of buffer zone distances left to protect nest sites from disturbance were found to be grossly inadequate, ranging from 10 to 260 feet from logging activity. The measurements collected will be used in developing a regional policy to address the distance and size of disturbance buffer zones required to protect nesting bald eagles in Alaska.

Wildlife Biologist/Boat Operator Zwiefelhofer provided bald eagle and tundra swan nesting information for the area around the Kodiak Municipal Airport to the Army Corp of Engineers on August 15.

F. HABITAT MANAGEMENT

1. General (Munoz)

Kodiak Refuge encompasses about two-thirds of Kodiak Island, all of Uganik and Ban Islands, and part of Afognak Island. The islands, part of the Kodiak Archipelago, lie at the western border of the Gulf of Alaska in the Pacific Ocean.

Although the Refuge is larger than the State of Delaware, with about 1.6 million acres of Federal, no place in the refuge is more than 15 miles from the sea. The refuge contains a variety of landscapes including: glacial valleys, tundra uplands, lakes, wetlands, sand and gravel beaches, salt flats, meadows, and rugged mountains. All but the highest peaks and ridges are covered by lush, dense vegetation in summer. Vegetation varies from tundra type plants on the south end of Kodiak Island to a dense Sitka spruce forest on Afognak Island.

The refuge is managed as de facto wilderness (73% of the refuge has been recommended for wilderness designation in the comprehensive conservation plan). Most of the habitats on Kodiak remain in an undisturbed state, the major exception being the coastline, where in some sections considerable development has occurred.

6. Other Habitats (Chatto)

Hidden Lake Coho Salmon Stocking

This stocking program begun in 1988 by ADF&G was not carried out in 1990. There was a shortage of coho salmon fry at the ADF&G Kitoi Bay hatchery on Afognak Island. Continued stocking of Hidden Lake by ADF&G in 1991 will depend on the availability of coho salmon fry at the hatchery.

## 12. Wilderness and Special Areas (Menke)

There is currently no designated wilderness on Kodiak Refuge. The comprehensive conservation plan includes a 1.17 million acre wilderness proposal (73% of the refuge). The proposal is currently going through the Department of Interior. The refuge also contains an 88,000 acre research natural area and four rivers designated for special river management according to the refuge comprehensive conservation plan. Although no specific management actions were proposed for these areas in 1990, wilderness values were considered in the selection of a preferred alternative in the refuge's public use management plan.

### G. Wildlife

#### 3. Waterfowl (Zwiefelhofer)

A portion of the refuge's prime wetland habitat along the Ayakulik River was first proposed to be surveyed for waterfowl production in 1989 but had to be rescheduled for the FY 90 field season. Unfortunately, the survey had to be postponed again due to the continued assessment activities associated with the Tanker Vessel Exxon Valdez oil spill. Hopefully, FY 91 oil spill assessment activities will not preclude completion of the proposed production survey during the upcoming field season. Ayakulik production data could be statistically compared to other Alaskan production areas to assess the value of expanding production surveys to other refuge wetlands.

The annual refuge aerial tundra swan nesting surveys were completed on June 7 and 8. A total of 105 adult tundra swans was counted during the survey. Kodiak's spring phenology and much of the refuge waterfowl nesting activity appeared to be several weeks early as compared to past years. Fourteen swan nests and 4 broods (18 nest sites) containing a total of 12 cygnets were also tallied. The total of 18 nest sites found in 1990 was down from the 8-year mean of 22 nest sites, but 1990 total spring swan count of 117 was up from the 8-year mean of 103 spring swans present on the breeding grounds.

The tundra swan production survey was conducted on August 30 and 31. Of the 12 cygnets found in the 4 early broods during the spring survey, only 6 of the cygnets were found during the productivity survey. It is not known if a 50% survival rate for early hatching broods is higher or lower than the overall rate of cygnet survival on the refuge. A total of 33 cygnets (including the 6 previously mentioned) in 11 broods were counted during the productivity survey, giving an average brood size of 3.0 cygnets for the 1990 nesting season. This is a slight increase over the 7-year mean of 2.7. A summary of refuge tundra swan surveys is presented in Table 4.

Table 4  
Kodiak National Wildlife Refuge tundra swan surveys  
Spring survey summary

Year	No. maps	No. obs.	Adults and Subadults				Sub-total	Cygnet	Total Swans
			In pairs	As singles	In flocks				
1980	10	31	38	8	15	61	0	61	
1981	10	45	62	10	13	85	0	85	
1983	12	51	86	8	0	94	23	117	
1984	11	53	62	21	4	87	8	95	
1985	10	50	76	8	13	97	20	117	
1986	12	58	80	17	7	104	1	105	
1987	11	64	98	11	20	129	12	141	
1988	11	55	74	17	9	100	0	100	
1990	11	49	82	7	16	105	12	117	

Fall Survey Summary

Year	No. maps	No. obs.	Adults and Subadults				Sub-total	Cygnet	Percent juveniles	Total Swans
			In pairs	As singles	In flocks					
1980	8	28	46	5	0	51	32	39	61	
1981	7	36	56	5	18	79	33	29	112	
1984	5	24	32	4	16	52	28	35	80	
1985	8	33	60	0	21	81	31	28	112	
1986	9	33	52	2	17	71	17	19	88	
1987	10	54	80	12	16	108	35	24	143	
1988	11	59	90	8	37	135	60	30	195	
1990	11	34	64	1	27	92	33	26	125	

1980-87 mean brood size = 2.8

1988 mean brood size = 2.4



Tundra swans nest in scattered locations, mostly toward the south end of Kodiak Island. Nesting success averaged 3 cygnets per pair surveyed, or slightly higher than average. (90-09) DM



The threatened Aleutian Canada geese are infrequently observed on Kodiak. (90-10) DM



Womens Bay near the City of Kodiak has been used regularly as a wintering area by a flock of emperor geese that have been documented at numbers as high as 140. (90-11) DM



Up to 2000 emperor geese winter around Kodiak. The two neck collared birds shown here are X-21 (immature) and X-57 (adult). These birds were banded at Yukon-Kuskokwim Delta. (90-12) DM

Winter and spring observations of arctic nesting geese on Kodiak Island have been made regularly over the past few years. Womens Bay, along the Kodiak road system, has been utilized by a flock of approximately 100 emperors during past winters. This flock was once again present in 1990 with groups of 30 to 120 regularly observed. The four neck-collared emperor geese previously observed in Womens Bay in 1989, returned to the same area in 1990. These annual sightings of the same collared geese, or those marked in virtually the same locality, indicates breeding ground sub-populations may have some affinity for a particular wintering area. This should be taken into account when making management decisions affecting these habitats.

Observations of collared greater white-fronted geese during their spring migration through Kodiak continued in 1990 with the sighting of 2 white-fronts (collared in Nevada) on April 12. Kodiak serves as a "short stop" for spring migrating waterfowl species waiting for the spring thaw on the northern Alaska breeding grounds.

#### 4. Marsh and Water Birds (Zwiefelhofer)

A minimum of two great blue herons spent the winter in the Chiniak Bay area during 1990. A local guide reported observing a flock of six sandhill cranes in Halibut Bay on May 6. Neither of these species is known to nest on Kodiak Island.

#### 5. Shorebirds, Gulls, Terns, and Allied Species (Zwiefelhofer)

The annual wintering pelagic seabird and waterfowl survey was conducted on February 15 to 24 in Kodiak west side bays. Plans to complete surveys on the east side of Kodiak had to be abandoned due to the prevalence of ice in the survey area. The large pelagic marine bird and mammal data base resulting from past refuge survey efforts is being converted from the regional main frame computer format to a personal computer format. Access and use of the data will be greatly improved by the change as will the refuge's ability to monitor population changes.

Oil impact assessment surveys of marine birds and mammals were carried out during July 11 to 20. Ongoing litigation with Exxon regarding spill mitigation has temporarily suppressed reporting of collected survey data. Survey results will be reported when this restraint has been lifted.

An unusual observation was made during the aforementioned assessment surveys. On July 13, a hatching year (by plumage) black-legged kittiwake was observed flying in the Northeast Arm of Uganik Bay. This is a record for the earliest date that a young of the year black-legged kittiwake was observed flying on the Kodiak Archipelago.

Two oil spill incidents occurred off the coast of the refuge during the month of August. On the 20th a barge delivering fuel oil to the village of Larsen Bay struck a submerged rock and lost an estimated 3000 to 6000 gallons fuel. Then on August 30 the Motor Vessel Bradley River, which was chartered by Exxon for the 1990 cleanup effort, ran aground off the mouth of the Karluk River. The vessel

lost a large portion of the 8,000 to 9,000 gallons of diesel fuel it was carrying. Adverse weather limited the cleanup of both of these spills and aided in dispersing the fuel slicks.

#### 6. Raptors

Oil impact assessment of Kodiak Island Archipelago bald eagle production was carried out during the 1990 field season. The same areas assessed during 1989 were surveyed again during 1990 and are described under the "Other Items" section of this report. Results of the surveys are currently part of damage litigation and will be reported at a later date.

A total of 16 bald eagle carcasses or parts of carcasses (8 adults, 8 subadults) were collected during 1990, or nine higher than reported during 1989. As many as 5 of the mortalities may have been due to the improper disposal of euthanized animals from the local pound. Landfill personnel were uncovering previously buried animals when moving fill to cover bales of trash. The disposed euthanized carcasses (particularly the liver and organs) were capable of secondary euthanization in bald eagles eating a portion of the organs. Consumption of small amounts would anesthetize and incapacitate the eagle for approximately 24 to 36 hours. Three such birds were found at the landfill facility from April 4 through June 17 (all were rehabilitated and released) which served to highlight the fact a problem existed. We were assured the euthanized animals were being properly disposed of even though we suspected this was not the case. After a positive identification of the euthanizing agent used by the dog pound was made from one of the bald eagle carcasses, the Kodiak Island Borough (responsible for landfill operations) was informed they would be liable for prosecution if additional bald eagles were found. Apparently the warning served to alleviate the problem. To date, no other dead or injured bald eagles have been found in the vicinity of the landfill. We also met with personnel to review their carcass disposal procedure. Personnel now ensure that carcasses are placed in the baler so that they are packed in the middle of bales. Bales with carcasses are then stacked on the bottom row when placed out in the landfill area.

Oil spill assessment activities were responsible for the location of at least 6 of the bald eagle carcasses from remote areas of the refuge. Because of the advanced carcass decomposition, no cause of death could be ascertained in these collections.

Additionally, 2 injured peregrine falcons (Peale's subspecies) were found along the Kodiak road system and received by the refuge during 1990. An immature female found on August 31 is currently being rehabilitated and flown under supervision of Dr. James Scott (Anchorage). Plans to return the falcon to Kodiak for release in the spring are pending. The second peregrine (an immature male) found on October 12 will not be as fortunate, since the injuries were more extensive. The bird will not fly again and has been recruited for a captive breeding program in the Lower 48.

## 7. Other Migratory Birds (Zwiefelhofer)

Resident populations of small passerines decimated by record low temperatures during the winter of 1989-90 began to show some signs of recovery. Particularly hard hit were wintering populations of winter wrens, golden-crowned kinglets and song sparrows. But several good nesting seasons will be needed for these reduced populations to return to their previous abundance.

## 8. Game Mammals

### A. Brown Bear (Barnes)

#### General

Good salmon escapements and an excellent berry crop provided good habitat conditions for brown bear in 1990. Despite these conditions, a number of animals couldn't resist the temptations of human food. Bears broke into meat caches at the Red Lake and Chief Cove recreational cabin sites as well as several private cabins around the island. In keeping with the trend of the past few years, bears raided camps of fishermen on the Karluk and Ayakulik Rivers during the spring chinook salmon season. Reports that fishermen shot and wounded a bear on the Ayakulik River were not confirmed. Although official records are not kept, reports and rumors of bear nuisance problems seem to have increased during the last 2 to 3 years.

#### Surveys

Nine aerial stream surveys were flown from July 23 to August 15. Low counts of 53 and 61 bears were recorded on the first and last days, respectively, while the highest tallies (141, 143, 163) were registered from July 31 to August 8. Peak counts for individual streams were: Sturgeon River-32 on July 31 and August 8, Connecticut Creek-59 on July 25, and Pinnell Creek-43 on August 7. Overall, bear concentrations on survey streams were comparable to those observed during the past 4 years. The lone exception was on Dog Salmon Creek, where a poor escapement of chum salmon resulted in low survey counts.

Composition of 1036 bear observations recorded during the survey period was: single-44%, maternal female-17%, new cubs-12%, and old (1-2 yr) cubs-26%. The values for single and maternal female are nearly identical to those recorded in 1989, and the overall composition of juveniles (38%) was the same as in 1989. However, more new cub (12 vs. 6%) and fewer old cubs (26 vs 32%) were observed in 1990. Survey results, in combination with harvest statistics, indicate that the brown bear population on southwest Kodiak Island remains stable.

#### Mortality

Sport hunters harvested 116 brown bears on the refuge in 1990 (Table 5); including 75 in the spring hunt (April 1-May 15) and 41 in the fall hunt (October 25-November 30). This kill represented 71% of the bear harvest for Game Management Unit 8



Lapland longspur (male above, female below) nest almost exclusively in tundra environs. (90-13, 90-14) DM





Willow ptarmigan are common as nesting species in areas of tundra vegetation. (90-15) DM



Kodiak bear along O'Malley Creek. (90-16) DM



Three of the four cubs in one litter. (90-17)  
DM



Sockeye salmon migrating up O'Malley River (right) and Canyon Creek (left) are easy prey for an estimated 50-60 bears each summer and fall. Several bears can be seen in the above photo. (90-18) VB



During summer the O'Malley Lake areas supports a bear density that probably exceeds 10 bears/mi<sup>2</sup>.  
(90-19) VB

(Kodiak Archipelago). Males accounted for 76% of the spring harvest and 54% of the fall harvest for an overall composition of 68%. Preliminary measurements indicate that 16 of the males exceeded the minimum skull size (28 in.) for listing in the Boone and Crockett trophy records.

Eight non-sport mortalities were recorded for the refuge in 1990, raising total known mortality to 124 (Table 5). This is the lowest total registered since 1983. Non-sport mortalities on the refuge included 6 Defense of Life or Property (DLP) kills and 2 mortalities due to unknown cause. Sixteen non-sport mortalities were reported for all of Game Management Unit 8 and 13 (85%) were DLP kills. Eight (62%) of the 13 DLP kills were females.

B. Mountain Goats (Munoz)

Mountain goat aerial composition survey results as reported to the refuge by Roger Smith of the ADF&G totalled 494 goats (388 adults and 106 kids). It is estimated that 75% of the known goat range was covered. The survey was done by ADF&G biologist Joe Dinnocenzo on three successive days (August 13-15) to avoid duplication. The last time an island wide survey was conducted occurred during 1985 when 360 goats were counted. Smith feels that the goat population in areas open to hunting are stable. However, the 1990 survey found that goats in closed to hunting areas increased to 160 from 83 in 1985. Survey results indicate that nearly all the potential goat habitat on Kodiak Island has

been colonized. Smith has consequently recommended that 25 more goat permits be issued for areas in the Uyak-Deadman-Zachar drainages that previously were closed to foster colonization. Past hunter success figures show that 25 permits will probably result in a harvest of 5-10 goats.

Table 5  
Reported brown bear mortality on  
Kodiak National Wildlife Refuge, 1981 to 1990

Year	Source			Total
	Sport	DLP*	Other**	
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
1986	121	12	8	141
1987	120	7	9	136
1988	128	3	6	137
1989	125	4	8	137
1990	116	6	2	124
Average	120	6	5	131

\* Defense of Life or Property.

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

C. Sitka Black-tail Deer (Munoz)

Winter conditions during 1989-90 were again tough for Sitka black-tailed deer. Heavy snowpacks resulted in high winter mortalities. Many local residents expressed concerns that deer numbers are declining. Alaska Department of Fish and Game biologist Roger Smith has proposed to drop the deer limit to four and modify the length of the season next year in an attempt to alleviate this declining trend. However, it is recognized that the primary factor governing deer numbers remains winter conditions. The winter for 1990-91 started out looking like snowpack would again be high. However, by the end of the year a melting trend resulted in more moderate conditions.

Surveys to monitor deer numbers were proposed as part of a subsistence management funding package. This type of data will be critical especially if deer numbers continue to decline. Rural preference on federal lands for subsistence take of deer could become a major management concern in the next few years.

The deer research project entered the telemetry phase after 19 does were radio-collared during June. This study is further discussed in Section D-5.

D. Roosevelt Elk (Munoz)

Elk are found on the Ban Island and Afognak portions of the refuge. Alaska Department of Fish and Game Biologist Roger Smith reported that the pre-season population estimate for Registration Hunt area 752 (of which refuge lands are just a portion) was 350-475 animals. Estimated hunting mortality was 40, or 11-14% of the pre-hunt estimate. The elk season for Hunt Area 752 ran from September 1 to December 15.

9. Marine Mammals (Munoz)

As mentioned in previous narratives, conservation of marine mammals, including sea otters, is mentioned as a primary purpose of the refuge. However, all use by marine mammals occurs off refuge in ocean waters. The Steller's sea lion was listed as a threatened species this year. This designation was necessitated by a steady decline in numbers the cause of which has yet to be identified. Some suspect that competition from commercial fishing may be partly to blame.

A host of other marine mammals including the endangered gray, sei, humpback, and finback whales are found around Kodiak.

10. Other Resident Wildlife (Zwiefelhofer)

Reindeer surveys were not conducted during 1990 because of budget and personnel constraints. However, a local pilot reported counting approximately 250 reindeer in 5 groups distributed around the Bumble Bay - Grant's Lagoon area on October 1.

11. Fishery Resources (Chatto)

Within the refuge's 114 anadromous fish streams can be found one or more of the 6 species of Pacific salmon, resident rainbow trout, Dolly Varden, and Arctic char. Refuge stream and lake habitat support fish populations which contribute to a multi-million dollar commercial fishery, subsistence fishery, and popular sport fisheries within the Kodiak area. In addition these species provide a highly important source of food for dense populations of brown bear and bald eagles.

A major goal of the refuge fishery program is to conserve fish populations and habitat by managing human use and ensuring adequate salmon broodstock escapement and maintenance of resident fish populations in cooperation with ADF&G.



Kodiak bear demonstrating a typical fishing technique. (90-20) DM



Sitka black-tailed deer have suffered winter kills in each of the last three years. (90-21) VB

#### A. The Commercial Fishery

In 1990 the commercial salmon catch in the ADF&G Kodiak management area was approximately 12.1 million fish worth an estimated ex-vessel value of 51.1 million dollars. The contribution of refuge based salmon stocks (including those from Native conveyed lands) to the total harvest is calculated at 7.9 million fish worth approximately 40.3 million dollars in ex-vessel value (Figure 3). The value of this catch would be considerably higher if the worth of the final product to the area economy was calculated.

Overall, with the exception of pink and chum salmon, the harvest of sockeye, chinook, and coho salmon was the first, second, and third largest on record, respectively.

#### B. The Sport Fishery

Sport fishing for Dolly Varden char, sockeye, and rainbow trout occurs from late May through the season until early November. Peak effort is concentrated in June for chinook salmon then again in August and September for coho. Steelhead are sought after by anglers in September, October, and early November. Although coho salmon, Dolly Varden char, and rainbow trout are present in many systems on the refuge, major populations of chinook and steelhead are only found in the Karluk and Ayakulik Rivers on the southwest end of the refuge.

Although sport fishing effort and catch for unguided anglers on the refuge is unknown, the guided sport catch is monitored through the refuge special use permit process.

In 1990, 22 (92%) of the 24 permitted sport fish guides responded to the deadline for report activity, with three of these guides reporting no activity for 1990. Sport fishing guides operated on a combination of both refuge and Native conveyed [22(g)] lands. The primary fishing areas used by guides on the refuge in 1990 were the Uganik, Ayakulik, and Frazer Lake/Dog Salmon drainages. Overall, with the exception of rainbow trout, the guided catch and effort on both the refuge and Native lands in 1990 was less than or equal to the 1987-1989 average (Figure 4). Catch for those species of interest on the refuge only was 516 chinook, 1,002 coho, 3,655 char and 122 steelhead (Figure 5). The catch per angler day for all species (both areas) ranged from 7.7 to 17.8 fish throughout the season with an overall rate of 10.5 fish/angler day. For refuge lands only the seasonal catch rate ranged from 9.0 to 30.2 with an overall rate of 15.3 fish/angler day. The overall number of sport caught fish kept (killed) ranged from < 1% for rainbow trout to 33% for sockeye, with the number of fish kept on refuge lands being considerably less than this.

#### C. Salmon Escapement

The 1990 salmon and steelhead escapements to refuge river systems (including Native conveyed lands) were monitored by both the ADF&G and the refuge. A total of 8 fish counting weirs (7

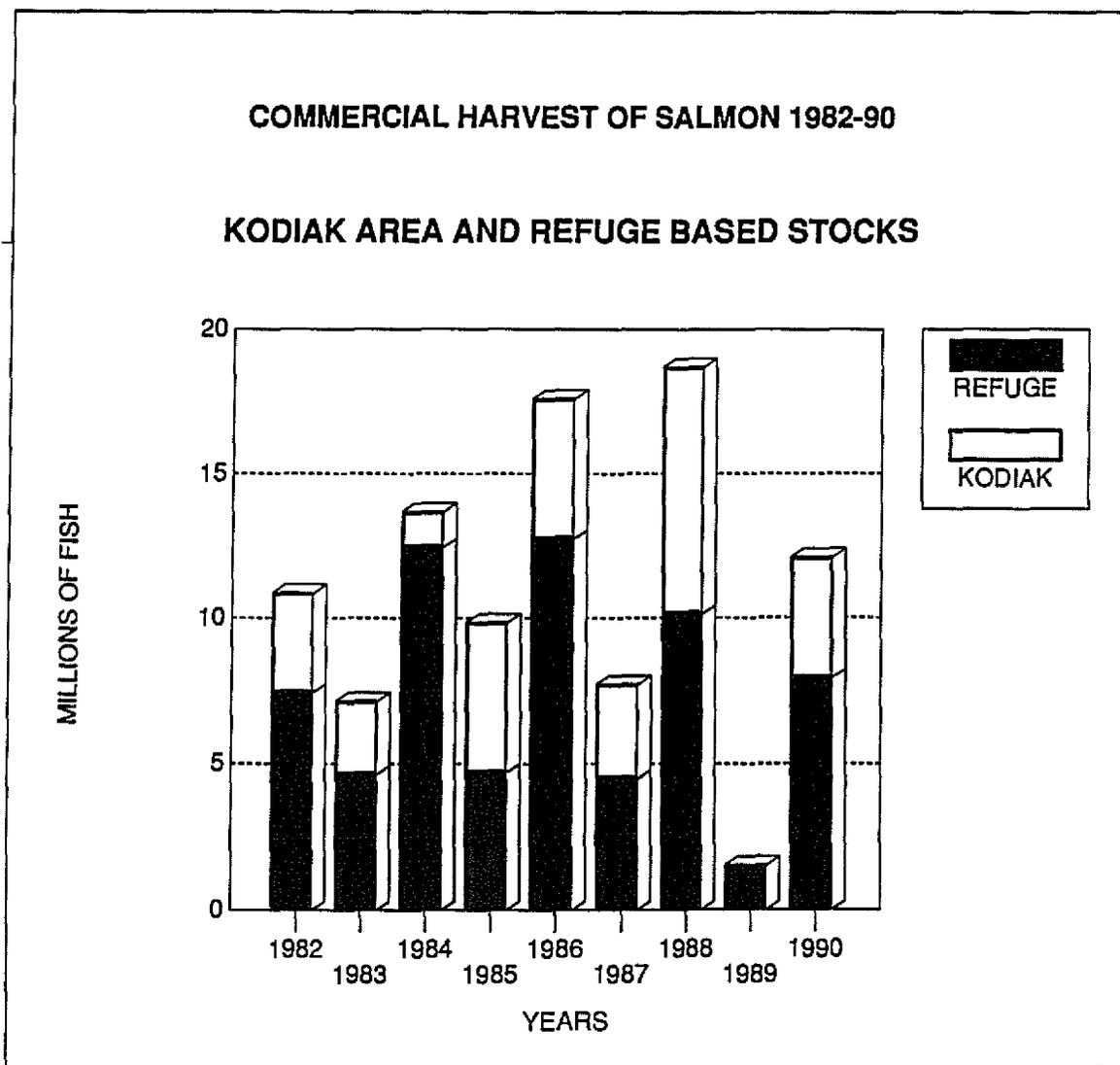


Figure 3

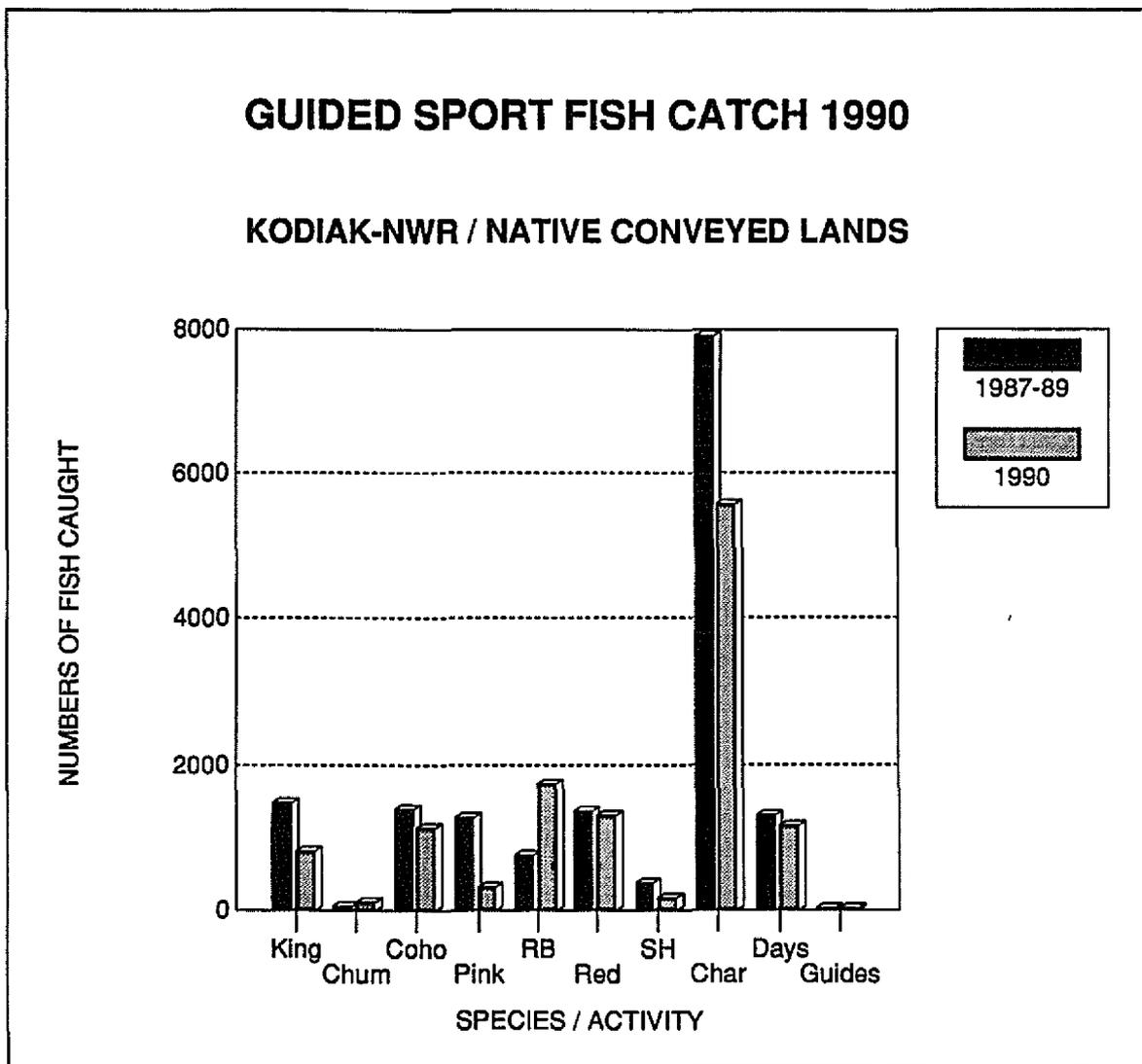


Figure 4

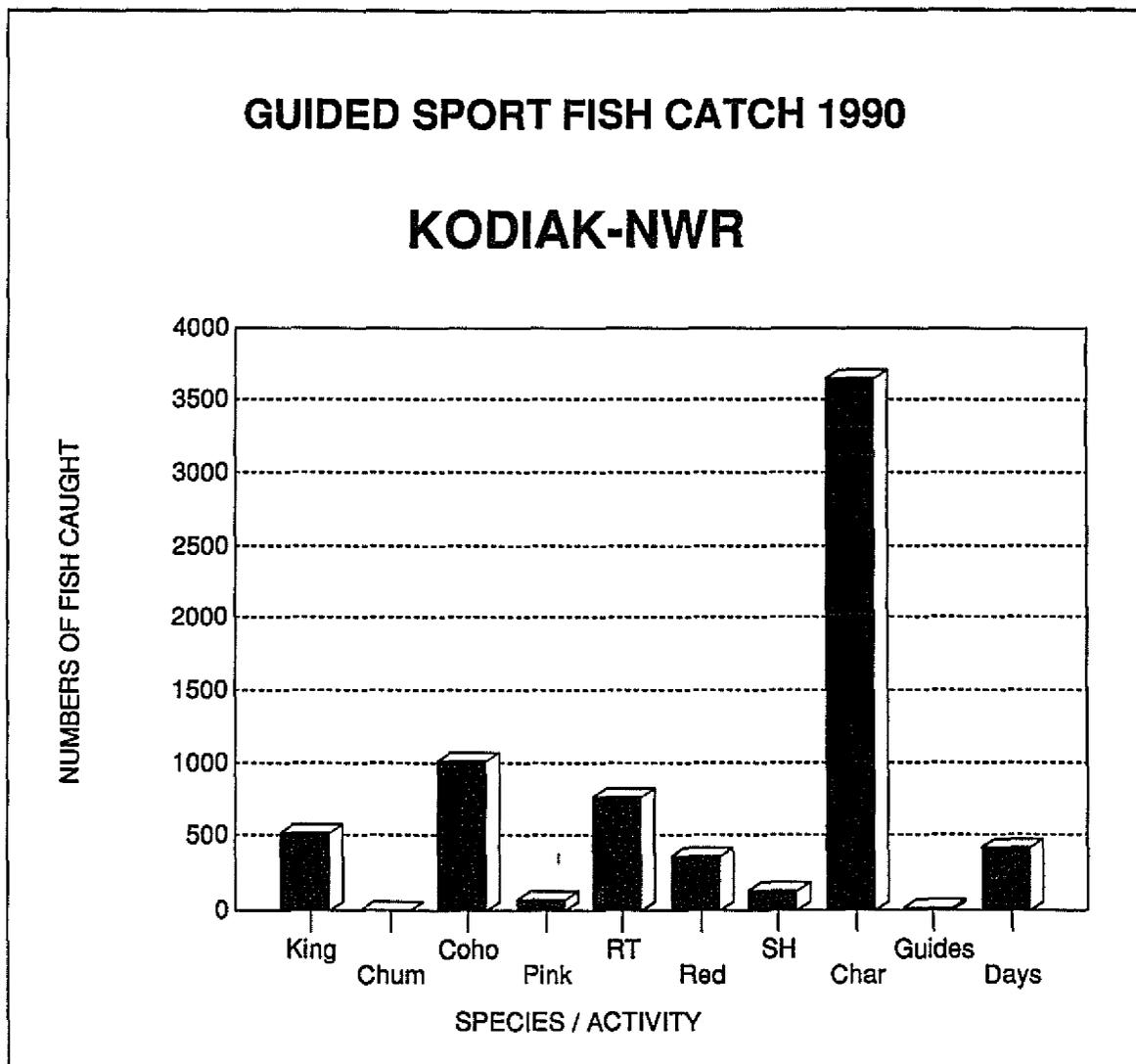


Figure 5



Steller's sea lions have declined throughout the Kodiak area in recent years and were designated a threatened species by the National Marine Fisheries Service this past year. (90-22) DM



Female killer whale from a pod of 7 seen during this summer's oil spill assessment surveys. (90-23) DZ

ADF&G, 1 Kodiak NWR) (Table 6) were operated during the season. In addition, 58 of the refuge's 114 streams were monitored through aerial index surveys. Although data is preliminary, the 1990 composite index escapement for the refuge (Figure 6) indicate that, with the exception of chum salmon, indexes for chinook, sockeye, coho, and pink salmon were above the 1982-88 average. Salmon index numbers for 1989 were not used in the average because of the large overescapement of most salmon stocks due to the commercial closure during that year as a result of the Exxon Valdez oil spill.

Although the 1990 index for pink salmon on the refuge is approximately 60% above the 1982-88 average, the Karluk River accounted for approximately 3.4 million fish (71%) of the 1990 index due to an abnormal entry pattern of pinks into the river. The remaining index of 1.4 million fish reflects the minimum to poor escapements observed in other refuge pink salmon streams.

Adult steelhead are counted on the Karluk, Ayakulik, and Dog Salmon Rivers May, June, and September prior to the weirs being removed. The kelt count through the weirs in late May and June are used as a index of the previous fall-winter population. Kelt counts in 1990 (Figure 7) indicate that the 1990 run was comparable to high counts observed in the early 1980's and the Dog Salmon steelhead run in 1990 appears to have reached an all time high. In addition, the immigrant spawner count of 572 fish on the Ayakulik in 1990 was the highest yet recorded prior to weir removal in early September. Although there appears to be no significant correlation between early run counts and the resulting spring kelt numbers a fairly high kelt count in the spring of 1991 is highly probable.

#### H. PUBLIC USE

##### 1. General (Menke)

Public use on the refuge decreased slightly to 21,300 visits, compared to 22,400 visits in 1989. These figures include both on refuge and visitor center use. The nearest point of refuge land is located about 20 miles from the headquarters which is close to the town of Kodiak. Table 7 summarizes public use levels for some of the major recreational activities for the past 4 years.

More than 100 businesses and individuals currently have refuge permits or have expressed an interest in obtaining permits for the following categories of commercial use: big game guiding and outfitting, sport fish guiding, recreation guiding, air taxi operations, and boat charters. Use levels for fishing guides and big game guide-outfitting are documented in the following sections of this report. The refuge now has many more requests for both sport fish guiding and big game outfitting permits than the numbers specified in the refuge's comprehensive conservation plan (24 sport fish guides and 18 big game guide-outfitters).

Two types of public use are recorded for the refuge. People stopping at the visitor center headquarters building, located about

Table 6  
 Salmon counting weirs used to enumerate  
 escapement of refuge based fish stocks in 1990.

Weir location	Dates		Species					
	Installed	Removed	Kings	Sockeye	Coho	Pink	Chum	Steelhead(kelts)
Uganik	6/25	10/14	6	6,551	5,261	77,015	2,560	1
Karluk	5/28	9/8	14,442	738,088	14,010	3,423,969	400	51
Ayakulik	5/28	9/7	11,251	371,282	22,539	708,372	117	572
Dog Salmon	6/24	8/15	270	254,540	6,484	4,718	6,520	2
Upper Station	6/1	9/12	28	254,446	7,467	948	2	0
Akalura	5/27	9/21	1	47,181	4,232	0	0	0
Horse Marine	7/15	9/13	0	2,111	234	387	179	0
Totals			25,998	1,504,113	60,227	1,133,836	9,778	624

NOTE: The above weirs operated by Alaska Department of Fish and Game with the exception of Uganik, which is operated by Kodiak National Wildlife Refuge.

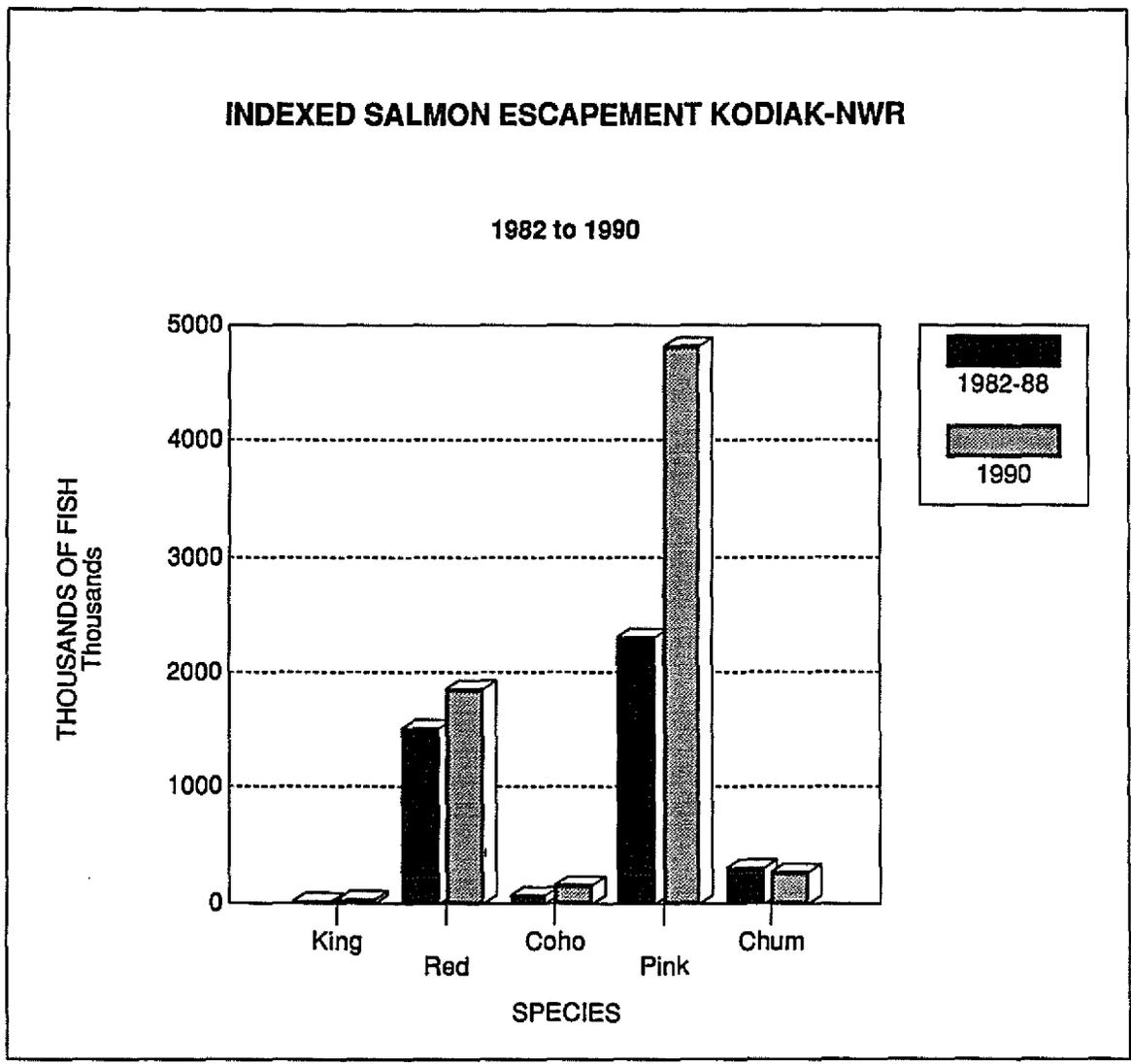


Figure 6

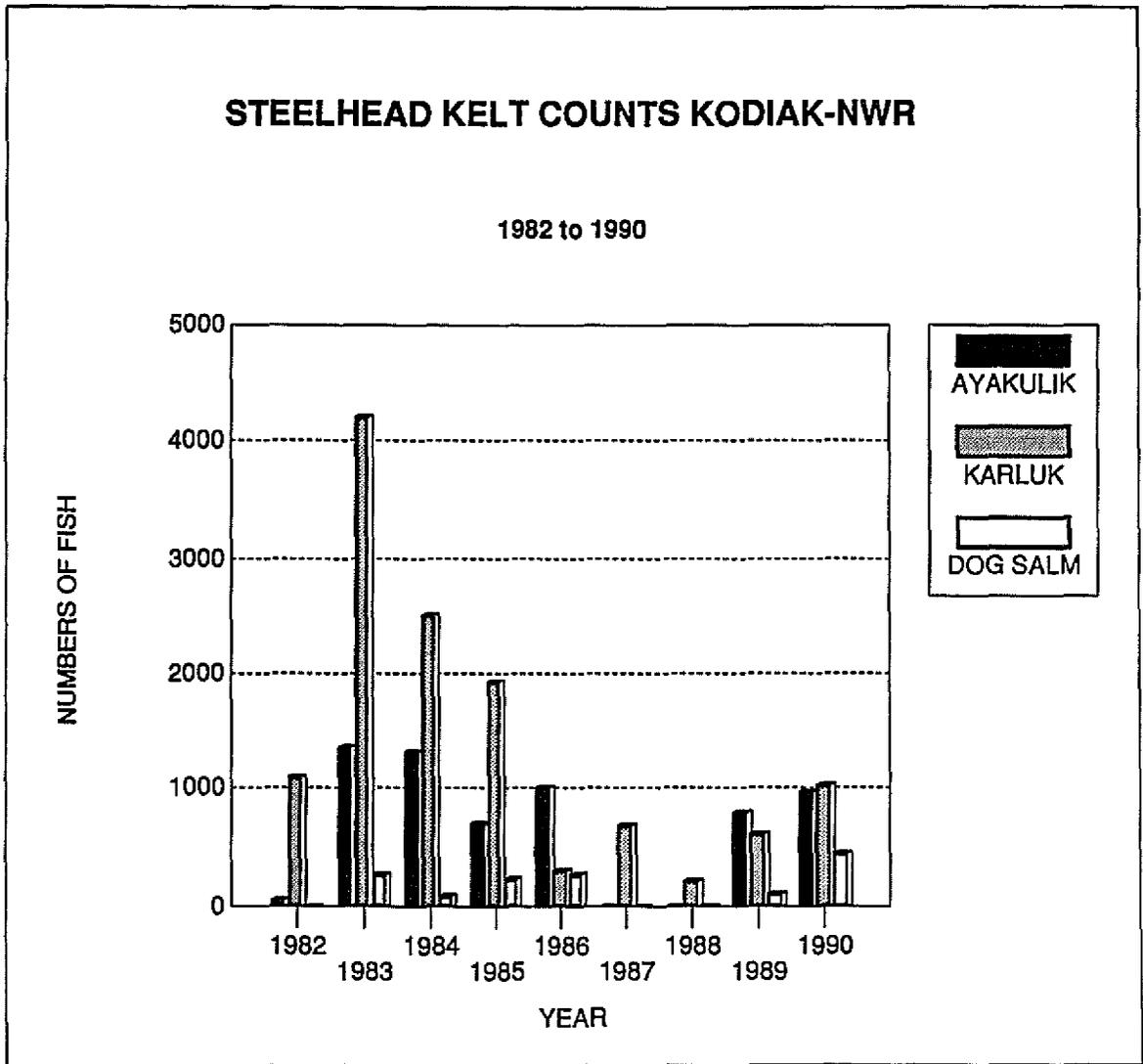


Figure 7

four miles from the town of Kodiak, spend an average of 1/2 hour viewing films and exhibits, obtaining leaflets, and asking questions about the refuge. Visits to the refuge proper involve chartering a small aircraft or boat to get to an activity site. Most visitors spend 4 to 7 days on the refuge during hunting, fishing, or photography trips.

Table 7  
Refuge public use for selected activities from 1986 to 1989.

Category	1987	1988	1989	1990
<b>Interpretive center</b>				
Visits	9,784	8,681	8,989	8,229
Activity Hours	4,851	4,342	4,495	4,255
<b>Environmental Education</b>				
Visits	591	725	902	652
Activity Hours	517	804	1,397	462
<b>Deer Hunting</b>				
Visits	1,523	1,661	1,493	1,246
Activity Hours	73,645	77,121	69,404	59,136
<b>Sport Fishing</b>				
Visits	2,740	1,970	2,045	2,500
Activity Hours	34,480	32,920	44,920	54,300

The refuge has more than 40 wildlife films, videos, and slide/tape programs which are available on loan to local school teachers and service clubs. The refuge staff wrote scripts and selected slides for two new programs on Kodiak Island including: Intertidal Life of Kodiak Island and Tarred feathers: Wildlife and the Exxon Valdez Oil Spill. Copies of these productions were donated to the city library and school system.

## 2. Outdoor Classrooms - Students (Menke)

In 1990 the number of student visits decreased to about 650 visits compared to over 900 last year. These included student visits to the refuge visitor center as well as occasional classroom and field trip visits by refuge personnel.

Several mailings were made to all private and public school teachers in Kodiak. A mailing in March included National Wildlife Week packets and a list of films available from the refuge film library. At the beginning of the school year another packet was mailed to Kodiak school district teachers advising them of visitor center and film check out possibilities.

The refuge now has produced 5 Kodiak videos featuring birds, bears, plants intertidal life and a refuge orientation. All of these videos as well as the rest of the refuge film library are available for loan by teachers and the general public.

### 3. Outdoor Classroom - Teachers (Menke)

Contacts with school teachers and program offerings were limited this year due to the transfer and extended leave of Public Use Specialist Cathy Rezabeck. The trend of increased teacher contacts and program offerings for Kodiak and village teachers was reversed as a result.

In March 1990 the refuge offered a 1-credit course at the local college entitled "Natural Resource Activities for Elementary Teachers". Due to insufficient number of teachers signing up the class was cancelled. The Alaska Natural History Association sponsored an In-service presentation on Environmental Education programs in Alaska by Melanie Heacox of the Alaska Public Lands Information Center in Anchorage. About 20 Kodiak school teachers attended 2 of the 3-hour sessions.

### 4. Interpretive Foot Trails (Menke)

During the year, trail markers and signs were put up for a short loop nature trail which will be located near the visitor center. Some work was done on trail clearing by the refuge staff and volunteers on their way to Adak but was terminated with the onset of winter. A trail leaflet was written and a leaflet dispenser was fabricated. We expect to complete this project in the spring of 1991.

### 5. Interpretive Tour Routes (Menke)

This was the first year that the refuge conducted a guided bear viewing program. The program was set up at Dog Salmon Falls (75 miles south of the town of Kodiak) at a site where the Alaska Department of Fish and Game maintains a fish ladder which bypasses the natural falls. Bears come to the area below the falls to fish for salmon. The program was conducted by a seasonal employee hired by the refuge.

From July 2 through August 10 groups, of up to 5 participants at a time, were scheduled to visit the site to view and photograph bears. Participants spent 4 or 5 days at the site which afforded ample opportunities to observe both individual bears and family groups. A small frame building for cooking and food storage and a weatherport with bunks were set up on the site to accommodate visitors with reservations.

Although the program was put together in short order and had little advance publicity, we received about 3 requests for each available slot. This was somewhat surprising considering the rather high cost to each participant for chartering a float plane to the site. As it turned out, all people participating in the program were able to see a variety of bears from 2 different observation areas set up near the feeding location. The Fish and Wildlife Service employee

accompanied all groups to the viewing area. Although there was no charge to participants during the first year, the refuge will institute a fee for this program in future years.

Features of the Program included:

- A. Participants were accompanied to the viewing area by an armed refuge employee at all times.
- B. A detailed orientation was provided to all participants when they first arrived.
- C. The refuge provided accommodations for sleeping and food preparation.
- D. Participants were responsible for their own food, personal gear, and transportation arrangements.
- E. Reservations were required and limited to 5 people at a time.

In all, 42 participants took part in this new refuge program. Most participants rated the program very highly although some disliked the un-natural features present at the site.

#### 6. Interpretive Exhibits/Demonstrations (Menke)

Use of refuge visitor center decreased slightly compared to 1989. Once again we were able to keep the visitor center open on weekend afternoons using volunteers. Use of the center during the summer months by off-island tourists accounts for much of the use.



Upper Dog Salmon Falls was the general location of the refuge's bear viewing program, most bear activity occurs downstream from the weir and fish ladder. (90-24) DM



The fish ladder and associated facilities is the focal point that concentrates bears in the bear viewing area. (90-25) DM



Up to seven bears at a time (two sows with several cubs) visited the weir at the brown bear viewing program site. (90-26) SS



A frame food storage and preparation building and weatherport (sleeping quarters) were erected for the use of bear viewing program participants. (90-27) DM



The scenic, meandering Dog Salmon River is the backdrop of the refuge's new bear viewing program. (90-28) DM



Some bear viewing program participants were not pleased with the fact that bears were often seen fishing along side man made objects. (90-29) DM



This sow with two yearling cubs was one of the most frequently observed bears at the refuge viewing site. (90-30) SS



Several bears used the viewing site and were observed by participants. (90-31) SS



The refuge's bear viewing program generated several positive articles in the Kodiak and Anchorage press. (90-32) DM



One of a series of temporary exhibits in the visitor center featured a school class exhibit of Kodiak Island habitat drawings. (90-33) DM

Although there were no tour ships this summer, tourists arriving via the airlines remained steady. Two local tour operators use the visitor center as one stop on their scheduled rounds of Kodiak Island points of interest.

The refuge staff writes a monthly wildlife or refuge news column called "Bear Country" which is featured in the local daily newspaper. A series of temporary displays were put up in the center corresponding with the monthly news column topics. Topics featured in the early months included bear research, duck stamps, and wildflowers. Due to maternity leave and later transfer of Public Use Specialist Cathy Rezabeck, we were not able to keep up with the schedule of displays and articles. We hope to offer these popular programs when a replacement is hired.

The most popular exhibit in the visitor center is a large topographic relief map which identifies unique characteristics of Kodiak Island. During recent years this map has developed an unsightly crack and has begun to show the signs of age including chipping and peeling. In October the map was sent to a Seattle fabricator who will recast and paint the map with all original detail. The new fiberglass map should prove more durable than the original version made from plaster covered foam material. Other visitor center displays feature information on natural/cultural history and refuge management of Kodiak Island.

A 15 minute video on Kodiak's wildlife is shown to visitors upon request. A variety of free literature from the refuge, ADF&G, and Chamber of Commerce are provided to visitors. This year the refuge reproduced a Wildlife Viewing Guide to Kodiak's Road System funded by the Alaska Natural History Association. An oak railing and storage access shelves were installed in the topographic map exhibit case. Approximately 60 sales items are available in the sales area (See Sec. H-18).

7. Other Interpretive Programs (Menke)

Regularly scheduled weekend wildlife films have proven a popular feature, attracting over 1,600 visitors during 1990. The films are shown at 1:00, 2:00, and 3:00 p.m. both Saturdays and Sundays. The refuge owns more than 40 films and videos which are shown to requesting groups and mailed out to schools.

8. Hunting (Menke)

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

Approximately 380 hunters used the refuge during the spring and fall bear hunts in 1990. Bear hunting on the refuge accounted for nearly 22,000 hours of public use. Sixteen big game guides have permits for hunting areas on the refuge.

Deer hunting use, both on and off-refuge, has decreased in the past two years due to widespread rumors of a massive winter kill last year. Although hunting pressure was down on refuge lands in 1990, late season hunters (late November through early January) still reported good success as deer moved to lower elevations as snow depths increase.

In 1988, the State of Alaska, based on a State Supreme Court decision, ended its long standing commercial big game management system of exclusive guiding. In simple terms this could have opened the door for any of the 140 Kodiak licensed big game guides to operate on the refuge instead of the 16 guides who had traditionally operated on refuge lands. In 1989 the Fish and Wildlife Service imposed a State-wide moratorium on guides and client numbers permitted on refuges throughout the State. This moratorium was extended through 1990 awaiting development of a State big game guide-outfitter allocation system.

Big game guide-outfitters are required to report use and harvest information as a condition of their permit. At the time of this report, this information is still being analyzed.

Approximately 35 mountain goat hunters used the refuge during the past year. Most of the other hunting activity on the refuge including small game, upland game (i.e. ptarmigan), and duck hunting occurs in conjunction with deer or bear hunting trips.



Refuge Manager Jay Bellinger (right) and Assistant Refuge Manager Munoz (left) visit with Morris Talifson who has guided bear hunters on Kodiak Island since the 1940's. (90-34) (Photo by John Merrick, Koniag, Inc.)



Morris Talifson and Bill Pinnell (who passed away during 1990) are widely known for their bear hunting camp that operates out of the old Olga Bay cannery site. (90-35) (Photo by John Merrick, Koniag, Inc.)

#### 9. Fishing (Menke)

Sport fishing is the most popular activity taking place on the refuge. This year, an estimated 2,500 fishermen participated in about 54,000 activity hours of freshwater fishing on the refuge. The most popular fishing locations on the refuge include the Ayakulik and Karluk drainages and Uganik Lake. The Karluk and Ayakulik systems support Kodiak's largest chinook salmon and steelhead runs. These 3 areas have well over half of the sport fishing pressure occurring on the refuge and Native conveyed 22(g) lands within the refuge boundary.

Interest in sport fish guiding has increased rapidly since 1983 when the refuge received its first permit requests. That year 6 sport fish guiding permits were issued; in 1984 nine permits were issued; in 1985-15; and in 1986-22. In 1987 the refuge reached the limit of 24 guides identified in the refuge comprehensive conservation plan. An additional 21 requests were received for refuge sport fish guiding permits over and above the 24 permits issued in 1990. As a condition of the special use permit, guides are required to submit a report of their use and the number of fish caught and released by their clients. Most of the guided sport fishermen on the refuge are day users.

#### 10. Trapping (Menke)

Eight trapping permits were issued for the 1989-1990 trapping season on the refuge. Individuals with refuge special use permits reported harvesting 13 red fox, 19 beaver, 19 river otter, and 5 marten. The marten were trapped on the Afognak Island portion of the refuge.

#### 12. Other Wildlife Oriented Recreation (Menke)

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 most cabins is highest during the peak deer hunting and fishing periods. The South Frazer, Red Lake, and O'Malley cabins are beginning to receive heavy use by wildlife photographers from early July through the end of August.

The refuge cabin administration and maintenance program is estimated to require over 0.5 FTE year. The staff commitment to the cabin program includes maintenance, answering inquiries, handling reservations, and law enforcement.

#### 17. Law Enforcement (Bellinger)

Refuge officers again journeyed to sunny Marana, Arizona for their 40 hour refresher training in March. Firearms re-qualification was conducted at the Kodiak Island Sportsmens Association firing range. We did not conduct our normal fall vessel patrol as our vessel operator was kept busy with construction of our new vessel in Port Townsend, Washington.



Red fox (above) and cross foxes (below) were both abundant this year. Trapping efforts on Kodiak primarily target this species. (90-36, 90-37) DM & VB



A majority of our enforcement program is expended checking commercial operators, primarily big game guides, sport fishing guides, and commercial fishermen. We also receive several calls each year to investigate violations of Migratory Bird Treaty Act, Marine Mammal Act, and Eagle Act on the road system.

Citations or law enforcement activities in 1990 are listed below:

A. Refuge Manager Bellinger and Airplane Pilot Patterson assisted Alaska Peninsula/Becharof National Wildlife Refuge during the spring bear season on the Alaska Peninsula. They wrote two citations for air taxi operations without a special use permit.

B. One commercial operator was issued a citation for sport fish guiding on a National Wildlife Refuge without a special use permit.

We just missed another unpermitted operator, however, if he returns from France in 1991, we hope to educate him this next summer.

C. We assisted State Fish and Wildlife Protection officers in establishing an undercover camp in Halibut Bay. The big game guide was arrested by the troopers for taking a fox out of season and wanton waste of caribou meat.

D. We conducted an undercover camp on the Dog Salmon River drainage with the assistance of Special Agents from Anchorage and Fairbanks. The big game guiding operation did not trespass on the refuge, and no citations were issued.

E. A fox carcass with only the tail removed was found at a big game guides camp shortly after he broke camp. This case of wanton waste is presently being investigated with the assistance of Special Agents in the Lower 48.

F. A warning was issued to a big game guide for hunting on Native selected lands without written permission (he had obtained permission to hunt on Native conveyed lands).

G. A complaint was received on non-Native possession of a sea otter pelt. Upon investigating the complaint, Refuge Officer Menke found that the pelt was a river otter. However, due to the fact that the individual did not possess a trapping license (needed to take river otter) Menke turned the case over to the State Fish and Wildlife Protection for prosecution.

H. We received the initial complaint of a local air taxi pilot using an airplane to harass a brown bear sow with cubs. Our investigation showed that the incident took place just off the refuge on an inholding of Native land. Therefore, we turned the case over to State Fish and Wildlife Protection for prosecution. The case will go to a jury trial in the near future.



Airplane Pilot Patterson examines this heavily impacted site that resulted from an illegal long-term commercial camp along the Ayakulik River. Refuge permits require moving camps periodically. This operator was given a violation notice for operating without a refuge special use permit. (90-38) DM



The confluence of the Ayakulik River and Bare Creek is the only reliable float plane landing spot on this river that is renowned for its king salmon run during June. Concentrated camping is resulting in negative impacts on habitat and bears. (90-39) DM

18. Cooperating Association (Menke)

The Kodiak Branch of Alaska Natural History Association (ANHA) had a successful year in 1990 generating a gross income of \$13,150 (down slightly from 14,250 in 1989). In addition, over 60 other educational items continue to be sold in the visitor center including books, slide sets, post cards, note cards, and posters. Much of the "profit" generated by these sales provides funding for special educational projects. In 1989 the refuge was able to reprint its popular news supplement "Bear Country, A Wildlife Viewing Guide to Kodiak's Road System" with association funds in combination with a matching grant from the State of Alaska. This publication was an extremely popular when provided to travelers on board the ferry operating between Kodiak and Homer, and is free to the public. This publication will be reprinted in 1991.

Other projects funded by the ANHA sales outlet included sponsoring an environmental education in-service program presented by Melanie Heacox, purchase of "grizzly" educational software, and purchase of a new storage cabinet for sales inventory. Drinking cups with the refuge logo were purchased by ANHA for distribution to refuge volunteers.



Kodiak Alaska Natural History Association produced items including refuge pins and T-shirts for sale. The cups were produced for refuge volunteers and sold at cost to refuge employees. (90-40) DM

## I. EQUIPMENT AND FACILITIES

### 2. Rehabilitation (Munoz)

The major portion of rehabilitation of the Camp Island panabode was completed this summer by Maintenance Mechanic Bowers with help from Walt Szelag and Harold Shipley of the Regional Office Engineering Department. Replacement of the roof on this structure will be the next project that will come up on this building. One of the first to field test the cabin following completion of this work was Director John Turner and Regional Director Walt Stieglitz on their tour of Alaska refuges.

The large visitor center relief map of Kodiak Island was removed and sent off to a contractor to serve as a template for a new map. This is a Maintenance Management Project (MMS) project.

Other MMS projects funded this year included the purchase of a new sander and truck.

### 4. Equipment Utilization and Replacement

#### A. Ursa Major (Zwiefelhofer)

The annual dry docking of the refuge vessel Motor Vessel Ursa Major for hull inspection, cleaning, and painting occurred June 11.

#### Ursa Major II (Zwiefelhofer)

Wildlife Biologist/Boat Operator Zwiefelhofer traveled to Port Townsend, Washington several times between August and November to monitor the construction progress of the new refuge vessel Motor Vessel Ursa Major II. The construction contract was accepted on November 26, with departure date from Port Townsend of November 27. Wildlife Biologist/Boat Operator Zwiefelhofer was accompanied by Ship Operator Al Bayer and Marine Machinery Mechanic Eric Nelson (Both of Alaska Maritime NWR). Due to bad weather and other problems by December 6 they had only made it as far as the North end of Vancouver Island. At that time a decision was made that it was best to return to Seattle for safety reasons. The vessel was delivered by barge to Kodiak just in time for Christmas on December 23. The replacement vessel was long over due and will greatly enhance capabilities to conduct coastal refuge operations. We will also be able to offer logistical support for other State and Federal agencies conducting work around the Kodiak Archipelago.

#### B. Airplanes (Munoz)

Activities related to airplane maintenance included:

1. An annual inspection at the Office of Aircraft Services in Anchorage during February;



The refuge received its new boat the Ursa Major II this year. The boat was constructed in Port Townsend, Washington. (90-41) DZ



The new boat was shipped by barge and delivered to Kodiak on December 23. (90-42) DZ



Boat construction process was monitored by Boat Operator Denny Zwiefelhofer on several occasions between August and November. (90-43) DZ



The new boat features a fiberglass hull that replaces the old 1940's vintage wooden boat. A critical part of refuge operations, the vessel is used for logistical support, law enforcement patrols, and sea bird surveys along the refuge's 800 mile coastline. (90-44) DZ

2. Installation of long range fuel tanks on the Super cub (necessitated when we lost fuel storage capability at Larsen Bay);
3. Placing straight floats on the Cessna 206 during June when corrosion was detected in the amphib gear; and
4. Reconfiguring the Cessna 206 to amphib and the Cub to wheels during October after Lilly Lake froze.



Straight floats and flint tanks on the refuge Cessna 206 greatly enhanced our summer operations during 1990. Fishery Biologist/Pilot Chatto departs Karluk Lake with a load of refuge and Regional Office personnel on board for a tour of refuge field projects. (90-45) VB

##### 5. Communications System (Munoz)

Plans to replace the radio system at Camp Island have been set into motion with a June 1991 completion date targeted. A repeater will be installed on refuge land near Larsen Bay. A radio/telephone patch will be installed at Larsen Bay on land leased by Telephone Utilities of the Northland from the City of Larsen Bay. A lease agreement needs to be worked out through the Realty Department. Tim Miller, Regional Office Communications Specialist, worked up the specifications for the system and a packet was sent to Contracting and General Services for processing.

Coast Guard radio specialists examined our base radio to see if interference we experience is due to Coast Guard transmissions. Part of our background noise is due to the proximity to Coast Guard

antennas, but they also thought the base station might have some problems. When we had a transmission failure during the field season the unit was taken in for repair. A replacement unit worked noticeably better indicating the old radio needs to be replaced. We put in an end-of-year request to replace it but didn't make the cut. Coast Guard personnel also recommended that we cut trees and brush encroaching on our antenna field in order to improve our transmitting/receiving capability.

6. Computer Systems (Zwiefelhofer)

The initial Office Automation Plan was approved during 1990. However, networking the refuge system is being reconsidered and will likely not be included in the FY 91 revision. Some changes in acquisition chronology may also be made depending on how much funding becomes available.

J. OTHER ITEMS

1. Cooperative Programs (Munoz)

The refuge continues to provide office space to Vic Barnes, a research biologist with the Alaska Fish and Wildlife Research Center. This arrangement is extremely beneficial to the refuge as is reflected by the quality of research that Vic generates on brown bears (Sec. D-5).

Special Use Permits were issued to the following agencies and individuals:

- A. Bureau of Land Management to land a helicopter on the refuge at various locations to check proposed Native allotments.
- B. Alaska Department of Fish and Game-Fisheries Rehabilitation and Enhancement Division to conduct a dewatering study that is looking at the effect of increased hydro-electric generation on salmon productivity.
- C. Kodiak Island Borough for passive clean-up of oiled beaches.
- D. Daniel Mann of University of Washington to conduct geologic field research.
- E. Alaska Department of Fish and Game-Habitat Division to conduct oil spill response surveys.
- F. Alaska Department of Fish and Game-Commercial Fisheries Division to land on the refuge with a helicopter to conduct fisheries management studies.
- G. Wolfgang Bayer to photograph on the refuge for a National Geographic special.

### 3. Items of Interest (Munoz, Zwiefelhofer)

Assistant Regional Director John Rogers and Associate Manager George Constantino conducted a refuge review July 30 through August 1. Sites visited included the Uganik weir, the Dog Salmon Falls Bear Viewing Site, the Uganik Lake Public Use Cabin, Camp Island, and the proposed O'Malley Creek Bear Viewing site.

Fish and Wildlife Service Director John Turner, Executive Assistant Director Mike Brennan and Regional Director Walt Stieglitz visited the refuge August 17 to 19. Areas and issues covered included the O'Malley Creek Bear Viewing Site, 22(g) lands, and an Afognak Island Unit overview.

Congressmen Silvio Conte was accompanied by Refuge Manager Bellinger on his annual visit to the Camp Island facility from August 24 to 31.

Work details included the following:

- Park Ranger Menke was sent to Arctic NWR to assist with a Public Use Standard review and to Togiak NWR to provide input on their Public Use Management Plan.
- Refuge Manager Bellinger and Airplane Pilot Patterson were sent to Alaska Peninsula/Becharof NWR to assist with a bear season law enforcement effort.
- Assistant Refuge Manager Munoz assisted the Subsistence Office with their round of public involvement meetings during November and December.

Refuge Manager Bellinger and Park Ranger Menke attended the Project Leaders Meeting in Homer on November 13 to 16 aboard the Motor Vessel Tiglax.

Airplane Pilot Patterson departed December 28 on annual leave in conjunction with a trip to Federal Law Enforcement Training Center for basic law enforcement training. He is expected to return in early April of 1991.

The refuge's research/patrol vessel, the Motor Vessel Ursa Major, and Wildlife Biologist/Boat Operator Zwiefelhofer were responsible for data collection used in the oil impact assessment of the Archipelago's seabird and seaduck populations. The assessment activities were carried out from July 11 to 20. The historic winter survey transect lines on the west side of Kodiak were utilized for the assessment in that area. Shoreline transects around Afognak and Shuyak Islands were also completed during the summer survey effort.

Portions of the Kodiak Island Archipelago were again surveyed during 1990 to assess potential impacts of the Tanker Vessel Exxon Valdez oil spill on nesting bald eagles. Survey coverage and timing of the surveys were comparable to the 1989 effort.

The coastline of Kodiak Island (from Spruce Cape to Cape Grant, plus Shuyak, Afognak, Ban, Raspberry, Whale, Spruce, Uganik, and Amook

Islands) that was aerially surveyed for bald eagle nesting activity in 1989 was resurveyed in 1990. Marmot Island was not surveyed to avoid disturbance of the Steller's sea lion rookery located on this island. During the survey all the coastal areas were flown at approximately 200 foot AGL with a single passenger as the primary observer and the pilot acting as a secondary observer. Observations were coded on the survey maps using standard terminology adapted from Postupalsky (1973) for occupancy and reproductive assessments. All observations were enumerated on U.S. Geological Survey 1:63,360 scale topographic maps.

Surveys were conducted from Cape Grant to Spruce Cape using a PA-18 Piper supercub from May 7 and 11. Kodiak Refuge Airplane Pilot Patterson and Wildlife Biologist/Boat Operator Zwiefelhofer conducted the fixed wing survey flights. Approximately 13 hours of fixed-wing flight time was expended on the Kodiak Island portion of the nest survey.

The coastlines of Afognak, Shuyak, and other islands north of Kodiak Island were surveyed from a Bell Jet Ranger 206A helicopter on May 14, 15, 22, 24, and June 3 with Alaska Helicopter pilot, M. Machulsky and Wildlife Biologist/Boat Operator Zwiefelhofer as observer. Approximately 29 hours of rotary-winged flight time was expended on this portion of the survey area.

The production surveys of nests determined to be active or occupied during the initial survey were conducted during July and August. Active nests on Afognak, Shuyak, Raspberry, and islands other than Kodiak were revisited on July 24 and 25 via an Alaska Helicopter's Bell Jet Ranger 206A piloted by M. Machulsky. Wildlife Biologist/Boat Operator Zwiefelhofer acted as observer during the 11 hours of rotary-winged flight time required to complete this portion of the survey.

The production survey of the active nests on Kodiak Island were conducted on July 29-30 and August 5 using a fixed-wing Piper PA-18 aircraft. Refuge Airplane Pilot Patterson and Fishery Biologist/Pilot Chatto each flew portions of the coastal Kodiak Island surveys. Research Biologist Barnes acted as observer for the July 30 survey flight, and Wildlife Biologist/Boat Operator Zwiefelhofer was the observer on July 29 and August 5 survey flights.

#### Oil Spill Assessment (Hardister)

John Hardister was detailed from Region 6 to Kodiak for the summer and served as the Oil Spill Coordinator for the Kodiak Zone. This allowed the refuge staff to concentrate on refuge business. John was assisted by Otto Florschutz who was detailed from Region 4. Other people who worked shorter details included Linda Hagen (Region 2), Bill Wilson (Region 6), Dick Wydoski (Region 6), and Bill Jones (Region 4).

Hardister compiled the results of oil spill related work in two documents. The first is entitled "Shoreline Survey for Oil Contamination Resulting from the Exxon Valdez Oil Spill." The second is a memorandum to the Regional Oil Spill Coordinator and is

included here as a record of Fish and Wildlife Service activities in the Kodiak Zone.

#### SPRING SHORELINE ASSESSMENT TEAM (SSAT)

The SSAT effort in the Kodiak Zone went well overall. Members of the two teams in the Kodiak Zone worked well together, both within and between teams, and generally accomplished the purposes for the reviews. The teams were even able to travel outside the zone and review beach segments in the Barren Islands, as requested. The operation in the Kodiak Zone began on March 29 and ended on or about May 27, 1990.

There were questions concerning why some beach segments were selected and others were not. This was not a function of the SSAT team. It reflected on the people responsible for segment selection. In retrospect, there should have been a process whereby the land managers could have reviewed a list of selected segments well in advance of the beginning of the surveys and added (or subtracted) segments. Also, there should have been some explanation as to the process used to select segments. At any rate, agency input in the segment selection process should have been available.

The use of helicopters for the reviews was an excellent idea. Teams could get to and from isolated areas in a short time, considering the distances involved. The only tough logistical problems were some of the narrow beaches on Afognak Island. The excellent safety program spoke for itself. From a wildlife harassment standpoint, the use of helicopters raises some questions. There were some incidences where bald eagles and other birds and the sea otter and other mammals were disturbed by entry to and exit from the beaches. Once we had information on the location of active bald eagle nests, the process to alert the pilots did not work as well as anticipated. Also, pilots were not trained or well informed to look for or avoid nests on their own.

A major question arises as to the need to conduct future beach surveys versus disturbance to eagles and other birds and mammals. In my opinion, reviewing the beach segments this past spring paid off. Beaches were surveyed for oil and we saw no evidence that disturbance prevented any eagles from nesting or that other wildlife were unduly disturbed. Usually, the disturbances are short-lived because the surveys take less than a day to complete on any given beach segment. I recommend that surveys proceed on refuge lands next year but with information about precautions voiced by FWS personnel on hand.

#### TRAINING BY EXXON

Training started for me upon arrival in Anchorage. Parts of the training were beneficial, however, in retrospect, I fail to see how it substantially helped with the spring and summer work that followed. The survival training was good, but I later learned that some of the procedures that were discussed in training were more appropriate to other parts of Alaska than for Kodiak. The so-called "Hazwhoper" course was absolutely the worst course I have ever had. I learned virtually nothing, except what bad courses are like.

There was nothing in the course that aided with the work effort. Exxon should have spent more time training us in the use of the SSAT forms than they did. They could have been beneficial. The "badges" that we got for training turned out to be a farce in the sense that they were supposed to be a requirement for being on a SSAT survey and for monitoring cleanup activities. As it turned out, I was never checked and I know of no one that was, especially the cleanup monitors that arrived throughout the summer months that had no training. Also, the "required" training for ASAP was a farce. No one checked to see if participants had the training and the "training" was not much more than an explanation of the procedures that were to be followed. I don't like being negative, however, its difficult to find much positive about the training we had.

#### NATIVE VILLAGE CLEANUP PROGRAM

For three days in April, I monitored cleanup efforts being done by Natives of Larsen Bay. About a dozen people were involved in manual removal of oil contamination at the Chief Cove area and some offshore islands in Spiridon Bay. Here again, I don't like to be negative, but I saw very little oil contamination removed as a result of the time involved. As one would expect, some workers were good and did a commendable job. Other workers did nothing (except collect their money). On a positive note, some contamination was removed that would not have been otherwise. In short, the operation was anything but cost effective.

#### OIL SPILL CLEANUP MONITORING

Here is an item that I can be more positive about. The assistance we received from cleanup monitors was outstanding. Everyone worked hard and did a most commendable job. I was especially impressed with the dedication of everyone to the job at hand. Instead of just standing aside and watching the workers, they all pitched in and helped. This was something that I did not see during last year's cleanup operations. I attribute the extra work to the "Esprit de Corps" that prevailed between folks in and between the agencies involved with cleanup. The attitude "Let's get this job done right..." seemed to prevail. At any rate, I cannot over-emphasize the hard work of all the FWS cleanup monitors.

#### EXXON'S CLEANUP PROGRAM

Overall, the cleanup effort was a good one. The two supervisors under contract to Exxon Corporation for cleanup did an excellent job. They were dedicated and they worked with the land managers and other people in a cooperative spirit. Of great importance, they were involved with last year's SSAT work. They often did more than was required by the work orders and, near the end of the cleanup effort, they took some flak from Exxon people for doing "extra" work. In one case on refuge lands, they cleaned up two beach segments without a work order. They knew we wanted the beaches cleaned (work order requests had been submitted).

The use of a helicopter for cleanup purposes was outstanding. As a method of ingress and egress to a beach site, it was far superior than operating from a boat. The helicopter operation was only

hampered by bad weather. The use of a helicopter did present another situation for review relative to harassment of wildlife during beach ingress and egress. In my opinion, the procedures worked well where wildlife sensitive zones were established and Service biologists assessed individual cleanup situations relative to bald eagle nesting. Those techniques could be employed again and the information used by the pilots to avoid the sensitive zones. Exxon should be encouraged to use helicopters next year for beach cleanup on refuge lands, using the same techniques as this year.

#### EXXON'S "ASAP" PROGRAM

In the Kodiak Zone, the ASAP program was a waste of time in the sense of accomplishing anything constructive. We anticipated a program that would check beach segments where cleanup took place and see if the cleanup effort was successful. As it turned out, emphasis was placed on whether the site should be re-surveyed next spring. Why? All beach segments that required an extensive cleanup effort should be on next year's list. Otherwise, a lightly oiled beach that was properly cleaned may not require any further work in the future. At any rate, the people heading up the effort here raced to get the job done. They hurried the team through the on-the-ground exercise, automatically stating that cleanup was satisfactory and considering the job complete. As participants, we took as close a look as we could under the circumstances and usually recommended that the segment be re-surveyed next spring. This was particularly appropriate for those beaches that had been cleaned only a few days prior to the ASAP visit. There was not a program whereby the land management agency could comment, per se, on the cleanup effort and no agency sign-off process. Perhaps there should be such a process in the future.

#### SERVICE CONDUCTED SHORELINE SURVEY AND SHEEN ASSESSMENT

An excellent decision was made as to the need for a survey for oil spill contamination on refuge shorelines not assessed by the SSAT. We had our share of problems getting the program obtained helicopter transportation, and bodies to conduct the survey. I understand that the survey on Afognak Island also went well. In summary, we are pleased with the way the operation went and the relative paucity of oil contamination that remains on Kodiak Island.

#### GENERAL COMMENTS

I cannot say enough about the excellent support provided by all of the staff at the Kodiak National Wildlife Refuge. They provided housing, transportation, materials, supplies, secretarial assistance, moral support and encouragement, and on and on. The assistance provided by Refuge Manager Bellinger and Assistant Refuge Manager Dick Munoz was particularly appreciated. There were some critical times in the operation, from my perspective, when their words of encouragement kept me going.

The cooperation and rapport established with personnel from all of the agencies, State and Federal, was one of my most rewarding career experiences with the Government. We all worked hard together, with

everyone's full cooperation, and we relaxed together at various social events. It all added up to an oil spill recovery effort that got the job done with the least amount of confusion and delay. Cooperation from personnel of Exxon Corporation (and their contractors) was also very good and without feelings of antagonism. There was a job to do and everyone fulfilled his/her role. A meeting of key agency personnel at the conclusion of the operation disclosed a consensus that the overall effort was successful.

#### NEXT YEAR?

The U.S. Coast Guard announced that Exxon Corporation will be back next year to re-survey and clean beaches. That could be taken as both good news and bad. The general feeling should remain on the positive side. Further cleanup on refuge lands may be necessary. A discussion of beaches for survey next spring appears in the next session.

#### BEACH SEGMENTS THAT SHOULD BE SURVEYED NEXT YEAR

- Beach segments in Alinchak and Puale Bays, Alaska Peninsula/Becharof National Wildlife Refuge, should receive top priority within the Kodiak Zone. Beaches there were heavily oiled in 1989 and, even though cleaned that year and in 1990, have potential for further cleaning. Remaining oil contamination is likely buried under sand for re-exposure by winter storms
- Other beaches on the Alaska Peninsula/Becharof National Wildlife Refuge should be surveyed on the basis of recommendations that emerge from the 1990 Service beach survey conducted there.
- Also, Service administered beaches on Afognak Island should be reviewed as per the 1990 Service survey.
- The following beach segments should be reviewed on Kodiak Island (refer to 1990 survey report):

K6-14	Village Island
K6-19-CK004	Cape Kuliak
K6-19-CK005	Chief Cove
K6-19-SB005	Spiridon Bay
K6-20-SB011	Hook Point
K7-12-AL100	Alitak Bay

#### 4. Credits

As usual, the writing of the annual narrative report for Kodiak Refuge is a team effort. Staff members who wrote or contributed to a section are identified by name in parenthesis following the section title. Chatto, Munoz, Bellinger, Barnes, and Castonguay edited the report. Hunter provided the information packet, and the typing and compiling was accomplished by Castonguay and Hunter. Photos were contributed by Dave Menke, Tony Chatto, Denny Zwiefelhofer, Vic Barnes, Scott Shelton, and John Merrick.

## K. FEEDBACK

Declining budgets and increasing workloads continue to add to the frustration level of the crew. However, there were a few bright flashes at the end of the tunnel during the year.

Our new vessel arrived in Kodiak on December 23, 1990. This 48 foot vessel is a dramatic improvement from the old vessel. The assistance we received from Engineering, Contracting and General Services and the Refuges and Wildlife Division in the Regional Office in obtaining this vessel was outstanding and much appreciated by the entire crew.

Many times we may think the Regional Office does not understand the situation when we have to justify and re-justify conservative stands on controversial issues. This year we had two Congressional inquiries on the same sport fishing guide Special Use Permit cancellation. The Regional Director took a firm stand in support of cancellation of this permit. This kind of support is greatly appreciated by the field and makes the additional workload seem not quite so heavy.



IN REPLY REFER TO:

## United States Department of the Interior

U.S. FISH AND WILDLIFE SERVICE  
Kodiak National Wildlife Refuge  
1390 Buskin River Road  
Kodiak, Alaska 99615  
(907) 487-2600



Dear Kodiak Public Use Planning Participant:

The enclosed pages summarize the comments we received in response to issues discussed in the Draft Public Use Management Plan. This past spring we held meetings in Kodiak, Anchorage, Akhiok, Old Harbor, and Larsen Bay to address issues and receive comments on the plan. We also received written comments from a number of agencies and individuals.

The following comment summary is organized issue-by-issue as follows:

1. A brief summary of how each issue was treated in the Draft Plan.
2. A summary of comments pertinent to each issue received at planning meetings and in written comments.
3. A statement of how the Refuge will address each issue in the Final Public Use Management Plan.

At past meetings, a number of comments on issues not addressed fully in the Draft Public Use Management Plan were discussed. We have summarized these comments and outlined our responses on the following pages.

The next step in the public use planning process will be to finish the plan. The final version will reflect the changes outlined in this document. We expect to finalize the plan and proposed regulations in May, 1991. Prior to finalizing the plan an informational meeting will be held in Kodiak on March 16 to discuss revisions which will be incorporated in the Final Public Use Management Plan. This meeting will be held at the Buskin River Inn starting at 2:00 p.m. At the meeting we will summarize the changes being made in the Final Plan and address any questions that arise. Following distribution of the Final Plan and expiration of the comment period the Refuge will hold public hearings in the Kodiak area to receive comment on public use regulations proposed in the Final Plan.

Please contact the Refuge at 487-2600 if you have questions.

Sincerely,

Jay R. Bellinger  
Refuge Manager

DM/JB:gc

Enclosure

ISSUES AND COMMENT SUMMARY  
Kodiak National Wildlife Refuge  
Draft Public Use Management Plan

SNOWMACHINES

Public Use Management Plan Draft: The Kodiak National Wildlife Refuge (Refuge) Comprehensive Conservation Plan (Comprehensive Plan) discussed the issue of snowmachine use on Refuge lands. Concerns included impacts of increased snowmachine use on denning brown bears and wintering deer. Snowmachines were prohibited on Refuge lands prior to the 1980 Alaska National Interest Lands Conservation Act (ANILCA); current use is very low. The potential effects of snowmachine use on Refuge resources and habitats are examined in Appendix A (pages 64-80) of the Kodiak Refuge Draft Public Use Management Plan (Draft Plan). The Draft Plan recommends prohibiting snow machine use in Refuge areas over 500 feet above sea level where over 90 percent of bear denning occurs and in wintering deer concentration areas. Proposed regulations for snow machine use and a map of areas proposed for closure to protect wintering deer are found on pages 214-215 and 218 of the Draft Plan, respectively. Proposed regulations would not apply to Native corporation or other private inholdings.

Comments: The State of Alaska (State) supported restriction of "snowmachines in bear denning habitat and deer wintering areas". They stated the desire to work cooperatively with the Fish and Wildlife Service (Service) to identify locations and timing of snow machine restrictions.

The Kodiak Electric Association (KEA) stated that they would like to continue to be permitted access to the Terror Lake Hydroelectric facility by snowmachine. (NOTE: Any proposed access restrictions would apply to public use; and access by snowmachines to Terror Lake Hydroelectric facilities for management or administrative purposes will continue to be allowed.)

Three conservation groups and several individuals suggested prohibiting snowmachines throughout the refuge, not just in the areas identified in the preferred alternative. One person observed that "Congress never intended to permit incompatible uses not allowed prior to enactment within pre-ANILCA refuges." The Citizens' Advisory Commission on Federal Areas felt that proposals to restrict certain types of access were not adequately justified, either by the current number of defense of life and property (DLP) kills

occurring on the Refuge or by the evaluations presented in the appendices to the Draft Plan.

Two people attending a meeting in Anchorage favored a Refuge-wide prohibition of snowmachines. One person felt only uses provided for in ANILCA should be allowed; another questioned whether the proposed 500 foot MSL closure for snowmachine use would adequately protect denning bears as the closure would be difficult to enforce. Old Harbor, Larsen Bay, and Akhlok residents attending village meetings agreed with the proposed public use regulation restricting snowmachine use. Akhlok residents felt it was important to regulate use now rather than let it get "out of hand." In Kodiak one person felt that snowmachine use was not currently a problem as use is very low and it should not be a major planning concern.

Treatment of the Snowmachine Issue in the Final Plan: Findings contained in the Draft Plan are that snowmachine use in some areas could impact denning bears and wintering deer. Recommendations in the Draft Plan to restrict snowmachine use in Refuge areas above 500 feet MSL and in important deer wintering areas will be retained in the Final Kodiak Refuge Public Use Management Plan (Final Plan). The Refuge will work with the local Alaska Department of Fish and Game (ADF&G) biologists to further define important deer wintering areas. The specific findings and recommendations for proposed limitations on snowmachine use are summarized on pages 78-80 and in Appendix J of the Draft Plan. Prior to implementing this proposed regulation, hearings will be held in Kodiak to receive comment.

PACK ANIMALS:

Public Use Management Plan Draft: Both the Draft Plan and the Comprehensive Plan addressed the use of pack animals on Refuge lands. The Comprehensive Plan Record of Decision states that pack animal use may be permitted, subject to provisions of the National Environmental Policy Act and promulgation of regulations. Specific regulations for pack animal use were to be developed in the Draft Plan. The issue of pack animals was examined in Appendix B of the Draft Plan (pages 81-93). Recommendations of the evaluation in this appendix included prohibiting pack animals except for pack dogs supervised by the owner while on the Refuge. This is reflected in the draft regulations presented in Appendix J (page 215) of the Draft Plan.

The Comprehensive Plan prohibits all grazing on Refuge lands (both commercial and recreational). Currently no pack animal operations occur on the Refuge. Proposed regulation of pack animal use would affect only Refuge lands; it would not apply to Native corporation or private inholdings.

Comments: The State did not support a refuge-wide prohibition of pack animal use, feeling that the Refuge should consider allowing pack animals by permit on a case-by-case basis. The State feels pack animals offer a non-mechanical alternative means of back country access which the Refuge could regulate to disperse use and minimize impacts.

Several people supported Alternative D prohibiting all pack animals and others specifically mentioned concerns about the use of pack dogs and their impact on bears. The Sierra Club and Wilderness Society both opposed allowing pack dogs because their food could attract bears and because dogs have a history of conflicts with bears.

At the Kodiak and Anchorage meetings a wide range of comments were made including:

- No pack animals should be allowed.
- No dogs should be allowed; other pack animals may be allowed as long as they don't overwinter.
- Use a permit system for pack animals.
- Dogs cause bear conflicts.
- Try pack animals on a trial basis.
- Pack animals will disperse use to new areas.
- Don't restrict pack animals because of possible problems (not yet documented).
- Sled dogs should not be prohibited on the Refuge.
- Pack animals could escape and possibly spread rabies to wildlife.

Residents of Kodiak Island villages supported restricting pack animals on Refuge lands. Residents of Old Harbor and Akhiok favored prohibiting all pack animals; including dogs. Larsen Bay residents felt that pack animals were not an issue now; but should be regulated.

Treatment of Pack Animal Issue in the Final Plan: Findings presented in the Draft Plan indicate that unregulated use of pack animals on the Refuge would have a detrimental impact on fish and wildlife. Based on this finding and

comments received, the Final Plan will be revised to include a permit system for use of pack animals on the Refuge. All pack animals (including dogs) will be regulated by Refuge special use permit. Persons wanting to use pack animals will be required to submit a plan of operation prior to receiving a Refuge permit. Based on an evaluation of this plan, the Refuge will determine if a permit will be issued. Items considered in this evaluation will include the length of time animals remain on Refuge lands, provisions made to adequately supervise animals and the proximity of pack animals to bear concentration areas. No grazing of animals nor unattended pack animals will be permitted on Refuge lands. Revisions to Appendices B and J (in the Draft Plan) will be made to effect this change in the Final Plan. The summary outlining the reasons for regulating pack animals (pages 93-95 of the Draft Plan) will be retained. The revised regulation contained in the Final Plan will be addressed in public hearings in Kodiak prior to implementation.

#### WILDLIFE CONCENTRATIONS

Public Use Management Plan Draft: The Draft Plan addressed increasing levels of public use where wildlife are concentrated on a seasonal basis, particularly increasing use along salmon streams with feeding concentrations of brown bears. Concerns included risk of human injury, displacement of bears from feeding areas and potential adverse bear/human interactions as human use increases. Thirty-four seasonal bear concentration areas on Refuge and Native conveyed lands were evaluated in Appendix C of the Draft Plan to determine impacts resulting from increased human use during feeding concentration times. This evaluation recommended that five Refuge areas be closed seasonally and eight additional areas be seasonally closed to camping. The closures would cover the minimum time period and areas required to protect specific brown bear feeding concentrations. These recommendations are reflected in proposed regulations and the map in Appendix J of the Draft Plan (pages 215-216 and 200, respectively). Actions recommended in these regulations plans will not apply to Native corporation or other private lands.

Comments: The State supported proposed access and camping limitations in areas with high potential for bear/human conflicts. While supporting seasonal closures in "critical" bear concentration areas, the State requested that the Service work closely with the ADF&G in refining boundaries of these areas. The State supported seasonal camping closures in important bear concentration areas and suggested these areas be described in detail in the Final Plan. The

State expressed a desire to cooperate with the Refuge staff in designing recreational carrying capacity studies in bear concentration areas.

The Kodiak Island Borough (Borough) opposed closing any areas of the Refuge to public access. They believe that these closures would set a "dangerous" precedent and that alternative management techniques for addressing possible bear/human conflicts had not been fully examined. The Borough suggested that a permitting system might be considered for these areas, but only after a compelling argument is made for their closure. The Citizens' Advisory Commission on Federal Areas also opposed public entry closures in bear concentration areas believing that these closures were unnecessary because of the current healthy state of the bear population. They suggested the Service consider other means including visitor education, non-lethal personal defense and a permit system similar to McNeil River prior to implementing public entry closures.

The Wilderness Society favored an educational approach over closing specific areas. They felt additional research was necessary and that the current level of DLP kills did not justify closures. (NOTE: The Refuge has from 8 to 29 years of survey data including each of the 34 concentration areas evaluated, including both aerial and ground surveys in some areas. The Service is not only concerned with DLP kills, but with displacement of bears from feeding areas and the increased potential for human injury as use increases.)

One Refuge commercial guide favored limiting camping in bear concentration areas but favored a permit system over closure of any areas to public access.

A wide range of comments concerning the issue of brown bear concentrations were voiced at the Anchorage and Kodiak planning meetings including:

- The Refuge has increased bear/human problems at O'Malley and Red Lake by providing public use cabins.
- Limit access rather than starting a permit process.
- Monitor use and problems before restricting access.
- The closed areas should be site and season specific.
- Have the option of initiating a permit system in the future.
- The way the issue is stated most of the Refuge could be closed.
- Don't restrict access; nature does it.
- Commercial operators are more easily restricted than the unguided public; be aware of this in considering possible future restrictions.

- The Refuge won't ever have the resources to adequately monitor bear populations. It would be difficult to design a study (to determine bear/human impacts).
- Don't restrict fly-in access.
- Document the problem first; then deal with it.
- Bear viewing programs conflict with plans to restrict use in bear concentration areas.
- Consider a permit system for use over totally closing areas.

In Old Harbor, Larsen Bay, and Akhiok residents felt there was general concurrence that seasonal closure of areas with high bear concentrations is appropriate. Some village residents suggested that bear viewing opportunities might be offered on Refuge lands in a well controlled situation.

Treatment of the Wildlife Concentration Issue in the Final Plan: Findings contained in the Draft Plan confirmed that increased use levels in some areas with very high seasonal bear concentrations are incompatible with Refuge purposes. The Refuge will review all proposed closure areas and dates prior to issuing the Final Plan. Additional information and improved maps outlining areas proposed for seasonal closure or camping restrictions will be included in the Final Plan. Most areas recommended for seasonal closures in the Draft Plan will be retained in the Final Plan as these areas have extremely high bear concentrations. Due to mixed ownership at Lower Dog Salmon Falls this area will not be proposed for access limits in the Final Plan. The Refuge staff will work with biologists from ADF&G to define areas of closure. In most cases the closure will be one quarter mile on either side of a stream or from a lakeshore determined to have high potential for bear/human conflict. The specific justification and recommendations for regulating access to seasonal brown bear concentration areas (pages 112-114 of the Draft Plan) and the proposed the regulation for closing areas seasonally to public entry and camping (as outlined in Appendix J of the Draft Plan) will be retained in the Final Plan. Prior to implementing the proposed regulation, public hearings will be held in Kodiak to receive comment.

#### BEAR VIEWING PROGRAMS

Public Use Management Plan Draft: Although the topic of bear viewing programs staffed by the Refuge was not identified as an issue in the initial planning process, it was a concern at several public meetings. Page 29 of the Draft

Plan identified the need to determine the feasibility of setting up a brown bear viewing programs on the Refuge including bear concentration areas identified in Appendix C. This appendix contains a recommendation to evaluate the potential for setting up managed brown bear viewing programs on the Refuge (page 114). During the summer of 1990 the Refuge conducted a test viewing program at the fishway on Dog Salmon Creek near Frazer Lake. This and other potential programs envisioned for Refuge lands will be evaluated in the Final Plan.

Comments: The State supports the concept of a developed bear viewing area on the Refuge. The State suggested that more specific details of bear viewing proposals be included in the Final Plan and urged the Service to work closely with the ADF&G in evaluating bear observation opportunities. The Citizens' Advisory Commission on Federal Areas recognized bear viewing as a legitimate activity, but felt that the Refuge was being inconsistent in promoting this program while prohibiting tent platforms, cabins and other structures supporting long-term use. The Commission was concerned that the bear viewing program would compete with private operations. They also suggested that a permit system similar to McNeill River State Game Sanctuary be used. A commercial user noted that the Refuge bear viewing program is a new "visitor service" using temporary and permanent structures in an area proposed for wilderness. He felt this use is a direct contradiction to recommendations in the Comprehensive Plan.

In Kodiak many people felt that the Service was circumventing its own public process by introducing a bear viewing program prior to receiving and analyzing public comment. In a straw poll of meeting participants the majority did not have a problem with the concept of a bear viewing area but nearly the same number disagreed with the way the Refuge proposed to implement the program and closing the area downstream from the viewing site to public entry. Comments included:

- Why is bear viewing being considered in areas which may be closed to the public?
- Bear viewing programs increase cumulative impacts on bears.
- The Refuge needs more input from current users.
- I object to a large area being closed for a bear viewing program.
- Bear viewing programs hurt private enterprise and expand the government.
- Bear viewing programs represent a change in the Refuge attitude toward people in bear habitat.

- I am concerned with the political pressure used to initiate this program.
- Will limits on sport fishing in the closed area for bear viewing just cause more closures in the future?
- The Refuge is changing the rules, setting up camps longer than those permitted for commercial operators.
- The Refuge discourages private bear viewing by limiting seasonal use of permitted cabins while promoting its own bear viewing program.

Treatment of Bear Viewing Programs in the Final Plan: The issue of bear viewing programs will be discussed in the Final Plan and an environmental assessment will be prepared prior to final implementation of this program. This assessment will examine the positive and negative impacts of conducting these programs. The Refuge currently envisions two possible bear viewing locations: the Dog Salmon fish pass area and the O'Malley Creek area. A trial bear viewing program was conducted at the Dog Salmon fish pass during the summer of 1990. The environmental assessment will be an appendix to the Final Plan.

The Refuge will work with the ADF&G during the preparation of the environmental assessment and during the implementation of any proposed programs. A permit system similar to that used for the McNeill River bear viewing program will be considered for use in proposed programs. Those areas recommended for access closures in this plan will be considered as possible viewing sites if safety and bear displacement concerns can be adequately addressed. In some cases, bear viewing programs will result in access limitations for both participants and non-participants in order to minimize disruption of viewing activities and to address public safety concerns. The Refuge will hold public hearings in Kodiak prior to implementing proposed regulations limiting public access to brown bear concentration areas.

#### CAMPING

Public Use Management Plan Draft: The planning process identified camping and the time periods camps can be set up in a given location on the Refuge as an issue. This issue was examined in light of the need to minimize impacts on wildlife and to be consistent with the public use objective of providing for short-term, low density wildlife oriented recreational opportunities on the refuge. The Draft Plan examined the effects of long-term camping on Refuge resources and habitats in Appendix D (pages 115-131), finding that long-term

recreational camps are not a traditional use of Refuge lands and that their establishment would cause both wildlife and people conflicts since a limited number of access points occur on the refuge. Limiting overnight camping to the current time periods required of commercial users is the fairest way to allocate use of popular access points and helps limit potential bear/human conflicts which have been documented at many sites where long-term occupancy occurs in bear habitat. Appendix D recommends limiting camping time on Refuge lands for specific time periods depending on the time of year and distance from salmon spawning streams and lakeshores.

Groups wishing to camp longer than the specified time periods would be required to move at least one mile to set up a new campsite. These recommendations are reflected in proposed regulations found in Appendix J (page 216) of the Draft Plan. Overnight camping time limits will not apply to the small number of traditional subsistence camps on Refuge lands or to uses on Native or other privately owned lands.

Comments: The State did not support the proposed camping time limits throughout the Refuge. While the State thought restrictions might be appropriate for the unguided public where resource damage is occurring due to long-term use, they felt that current low levels of use do not justify restrictions in all seasons or in all locations. The State felt the plan did not present adequate justification for such restrictions; that the proposal would restrict subsistence and recreational activities; that the proposed camping limits would be difficult to enforce; and that the time period for camping restrictions along salmon streams was placed on too many streams.

The Borough felt that the seven and fifteen day camping limits would be the start of (and could not be enforced without) a permit system. They feel this requirement is not needed to protect wildlife since most activities are concluded within the proposed camping time limits.

The Citizens' Advisory Commission on Federal Areas suggested that camping time limits would be difficult to enforce and did not feel requiring groups to move camps one mile would deter encounters with bears. The Commission suggested the Service might revise the seven day limit to ten or twelve days and the fifteen day limit to twenty-one days. They favored educating visitors to reduce the potential for bear encounters over imposition of overnight camping time limits.

One conservation organization supported camping time limits for unguided users and proposed additional area and seasonal limits on camping when necessary to avoid human/animal conflicts during critical feeding and mating periods. One person suggested requiring a permit system or careful regulation of unguided camping on Refuge lands.

At both the Kodiak and Anchorage meetings several people mentioned problems, such as trash and bears coming into take deer meat at those sites heavily used by campers. Several people commented that the Refuge would have a limited ability to monitor and enforce camping restrictions. Other comments included:

- Limit the number of deer taken during the times bears are active.
- Limit the time hunters can stay on the refuge.
- The Refuge adds to the problem by providing public use cabins.
- Only a limited number of areas are accessible on the Refuge; for those areas that are heavily used, reservations should be required (for camping) like the reservation system for public use cabins.
- Limit use of access points by working through air taxi operators and other transporters (several comments).
- It is difficult to regulate air taxi operators; it is more appropriate to regulate clients.
- Don't restrict transporters as to the number of people they can take to an area; permit the people who want to gain access to the area.
- The Refuge should try to spread out use over a longer season.
- The proposed day length camping restrictions won't accomplish goals; since one group can follow previous groups into popular campsites.
- The Refuge needs to consider upper limits of use before impacts occur.
- I oppose permits but see a need to restrict use at specific sites.
- Since commercial operators are restricted the general public access needs to be controlled to be fair to all users.
- The Refuge data collected on public use looks at the past; they need to collect data which focuses on today.
- The Refuge needs to preserve a quality wilderness experience.
- Inholdings make these regulations on Refuge land ineffective.

Comments from Old Harbor, Larsen Bay, and Akhiok were in agreement with the proposed camping time limits. Akhiok residents felt that the camping limit for deer hunters should be reduced in the Final Plan to seven days.

Treatment of the Overnight Camping Issue in the Final Plan: The following points address a number of expressed concerns and will be explained more fully in the Final Plan:

1. Regulations on length of use will apply to the camping party not to the specific area. Once one party has vacated a site it will then be available to other campers.
2. Rather than restricting the number of people able to camp on Refuge lands the Service believes camping use limits will allow more hunters, fishermen, and other recreationists to have the opportunity to camp at popular access points and campsites by limiting long-term use by a single group.
3. The Draft Plan considered the possibility of a backcountry permit system for distributing use, but current levels of use and bear conflict incidents do not justify implementation of a permit system for unguided users at this time.
4. While some trouble spots have been identified; any site on the Refuge with long-term occupancy has potential for bear/human conflicts.
5. Restrictions on overnight camping will not apply to traditional subsistence camps on Refuge lands. No long-term subsistence camps presently occur on the refuge.
6. The Refuge has identified several specific sites where bear/human conflicts are presently occurring within the Refuge boundary due to the intensity of human use in these areas. A partial list includes Karluk lakeshore (various locations), Karluk Portage (off refuge), Green Banks, Uganik Lake outlet, Red Lake outlet, Brown's Lagoon (off refuge), Bare Creek on the Ayakulik River, Uganik Lake inlet, and several locations on Zachar Bay.

Findings in the Draft Plan confirmed that long-term camping along with increased use levels would be detrimental to Refuge resources due to habituation and displacement of bears. The Final Plan will contain recommendations for seven and fifteen day camping time limits as they appear in Appendix D of the Draft Plan. The Final Plan will drop the thirty day camping restriction during the January 1 through March 31 time period. Restrictions on camping times will not apply to administrative or subsistence uses occurring on Refuge lands. The specific justification and recommendations for the proposed limitations on long-term camping (pages 129-131 of the Draft Plan) will be retained in the Final Plan. Prior to

implementing the proposed overnight camping time period regulations public hearings will be held in Kodiak to receive comment.

#### NEW ACTIVITIES IN PRIVATE CABINS WITH REFUGE PERMITS

Public Use Management Plan Draft: A limited number of private cabins used to conduct commercial activities, such as shore fisheries and big game guiding, are permitted on Refuge lands. Currently, occupancy of these facilities is limited to the season of use specified in a special use permit. The issue of permitting new activities in these facilities is evaluated in Appendix E of the Draft Plan (pages 132-147); findings are based on the cumulative impacts that additional long-term human use at these facilities would have on Refuge resources and habitats. This evaluation found that new uses which would significantly increase the period of occupancy should not be allowed because they would adversely impact Refuge resources in combination with other increasing levels of human use on the Refuge. Another specific recommendation outlined on page 147 of the plan recognized the need to allow an opportunity for commercial users to extend their permitted periods of use as industry requirements change.

Comments: The Citizens' Advisory Commission on Federal Areas commented that allowing permittees to hunt deer from permitted cabins should be allowed after the fishing season because cabins provide a measure of security compared to tent camps. [NOTE: The Service does not issue permits for private recreational use of cabins on Refuge lands in accordance with Section 1303 (b) (1) ANILCA.]

Widely varying opinions were voiced at meetings in Anchorage and Kodiak. Comments included:

- Permittees should be able to use Refuge lands for personal recreation.
- The Refuge should have the flexibility to allow for shifting time periods as commercial activity requirements may change from year to year.
- Due to changes in big game guide laws the Refuge may need to allow additional new commercial activities (two comments).
- Requests for additional use at commercial cabins should be evaluated on a case-by-case basis.
- New activities might be allowed if they are along the same line as the original permit.

- The theme of short-term, low-density use should be applied to cabin uses the Refuge needs to stand their ground now.
- The provision in the Comprehensive Plan to convert facilities (at set net sites) from tents to cabins was the right decision for the Refuge to make.

There was support at meetings in Old Harbor, Larsen Bay, and Akhiok to restrict activities in Refuge permitted cabins to existing uses.

Treatment of the Issue of New Activities in Permitted Cabins in the Final Plan:

Based on the finding that additional long-term uses would cause adverse impacts on Refuge bear populations, the Refuge plans to retain the recommendations contained in Appendix E of the Draft Plan. While new commercial activities will not be permitted in these cabins, extended periods of use may be permitted to accommodate changing industry requirements and seasons for the commercial activity for which cabins are presently being used. The Refuge will not restrict permittees and guests from pursuing recreational activities during the time period they are conducting commercial activities allowed by their permit. Section 1303 (b) of ANILCA does not allow these cabins to be used solely for the private recreational use by the permittee (i.e. at a season during which commercial activities are not being conducted). Any extended seasons or new uses of cabins on Refuge lands must be requested by the permittee and contained in the Special Use Permit for the cabin. The specific reasons for restricting the season of use and activities at Refuge permitted cabins (pages 144-147 of the Draft Plan) will be retained.

COMMERCIAL USE LEVELS

Public Use Management Plan Draft: The numbers of commercial users providing recreational services, client numbers, and camping time limits is addressed as an issue in the Draft Plan. The State is currently working on a system to allocate big game guiding opportunities throughout the state. Pending finalization of this allocation system, the Refuge will not designate a final number of permits to be issued for big game guiding on Refuge lands. The Refuge has maintained a moratorium on species harvested and client numbers which will remain in effect until a statewide allocation system for big game guide-outfitter use is implemented. The issue of increasing levels of sport fish guiding, recreation guiding, and transporter use of Refuge lands is examined in Appendix F (pages 148 through 167 of the Draft Plan).

Recommendations contained in Appendix F of the Draft Plan include:

1. Continue to allow up to 24 sport fish guides to operate on Refuge lands and waters with two operators allowed to set up overnight camps on any drainage at a time with a maximum of six clients per camp. An operator may set up a maximum of two camps at a time.
2. Day use for all 24 sport fish guides may be conducted at any location on the refuge.
3. Guiding permits for overnight commercial sport fishing use on the Karluk, Uganik, Dog Salmon, and Ayakulik systems will be issued for early season (prior to July 15) and late season use (July 15 and after) to allow use of these systems by more permittees.
4. A maximum of six individuals will be permitted in overnight camps established by big game guide-outfitters on Refuge lands.
5. All commercial users will be restricted to the camping time limits identified in Appendix D of the Draft Plan (see page 131).

No specific recommendations are contained in the plan to limit the numbers of air taxi operators, marine transporters, or recreation guides allowed to operate on the refuge.

Comments: The State supported limitations on commercial users from the standpoint of assuring that unguided users have a reasonable opportunity to use the limited number of preferred access points. The State believes that the Final Plan should discuss the system by which the Service proposes to allocate commercial use permits in greater detail and should describe the justification for the number of commercial operators and camps allowed in the Refuge. The State emphasized that it wanted to work cooperatively with the Service so that the new management system for guide-outfitter use of Refuge lands would not appear to impose arbitrary limits on the number of hunting guide-outfitters as may have been the case in the past.

Two individuals suggested the Refuge work toward limiting or reducing the number of commercial users operating on Refuge lands. Several others supported Alternative D which contains provisions to reduce the number of commercial users, their clients, and camping times. One commercial permittee did not agree with provisions of the preferred alternative which would limit guide-outfitter client numbers to maintain current numbers levels. He did not agree with using 34 guide-outfitter permits as a baseline number when considering how many permits to issue in the future. Two conservation

organizations felt that the Refuge should maintain the current level of commercial users of Refuge lands. A comment from the Sierra Club further suggested that a carrying capacity analysis of visitor use levels be conducted prior to any future changes in the current limits of guide outfitter use of the Refuge.

Several people attending meetings in Kodiak and Anchorage felt the Refuge should make a greater effort to regulate people (both guided and unguided) that use the Refuge instead of intensifying regulations on guides. Other comments included:

- Since deer guiding is a relatively new use on Kodiak, the Refuge should allow more guide-outfitter utilization of this resource.
- The baseline figure of 34 guides-outfitters used in the Public Use Plan isn't accurate in reflecting the numbers which should be considered in the new allocation process for selecting guide-outfitters.
- Guides should be allowed more than five years in a permit allocation system to make a secure career.
- Big game guides are limited by Refuge permit; the Refuge should also limit marine transporters who also focus on game hunting.
- Work with State Fish and Game to lower bag limits, which in turn will limit the number of hunters.
- Imposing a \$25.00 tag fee for deer may help limit resident deer hunters and eliminate waste.
- The Refuge can allow only so many people in the same place at one time.
- Section 1316 of ANILCA (provisions for temporary facilities for the taking of fish and wildlife) should continue to apply (to Refuge lands) in the Public Use Plan.
- It's very difficult to cut back on use levels once they have become established.
- The Refuge should be more interested in the number of people using the Refuge rather than regulating the number of commercial operators.
- Perhaps permits should only apply to heavily used areas.
- Two factors, biological and aesthetic, will have to be considered to determine the number of people allowed in an area.
- The Refuge could designate areas where different uses are permitted.
- The Refuge should permit the individuals using the Refuge rather than commercial operators who can then take any number of clients with them.

People at the Old Harbor meeting did not support restricting guide and client numbers (as long as the resources are not being affected) and favored flexibility in the guide system to allow for new guides. Larsen Bay residents generally agreed except they felt current client numbers should be maintained. Akhiok residents also suggested that the Refuge should encourage local residents to take up guiding.

Treatment of Commercial Use Levels in the Final Plan: In most respects final recommendations for levels of guiding and outfitting will remain as written in the Draft Plan. The Final Plan, however, will not contain any baseline numbers for big game guide-outfitters since the Big Game Commercial Services Board is currently working on a new allocation system for guide-outfitter areas throughout the State. For both big game guiding-outfitting deer hunters and sport fish guiding the Service believes that client numbers may be allowed to increase somewhat without adversely impacting Refuge resources.

SPECIFIC RECOMMENDATIONS FOR SPORT FISH GUIDING INCLUDE:

Maintaining a limit of 24 sport fishing guides including both overnight and day use guides. This number was established in 1984 and is working well, although the number of guided clients using the Refuge is still increasing. Twelve drainages, all or part of which are in Refuge ownership, provide potential for overnight camps supporting commercial sport fish guiding operations. Three drainages receive approximately 80 percent of the commercial sport fishing use (Uganik, Karluk, and Ayakulik systems). At the present use rate the level of commercial sport fishing is not causing either user conflicts or resource problems on most of the Refuge. A few areas, including the Ayakulik River at Bare Creek and the Uganik Lake outlet are at maximum utilization during popular time periods and are experiencing some problems. Specific river management plans will likely be needed for these and other locations as use increases. The discussion of allocating sport fish guiding privileges among the 24 Refuge permittees will be expanded in the Final Plan.

Permitting up to two guides to set up overnight camps on any given drainage on the refuge. Limits on the number of guides with overnight camps have been established to prevent overcrowding on the relatively short river systems on Kodiak. As an example, the number of guides now requesting use of the Ayakulik River for overnight camps far exceeds the total number of available camping locations on the river. Limiting guided camps also prevents

overcrowding which could increase bear/human conflicts and maintains opportunities for unguided users.

All 24 sport fishing guides may use any Refuge location for day use operation. Providing maximum flexibility for fly-in day trips will allow operators to select fishing sites based on weather conditions, occupancy, or other factors.

Temporary camps are limited to no more than 6 people in camp for no longer than seven days at a given site along anadromous streams. Larger camps or those of longer duration increase the likelihood of bear/human conflicts. The limited length of time that camps may remain in one location will also make camp sites available to other users.

SPECIFIC RECOMMENDATIONS FOR BIG GAME GUIDING INCLUDE:

Limiting the number of people in tent camps to no more than six at a time for no longer than 15 consecutive days. These limits will help prevent bears from being attracted into camps (particularly deer hunting camps) because of deer meat and garbage being stored over extended periods of time.

Requiring commercial hunting camps to be located no closer than three miles from other commercial camps. This will help prevent concentration of hunting in limited areas and spread out use thus lessening the potential for user conflicts.

There is no set limit on the number of recreation guides (rafting, photography, sightseeing, etc.) permitted on the Refuge. Each request for recreation guiding will be evaluated on a case-by-case basis and permitted to the extent that it does not pose resource conflicts nor interfere with established public or commercial uses in a given location.

Measures, such as limits on long-term camping and access restrictions in areas of critical bear use on a seasonal basis have been recommended as ways to prevent bear/human conflicts while allowing increased recreational use of the Refuge in the future. The justification and recommendations supporting the proposed permit stipulations for guiding and outfitting (pages 163-167 of the Draft Plan) will be retained in the Final Plan.

UPLAND AIRCRAFT LANDINGS

Public Use Management Plan Draft: The use of aircraft to access Refuge lands was addressed in the 1987 Comprehensive Plan. A determination was made during the comprehensive planning process to permit fixed-wing aircraft landings on all water bodies, frozen water bodies, and salt water beaches. The Comprehensive Plan also stated the intent to prohibit upland aircraft landings and development of airstrips on the Refuge. Regulations published in the Federal Register prior to the passage of ANILCA, prohibited the landing and operation of fixed-wing aircraft in upland areas; no traditional upland aircraft use on the Refuge exists. Helicopter use is allowed by permit only, but not for recreational access.

Although the Comprehensive Plan identified the intent to restrict upland landings of aircraft on Refuge lands, the final determination to do so is based on the evaluation of effects found in Appendix G (pages 168-182) of the Draft Plan. This analysis determined that upland aircraft landings and resulting impacts were inconsistent with Refuge purposes when evaluated along with other human impacts occurring on the Refuge and adjacent lands. The development of new upland landing sites on the Refuge would lead to increased human impacts in previously unexploited interior Refuge areas. Since relatively few suitable upland landing sites are available, the levels of use and subsequent wildlife impacts would likely be concentrated in these areas. The specific recommendation in Appendix G, and reflected in the proposed regulations in Appendix J (page 215), provides for fixed-wing aircraft landings only on saltwater beaches, water bodies, and frozen waters. Proposed regulations would not apply to Native or other private lands within the Refuge boundary.

Comments: The State indicated an interest in being involved in evaluation and selection of any aircraft landing restriction involving state waters (NOTE: Aircraft landing restrictions proposed in the plan do not include any state or navigable waters and will affect only upland landings). The Kodiak Electric Association raised a concern about access to Terror Lake Hydroelectric facilities by fixed-wing aircraft and helicopters. (NOTE: These uses are currently permitted for management purposes in accordance with licenses and permits and will be allowed in the future).

Although the Citizens' Advisory Commission on Federal Areas did not specifically mention upland aircraft landings, they were opposed to all types of access restrictions proposed in the plan. Several individuals and representatives of conservation groups either supported a prohibition of upland aircraft landings or supported Alternatives C or D which contain this provision.

At meetings in Kodiak and Anchorage several comments addressed limitations on upland landings. These comments included:

- Enforcement of the 2000 foot above ground elevation limitation (shown on aviation charts) will "tie the hands" of pilots.
- Low, slow flying aircraft (such as helicopters) have caused some problems.
- Does snow qualify as frozen water for landing purposes (NOTE: Snow is not considered the same as frozen water for the proposed regulation).
- Another person asked if dropping equipment from an airplane to someone on the ground was O.K. (NOTE: This is permitted as long as the equipment or packaging is not abandoned on the Refuge.)
- Restrict upland landings, which are not traditional on Kodiak
- Consider closure of higher elevation lakes.

Village residents in Old Harbor, Larsen Bay, and Akhiok supported the proposed upland aircraft landing restriction. Larsen Bay residents stated they would like to see a limit on the number of aircraft landings on the Karluk River. (NOTE: Access to the Karluk River is not controlled by the Refuge.) Akhiok residents felt there should be more restrictions on the number of aircraft operations.

Treatment of the Upland Aircraft Landings Issue in the Final Plan: Upland aircraft landings are not a traditional use of the Refuge and were prohibited prior to ANILCA. Based on the Draft Plan finding that use of upland landing sites could adversely impact wildlife in areas which currently receive little use, the Final Plan will retain the proposed regulation (Appendix J, page 215) prohibiting upland aircraft landings on the Refuge and the recommendations in Appendix G (pages 180-182) of the Draft Plan. Prior to implementing this proposed regulation, hearings will be held in Kodiak to receive public comment.

#### JET BOATS

Public Use Management Plan Draft: The issue of jet boat use on the Refuge was addressed in the Comprehensive Plan. The Comprehensive Plan proposed to limit jet boat use to areas in which it would not impact wildlife resources and to evaluate those areas and impacts in the Public Use Management Plan. This evaluation was completed in Appendix H (pages 183-197) which recommended restriction of jet boats to moderate management areas as shown in the Comprehensive Plan. Jet boat use was prohibited on the Refuge prior to the 1980 Lands Act. The use of jet boats is not traditional on the Refuge although there is traditional use of prop driven motor boats on both Refuge rivers and lakes. The evaluation presented in Appendix H found jet boats, and the increased access they afford into extremely shallow stretches of river, to be incompatible with Refuge fish and wildlife resources; particularly disturbance of brown bears feeding along salmon streams and potential disturbance of salmon spawning beds. The proposed regulation limiting jet boat use to moderate management areas is reflected in Appendix J (page 215) of the Draft Plan. This regulation will not apply to Native or other private lands within the Refuge boundary.

Comments: The State indicated an interest in the public response to restriction to jet boat use because the State asserts management authority for waters in the Refuge. (NOTE: As a pre-statehood refuge, Kodiak National Wildlife Refuge has reserved water rights, thus the ownership of waters and submerged lands within the Refuge boundary remains in federal hands. The Service recognizes the differences between State and Federal interpretation which will likely be resolved in court. For the purpose of the Final Plan the management of these waters will be considered the responsibility of the Refuge.)

Written comments received from the public and conservation groups favored limits on jet boats as indicated in the plan or a complete ban of jet boat use. One conservation group noted it would be difficult to limit jet boat use to moderate management areas without more clearly marking other areas.

One participant in the Anchorage meeting felt additional justification was needed to explain why jet boat outboards were any worse than prop driven outboards.

Treatment of the Jet Boat Issue in the Final Plan: Jet boat use is not traditional on the Refuge and was prohibited prior to 1980. Based on the finding that jet boat use could adversely impact brown bear feeding on salmon streams and the survival of salmon eggs in shallow stream beds (see Appendix H) the Final Plan will restrict jet boat use to areas currently used by boats with prop driven outboards. The recommendation to limit jet boats to Moderate Management Areas contained in the Comprehensive Plan and Draft Plan will be revised to allow jet boats to operate in areas where prop driven boats have historically been used. The Final Plan will be revised and specific areas where jet boat use will be allowed will be listed in the proposed regulations. The summary of reasons for recommending restriction of jet boat use on the Refuge (pages 195-197 of the Draft Plan) will be retained in the Final Plan. Prior to implementation, proposed regulations will be written and public hearings will be held in Kodiak to receive public comment.

#### NEW TENT PLATFORMS

Public Use Management Plan Draft: Four tent platforms currently are permitted on Refuge lands to support big game guiding activities. As a result of decisions made during the comprehensive planning process, up to ten tent platforms used to support commercial set net fishing operations based on Refuge lands may be converted to cabins which will remain under Refuge permit. A determination was made in Appendix N of the Comprehensive Plan to not allow new development of commercial fishing sites on Refuge lands (including new sites with tent platforms). The Comprehensive Plan also determined that most interior areas of the Refuge would be closed to the development of new tent platforms, but in moderate management areas along the coastline new tent platforms may be allowed. Since new tent platforms are allowed on Refuges (provided that they are not a significant expansion that is detrimental to the refuge-Section 1316 of ANILCA), this possibility was examined in an evaluation contained in Appendix I (pages 198-213) of the Draft Plan. This evaluation considered potential development of new tent platforms based on the number of current commercial operators using tents and the long-term impacts these and other developments would have on Refuge resources; primarily brown bear populations and habitats. The evaluation found that development of new tent platforms would be a significant expansion which, in combination with other developments, would be detrimental to Refuge resources. Recommendations contained on page 213 of the Draft Plan would allow current use levels to continue at existing tent platforms on the Refuge but, would prohibit

development of new tent platforms on Refuge lands for commercial or private use. The potential exists for a substantial increase in the number of tent platforms on Refuge lands if this use is permitted. Proposed regulations would not apply to Native or other private lands within the Refuge boundary.

Comments: The State objected to a "prohibition" of tent platforms as outlined in the Comprehensive Plan and the Draft Plan. The State contends that "provision of cabins and temporary facilities in selected locations would actually help reduce adverse impacts to wildlife resources." They further urged a reconsideration of these provisions in the Final Plan. The Citizens' Advisory Commission on Federal Areas objected to the "prohibition" of tent platforms stating that tent platforms are traditional on Kodiak and "specifically allowed for by ANILCA and the Kodiak NWR Comprehensive Conservation Plan." One commercial user felt that the discussion and decisions relative to management of tent platforms in the Draft Plan inappropriately superceded management decisions made in the Comprehensive Plan. It was also suggested that since tent platforms were regulated by Refuge permit they would not necessarily increase long-term human activity in any location. This user recommended that provisions for tent platforms in the Final Plan be consistent with the Comprehensive Plan and Section 1316 of ANILCA.

Several individuals and conservation groups supported the provision to prohibit construction of tent platforms in new locations or supported Alternatives C or D of the Draft Plan which contain this provision.

At the Kodiak meeting one commentor suggested that the Service should treat tent platforms as was originally intended in Section 1316 of the ANILCA and as outlined in the Comprehensive Plan. Comments favoring the restriction of tent platforms to existing facilities were made at all three village meetings on Kodiak Island. An individual in Old Harbor said that tents without platforms or other permanent improvements should be sufficient for people who wanted to use the Refuge.

Treatment of the Issue of New Tent Platforms in the Final Plan: The Service plans to retain the recommendations in the Draft Plan with some minor modifications:

1. New tent platforms may be permitted on a case-by-case basis at sites on the Refuge which are currently developed (i.e. have currently occupied

tent platforms or cabins or such facilities have been used on the site within the past five years) and where the establishment and use of such facilities would not be detrimental to Refuge purposes.

2. Existing tent platforms will continue to be permitted and may be maintained or reconstructed in the same location if they are destroyed.
3. No new tent platforms at previously undeveloped sites will be permitted on Refuge lands for either commercial or private use.

The Service believes it is necessary to limit the development of tent platforms at new sites for the following reasons:

1. Recent large increases in the number of commercial users could cause a significant expansion in the number of new tent platforms on Refuge lands exists.
2. Tent platforms tend to attract long-term human use to given sites due to the presence of platforms and outbuildings. Long-term human occupancy tends to habituate some bears and may displace other; both are detrimental to Refuge purposes.
3. Tent platforms even when regulated by permit, tend to attract unauthorized users, long-term storage, and accumulation of garbage, all of which can cause problems with bears.
4. Tent platforms at popular camping sites may restrict public access to those sites. For instance, the current demand for tent platforms could tie up all suitable camping areas on Uganik Lake and the Ayakulik River as well as many popular access points along the coastline.

Regulations on new tent platform development will not apply to administrative structures or to tent platforms for subsistence activities. The summary of the recommendation and justification for limiting the development of new tent platforms on Refuge lands (pages 211-213 of the Draft Plan) will be retained with the changes outlined above in the Final Plan.

#### PUBLIC USE CABINS

Public Use Management Plan Draft: Maintenance of existing public use cabins and development of new public use cabins was addressed in both the Comprehensive Plan and the Draft Plan. The Comprehensive Plan allows for development of additional public use cabins in Moderate Management areas, primarily along the Refuge coastline, but a final decision on developing new public use cabins is to be made in the Public Use Management Plan. Most

comments received when preparing the Draft Plan recommended better maintenance of existing public use cabins while not supporting development of new cabins. The preferred alternative of the Draft Plan calls for maintenance of existing cabins; development of new cabins for public use is not planned at this time. The Draft Plan recognizes the need to improve maintenance of Refuge cabins.

Comments: The State opposed the Refuge "prohibition" on new public use cabins and other facilities throughout the Refuge. The State advocates provision of additional public use cabins to reduce bear conflicts and provide for increasing use. The Citizens' Advisory Commission on Federal Areas also opposed the "prohibition" on public use cabins on Refuge lands. Several individuals and conservation groups favored a policy of maintaining the existing number of public use cabins or favored Alternatives C or D which would limit or reduce the number of public use cabins.

Commentors from Old Harbor, Larsen Bay, and Akhiok generally wanted to maintain or decrease the current number of public use cabins. One Old Harbor resident felt cabins should be removed or relocated if the wildlife problems are occurring at the present site. An Akhiok resident suggested that any new cabins be on salt water and not inland on any of the lakes or rivers.

At the Kodiak meeting most commentors did not want to see the Refuge cabin program expanded. One person felt the Refuge cabin program was inappropriate because it competed with private enterprise for cabin rentals. Another person was concerned about subsidizing public use cabins with tax dollars. Another person felt that cabins should not be "upgraded" since other facilities on Refuge lands have not been upgraded (i.e. private cabins with Refuge permits).

Several people at the Anchorage meeting identified the need for better maintenance, litter control, and documentation of wildlife problems at cabins. Other commentors suggested providing cabin users with better information about bear/deer hunter conflict prevention and that the Refuge should use existing private cabins as public use cabins rather than building new cabins.

Treatment of the Public Use Cabin Issue in the Final Plan: As a result of comments on the Draft Plan, the Final Plan will not prohibit additional public use cabins. While no specific locations for new public use cabins will be identified in the Final Plan, the Service will evaluate the suitability of existing unused or abandoned cabins for conversion into public use cabins.

The Service recognizes the demand for more public use cabins, particularly in salt water areas during the deer hunting season. Siting of new public use cabins will take into account such factors as current uses of and potential competition with private facilities. The Service will also take steps to better maintain cabins, improve meat caches, improve handicapped access at some cabins and provide better information concerning bear/human conflict avoidance. Prior to developing or designating any new public use cabins the Refuge will complete an environmental assessment and subsistence determination considering site specific impacts. Environmental assessments will consider impacts on commercial operators with private cabins as well as impacts on fish and wildlife populations and habitats.

#### IMPROVED TRAILS AND CAMPSITES

Public Use Management Plan Draft: Presently there are no improved campsites, trails, or similar developments on Refuge lands. The Comprehensive Plan allows for development of improved campsites in moderate management areas subject to a site specific environmental assessment. The Comprehensive Plan left the option open for the development of foot trails where such development would not pose resource conflicts. Providing new improved trails and campsites was discussed in the public involvement section of the Draft Plan, although the Draft Plan does not provide for their development. This decision was based on the opposition that many early respondents to planning workbooks expressed toward development of new facilities on Refuge lands. Development of new trails and campsites could also conflict with public use objectives 3 and 5 (see pages 15 and 16 of the Draft Plan) which provide for "short-term, low-density public use" and "recreation opportunities requiring minimal facility development and habitat alteration."

Comments: The State suggested that campground improvements, if carefully located, could improve public health and safety and reduce impacts from concentrated tent camping at popular access points. The State further suggested construction of food/meat caches at popular deer hunting sites as a means of avoiding conflicts between deer hunters and bears. Several individuals and conservation group supported Alternatives C or D which would not provide for any new trails or improved campsites.

At Anchorage and Kodiak meetings, most commentors opposed development of new trails and campsites for several reasons - expense of maintaining trails,

encouraging long-term use, litter control problems because of concentrated use, and wildlife conflicts because of concentrated activities at a limited number of sites. One commentor felt that developed campsites, on the other hand, would provide a better means of controlling litter problems. Several people at the Anchorage and Kodiak meetings mentioned the need to provide 17(b) easement signing (to provide access to Refuge sites through private inholdings).

All comments received in Old Harbor, Larsen Bay, and Akhiok meetings favored the Draft Plan recommendation not to provide for new trails or improved campsites.

Treatment of the Improved Trail and Campsite Issue in the Final Plan: No specific plans for improved trails or campsites will be recommended in the Final Plan. The Refuge recognizes that innovative approaches are needed to prevent bear/human conflicts in locations where recreational use concentrations occur on Refuge lands. The Final Plan will be changed to reflect the possibility of locating facilities such as meat caches or electric fencing at heavily used campsites. In the near future the Service plans to test the effectiveness of providing food and fish caching structures at a few popular public use sites where bear/human problems have been documented. If this reduces currently occurring bear/human problems in the area, such facilities may be provided at additional sites on the Refuge.

#### INHOLDINGS

Public Use Management Plan Draft: Activities and developments occurring on inholdings which impact Refuge resources have long been recognized as a major issue. Inholdings within the Refuge boundary include Native corporation lands, Native allotments, village sites, and patented sites. Many of these inholdings are in prime fish and wildlife habitats which formerly were protected from development impacts due to Refuge designation. Up to 310,000 acres of former Refuge lands were transferred to Native corporation ownership as a result of the 1971 Alaska Native Claims Settlement Act. Management strategies proposed in the Draft Plan to begin addressing inholding concerns include:

1. Identifying and acquiring critical inholdings.
2. Using cooperative agreements with adjacent landowners.

3. Working with the Kodiak Island Borough on zoning designations which affect Refuge lands and inholdings.

These management strategies are based on current Refuge directions and suggestions provided as workbook responses during the early development of the Draft Plan.

Comments: The State stressed that the protection of critical habitats on inholdings should be one of the highest priorities for the Refuge. The State indicated that unregulated use on non-federal land can significantly impact Refuge resources. The State suggested that the Refuge increase efforts to pursue cooperative agreements, easements and acquisition benefitting Refuge resources. The Borough indicated that the greatest threat faced by the Refuge is the unknown consequence of what may occur on former Refuge lands that are now Native corporation lands. The Borough suggested that additional development on these lands and other inholdings will increase bear/human interactions causing management strategies to be more restrictive on Refuge (federal) lands. The Borough believes that the Service should work toward a management strategy for 22(g) lands. [NOTE: Section 22(g) of Alaska Native Claims Settlement Act provides that former Refuge lands transferred to Native Corporation ownership "remain subject to the laws and regulations governing use and development of such Refuge."]

Several comment letters received from the public supported inholding acquisition, cooperative agreements, or supported Alternatives C or D which include these options.

Comments made at Old Harbor, Larsen Bay, and Akhiok meetings all supported acquisition of critical inholdings and seeking cooperative agreements to manage inholdings. Old Harbor residents mentioned a desire to see a land trade completed which would result in some Native lands returning to Refuge ownership.

Several strategies were suggested at meetings in Anchorage and Kodiak - working with the Borough to control development through zoning requirements, working toward cooperative agreements with inholders, working with the Nature Conservancy on purchasing inholdings, and having Refuge inholdings placed in the natural use zoning designation on Borough zoning maps.

Treatment of Inholding Issue to the Final Plan: Recommendations in the Draft Plan to work toward acquiring critical inholdings, seeking cooperative agreements, and working with the Borough on zoning designations will be retained in the Final Plan. The Service also recognizes the need to work toward a management strategy for Native conveyed 22(g) inholdings. Attempts to negotiate a management strategy for 22(g) lands have been unsuccessful to date, but will be renewed in the future. In addition, the Service is currently developing a Land Protection Plan which will address wildlife values and acquisition priorities for Refuge inholdings. The Land Protection Planning process will also be used to identify and inform willing sellers of acquisition potential for various inholdings.

#### INFORMATION AND EDUCATION

Throughout the planning process there was almost universal agreement that the Refuge needs to enhance information and education services. This need was recognized in the Draft Plan. Based on identified needs and comments made by agencies and the public the following partial list of information and education directions will be emphasized in the Final Plan as future program goals:

1. The Refuge will designate an employee to coordinate teacher training programs and other educational contacts with Kodiak and village schools.
2. Various outlets will be utilized to make Refuge library and environmental education materials increasingly available to educators.
3. Increased information contacts will be focused on areas where potential bear/human conflicts are likely to occur. In some cases river ranger camps may be set up to provide better information to sport fishermen camping in bear concentration areas.
4. Information services for Refuge public use cabin users will be increased. Bear/human conflict prevention will be a major focus of this effort.
5. Refuge information packets sent to potential recreational users will be upgraded to include public use regulations, more information on bear safety concerns, protection of Refuge resources, maps showing private lands within the Refuge boundary, and requirements for preventing litter accumulation.
6. Refuge information and law enforcement efforts will continue to focus on fall deer hunting activities on Refuge lands. A major objective of this effort will be to provide information and help users to prevent bear/deer hunter problems which have occurred in the recent past.

## KODIAK NATIONAL WILDLIFE REFUGE

### FACT SHEET

#### History

- 1941 - Kodiak National Wildlife Refuge was established by Executive Order number 8857 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." About 1.987 million acres were included within the refuge boundary. A one mile coastal strip of refuge remained open to public land laws.
- 1958 - A public land order withdrew a one mile coastal strip from public land laws (settlement). At the same time two peninsulas were withdrawn from the northern most portion of the refuge reducing total acreage to approximately 1.82 million.
- 1971 - The Alaska Native Claims Settlement Act (ANCSA) turned 310,000 acres of refuge land over to Native ownership subject to refuge regulations.
- 1975 - The Mount Glottof Research Natural Area was designated within the refuge to protect alpine feeding habitat for brown bears. Located in the Uganik alpine this 88,000 acre area will provide for future research on this unique brown bear summer feeding habitat.
- 1980 - The Alaska National Interest Land Conservation Act (ANILCA) added 50,000 acres of land on Afognak and Ban Islands to the refuge.
- Today - Current acreage within the refuge boundary totals approximately 1.865 million (including Native conveyed lands).

#### Purposes of KNWR as stated in the ANILCA (1980)

- A. Conserve fish and wildlife populations and habitats in their natural diversity including, but not limited to, Kodiak brown bears, salmonoids, sea otters, sea lions and other marine mammal and migratory birds.
- B. Fulfill international treaty obligations of the United States with respect to fish and wildlife.
- C. Provide the opportunity for continued subsistence uses by local residents consistent with the primary purposes of the refuge.
- D. Insure the maintenance of water quality and necessary water quantity within the refuge to conserve populations and habitats in their natural diversity.

## Wildlife

Kodiak is world famous as the home of the Kodiak brown bear. Most of the refuge is considered to be optimum bear habitat. Biologists estimate 2,500 to 3,000 bears inhabit the island. Kodiak has the highest known density of brown bear in the world.

Of all the land mammals found on Kodiak only 6 are native to the island. The brown bear, short-tailed weasel, river otter, tundra vole, little brown bat and red fox.

All of Kodiak's other land mammals have been introduced by humans during the past century. The most successful being the Sitka black-tailed deer, beaver, mountain goat, snowshoe hare and Roosevelt elk on Afognak Island.

The American bald eagle occurs in great numbers on Kodiak Island. Bald eagles reside year round on the refuge. The adult plumage occurs when a bird is 5 years old and has reached sexual maturity. Bald eagles normally mate for life.

Fourteen marine mammal species have been recorded in the waters adjacent to the refuge, including eight whale species, harbor seals, Steller's sea lions and sea otters.

An estimated 1.5 million seabirds and at least 150,000 ducks and geese winter on the bays, inlets and shores adjacent to the refuge. Over 140 seabird colonies are found along Kodiak's coastline.

All five Pacific salmon species (sockeye, chinook, pink, coho and chum) spawn in the refuge. Sockeye, pink and chum are the three most important commercial salmon species. It is estimated that up to 70 percent of the salmon caught by commercial fishermen in the Kodiak area are refuge based stocks.

Other fish found in the refuge's streams and lakes include Arctic charr, Dolly Varden, rainbow trout and steelhead; two streams support abundant steelhead and chinook salmon populations, an unusual occurrence in an Alaska National Wildlife Refuge.

## Public Use and Recreation

People come to Kodiak Refuge primarily to hunt and fish, although nonconsumptive recreational uses such as hiking, photography and wildlife observation have been increasing.

Many nonlocal sport fishermen come to Kodiak because of its reputation as an angler's paradise.

Big game guides, as well as sport fishing guides, photography guides, outfitters, and marine transporters, provide services to Kodiak hunters and fishermen.

People camp, hike, observe wildlife and take photographs usually in conjunction with hunting and fishing.

Sport fishing is the single most popular activity taking place on the refuge.

In 1984 the five most popular uses of the refuge based on activity hours were 1) deer hunting (35%); 2) fishing (26%); 3) bear hunting (10%) 4) trapping (5%) and 5) berry picking and other consumptive use (4%).

The entire refuge is open to hunting and trapping. 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 the Alaska Department of Fish and Game.

The refuge maintains nine public use cabins available to recreationists for a charge of \$10.00 per night. Advance reservations are required for use of the cabins with the maximum period of use being 7 days at each cabin. Coastal cabins are located on Uganik Island, Chief Cove and Viekoda Bay. Inland cabins on lakes include Uganik Lake, Little River, Karluk (O'Malley cabin), Red, North Frazer and South Frazer Lakes. Access to cabin locations requires use of a float plane.

#### Native Villages and Communities

Four Kodiak Island villages are surrounded by refuge lands - Karluk, Larsen Bay, Akhiok and Old Harbor.

Karluk is located on the west coast of Kodiak Island. Karluk was reknown for having the largest salmon cannery in the world, and the river was known as the greatest red salmon stream in the world. Overharvesting forced the canneries to close in the 1930's. Current population is about 94.

Larsen Bay is located near the mouth of Larsen Bay on the west shore of Uyak Bay on the southwest coast of Kodiak Island. The Native name for the town is Uyak. The area is thought to have been inhabited 2000 years by the Aleut people. Current population is about 170.

Akhiok is located at the south end of the island at Alitak Bay. The community was originally a sea otter hunting settlement. With the decline of the sea otter industry the village has become oriented primarily toward fishing. Current population is about 105.

Old Harbor is thought to have been inhabited for nearly 2000 years. It is located on the southern coast of Kodiak Island. Many of the residents are commercial fishermen. The current population is about 340.