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US FISH & WILDLIFE SERVICE--ALASKA

Kodiak National Wildlife Refuge

Kodiak, Alaska

Annual Narrative Report

Calendar Year 1995

**U.S. Department of the Interior
Fish and Wildlife Service
National Wildlife Refuge System**



KODIAK NATIONAL WILDLIFE REFUGE

KODIAK, ALASKA

ANNUAL NARRATIVE REPORT

Calendar Year 1995

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United States Department of the Interior
Fish and Wildlife Service
NATIONAL WILDLIFE REFUGE SYSTEM

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A. Highlights:

- ☞ 1995 was the second wettest year on record for the Island
- ☞ A major agreement was signed in May which will restore most of the Akhiok-Kaguyak (AKI) and Old Harbor (OHI) Native Corporation inholdings to service control.
- ☞ Kodiak refuge's marine vessel, URSA MAJOR II, and her crew (WB Zwiefelhofer and BT Johnson) provided technical expertise, transportation, and logistical support to personnel of Katmai National Park during June.
- ☞ Deputy Refuge Manager Dick Munoz transferred from Kodiak NWR to the Portland Regional Office as an Assistant Refuge Supervisor.
- ☞ Bald eagle nesting effort in the 1995 random sample plots was approximately 12% lower than the 1994.
- ☞ Documented brown bear mortality within the Refuge boundary (includes Native-conveyed lands) was 107 in 1995 which was 25% less than in 1994.
- ☞ Federal Subsistence Board decision allows a qualified rural resident (recipient) of GMU 8 to designate another qualified rural resident of GMU 8 to take deer on his\her behalf.
- ☞ The refuge based salmon contribution to the Kodiak area commercial fishery (including conveyed 22g lands) is estimated at 32.2 million fish (Figure 3) worth an ex-vessel value of approximately 36.6 million dollars.
- ☞ All Kodiak village teachers (A total of 29), except for the Ouzinkie village principal, attended one of the Seabird Workshops.

B. Climate:

KODIAK WEATHER - 1995

	<u>Temperatures</u>				<u>Precip.</u>	<u>Snow</u>	Ave.	Peak
	<u>Low</u>	<u>Ave.</u>	<u>High</u>	<u>Ave.</u>			<u>Wind</u>	<u>Wind</u>
January	9.00	26.20	42.00	35.80	6.92	12.90	10.50	37.00
February	-1.00	26.50	46.00	36.80	7.07	24.40	12.10	33.00
March	9.00	23.10	50.00	36.00	4.30	8.10	15.30	55.00
April	31.00	35.60	61.00	45.90	6.58	5.50	11.20	32.00
May	32.00	39.40	56.00	47.00	9.46	0.00	9.90	38.00
June	39.00	45.20	77.00	53.50	8.16	0.00	8.40	30.00
July	44.00	48.40	70.00	59.50	5.02	0.00	7.20	25.00
August	41.00	48.50	74.00	62.40	4.35	0.00	12.00	35.00
September	34.00	47.30	64.00	56.10	19.44	0.00	12.20	44.00
October	22.00	35.80	59.00	48.70	9.99	0.80	13.80	40.00
November	14.00	29.40	46.00	38.60	2.24	2.80	15.40	62.00
<u>December</u>	<u>9.00</u>	<u>31.60</u>	<u>43.00</u>	<u>37.90</u>	<u>11.76</u>	<u>2.00</u>	<u>17.10</u>	<u>44.00</u>
Total					95.29	56.50		
Average	36.40		46.50				12.09	39.58
Normal	34.40		46.80		67.58	74.50		
Departure	1.60		-0.3		27.71	-18.00		

Weather conditions for 1995 were taken from the National Weather Service reports recorded at the Kodiak Airport. 1995 was the second wettest year on record for the Island and only missed the record by .80 inches. September 1995 was the second wettest month ever in Kodiak with 19.44 inches of rainfall. Total snowfall for the year was 24% below normal, with December placing as the 10th least snowiest on record. Several notable high wind events occurred this year with the strongest sustained winds ever recorded at the state airport occurring on November 11th. Northwest winds reached 62 MPH with an official peak gust of 75 MPH. An unofficial wind gust of 100 MPH was recorded at the Sealand Dock near town.

C. Land Acquisition:

1. Fee Title:

The Kodiak NWR staff have been heavily involved in the reacquisition of inholdings since the early 1980's. The results we have witnessed

this year have made all of the bar-b-ques, sightseeing trips, and campouts worthwhile.

A major agreement was signed in May which will restore most of the Akhiok-Kaguyak (AKI) and Old Harbor (OHI) Native Corporation inholdings to service control.

A total of 76,211 acres of Akhiok-Kaguyak Native Corporation (AKI) will come back to the refuge as Fee Title. Approximately 22,000 acres of AKI land will be returned to service ownership in the near future through on land trade, (the 22K of service land traded will be under a conservation easement).



High value wildlife habitat similar to that pictured was returned to refuge ownership and management with the Akhiok-Kaguyak Native Corporation (AKI) lands agreement. 7/95, PBT

A total of 29,100 acres of Old Harbor Native Corporation (OHI) will again be Fee Title service land.

A second agreement was signed in November with the Koniag Native Corporation (KNC). This agreement will result in restoring 59,689 acres to refuge Fee Title.

The 165,000 acres included in these agreements represents approximately 62 percent of the land previously selected from the refuge by the Natives.

The acquisition program also resulted in eight small tracts containing a total of 245.27 acres being purchased from individual sellers.

2. Easements:

The agreements with AKI and OHI also resulted in Conservation Easements on 24,674 acres of prior refuge land that the native Corporations retained. Refuge Purposes apply on these easements. Akhiok-Kaguyak retained control of commercial access on their 21,674 acre easement and OHI retained control of all access in their 3000 acre easement.

A land trade is in progress that will restore 22,000 additional acres of AKI land to the refuge. The 22,000 acres of current refuge land to be traded will also be included in the Conservation Easement. Therefore, we will have a conservation easement on a total of 46,674 acres of AKI and OHI lands.

A conservation easement was also included on 57,082 acres of KNC lands in their agreement. This easement includes access by FWS and ADF&G for management, non developed and an option to purchase the land for a six year time period. This easement primarily covers the Karluk and Sturgeon River drainages.

D. Planning:

2. Management Planning:

a. River Management Planning Project:

The 1995 field season was the last year of data collection for the River Management Planning Project. Efforts were directed on several small projects in cooperation with other ongoing projects on the Refuge to collect data that could contribute to future river

management and to a comprehensive summary of available information for Refuge rivers.

(1) Observers surveyed the East Fork of the Ayakulik River to Bear Creek on the mainstem during late May for breeding pairs of harlequin ducks.

(2) Personnel at the Ayakulik law enforcement camp during the June chinook salmon sport fishery kept records of visitor use and interviewed departing campers at Bear Creek regarding the quality of their experience.

(3) Observers surveyed the Uganik drainage from above the lake to saltwater for harlequin duck broods during July.

(4) Observers evaluated the potential for bear viewing at the estuary of Terror River and surveyed the lower river for harlequin ducks during late August.

(5) Observers evaluated the potential for bear viewing at the estuaries at the head of Uyak Bay during September.

Negotiations with Koniag, Inc. over reacquisition of the Karluk River did not progress to the point that future management of the river was known by the 1995 season; therefore, we did not monitor the Karluk River during the chinook sport fishery.

STUDY AREAS AND PERSONNEL

From 23 to 28 May, Kenai Fisheries Resource Office Biological Technician Brad Benter and Natural Resource Planner Ron Squibb floated the East Fork of the Ayakulik River to the mainstem, and thence to Bear Creek. In conjunction with the harlequin duck survey, Benter sampled the river for rainbow trout (see Fisheries section of Narrative).

The law enforcement camp at Bear Creek was operated from 8 June to 1 July; teams working at the camp were Assistant Manager Dick Munoz and Biological Technician Heidi Brokate (8 -16 June), Manager Jay Bellinger and student trainee Sarah Lukin (16 - 22 June), and Ranger Paul Taylor and volunteer Janet Taylor. They contacted all arriving visitors and patrolled the Ayakulik from the confluence of the Red Lake River to below the confluence of Bear Creek.

From 26 to 29 July, Brokate and Squibb floated the Uganik River

drainage from the inlet of Uganik lake to the mouth of the lower river in the east arm of Uganik Bay, and hiked the east fork of the upper river and side streams of the lower river to search for harlequin ducks.

From 29 August to 1 September, Squibb and Brokate surveyed the estuary of Terror River and the lower 2 km of river from their camp on the west side of the head of Terror Bay.

From 11 to 14 September, Brokate, Squibb, and P. Taylor surveyed the head of Uyak Bay including the estuaries of East Uyak Creek and South Uyak Creek from their camp north of the mouth of East Uyak Creek.

METHODS

At the Ayakulik law enforcement camp, personnel patrolled the river on foot and with a small motorized raft. They noted all arriving parties and contacted as many as possible to obtain basic visitation data, i.e. party size, duration of stay, whether guided, whether campers or day users, and whether sport or subsistence fishing. Initial contact was especially important for raft-camping parties that floated downriver to depart from the river mouth. They also recorded all bear-human incidents near Bear Creek involving food obtained from people or property damaged, discharge of firearms or other deterrents, or perceived aggression. In order to learn more detailed information about visitors' experiences on the river, one of the team attempted to interview all campers within a day of their departure from Bear Creek. The interview included questions regarding visitors' perceptions of crowding, their encounters with bears, and their expectations and experience of the wilderness nature of the area.

When searching for harlequin ducks, observers recorded the number, age, sex, and location; locations were estimated with a hand held global positioning system and marked on a 1:63,360 USGS map to the observers' best estimate. On the East Fork and mainstem Ayakulik, observers floating the river recorded courting pairs and single adults when encountered. In the Uganik drainage, observers hiked the east fork of the upper river and two tributaries of the lower river, and floated the mainstem of the lower river. They stopped at each new vista of the stream course to scan for broods and adults. At Terror River, observers hiked the lower 2 km of river and an unnamed tributary creek, similarly searching for harlequins.

At the heads of Terror and Uyak Bays, observers evaluated bear viewing potential by locating observation points and scanning the area for extended periods. Familiarization with the areas also provided

information on potential camp sites and other aspects of visitor use.

SUMMARY OF 1995 RESULTS

Visitor Use of the Ayakulik

Visitation. During 9 to 30 June 1995, there were 945 user days originating at Bear Creek including 48 user days by Refuge personnel in the law enforcement camp. (our data exclude use originating from the lodge at the mouth of the river and other sources) The peak daily use occurred on 13 June with 88 people on the river. Of the almost 900 recreational visitor days, 26% were guided. Unguided use (74%), included 33% campers near Bear Creek, 39% raft-campers floating from Bear Creek to depart from the river mouth, and only 2% day users.

In order to make comparisons with previous years (Table 1) more comparable, visitor data from 1992 - 1994 were truncated (Squibb and Brokate 1995) to match the dates that Refuge personnel were on the river in 1995 (Table 2). These comparisons show that, although visitation in 1995 was slightly lower than in 1994, it was still greater than in 1992 and 1993. Possible factors contributing to the slight decrease in 1995 included: (1) poorer flying conditions due to higher than average occurrence of rain and fog, and (2) only one major air taxi was regularly outfitting and picking up rafters from the river mouth, consequently raft-camper visitor days were down substantially from 1994 (Table 2).

Guided use increased 49% in 1995 (Table 2). Included in the 231 guided visitor days, were 48 visitor days by an illegally guided German raft-camper party. Assistant Refuge Manager Dick Munoz issued the guide a citation on 11 June. The most dramatic change in visitation to the Ayakulik involved Olga Bay Lodge, which has one of the two overnight guiding permits for the river. In 1995, they established the most unique camp on the river, a floating Weather Port. Observers estimated 78 visitor days by Olga Bay Lodge guides and clients staying overnight on the river.

Refuge personnel recorded reports of four bear-human incidents. Of these, three involved displacement interactions between bears and people and only one involved food. In the food related incident, the bear was displaced before it could obtain food from the people. The lack of incidents of bears obtaining food from people in the Bear Creek area in 1995 was a pleasant contrast to previous years. Reports of bears taking human food and sport caught fish from people's camps numbered three in 1992, four in 1993, and six in 1994; in the worst incident of 1994, a bear took 90 lb. of salmon and other food from a

single camp.

Visitor Experience. Campers near Bear Creek responded in our survey that they would accept on average a 60% increase in the number of other parties that they encountered per day and that they would accept a 120% increase in the number of other camps that were within sight or sound of their own camp. These 1995 results showed a greater acceptance of increases in visitation than was the case in 1994 when survey results indicated that campers would accept on average only a 40% increase in parties encountered and a 30% increase in nearby camps. The 1993 survey indicated a still greater acceptance of increased visitation; campers then would have accepted a 210% increase in nearby camps. These year-to-year changes in acceptance of crowding by Bear Creek campers correlated well with the total number of visitor days (Table 2).

The variability among 1995 campers' attitudes towards crowding was substantial. There were 44% of 18 parties responding that wanted to see no increase or a decrease in the number of parties encountered per day. One of these parties stated that they would probably not return after twelve years because of the crowding. In contrast, 22% would have accepted increases of 5 to 10 encounters per day; and 34% would have accepted smaller increases. Similarly considering the variability among campers' responses regarding nearby camps, 39% wanted to see the number of nearby camps remain the same or decrease, 17% would have accepted one more camp, 33% would have accepted 3 - 4 more camps, and 11% would have accepted 7 - 8 more camps.

Table 1. Comparison of human use of Ayakulik River, originating on Refuge lands at Bear Creek, from 1986 to 1995. Consider differing length of field season in all comparisons; 1992 statistics presented for two season lengths.

Table 1.

<u>Year¹</u>	<u>Dates</u>	<u>Visits²</u>	<u>Overnights³</u>	<u>Visitor Days³</u>	<u>Angler Days⁴</u>	<u>Aircraft Landings</u>
1986	6/9 -7/7	99	237	336	42	
1987	5/27-7/7	113	453	566	59	
1991	6/10-7/1	124	290	422	83	
1992-A ⁵	5/31-7/6	≥270	≥686	≥1058		
1992-B ⁵	6/9 -7/6	228	597	895	161	
1993 ⁶	5/26-7/10	429	695	1124	825	215
1994 ⁷	5/27-7/11	541	1202	1731	1251	246
1995 ⁸	6/9 -6/30	293		652	945	140

¹ 1986-1991 (Jones and Selinger 1986, Hander and Selinger 1987, Johnson 1991).

² Definitions of 1992 "visits" and 1986-91 "total number of users" appeared to be the same.

³ Assumptions made to convert overnight use from 1986-91 "days" to 1992-94 "overnight stays" and "visitor days" may have resulted in some error. All estimates include days that rafters spent on private lands at the mouth of the river, a small proportion of their total time on the river.

⁴ Angler days estimated by Booth's (1995) creel surveys excluded days that anglers did not fish, non-angler use, and FWS use. We derived angler days originating at Bear Creek by summing the categories Weir-Rafters and Bear Creek-Total from appendix tables of Booth (1995).

⁵ 1992: Of the 5/31-7/6 estimate, FWS and ADF&G personnel accounted for 68 visitor days and 60 overnight stays. Of other visitor days, 427 were campers, 54 were unguided day users, and 138 were guided day users (including guides) at Bear Creek; 371 were raft-campers floating to the river mouth. Actual dates in the field began 6/8. Estimates of overnight use beginning 5/31, and of day use on 6/7, were derived from campers present on our arrival.

⁶ 1993: Federal and state personnel accounted for 138 visitor days and 118 overnights. Of other visitor days, 382 were campers, 62 were unguided day users, and 200 were guided day users (including guides) at Bear Creek; 342 were unguided raft-campers floating to the river mouth. Actual dates in the field began 5/28, estimates of use beginning 5/26 were derived from campers present on our arrival.

⁷ 1994: Federal and state personnel accounted for 192 visitor days and 178 overnight stays. Of other visitor days, 543 were unguided campers, 54 were unguided day users, 9 were guided campers, and 232 were guided day users (including guides) at Bear Creek; 701 were unguided raft-campers floating to the river mouth. We derived 1994 estimates of visits, overnight stays, and visitor days from creel survey data (Booth 1995) and the 1994 Ayakulik aircraft log.

⁸ 1995: FWS personnel accounted for 48 visitor days and 44 overnight stays. Of other visitor days, 301 were unguided campers, 19 were unguided day users, 78 were guided campers, and 105 were guided day users (including guides) at Bear Creek; 346 were unguided raft-campers and 48 were illegally guided raft-campers floating to the river mouth.

Table 2. Comparison of human use of Ayakulik River, originating on Refuge lands at Bear Creek, during the period 9 to 30 June from 1992 to 1995. Visitor data from previous years in Table 2 have been recalculated to estimate the visitor use that would have been detected¹ by FWS personnel camped near Bear Creek during the dates of the 1995 law enforcement camp.

<u>Year</u>	<u>Total Total</u>	<u>Non-Govt.</u>	<u>Visitor Days</u>			
			<u>Unguided Campers</u>	<u>Rft-Cmpr</u>	<u>Day Use</u>	<u>Guided Use</u>
1992	823	771	301	323	38	109
1993	760	680	234	270	36	140
1994	1161	1060	360	521	24	155
1995	945	897	301	346	19	231

¹ To calculate visitor use that "would have been detected", raft-camper parties that were still on the river but had departed Bear Creek before 9 June were deducted from the total use originating at Bear Creek for the period 9 to 30 June for 1992 through 1994.



Typical example of the camp crowding at Bear Creek on the Ayakulik River in early June. 6/95 PBT

A majority of camping parties (9 of 17 responding) would support limits on visitation to the Ayakulik, and half of the remaining parties (4 of 17) might support limits under certain circumstances. There was similar support for limits among campers in 1994, and much greater support in 1993. The majority of 1995 campers at Bear Creek sought solitude and a pristine natural area as goals of their trip. Almost all of these campers felt that their trip to the Ayakulik had provided these experiences.

Harlequin Duck Observations

Harlequin ducks have good potential to serve as a sensitive ecosystem indicator for many drainages in the Refuge. Refuge Wildlife Biologist Dennis Zwiefelhofer has worked over the years to develop baseline data and a monitoring program for this species. In 1995, some river planning effort was put into assisting Zwiefelhofer's program collect data on harlequins in three drainages. (for a more complete discussion Refuge harlequin data, see the Wildlife section of this narrative)

From 24 to 27 May 1995, observers floated the Ayakulik drainage during the latter part of the period that harlequin duck breeding adults should have been concentrated along the main stream courses. They recorded 19 to 23 harlequin ducks, considering possible duplicates, in 10 sightings along the East Fork of the Ayakulik; no harlequins were observed along the mainstem of the Ayakulik. In 1985, Zwiefelhofer (1985) observed 50 harlequins along the same route, including 8 on the mainstem; Zwiefelhofer's earlier start on 13 May 1985 probably explains at least some of the difference from 1995 observations. A brief note in Refuge files documents another waterfowl survey of the Ayakulik by fisheries workers from 23 to 25 May 1989; from about 4 km (2.5 mi.) up the East Fork to Bear Creek, they recorded 31 harlequins. In that area, the 1995 survey recorded only 2 to 4 harlequins.

From 26 to 28 July 1995, observers searched the Uganik drainage during the period when harlequin broods should have been on the primary or secondary stream courses. They recorded 9 to 12 harlequin ducks, considering possible duplicates, in four sightings. There were at least two broods, a female with three young and another with two; the second sighting of a female with two may have been a duplicate. Harlequin broods' fidelity to specific riffles, presumably feeding sights, may be useful for future monitoring. At the riffle on the lower river where the female with two was observed, the same sized brood was observed on 14 August 1995; and a group of three harlequins, presumably fledglings, was observed there several times in early September 1994.

Observers recorded 9 harlequin ducks at the mouth of the Terror River on 31 August 1995, but no broods.

Bear Viewing Potential

Bear viewing has become a popular recreational activity on Refuge lands. The numbers of guided bear viewing days on the Refuge have increased rapidly in the last few years to become comparable to the number of guided angler days. Proposed access closures to four of the most critical areas where bears concentrate on salmon spawning streams will limit the number of areas available to recreational bear viewers, and already does so for guided bear viewers through conditions on the guides' permits. In order to learn more about the potential for bear viewing at other sites, observers visited the heads of Terror and Uyak Bays during the pink salmon runs.

Neither of these areas has the potential for the type of bear viewing that occurs at Alaska's most popular areas of McNeil River, Brooks River, and Anan Creek where bears concentrate at a falls or cascade that slows the progress of migrating salmon. At Terror and Uyak, bear use, and therefore viewing opportunity, is dispersed across very large tidal flats and along the channels of the rivers where salmon migrate and spawn. Use of a skiff, kayak, or inflatable boat would allow viewers easy access and the ability to work the tide in both areas, as much of the viewing opportunity is on the tidal flats. This has apparently been the method of choice for the bear viewing guides that have worked the head of Uyak Bay in recent years.

Observers visited both areas for only a few days, and those dates may not have been during the best period for bear viewing. The number of bears feeding in these areas depends on the strengths and timing of pink, chum, and coho salmon runs, and on the size and timing of the elderberry crop (Sambucus racemosa subspp. pubens var. arborescens), an important alternative food in both areas.

Mouth of Terror River. During 29 August to 1 September, observers watched the mouth of Terror River and tidal flats and walked the lower 2 km of river. They recorded 4 to 5 unique bear groups: a female with one cub-of-the-year, a female with two cubs-of-the-year, and 2 to 3 single bears including at least one adult and one subadult. On 30 August from the knoll west of the river mouth, they scanned the river delta and tidal flats hourly from 1100 to 1700. They recorded averages of 1.1 bears and 44.9 eagles per scan. Waterfowl of several species were abundant, and they also saw a harbor seal and a sea otter.

In addition to viewing from a boat in the tidal flats, there are two knolls, one on either side of the river mouth, that offer vistas of the area. The knoll to the east of the mouth probably offers the better view and its vista point is more readily accessible. These knolls would provide distant viewing.

The Terror River and estuary would be an excellent destination for visitors with some back country and boat experience who were looking for a scenic wilderness trip with an abundance of salmon and wildlife where bears would be regularly encountered. It would not be a destination for someone looking for easy or close bear photography.

Terror River estuary is the nearest point in the Refuge from Kodiak town where bears can dependably be seen during early August to mid-September. Visitors should be aware of the constraints on access and visibility. Tall grass limits visibility in the delta, and deep tidal sloughs cannot be easily crossed when flooded. Vegetation upstream also limits visibility. There is no beach at high tide at several places along the shore, and tall grass, shrubs, and tree falls impede walking. Bears are shy making brief encounters the norm unless viewing from long distances.

Head of Uyak Bay. During 11 to 14 September, observers watched the tidal flats off South and East Uyak Creeks and walked the east shore of the area and the ridge between the creek basins. They recorded 6 to 9 unique bear groups: two females with two cubs-of-the-year each, and four to seven single bears including at least three adults and one subadult. On 12 September from 1100 to 1500, one observer scanned the tidal flats from the small headland on the east shore that divides the basins of the two creeks. During the first half-hours of each hour, he recorded an average of 2.2 bear groups present. Waterfowl were abundant, but there were fewer eagles than at Terror Bay.

The potential visitor experience would be similar to that at Terror. Bears should be somewhat more common and the opportunity to easily see them greater because of the much larger tidal flats. Bear viewing is dispersed, and close bear photography would be difficult unless some bears have habituated to people. Given that viewing guides work the area, the likelihood of solitude is less. The constraints on access and visibility are the same as at Terror; although, there are more level areas along the shore for camping that are away from bear fishing areas.

A 121 ha (300 acre) parcel of land at the mouth of South Uyak Creek was recently purchased for inclusion into the Refuge. Refuge lands immediately upriver have been proposed for closure to access during 15 August to 30 September, the period of concentrated bear feeding.

Recent guided bear viewing has been below the proposed closure on the acquired parcel or tidal lands.

DIRECTION FOR KODIAK RIVER MANAGEMENT PLANNING

At the end of 1995, it was decided to change the near term goal for the river management planning project on Kodiak. Instead of working towards implementation of a river management plan in the near future, the new goal is a river management report that would contain for each significant drainage an analysis of management concerns, a statement of desired future conditions, a discussion of indicators and standards for monitoring and determining present conditions, and potential management options for maintaining resource values. This report would not have the authority of a plan for directing management, but would present the Refuge's options for future management.

This decision to postpone the river management plan resulted from the belief that other outstanding efforts should first be resolved before putting forward a new plan. The most important unresolved efforts were: (1) the proposed regulations for camping closures and access closures on the Refuge's most important bear concentration areas for feeding on salmon, and (2) the negotiations with Koniag, Inc. towards re-acquiring native conveyed lands with funds from the Exxon Valdez Oil Spill Trustees.

4. Compliance with Environmental and Cultural Resources:

a. Spiridon Lake Sockeye Enhancement Project. (Chatto)

This project was initiated by ADF&G in 1991 under the auspices of an environmental assessment prepared by the refuge. Sockeye salmon fry, which are stocked in the lake annually, migrate to the ocean as 1-year old fish and return two-to-three years later as mature fish which are harvested in the common property fishery within the Kodiak area. Data collected by the Department in 1995 indicate that the physical and biological parameters associated with the lake environment, as stipulated in the environmental assessment, continue to be within acceptable limits.

In the spring of 1995 approximately 4.6 million sockeye fry were stocked into Spiridon Lake. Additionally, approximately 615,000 sockeye smolt migrated from the lake during May and June 1995. These fish were from fry planted in 1992, 1993 and 1994.

A total of eight salmon aerial index surveys on Spiridon River were conducted by the ADF&G and the refuge in 1995. The Spiridon River

drains into the bay adjacent to the Spiridon Lake project and monitoring of escapement is mandated by the environmental assessment. The peak index escapement count for pinks exceeded the upper end of the desired goal by 93 percent and the count for chums was within the guideline range. Indexed escapement of coho was within the upper end of the established goal. Sockeye escapement into the river was indexed at 450 fish. Although there is no established escapement goal for sockeye into the Spiridon River, this small population is being indexed to detect any changes in the relative numbers of fish using the system.

In 1995 an estimated 96,709 project sockeye were caught by commercial fishermen along the west side of Kodiak. Approximately 33 percent of these fish were harvested in the Spiridon Bay special harvest area and the rest were harvested in the more traditional areas along the west side of the island.

In 1995 an experimental barrier net was used within the Telrod Cove area to keep returning fish from crowding up into the inner part of Telrod Cove where the stream that drains Spiridon Lake empties into the bay. This action was taken to avoid potential wildlife resource problems observed in 1994 within the inner cove by numerous boats trying to fish. Since there is no escapement goal for these returning sockeye it also allowed for a more complete harvest. No significant problems were observed by the use of the barrier net in 1995. Evaluation of the barrier net will continue in 1996.

Spiridon Lake - (Zwiefelhofer)

Monitoring of bald eagle nesting and productivity within the Spiridon Lake project area by the Kodiak refuge staff continued during 1995. Bald eagle nesting activity within the project area has been monitored by the refuge since project initiation in 1991. A minimum of 24 occupied bald eagle nests within the project area were identified during 1995. Of the total occupied nests, 63% were successful producing a total of 26 young for a mean of 1.1 young per occupied nest. The 1995 nesting results were considerably lower than the 42 occupied nests found in 1994. The cost of monitoring this enhancement project's potential impacts to nesting bald eagles is supported by refuge wildlife inventory funds.

b. Hidden Lake Sockeye Enhancement Project.

This project was initiated by ADF&G in 1992 under the auspices of an environmental assessment. The project is similar to the Spiridon Lake except it is on a smaller scale and located on the Ban Island/Afognak Unit of the refuge.



View of the Telrod Cove exclusion net installed to facilitate sockeye salmon harvest on the Spiridon Lake enhancement project. 7/95, DAC



Salmon seiners activity participating in the Telrod Cove sockeye fishery. 7/95, DAC

In 1995, 99,000 sockeye fry were stocked into Hidden Lake. The low stocking level is in response to Lake Limnology sampling in 1994 which indicated that limnological parameters were still recovering, consequently the decision was made to continue the low density stocking of fry again in 1995. Subsequent sampling in 1995 indicated that the density and biomass of zooplankton had increased compared to 1994, but was still significantly less than pre-stocking years.

As in previous years there is no total estimate on the number of smolts which left the lake in 1995. Data collected indicate that approximately 97 percent of the smolts which left the lake were age-1 fish from stocking in 1994.

In 1995 sampling for Dolly Varden in the lake was continued by the Department and catch/unit effort was at or above that observed in 1994. Data on the overall sampling for Dolly Varden is being reviewed to determine if this aspect of the monitoring needs to continue beyond 1995.

A total of eight stream surveys were conducted by the ADF&G on Hidden Lake creek in 1995. Pink salmon escapement (7130 fish) was within the desired range. Although only approximately 49 coho salmon were observed in the system, this is acceptable since there is no escapement goal for these fish in the system since these fish are remnants from an earlier enhancement project the ADF&G had terminated in 1992.

In 1995 an estimated 31,190 sockeye were caught in the Hidden Lake Terminal Harvest Area which were assumed to be fish returning from project efforts.

Hidden Lake - (Zwiefelhofer)

Monitoring of bald eagle nesting and productivity within the Hidden Lake fisheries enhancement project area was initiated during 1993. A minimum of 24 occupied bald eagle nesting territories were identified during 1995. Nesting success was 54% for the 24 occupied nests. Producing only 23 young for a mean .98 young per nest. The 1995 Hidden Lake project area bald eagle nesting results were also lower than in 1994 when 37 occupied nests were found. Cost of conducting annual bald eagle nest monitoring surveys for the Hidden Lake Enhancement Project are paid for by the Kodiak Regional Aquaculture Association.

c. Terror Lake Hydroelectric Project - Fisheries Studies (Chatto)

The Federal Energy Regulatory Commission (FERC) has not yet reviewed the completed fishery studies to determine if the conditions of the licence for the project have been met in regards to the minimum flow regime.

In late 1994 the Alaska Energy Authority (AEA) in conjunction with the Kodiak Electric Association (KEA) initiated discussions with concerned agencies in evaluating the possibility of requesting an amendment to the Terror Lake projects FERC licence to modify the current minimum in-stream flow requirement in the Terror River. No further action on this proposed amendment was initiated in 1995, but they will be preparing a proposed amendment to the licence to modify the Ramping Rates without modifying the minimum flows.

5. Research and Investigations

a. Kodiak NR 95 - "Coho Salmon Investigations Ayakulik River" (Chatto)

In 1993 a study was initiated on the Ayakulik River to evaluate coho salmon spawning habitat through assessment of stream substrate and how this composition directly affects the suitability of potential spawning habitat. The goal of the study is to calculate optimum coho escapement based on available stream substrate. This project is being conducted by a graduate student (Ray Hander) at the University of Alaska Fairbanks. Work in 1995 concentrated on preparing a draft of the Thesis entitled "Spawning Substrate and Capacity for Coho Salmon in the Ayakulik River, Kodiak Alaska". Thesis defense is expected to occur in the Fall of 1996.

b. Kodiak NR 95 - "Rainbow Trout Inventory" (Chatto)

A rainbow trout inventory was initiated in 1995 to establish baseline age and length information on selected streams on the Kodiak Refuge. The purpose(s) of the study was to evaluate the diversity of the rainbow populations, identify possible conservation problems and initiate management practices if needed to conserve populations. Project objectives were to: (1) characterize selected populations in terms of length and age; (2) compare these populations with others in Alaska and (3) evaluate management regulations. This project is being conducted by the Kenai Fisheries Resources Office at the request of the Refuge.

In 1995 work was completed on the characterization of populations in Uganik, Little and Dog Salmon Rivers and the mean lengths of fish sampled were 375, 189 and 329 mm, respectively. Ages ranged from 2-9 years with modal ages of 6, 3 and 5 years for Dog Salmon, Little and

Uganik Rivers respectively. This project is scheduled to be continued in 1996 and beyond in order to complete several other systems including the Karluk and the Ayakulik Rivers.

Additionally, in 1995 the refuge conducted preliminary surveys on a small system in the Northeast Arm of Uganik Bay, Silver Salmon and Horse Marine systems in Olga Bay. The purpose was to detect the presence of rainbow and characterize the habitat. A project report on the results of the sampling indicate that the Northeast Arm drainage does not support rainbow, but both Silver Salmon and Horse Marine have small populations with potential age classes ranging from 1-7 years based on age-length data from other Alaskan systems.

c. Kodiak NR 95 - "Population Ecology of Brown Bears on Aliulik Peninsula, Kodiak, Alaska" (National Fish and Wildlife Foundation Challenge Grant) (Barnes).

This is a cooperative study involving the Refuge, Alaska Department of Fish & Game (ADF&G), and National Biological Survey (NBS). Study objectives are to: (1) determine seasonal habitat use patterns, and (2) estimate mortality by sex and age class.

Thirty radio collared bears were monitored all or part of the year, yielding 763 relocations. Preliminary analysis of data collected since 1992 shows that bears favor habitats on or near ocean beaches in spring and congregate along salmon-rich streams in July and August. Denning ecology of the animals is a typical compared with other areas on Kodiak. Many bears den in low-elevation (<500 ft) benchland habitat and occupy more than one den each season. Length of the denning season is shorter than on other areas we have studied on the Refuge, and a few bears don't enter dens at all.

During 23 June - 4 July, we captured 40 animals on the study area, including 37 new captures and 3 recaptures. Thirteen of the animals were radio collared. The remaining animals, primarily subadults and adult males, were eartagged and tattooed in order to determine rates that those classes are taken in the sport harvest.



Typical "installation" of a telemetry collar on a Kodiak brown bear. 7/95, VGB

d. Kodiak NR 95 - "Brown Bear Activity, Behavior and Distribution Related to a Bear Viewing Program at O'Malley River, Kodiak Island, Alaska" (74530-91-01) (Barnes).

This study was a four-year (1991-1994) effort that investigated brown bear response to different types of human use. Data were collected by biologists stationed at observation posts. In 1994 we conducted simultaneous ground and aerial counts to provide the baseline for long-term monitoring of bear use on the O'Malley area. Analysis of concurrent counts (n=14) of independent bears revealed good agreement between ground (\bar{x} =14.3) and aerial observers (\bar{x} =13.2) in 1994. Continued monitoring of bear use on the O'Malley area is particularly important because, starting in 1995, a seasonal closure to public access is in effect from 25 June - 30 September.

Aerial counts of the O'Malley area were conducted periodically (n=20) from 20 July to 15 September, 1995. Counts of independent bears were markedly higher in 1995 than in 1994, with the greatest difference

noted in the late July to early August period of peak bear use. The mean count of independent bears during that time in 1995 (\bar{x} =33.0, n=6) was more than double the average count (\bar{x} =13.2, n=6) in 1994. Although these results are preliminary and need to be supported in 1996, they suggest a strong response by bears to the seasonal closure to public access.

E. Administration:

1. Personnel:

The only permanent change of station to occur in 1995 was the transfer of Deputy Refuge Manager Dick Munoz from Kodiak NWR to the Portland Regional Office as an Assistant Refuge Supervisor. Michael Hawkes was selected from a promotion certificate to replace Dick. Mike moved from the primary assistant manager position at Kofa NWR in Arizona to Kodiak on November 20, 1995, just in time to get furloughed for 2 weeks.

Subsistence Biologist Robert Stovall was temporarily promoted from GS-9 to GS-11 while acting as Acting Subsistence Coordinator for the Kodiak Regional Subsistence Council.

Refuge Office Automation Clerk Jacke Barnes was reclassified and promoted from a GS-4 to an Administrative Technician GS-5.

Refuge staffing for 1995:

1. Jay R. Bellinger Refuge Manager - GS-485-13
2. Dick Munoz Deputy Refuge Manager - GS-485-12,
 transferred 6/95.
3. Mike Hawkes Deputy Refuge Manager - GS-485-12, EOD 11/95.
4. Paul Taylor Refuge Ranger - GS-025-11
5. Butch Patterson Pilot - GS-1281-12
6. Tony Chatto Fishery Biologist/Pilot - GS-482-12
7. Denny Zwiefelhofer Wildlife Biologist/Boat Operator GS-486-11
8. Robert Stovall Wildlife Biologist - GS-486-09
9. Diana Brooks Refuge Ranger - GS-025-09
10. Julie Revalee Administrative Technician - GS-0303-6
11. Jacke Barnes Administrative Technician - GS-0303-5
12. Bill Lanahan Maintenance Worker - WG-4749-08
13. Gus Johnson Marine Machinery Mechanic - WG-5334-07
14. Greg Wilker Biological Technician, Temporary - GS-404-05
15. Heidie Brokate Biological Technician, Temporary - GS-404-05
16. Ray Hander Fisheries Technician, Temporary - GS-05
17. Ron Squib Natural Resource Planner - GS-11 Temporary

- assignment from RO
18. Vic Barnes Wildlife Biologist - GS-13, USGS-BRD, Kodiak Station
 19. Carl Peterson Laborer, Intermittent - WG-2
 20. Maggie Tuck Visitor Center Ranger, Temporary - GS-3
 21. Shirley Monte Data Transcriber, Temporary - GS-4

4. Volunteer Program:

Resource Apprentice Program (RAP) participant Sarah Luken continued her refuge experience under the guidance of RM Bellinger. In order to broaden Sarah's experience, Bellinger assigned her a variety of field missions, the first of which was a week on the Ayakulik River assisting in collection of public use data. She also spent time on the Ursa Major and made trips to Camp Island and the O'Malley research camp. It appears that Sarah will spend at least one more season in this program.

The TNT Program - Teen Nature Teachers, a volunteer group of high school students interested in education careers, completed another Project WILD workshop --- a first for new members and a refresher for returning students. Subsequently, they traveled to several villages and local classrooms to present environmental education lessons, primarily relating to Earth Day themes. Many TNT's had difficulty getting release time from classes, so coverage, particularly of town schools was disappointingly short. However, since this left money in the Alaska Conservation Fund Grant, Ranger Brooks obtained ACF approval to use the grant funds for a new summertime project. This project was the Families Understanding Nature (FUN) program which will be explained further under Outdoor Classrooms.

Volunteers Meldonna Cody and JoAnne Alvarez continued to assist with occasional E.E. presentations. Gail Smith and Charlie Elliot helped with a new ANHA sales shelf. Hans Tschersich and Elinor Poll Ramos continued to assist with translation in German and Spanish. In 1995, Kodiak was found to have the fastest growing Hispanic population in the state of Alaska, while German speakers comprise a large proportion of European visitors.

Approximately 20 volunteers staffed the Visitor Center on Saturdays, continuing the now established practice of closing on Sundays due to lack of both visitors and volunteers. During winter (November thru February), weekend VC operations ceased altogether. Volunteer Coordinator Brooks' maternity leave (Perri Anderson born 10/16/95) and the government shutdown contributed to this closure.

5. Funding:

The final FY 1995 funds advice for Kodiak NWR received on 2/22/95 was as follows:

Fixed/Overhead Cost: \$696k
Subsistence Fixed/Overhead Cost: \$ 59k

FY 1995 Projects

Biological Surveys & Inventories	\$ 45k
Implement EE Plan	\$ 10k
LE/SUP/Pubic Contact Activities	\$ 35k
River Management Planning	\$ 27k
Visitor Center Staff (new start)	\$ 8k
Grumman Goose (new start)	\$ 11k
Fisheries Program Seasonal (new)	\$ 16k
Winter Deer Survey	\$ 14k
Subtotal	\$166k

MMS Projects

Replace Aircraft Tow Trailer	\$ 15k
Rehab Two Public Use Cabins	\$ 12k
Replace Office Copier	\$ 10k
Rehab Workstation Cabinets	\$ 3k
Rehab Hangar Exterior	\$ 26k
Replace Office Furniture	\$ 2k
Subtotal	\$ 68k
Total	\$989k

1261 Allocation \$652k
1262 Allocation \$337k

6. Safety:

Robert Stovall served as Safety Officer for 1995. Safety meetings and training for the year were as follows:

January - All Refuge staff completed the Region 7 compliance training for hazardous wastes and environmental\spill response conducted by Regional Office Safety and Engineering staff.

February - Refuge staff began a series of Dept. of Interior watercraft safety training modules given by Bio. Tech.\Deck hand Johnson who is a Certified Dept. of Interior Watercraft Safety Instructor. This first module was on the familiarization of various types of personal

floatation devices (PFD.'S), and survival suits. The training was held at the Kodiak High School pool.

March - Bio. Tech. Wilker, Wildlife Biologist\Boat Operator Zwiefelhofer, and Fish Biologist\Pilot Chatto successfully completed the boat operation practical module from the Dept. of Interior watercraft safety training course. Other staff members continued to practice their boating skills with various Refuge watercraft.

April - Bear safety training (classroom) was completed by all permanent staff during April, with 7 Refuge staff completing the firearms qualifications portion of bear safety training, qualifying as designated shooters or firearms carriers.

The Regional Aviation Safety Trainer Eric Akola conducted Aviation Safety training for 11 Refuge staff and volunteers at the Refuge headquarters.

May - A total of 16 Refuge staff and volunteers completed the Kodiak Red Cross CPR recertification\certifying, with eight members also completing the First Aid training.

During May and June, the remainder of the Refuge Staff, temporary staff, volunteers, and other Dept. of Interior employees completed the bear safety training\firearms qualification, and watercraft refresher training in time for the field season. The USDI watercraft safety training classroom module, was completed by permanent refuge staff during June.

In June a safety and health inspection of the Kodiak Refuge Buildings was completed by EPA and Regional office staff. All areas were checked and an Action Item List was drawn up. All items on this list were corrected by the end of the year.

Also, in June the HIV awareness training video was viewed by Refuge staff. An HIV awareness workbook was also handed out to all staff to complete the training.

No lost time accidents were recorded in 1995.

7. Technical Assistance: (Zwiefelhofer)

WB Zwiefelhofer provided trend information from the refuge's 16 years of winter seabird and sea duck surveys to University of Alaska - Fairbanks Dr. Alan Springer as part of a study on long term environmental changes in the Gulf of Alaska and how it effects marine

populations.

WB Zwiefelhofer also provided his summer observations of juvenile *Brachyramphus* (sp.) murrelets (marbled and kittlitz's) over the past 17 years to Alaska Biological Research Inc. and National Biological Survey personnel as part of an assessment of potential impacts to these species relative to the Exxon Valdez Oil Spill.

Kodiak refuge's marine vessel, URSA MAJOR II, and her crew (WB Zwiefelhofer and BT Johnson) provided technical expertise, transportation, and logistical support to personnel of Katmai National Park during June. The trip covered the Katmai coast from Katmai Bay to Hallo Bay. Surveying the seabird colonies and marine mammal haul outs along the coast were the primary focus of the Park Service personnel.

(Chatto)

Assistance was provided to the Anchorage Office of the National Biological Survey in planning and collecting genetic samples from sockeye salmon spawners in the Karluk, Dog Salmon and Ayakulik River systems. The purpose of the sampling was to compare the genetic composition of an introduced sockeye population on the Dog Salmon/Frazer Lake system with the various donor stocks that were originally introduced into the system and determine the dominant (if any) donor stock.

8. Other: (Chatto)

Remote ADF&G fisheries field camps on the Refuge were visited throughout the year to monitor ongoing activity and offer any needed assistance to keep camp activities compatible with Refuge purposes.

The ADF&G-Commercial Fish Division conducted their annual pre-emergent pink salmon sampling on refuge streams in March and April of 1995. The refuge issues a SUP to the Department for the use of a helicopter to access refuge streams each spring.

As in previous years numerous informational requests on the status of the fishery populations and habitat on the refuge and on Native Conveyed lands were processed. This information was provided as part of the ongoing effort to brief the Exxon Trustees and other concerned parties on the value of the aquatic habitat located on conveyed and private lands within the Refuge boundary which were being considered for purchase.

In early January 1995, FB/P-Chatto was part of a fisheries team that met in the regional office to evaluate the regional fisheries

restoration and enhancement policy. The team identified 7 problems with the current policy and prepared a briefing document for review by the regional directorate.

Fishery Biologist/Pilot Chatto attended a Salmon Supplementation Workshop put on by the EVOS Trustee Council in Anchorage on January 12-13. The purpose of the workshop was to review fishery projects and proposals involved with supplementation and how they relate to injured fishery resources.

In early March 1995 the Refuge prepared a compatibility determination on an ADF&G action which changed the source of sockeye brood stock for the ongoing Spiridon Lake Sockeye Enhancement project. This action had been taken without consultation with the Service and was contrary to the operational procedures outlined in the Services` 1991 Environmental Assessment. Fishery Biologist/Pilot Chatto traveled to the regional office and gave a briefing on the project and refuge compatibility. The compatibility determination recommended the use of the interim brood stock but only on a one time basis because of the unknowns regarding IHN and genetics.

The Refuge hosted the annual Spiridon and Hidden Lakes Sockeye Enhancement project review meeting in early May 1995. Present at the meeting were representatives from the ADF&G and the Kodiak Regional Aquaculture Association. The purpose of the annual meeting is to review the studies and other operational aspects of these projects and how they are tracking with the requirements outlined in the respective Environmental Assessments. Both projects appear to be accomplishing the original purpose of increasing the common property fishery in the Kodiak Area and, at this time, operations appear to be remaining compatible with the Refuge purposes.

Fishery Biologist/Pilot Chatto traveled to the regional office in September 1995 and attended a workshop to review the annual Alaska Board of Fish proposals. Input and written comments were provided on those proposals in the Kodiak Area that may affect the Refuge fishery resources. In addition, FB/P Chatto attended the BOF meeting held in Kodiak from November 29 - December 2, 1995.

G. Wildlife:

3. Waterfowl (Zwiefelhofer)

Waterfowl production surveys were conducted during 1995 in a continuing effort to quantify wildlife resources in popular recreational areas of the Kodiak National Wildlife Refuge. The 1995

production surveys were carried out in the Spiridon river drainage. The eight one mile square plots (4 low strata, 4 other strata) were surveyed in 1995. One low strata plot was dropped during the 1995 survey due to lack of suitable wetland habitat. Spring phenology in 1995 seemed slightly later than normal despite warmer and wetter than normal conditions in April. The wet conditions continued into May and June with both months receiving over 2.5" above normal precipitation levels. High water conditions with cool temperatures likely had an adverse effect on nesting waterfowl. The total number of observed broods was down by 22% with the only increases seen in cavity nesting species (Barrow's goldeneye and Common merganser) providing some possible indirect evidence of the impacts the wet weather had on other waterfowl species. However, since 1994 and 1995 survey data is the first waterfowl production information collected in the Spiridon River drainage the effect the past two summers of adverse weather conditions have had on nesting waterfowl is difficult to quantify.

The 1995 waterfowl production surveys were conducted July 8 to 17 by BT G. Johnson, Ranger P. Taylor, and T. Guy (Kenai Fisheries Resources). The three person survey crew was dropped off via fixed-wing aircraft, at small lake which drains into the Spiridon river known locally as Munsey's lake. Transportation of equipment and personnel between survey plots was accomplished by use of two 11.5-foot inflatable kayaks. Water bodies in the plots were surveyed on foot, with exception of those plots which contained portions of the main stem of the Spiridon river. The river segments were surveyed while in transit with the inflatable kayaks. Surveys were conducted using U.S. Fish and Wildlife Service Region 7 Standard Operating Procedures established for ground waterfowl production surveys in Alaska.

Table 3 presents the number of observed broods and broody hens, by species, found in the random plots during the 1995 survey. Table 2 presents the 1995 expanded waterfowl production by species for the 22 square miles of Spiridon drainage sampled.

Table 3. 1995 Waterfowl Production Summary - Observed Broods

Production Area: South Central Year: 1995
 Selected Data: ALL STRATA
 Number of Plots: 8
 Expanded Area: 22

Species Observed	Class I	Class II	Class III	Broody Hens	Total
Mallard	0	0	0	1	1
Gadwall	0	0	0	0	0
American Widgeon	0	1	0	0	1
Green-winged Teal	2	0	0	1	3
Northern Pintail	0	0	0	0	0
DABBLER SUBTOTAL	2	1	0	2	5
Greater Scaup	0	0	0	0	0
Barrow's Golden eye	1	6	0	0	7
DIVER SUBTOTAL	1	6	0	0	7
Common Merganser	3	3	0	0	6
Red-breasted Merganser	0	0	0	0	0
MISC. DUCK SUBTOTAL	3	3	0	0	6
TOTAL DUCKS	6	10	0	2	18

Ponds or lakes without recent or current beaver activity again had little or no use by waterfowl in 1995. The small amount of shorebird activity in the survey area was primarily along the main stem of the Spiridon river. Shorebird species observed were least and western sandpipers, and greater yellowlegs. The relatively low numbers of shorebirds observed are indicative of the differences in wetland habitat between the tundra areas along the Ayakulik and the mostly wooded areas along the Spiridon river. Results were provided to the Anchorage Regional Office Waterfowl Production Survey Coordinator to increase the baseline information for the South Coastal waterfowl production area. Kodiak is the sole representative of this stratum to date. The south coastal waterfowl production area may be of greater importance to the health and size of resident (wintering waterfowl) populations than to the overall flyway waterfowl populations.

Subsistence use of these apparently resident populations as well the migrating component of the waterfowl populations locally available can not be separated. The resident portion of Kodiak's and other south coastal waterfowl populations may be much more important in providing subsistence opportunities for rural residents than has been previously thought.

Table 2. 1995 Waterfowl Production Summary - Expanded Broods

Production Area: South Central Year: 1995
 Selected Data: ALL STRATA
 Number of Plots: 8
 Expanded Area: 22

Species Observed	Expanded Broods	Co. of Var.	Stand. Error	90% C.L. Lower	90% C.L. Upper
Mallard	3	1.00	3	-2	9
Gadwall	0	0	0	0	0
American Widgeon	3	1.00	3	-2	9
Green-winged Teal	10	0.64	6	-1	20
Northern Pintail	0	0	0	0	0
DABBLER SUBTOTAL	16	0.50	8	3	30
Greater Scaup	0	0	0	0	0
Barrow's Golden eye	23	0.35	8	10	37
DIVER SUBTOTAL	23	0.35	8	10	37
Common Merganser	20	0.43	8	6	33
Red-breasted Merganser	0	0	0	0	0
MISC. DUCK SUBTOTAL	20	0.43	8	6	33
TOTAL DUCK	59	0.26	15	34	84

Collection of harlequin duck breeding population baseline data on the refuge's coastal and interior habitats continued during the summer of 1995.

Marine survey efforts covered Kodiak refuge's western coastline from Uyak Bay on Kodiak Island to Bluefox Bay on Afognak Island. Coastal surveys were conducted from a small boat equipped with a Global Positioning System (GPS) and a waterproof notebook computer loaded with GPS Trak program.

A calibration problem was found in the electronic planimeter used for determining the length (kilometers) of coastline covered in 1994. The result was lower calculated (reported) densities of harlequin ducks per kilometer (ducks/km) of coastline than the actual (corrected) density. When the correction was applied, the May 1994 linear density increased from 4.6 to 5.0 ducks/km and August densities increased from the reported 3.8 to 4.1 harlequin ducks per kilometer of coast. Future surveyed distances will be calculated from digitized (1 inch = 1 mile) topographic map projections using geographical information system (GIS) software.

The 909 kilometers of refuge shoreline surveyed in May accommodated a linear density of 3.6 harlequin ducks per kilometer of coastline. Spring abundance of coastal harlequin ducks dropped from 4369 in 1994 to 3317 in 1995. In 1995 the number of adult males decreased by 29% from 1994, but represented 45% of the total 1995 identified (age/sex) population. Adult males made up 69% of the total 1995 male population. Subadult (second year) and juvenile (first year) males comprised 16% and 15% of the total 1995 males respectively. In 1995 the number of females decreased by 36% and represented only 34% of the 1995 total known sex birds. Adult male/female ratio increased from 51 males to 49 females in 1994 to 53 males to 47 females in 1995.

Overall male age classification during the (May) 1995 surveys improved from the 1994 survey due to increased observer experience. Immature males were divided into first and second year categories in May 1995 instead of the single subadult category used in May 1994. Unknown sex or age class decreased 43% due in most part to increased observer experience. Errors in classifying free-flying harlequin ducks by plumage are lessened with experience but likely also vary with changing survey conditions. The extent to which classification errors effect reported sex/age ratios has not been quantified.

In August, 900 kilometers of coastal area covered in May tallied a total of 3693 harlequins. Earlier survey initiation increased the number of known sex harlequin duck observations 69% over the August 1994 survey. However, the number of broods and young detected during the 1995 survey declined approximately 80% and 85% respectively.

A total of 10 broods were identified during the August survey. Using the survey data to compute the standard reproductive variable of brood size (2.8 yg/brood) however, is of little value. The relatively small number of young identified (n=28) during the survey is considered a minimum number due to difficulty detecting and separating broods from large molting flocks. Broods tended to dive quicker and separate from the main flock when disturbed, increasing the chances of missing them. Due to the earlier survey timing in 1995, broods may have used this

type of avoidance behavior more often than in 1994 resulting in a lower number of broods detected in 1995.

A total of 30,772 individual birds representing 41 different species were found during the May effort. The August survey tallied 45,412 birds from 40 species. Larus gulls were the most abundant species group observed during both May and August surveys. They totaled 39% and 33% of all observations respectively with glaucous-winged gulls dominating the Laridae totals. Harlequin ducks were the third most abundant species found during the May survey with 11% of the total birds observed. However, by August, harlequin ducks were only 8% of the total birds observed. Despite the lower abundance of harlequin ducks in May 1995, distribution patterns remained relatively consistent between both survey years.

Harlequin duck observations were collected over 285 kilometers of freshwater streams and lake shoreline by refuge staff, Kenai Fisheries Resource Office (KRFO) personnel, National Biological Survey (NBS) personnel, Alaska Department of Fish and Game (ADFG) personnel, and volunteers during the period May 23 to August 31. Observations of harlequin duck breeding and foraging activity were collected on watersheds receiving the greatest amount of public use, including the Ayakulik, Karluk, Frazer/Dog Salmon, and Uganik Rivers. Portions of 3 other major drainages (Spiridon, Terror, and Little rivers), plus 3 minor watersheds (Northeast Arm Uganik, Silver Salmon, and Horse Marine Creeks) were also covered in conjunction with refuge waterfowl and fisheries inventory work.

Dedicated survey efforts carried out during 1995 specifically to locate harlequin ducks included: (1) A harlequin duck breeding pair survey conducted (May) along the East Fork of the Ayakulik river (repeat of a May, 1985 survey), (2) Coverage of Karluk lake shoreline 4 times from May to August, (3) A survey of Uganik lake and river in late July, and (4) And the lower portion of Terror river was surveyed for harlequin duck activity during late August. Observation data consisted of date, number of individuals, location (on map or GPS), and behavior. Time of observation, habitat characteristics, sex, and age of individuals were also determined and noted whenever possible.

Survey coverage included approximately 286 kilometers of streams and lake shoreline producing a minimum of 61 freshwater observations containing a total of 191 harlequins. Of the total, 198 kilometers of the coverage was directed at locating harlequin ducks specifically. The dedicated freshwater harlequin surveys contributed 46 of 61 observations tallying 104 harlequin ducks. Observers recorded when duplication of previously observed (same day) and recorded harlequin ducks were probable. No effort was made to distinguish if

observations of harlequins in a drainage on subsequent dates by the same or a different observer were duplicates. The 11 freshwater broods contained a total of 30 young from 3 different watersheds. Location of the broods were as follows: Karluk watershed had 5 broods (17 young), Uganik 3 broods (7 young), and Frammer/Dog Salmon 3 broods (6 young). However, of the 11 broods observed, 3 broods totaling 11 young (2 Karluk, 1 Uganik) were probably duplicate observations resulting in an average brood size of 2.6 young for 8 freshwater broods. All observed harlequin broods were accompanied by females.

The May 1995 survey of the East Fork Ayakulik river counted approximately 40% less harlequins than in 1985. A maximum of 23 harlequin ducks were observed on the Ayakulik in 1995 compared to 50 in 1985. However, the 1995 survey began 14 days later and spent 5 days on the river compared to 14 days in 1985. Both these factors plus an earlier 1995 spring phenology make direct comparison of these survey results inappropriate and somewhat misleading.

A new waterfowl species nesting record for Kodiak Island occurred when a brood of 6 surf scoters was observed on July 31 by WB Zwiefelhofer and BT Johnson at the head of Uyak Bay while conducting coastal harlequin duck surveys.

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

The annual wintering pelagic seabird, sea duck, and marine mammal survey was conducted on February 9 to 16 in Kodiak west side bays and February 22 to February 25 in the east side bays. Table 3 compares the total number of species counted during surveys from 1993 to 1995.

Marine mammal observations made during the surveys since 1993 are presented in Table 4. Sea water temperatures were down from 1993 but were closer to the normal average. Numbers of common murrelets tallied during the 1994 survey were down from 1993 as well as black scoter, oldsquaw, and harlequin ducks.

Table 3. Comparison of total birds observed during winter surveys 1993 to 1995.

Species Common Name	1993 Numbers	1994 Numbers	1995 Numbers
American Widgeon	6	0	0
Bald Eagle	316	216	133
Barrow's Goldeneye	691	623	678
Black-legged Kittiwake	32	5	5
Black Oystercatcher	68	180	37
Black Scoter	2134	1250	1447
Bufflehead Duck	68	4	47
Common Merganser	65	206	410
Common Murre	9998	4515	12097
Emperor Goose	0	41	0
Greater Scaup	6	81	86
Glaucous-winged Gull	1627	1534	1371
Harlequin Duck	1091	842	1095
Horned Grebe	212	366	317
King Eider	6	8	0
Mallard Duck	95	109	54
Marbled Murrelet	761	763	1155
Mew Gull	367	560	935
Oldsquaw	4567	1773	3237
Pigeon Guillemot	221	267	249
Red-breasted Merganser	422	568	502
Red-necked Grebe	180	180	216
Rock Sandpiper	76	130	180
Steller's Eider	228	130	351
Surf Scoter	242	263	327
Cormorant Sp.	1254	1200	1679
Loon Sp.	192	258	375
White-winged Scoter	1103	1168	937

Table 4. Marine Mammals

Species Common Name	1993 Numbers	1994 Numbers	1995 Numbers
Dall Porpoise	20	0	0
Harbor Porpoise	10	8	24
Harbor Seal	4	35	8
Sea Otter	278	248	491
Stellar's Sea Lion	37	15	128
Fin Whale	7	1	7
Killer Whale	0	1	0
Minke Whale	0	0	1

The appearance of a Great Black-backed Gull in the Kodiak Harbor during the first part of February was the first time this species had been found on the Archipelago.

6. Raptors (Zwiefelhofer)

A random plot survey of bald eagle nesting effort and productivity was again conducted during the summer of 1995. The number of plots in the various bald eagle nesting strata during 1995 were as follows: Low strata - 62 plots; Medium strata - 69 plots; High strata - 47 plots; and Very High strata - 16 plots; for a grand total of 194 bald eagle nest survey plots on the Kodiak National Wildlife Refuge. The sub-sample sizes for each of the stratum randomly selected for the 1995 survey were as follows: 8 plots each for the Low, Medium, and High strata, plus 4 plots in the Very High strata for a total sample of 28 plots.

Surveys were flown utilizing the refuge's PA-18 Piper supercub. Parts of the initial nest occupancy surveys were flown by both Fisheries biologist/pilot T. Chatto and Pilot J. Patterson. Observers included WB D. Zwiefelhofer, RB V. Barnes, and Alaska Dept. of Fish and Game biologist R. Smith. The productivity survey flights were again piloted by both T. Chatto and J. Patterson with WB D. Zwiefelhofer and RB V. Barnes acting as observers.

The initial occupancy survey flights to determine nest location and status were completed on May 9, 21, 28, 30, June 2 and 4. The follow-up productivity survey to determine the status of nests determined to be occupied during the May survey was completed on July 27, 28 and August 6.



Eagle production, monitored annually by aerial surveys is increasing over the long term. 5/95, DCZ

The surveys were flown at approximately 200 foot AGL with the passenger as the primary observer and the pilot acting as a secondary observer. Nest sites were determined to be active by the presence of an adult in an incubating stance or eggs in the nest with an adult standing in the nest. Occupied nests had one or more of the following criteria: fresh nesting materials present, two adults actively defending the nest, or 1 or 2 adults standing in the nest but no eggs or young visible. Empty nests contained no evidence of use with no indication of added nest material or fresh construction activity. All observations were placed on U.S. Geological Survey 1:63,360 scale topographic maps.

A total of 165 bald eagle nests including 71 active, 5 occupied and 89 empty bald eagle nests were found (May-June) in the 28 plots surveyed for a nest occupancy rate of 46%. Tree nests comprised 68% (n=52) of the active/occupied nests with ground, shrub, or cliff nests comprising the remaining 32% (n=24) of active/occupied nests from all strata. The results of the nest occupancy survey can be found in Table 5. The expanded estimate for the number of spring occupied bald eagle nests refuge-wide are presented in Table 6.

All 76 active or occupied nests located in May and June were re-checked in July and August to ascertain the number of young produced. A total of 62 young were counted during the survey effort. A total of 41 nests were successful in producing young for an overall nesting success of 54%, .8 young per occupied nest (spring) or 1.5 young per successful nest. These results are down from the historic refuge average of 65% nesting success, 1.01 young per occupied nest (spring), or 1.55 young per successful nest.

Table 7 summarizes the 1995 productivity survey results by strata. Table 8 displays the expanded (90% C.I.) 1995 bald eagle nesting production estimates for the entire Kodiak refuge. Table 3 presents Kodiak NWR bald eagle nesting and production survey results from 1963 to 1995.

Bald eagle nesting effort in the 1995 random sample plots was approximately 12% lower than the 1994 sample with lower numbers of occupied/active nests found in the low and very high strata. The medium and high strata had nearly identical totals of occupied/active nests during 1994 and 1995. The reason for this decrease is not known but is probably related to the amount of precipitation during the April to July nesting season. The 1995 rainfall total during this period was the second highest since 1970, with only 1971 having more total rainfall during these months. Wet weather is likely to result in a greater number of unhatched eggs from chilling during the periods incubating adults were off the nest. Hypothermia of fledglings is also highly probable during wet weather since thermal regulation by eaglets during their first 2 weeks of life is very poor.

The low productivity in the sample plots during 1995 could possibly be a result of the higher precipitation amounts as well. Total production of young in 1995 was down 33% from 1994 with 3 of the 4 survey strata having lower production of young. No young were produced in the low stratum sample plots during 1995. Only the medium survey stratum had higher a production of young in 1995 than during 1994 nesting season but was still within the range expected mean production for the stratum.

While environmental factors may be behind the poor 1995 nesting results seen in the Kodiak refuge's bald eagle population, we also may be reaching saturation of the available bald eagle nesting habitat. The 1996 survey of randomly selected sample plots from the 4 different strata will perhaps indicate whether this is a population trend or the result of environmental factors. The 5 year refuge-wide bald eagle survey effort scheduled for 1997 will likely be the best way to find out if the refuge's bald eagle nesting population is still increasing or has leveled off.

Table 5. Results of Kodiak NWR bald eagle stratified random plot nest survey conducted during May and June 1995.

NEST STRATA	TOTAL NO. OF PLOTS	NO. PLOTS SURVEYED	OCC./ACT. NESTS	EMPTY NESTS	TOTAL NESTS
Low	62	8	6	8	14
Medium	69	8	15	13	28
High	47	8	32	34	66
Very High	16	4	23	34	64
TOTAL	194	28	76	89	165

Table 6. Expanded estimate of occupied/active bald eagle nests on the Kodiak NWR during May and June 1995.

NEST STRATA	MEAN ACTIVE NESTS	TOTAL NUMBER PLOTS	ESTIMATED NUMBER OF NESTS (90% C.I.)
Low	.75	62	47 (\pm 38)
Medium	1.88	69	130 (\pm 33)
High	4.0	47	188 (\pm 23)
Very High	4.75	16	76 (\pm 11)
TOTAL	2.85	194	552 (\pm 147)

Table 7. Results of Kodiak NWR bald eagle stratified random plot productivity survey completed July and August 1995.

Nest Strata	Nests W/0 Yg	Nests W/1 Yg	Nests W/2 Yg	Nests W/3 Yg	Total Young
Low	6	0	0	0	0
Medium	5	5	5	0	15
High	15	9	7	1	26
Very High	9	7	7	0	21
TOTAL	35	21	19	1	62

Table 8. Expanded estimates of number of young bald eagles produced on Kodiak NWR during 1995 nesting season.

NEST STRATA	TOTAL NUMBER OF PLOTS	MEAN NUMBER OF YOUNG PER SAMPLE PLOT	ESTIMATED NO. OF YOUNG IN ALL PLOTS
LOW	62	0	0
MEDIUM	69	1.88	130 (\pm 52)
HIGH	47	3.25	153 (\pm 26)
VERY HIGH	16	5.25	84 (\pm 5)
TOTAL	194	2.6	504 (\pm 194)

Raptor Mortality

The number of dead and injured bald eagles received and reported to the Kodiak refuge decreased in 1995 from 1994. A total of 10 carcasses or parts of carcasses were reported or collected during 1995. Table 9 summarizes the 1995 mortality results. A banded adult bald eagle found dead on Woody Island was turned in on June 11. The eagle had been captured and banded on June 3, 1989 at Monashka Bay as a subadult as part of the Exxon Valdez Oil Spill impact assessment activities.

Table 9. Summary of 1995 Kodiak bald eagle mortalities.

AGES	CAUSE OF DEATH	LOCATIONS FOUND
	7 - Unknown	8 - Local Area
4 Adults	2 - Electrocuted	2 - Village Areas
6 Subadults	1 - Euthanized	

In addition to the mortalities, 3 injured bald eagles were handled during 1995 by the refuge staff. All 3 eagles were transferred to the Arctic Animal Hospital in Anchorage for long term care. Three other injured bald eagles were reported but not found or turned in. Four other bald eagles were reported dead in various locations but either the carcasses were not turned in or recovered.

8. Game Mammals:

a. Brown Bear: (Barnes)

Aerial Stream Surveys:

Surveys (n=4) of the standard stream routes were flown during 22 July to 7 August. Number of bears observed during the flights were as follows: 147 (7/22PM), 155 (7/23AM), 117 (8/6 AM), 82 (8/7 PM). The counts were higher in 1995 (\bar{x} =125) than in 1994 (\bar{x} =100) and more typical of long-term averages. Composition of bears observed on the surveys was as follows: single bear - 46%, maternal female -17%, new (<1yr) cubs - 10%, and old (\geq 1yr) offspring -27%.

Stream surveys were also flown on the Aliulik Peninsula as part of investigations in progress on that area. Seven surveys conducted during 3-29 August produced a mean count of 43 animals, compared to an average of 33 in 1994. A strong pink salmon run in 1995 may account for the apparent increase in bear use. Composition of bears observed during all flights was as follows: single bear -47%, maternal female - 16%, new cubs -8%, and old cubs (29%). Seventy to 82% of 30 radio collared bears on the study area were congregated along the stream drainages during the surveys.

Intensive Aerial Survey:

The objective of this procedure is to improve brown bear population estimates for representative areas and to provide a baseline for measuring population change. The method is an extension of density estimation studies conducted in past years (1987-1993).

In 1995 intensive aerial survey (IAS) was conducted on a 286 km² (111mi²) area on Spiridon Peninsula. Four replicate surveys produced mean observation rates of 1.2 (\pm 0.2 SE) independent bears per hour and 4.0 (\pm 0.8) independent bears per 100 km². Using sightability data for radio collared bears in similar habitats elsewhere on the Refuge, we estimated the population of independent bears on the IAS area at approximately 34 animals. The corresponding density estimate for independent bears was 118 animals per 1000 km². The density in this area is significantly lower than the other 3 areas of the refuge surveyed to date which averaged 223 independent bears per 1000 km².

Mortality:

Documented brown bear mortality within the Refuge boundary (includes Native-conveyed lands) was 107 in 1995 which was 25% less than in 1994. Although sport harvest on the Refuge declined from 1994 to 1995

(115 vs. 102), the largest difference between years was in nonsport mortality. Only 2 nonsport kills were attributed to human cause in 1995 compared to 18 in 1994. The decline in sport kills may be due, in part, to more conservative harvest regulations that have been implemented in a portion of southwest Kodiak Island. Unfortunately, the decline in nonsport mortality is most likely due to year-to-year fluctuation rather than a trend in reduced bear/human conflict.

The 1995 sport harvest on the Refuge included a take of 66 during the spring season and 36 during fall. Males made up 70% of the harvest. Four trophy-class (≥ 28 inch skull measurement) males were taken during the year.

b. Sitka Black-tailed Deer: (Stovall)

General:

Sitka black-tailed deer have been identified as the primary big game species for subsistence use on the Kodiak NWR. During the early 1980's, the black-tailed deer population on Kodiak Island experienced high growth and expansion rates, peaking by mid-decade. From 1985-1992 a series of severe winters produced high winter mortality. This along with increased hunter pressure eventually lead to decreased bag limits for deer harvest on non-refuge areas. Refuge bag limits remained the same for subsistence hunters, which maintained a subsistence preference on federal lands.

The severity of winter weather is considered to be the primary factor influencing the Sitka black-tailed deer population on Kodiak Archipelago. The number of black-tailed deer surviving the winters has a direct correlation to the number of deer available for subsistence and sport harvest.

Black-tailed deer ground counts which began in 1992 are no longer completed, however, deer mortality surveys have continued in the same areas since 1992. Coastal Aerial Deer Surveys and additional Cooperative Coast Guard deer surveys were also completed this year.

Deer mortality surveys were accessed from the Refuge's 48 foot M\V URSA MAJOR II and Beaver float plane.



Typical example of the remains of a winter killed Sitka Black-tailed deer on Kodiak. 5/95, RAS

1995 BLACK-TAILED DEER WINTER MORTALITY SURVEYS:

In 1995, deer mortality surveys were conducted at five areas, for a total of 19.3 KM surveyed. The areas surveyed were: Olga Bay (OGB) - May 15, North and South Chief Cove (CCN, CCS) - April 10,11, East Arm Uganik Bay (EAU) - March 24, and South Uganik Island (UGI) - May 4.

Methods:

Mortality survey routes are walked by two person teams. The first team member navigates the predetermined route between way points using a small hand held GPS unit, searching for deer carcasses, and recording carcass Lat. and Long. locations from the GPS unit. The second team member walks a parallel zigzag pattern, 30-60 meters apart, and on either side of the navigator, (depending on terrain) searching for carcasses and recording all carcass data. The survey transect areas were from coastlines to approximately 200 meters up slopes, and along coastlines ranging from 1.6km - 5.6km in length. Carcass data collected included: GPS carcass coordinates, carcass distance from beach, general carcass appearance, sex and age when possible, and bone marrow coloration.

A determination of a "new" carcass was made after finding remains which had enough bones, fur and skin to identify the carcass as a black-tailed deer. An "old" carcass determination (carcasses which are greater than one year old) was made when carcasses had signs of green moss growth, bleached bones, and/or was covered with fallen leaf litter. Bone marrow coloration is directly related to the determination of death by starvation

Results\Discussion for Winter Mortality Survey 1995:

In general, the winter of 1994/95 started out with high winds, some heavy snowfalls in December 1994 (37.6 inches), and cooler temperatures. Temperatures and snowfall moderated for the rest of the winter with a total snowfall of 87.6 inches. This early severe winter weather may have resulted in a higher, early, winter mortalities for deer populations. After December, milder weather probably contributed to decreased deer winter mortality during the remainder of the winter. Deer mortality for 1994/95 was more than double the previous two years of surveys, but still much lower than 1992.

A total of 48 carcasses was found during all surveys in 1995. The Chief Cove area had the most carcasses with 31. A total of nine carcasses was found at Uganik Island and seven were found in the East Arm Uganik Bay area. Only one starvation carcass was found in the Olga bay area for the second straight year. Very few bones were found associated with the hair piles, and only 25% of the carcass skulls were found during the surveys. Other carcass remains were also highly scattered when found. Carcass age was estimated to be between 3-5 months old for all areas. All winter starvation carcasses bone marrow was dry and stringy when checked. Marrow coloration ranged from red to dark yellow.

The number of carcasses per kilometer for all areas was 2.48 in 1995. Three times higher than last year's 0.81, but still much lower than 1992, which had 5.6 carcasses per kilometer.

CARCASS SEX AND AGE CHARACTERISTICS FOR 1995:

Adult - Male = 1 Total;	2%
Adult - Female = 3 Total;	6%
Adult - Unidentified Sex = 3 Total;	6%
Yearling - Male = 1 Total;	2%
Yearling - Female = 0	
Fawn - Male = 6 Total;	12%
Fawn - Female = 1 Total;	2%
Fawn - Unidentified Sex = 31 Total;	64%
Unidentified Sex and Age = 4 Total;	6%

Recommendations:

Despite the slight increase in winter mortality the black-tailed deer population appears to be in good shape and is probably still increasing in numbers. No decrease in subsistence harvest was recommended.

SUMMARY OF SITKA BLACK-TAILED DEER WINTER MORTALITY SURVEY DATA ON THE KODIAK NWR: 1992 - 1995

Introduction:

Mortality surveys begun in 1992 on Kodiak NWR were based in part on deer mortality survey techniques developed by Alaska Dept. of Fish and Game. Since 1988, deer mortality surveys have been completed in cooperation with ADF&G Biologists, in the Chief Cove area, of the Spiridon Peninsula. Other off-refuge areas have been periodically surveyed for deer mortalities by ADF&G Biologists, both prior to, and in subsequent years.

Kodiak Refuge mortality surveys have been completed continuously since 1992 in five wintering (core) areas. They are: Chief Cove North and South, East Arm Uganik Bay, Uganik Island, and Olga Bay. In 1992 and 1993, three other areas had mortality surveys completed, with cooperation from the local Native Corporation land owners of Akhiok - Kaguyak and Old Harbor. These areas were Kempff Bay, Sitkalidak Strait on the North side, and Tanginak Anchorage on Sitkalidak Island. In 1994 and 1995 these areas did not have any mortality surveys completed, so that efforts could be concentrated on Refuge lands.

Results\Discussion:

From 1992-1995 a total of 289 deer carcasses were found during mortality surveys. An average of 26.8 km were surveyed each year for an average of 2.6 carcasses/KM/year for all areas.

TABLE - 10: CARCASSES/KILOMETER 1992-1995

AREA	1992 CARC#	1992 CARC/ KM	1993 CARC #	1993 CARC /KM	1994 CARC #	1994 CARC /KM	1995 CARC #	1995 CARC /KM	TOT. CARC #
CCS	45	11.3	0	0	3	0.8	15	3.8	63
CCN	64	11.4	1	0.2	9	1.6	16	2.9	90
UGI	13	5.4	0	0	2	0.7	9	1.3	24
EAU	69	7.8	0	0	2	0.7	7	4.4	78
OGB	5	0.5	0	0	1	0.3	1	0.3	7
KEB	11	6.9	3	1.4	NS	0	NS	0	14
NSS	11	1.2	0	0	NS	0	NS	0	11
TGA	2	0.4	NS	0	NS	0	NS	0	2
TOT. /AVE	220	AVE. 5.6	4	AVE. 0.2	17	AVE. 0.8	48	AVE. 2.5	289

For Table - 10:

CARC # - CARCASS NUMBER; CARC/KM - CARCASS/KILOMETER

NS - NOT SURVEYED

- AREAS CODES:

CCS - CHIEF COVE SOUTH; CCN - CHIEF COVE NORTH

UGI - UGANIK ISLAND, NORTH AND SOUTH ENDS

EAU - EAST ARM UGANIK BAY, PACKERS SPIT AND UP SLOPE OF TIDAL FLAT

OGB - OLGA BAY; KEB - KEMPFF BAY

NSS - NORTH SITKALIDAK STRAIT

TGA - TANGINAK ANCHORAGE

Overall deer mortality decreased from a high of 220 carcasses found in 1992, to a low of four carcasses found in 1993. In 1994 and 1995 the deer carcass counts increased, (n=17 in 1994, n=48 in 1995) but only up to 22% of the 1992 high count. (See table 1)

From 1992 through 1995, the Chief Cove areas had the most deer mortalities with a total of 153 carcasses found and a cumulative carcass/KM of 15.9, East Arm Uganik Bay including UP SLOPE from the tidal flats and the Packer Spit areas had a total of 78 carcasses and 8.8 carcass/KM, Uganik Island total of 24 carcasses and 3.9 carcass/KM, and Olga Bay total of 7 carcasses and 1.4 carcass/KM. A total of 27 carcasses with a cumulative carcass/KM of 2.2 was found in the Kempff Bay, North Sitkalidak Strait, and Tanginak Anchorage areas.

Fawns (63%) and yearlings (17%) accounted for most of the deer

mortalities found with a sex ratio of 3:2 males to females. Adults accounted for 20% of the mortalities with adult male and females found in equal numbers. Older adults (> 7 years old) predominate samples of teeth which were brought in for laboratory cementum age analysis.

Kodiak Refuge does not have any remote weather stations in place, therefore, all weather data are summarized from data measured at the Kodiak State Airport by the National Weather Service.

Weather conditions from December 1991 - April 1995 varied only by the amount of snowfall, with the 1994/95 winter having the highest snowfall (87.6 inches), followed by the 1991/92 winter (75.8 inches). Overall average maximum (38°F) and minimum (27.6°F) temperatures varied very little during the four years of surveys, with overall temperatures ranging between .5 and 1 degree, for each year. Temperatures were probably less of a factor in weather related deer mortality.

All mortality surveys were conducted within a kilometer of the shorelines. The average distance from the beach/shoreline that carcasses were found was 96 meters.

The predominate habitat types where deer carcasses were found (58%) occurred in a tall shrub open and tall shrub open/herbaceous moist mix habitats. This habitat type is characterized by an open canopy of willow, birch, alder, and small cottonwood trees. These tall shrub areas were interspersed with areas of herbaceous moist mix vegetation including salmon berry, cow parsnips, elderberry, highbush cranberry and a mix of moist/wet grasses and forbs. Carcasses were commonly found along the edges of these habitats. Broadleaf open cottonwood forest vegetation complex areas accounted for 21% of the carcasses found.

Other primary habitats where carcasses were found included, medium shrub open/herbaceous mix moist, herbaceous mix wet/graminoid moist near ponds, broadleaf open/tall shrubs closed, low shrub/herbaceous mix moist (tundra type), herbaceous mix moist/wet mix moist near beaches, broadleaf open/herbaceous mix moist, and herbaceous mix wet/low shrubs.

The tundra type habitat complexes found in the southern and western portion of Kodiak Island are characterized by low shrubs of willow, birch, and alders mixed with bearberry, moss, ferns, grasses, lichens and other wet/moist vegetation.

Marrow fat content was estimated from marrow coloration and appearance. This provided a basis for verifying winter starvation

mortality. High marrow fat content was white firm or stringy in appearance while low marrow fat content was red gelatinous or stringy. All other grades of marrow color were considered starvation and white marrow color was a non-starvation mortality. Marrow fat content was recorded from deer long leg bones on 244 carcasses.

Carcass locations were mapped using GPS coordinates obtained while in the field, on all carcasses found in 1994 and 1995.

COASTAL AERIAL SURVEYS FOR SITKA BLACK-TAILED DEER ON THE KODIAK NWR:

Introduction:

In 1992, coastal aerial surveys were completed along the entire Kodiak Refuge coastline. The objective of these flights was to determine deer wintering concentrations within coastal habitats. The information gathered was partially used to determine areas to do deer ground counts and mortality surveys. These aerial surveys would assist in determining any changes in wintering habitat use and help map deer concentration areas.

In 1995 coastal aerial surveys were again flown along most of the Refuge coastlines. The objective for this survey was the same as in 1992. Weather and time constraints prevented all Refuge coastline areas from being resurveyed this year.

Methods:

Surveys were flown using the Refuge's Cessna 206 float plane with a crew of two observers and pilot. The primary observer sat on the right side of the aircraft counting all deer observed within 500 meters of the salt water edge, and recording the deer numbers on 1:250000 scale USGS maps. The secondary observer assisted the primary observer with recording deer numbers, as well as recording habitat types of areas with high deer concentrations. The secondary observer also assisted with the counting of large groups. Areas with a large concentration of deer were circled to get a total count of all animals in the group. For all the surveys, pilots attempted to keep the aircraft approximately 50 meters offshore. Surveys were flown at an average of 150 meters AGL (500 feet), and an average airspeed of 85 knots.

For the 1/24,25/95 flights, the pilot was B. Patterson, primary observer G. Johnson, and the secondary observer was R. Stovall. For the 2/23/95 flights the pilot was T. Chatto, primary observer R. Stovall, and secondary observer G. Wilker.

Habitat types where deer were concentrated were recorded during the flights. The percent of snow cover for areas surveyed was characterized as Low:(0-25%), Medium:(26-75%), High:(76-100%), and was recorded during the flight. Weather, time of day, and general survey flight conditions were also recorded during the flight.

Results\Discussion:

The environmental conditions for all flights was fair. The weather was a mixture of sun and clouds, with temperatures in the 20s(F), and light and variable winds. On the 1/25/95 flight, heavy snow flurries near Cape Kuliuk to Miners Point reduced visibility and prevented the observers from getting an accurate count. The survey for that day ended just past Cape Ugat. In late January, snow cover for most of the coastline areas surveyed was in the low to medium category. For the February flight snow cover was in the medium category. Windy weather during January and February prevented coastal aerial surveys along the southwest coast of Kodiak Island.

On January 24, coastal aerial surveys were completed along the east side of Kodiak Island starting at Kiliuda Bay and ending at the village of Akhiok. A total of 2968 deer was counted in 460 kilometers surveyed for a density of 6.5 deer/KM. On January 25 and February 23, Westside coastal aerial surveys were completed, starting at Sevenmile Beach and ended on the south side of Viekoda Bay. Coastal areas of Amook and Uganik Islands were also flown. A total of 2906 deer was counted in these areas, covering 459 kilometers for a density of 6.3 deer/KM. Areas not surveyed in 1995 were Sitkalidak Island and the southwest coast of Kodiak Island from Kempff Bay through Rocky Point just west of Sevenmile Beach, a total of 272 kilometers.(See Table-11)

A total of 5874 deer was counted during these three days of survey, covering 919 kilometers of the Refuge coastline. Total flight time was 10.8 hours for 544 deer/hour. The average density for all coastal areas flown was 6.4 deer/KM.

Deer densities were highest along Sevenmile Beach at 36.2 deer/KM, followed by Uyak Bay through West Point on the Spiridon Peninsula with a density of 8.3 deer/KM, and the Aliulik Peninsula with a density of 6.8 deer/KM. The Uganik Bay, Terror Bay, and Viekoda Bay densities remained the same as 1992 surveys at 2 deer/KM. Uganik Island had a slightly decreased density from 1992; 1992 = 2.2 deer/KM vs. 1995 = 1.8 deer/KM.

On January 25, we deviated from our survey route to investigate deer distribution patterns at higher elevations. A five kilometer strip

transect was flown on the southeast facing ridge above Humpy Creek, north of Chief Cove on the Spiridon Peninsula. All deer were counted UP SLOPE from 300 meters elevation. A total of 50 deer was counted for a density of 10 deer/KM.

TABLE - 11: A Comparison of Coastal Aerial Deer Surveys Completed in 1992 and 1995.

SURVEY LOCATIONS	# OF DEER 1992	# OF DEER 1995	# KM	#DEER /KM 1992	#DEER /KM 1995	SNOW COVER 1995 L, M, H
KILIUDA BAY TO OLD HARBOR	5	180	43	0.1	4.2	L->M
SITKALIDAK IS.	154	NS	139	1.1	ND	M->H
OLD HARBOR TO CAPE TRINITY	84	1112	182	0.5	6.1	M
CAPE TRINITY TO MOSER POINT	154	938	120	1.3	7.8	L->M
MOSER POINT TO OLGA BAY/AKHIOK	346	738	115	3	6.4	M
AKHIOK TO CAPE ALITAK	108	NS	19	5.7	ND	M
CAPE ALITAK TO MIDDLE CAPE	112	NS	67	1.7	ND	M
HALIBUT BAY TO SEVENMILE BEACH	193	NS	47	3.3	ND	M
SEVENMILE BEACH TO HARVESTER IS.	114	398	11	10.4	36.2	L->M
UYAK BAY TO CARLSEN POINT	261	914	106	2.5	8.6	L
AMOOK ISLAND	NS	217	35	ND	6.2	L->M
ZACHAR BAY TO WEST POINT	438	1002	115	3.8	8.7	L->M
UGANIK BAY TO VIEKODA BAY	277	279	139	2.0	2.0	M
UGANIK ISLAND	115	96	53	2.2	1.8	L->M
TOTALS	2361	5874	1191	AVE. = 2.9	AVE. = 8.8	L->M

NS = NOT SURVEYED; ND = NO DATA DUE TO NO SURVEY FLOWN

The low shrub/herbaceous mix moist habitat complex accounted for 32% (n=1804) of the wintering habitat types where deer were counted during the survey. These habitat types included the Aliulik Peninsula, Olga

Bay and Sevenmile Beach areas. Broadleaf open and closed canopy forest interspersed with tall shrub closed/herbaceous mix moist habitats accounted for 21% (n=1238) of the winter habitats where deer were observed. This habitat is primarily found on the Westside of Kodiak Island and includes Uyak, Uganik, and Terror Bays, and along the Spiridon Peninsula. Deer were counted on the beach and tidal areas less frequently than expected or when compared to 1992.

The comparison between 1992 and 1995 deer coastal aerial surveys reveal deer counts which more than doubled between these years (with fewer kilometers flown). The reasons for this apparent deer population increase cannot be explained with this data.

Recommendations

With some refinement, this aerial survey/technique could also be used to monitor changes in deer population trends for specific coastal areas of Kodiak Refuge. This coastal aerial survey would also continue to be used to identify high deer density areas for further study or census.

It is recommended that this survey be completed every two to three years, to continue monitoring deer wintering habitat concentrations and to begin using as a deer population indexing tool. The objectives would change to reflect these different uses of this data.

FLIGHT SUMMARY AND EVALUATION OF AERIAL SURVEYS OF SITKA BLACK-TAILED DEER USING FORWARD LOOKING THERMAL INFRARED (FLIR) TECHNOLOGY:

Introduction:

On January 17,19, nine Aerial Survey Strip Transects were flown on Uganik Island and the Spiridon Peninsula. On February 14 and March 6, three areas on the Spiridon Peninsula were flown using an Intensive Search Method. These two methods of Deer Surveys were flown in cooperation with the U.S. Coast Guard to investigate the usefulness of FLIR technology in the census of black-tailed deer on Kodiak Refuge's brush\tall shrub habitats. These flights are the follow through of previous Coast Guard cooperative flights completed in 1992 and 1994, using the FLIR technology.

The purpose of this continuing study is to investigate FLIR technology for census of Sitka black-tailed deer on Kodiak Island.

Specific objectives are:

1. Evaluate the precision of FLIR in aerially surveying of Sitka black-tailed deer.
2. Assess the resolution and coverage of FLIR equipment for wildlife monitoring.
3. Develop specific procedures for operational monitoring of black-tailed deer using FLIR technology.

Locations and Methods:

Four deer survey strip transects were flown on Uganik Island's interior valleys and Five were flown along the coastal areas of Spiridon Peninsula, located on the Westside of Kodiak Island. Three intensive search areas were flown on the Spiridon Peninsula including the Long Beach\Chief Cove area (Area A), Campbell Lagoon\Little River area (Area C), and the Miners Point\Broken Point area (Area B).

All deer survey/FLIR training flights were accomplished by a Coast Guard H-60 Helicopter, which was equipped with FLIR 2000 Camera and controls, video display, VCR, and a GPS navigation system capable of flying on and between transects and flight lines.

Coast Guard flight crews consisted of a Pilot, Copilot, FLIR Operator and a Crewman. Refuge Biologist Stovall flew on all flights to monitor FLIR operation and count deer on the video display. All strip transects, intensive search areas, and any repetitions were recorded on videotape for review and count after the flight. Each flight began with a flight briefing to familiarize and review with flight crews the survey technique, locations, and safety.

Strip Transect Method - Each of the strip transects was flown with 3-4 repetitions for each transect, (3 Reps for Spiridon and 4 Reps for Uganik) on each day and at two flights each day (to cover both areas during the day). Strip transect widths (camera coverage) averaged 720 feet with an average AGL of 575 feet. The average airspeed of the surveys was 65 knots and the time of surveys averaged 2.7 hours. Various camera positions were investigated to determine the FLIR camera's ability to detect deer in the various habitats, terrains, and slopes. Different above ground levels were flown to investigate image sizes at different altitudes. The FLIR camera had different polarity settings which were investigated to get the best deer image. The settings either allowed the "hot" spot image to be white with black background or black with white background.

Intensive Search Method: Two coverage methods were investigated.

They include using a set distance for each flight line, varied by terrain, and without any overlap; or to not have a set distance with flight lines which varied with terrain and above ground level flight, while assuring for some overlap. Only two repetitions were flown for each area. Parallel flight lines were flown for each area in alternating directions. The average AGL was 800 feet and the average camera coverage width was 1250 feet. The average air speed was 70 knots and flight time averaged 2.25 hours. The camera was set down 30-90 degrees and forward, with polarity set for a white deer image.

All flights were recorded on video tape which was tied into the helicopter's flight GPS which gave constant time GPS coordinates on the tape. The information assisted the video tape interpretation sessions after the flights. The video tape sessions after each flight aided in the accurate identification of deer images and their count.

Summary of Survey Results:

General - Weather for strip transect flights was partly sunny with temperatures in the mid twenties to upper thirties, and light (< 15 mph) easterly winds. Snow cover in both areas was low below 700 feet elevation but increased further up slopes. The February 14 intensive search flight had bright sunshine and gusty NW winds up to 30 mph. The March 6 intensive search flights were also very sunny, with temperatures for these flights ranging from mid-thirties to mid-forties. Snow cover was low below 1300 feet for all areas. For the March 6 flight surface heating became a factor in the PM flight for deer detection on the FLIR video display.

Strip Transects-

A total of 9 transects was flown, (four on Uganik Island and five on Spiridon Peninsula) for a total of 24.25 linear miles, an average of 2.7 mi\transect and a total of 6.3 sq. mi. A total of 238 deer was counted from the video tape, with transect four on Uganik Island (n=27), and transect 6 on Spiridon Peninsula (n=20) having the highest average number of deer. On average, Spiridon Peninsula had 25.45 deer\sq.mi. and Uganik Island had 19.9 deer\sq mi. More deer were counted during AM flights compared to PM flights

Other wildlife thermal images captured on FLIR videotape included a brown bear spotted on the Spiridon Peninsula, also foxes, eagles, and unidentified waterfowl and seabirds were observed on tape.

Intensive Search-

Three areas with a total of 24.5 sq. mi were flown on the Spiridon Peninsula. A total high count of 96 deer was counted from the video tape for a total of 5 deer/sq mi. Two repetitions were flown for each area. Area C had the highest count of deer (n=39) averaging 38 in the two repetitions. Area A had the low count for an area of 24. The average number of deer counted for Areas B and C was 35, with a high count of 72 for the two areas.

Mean deer/sq.mi:

AREA A = Mean # of deer 19.5/3 sq.mi. = 6.5

AREA B = Mean # of deer 31.5/10.5 sq.mi. = 3

AREA C = Mean # of deer 38/11 sq.mi. = 3.5

Conclusions and Recommendations:

Conclusions-

More deer were counted and observed during the January Strip Transect method flights, than the March Intensive Search flights for these areas. This decrease in deer density could be attributed to the time of the year, lack of snow cover, moderating temperatures, increased rainfall or a combination of these or other factors.

Deer thermal images were clearly discernable for all morning flights, for both methods, (Strip Transect, and Intensive Search) despite the lack of snow cover and sunny weather conditions. The implication is that FLIR deer survey flights are best done during the morning hours for optimum FLIR camera operation, and countable conditions.

When completing FLIR deer surveys during sunny days, constant adjustment of the gain control and the level/fine gain control knobs is needed to compensate for changes in surface heating and sun position. For the afternoon flight of March 6, these control knobs could not fully compensate for this surface heating effect.

Deer behavior, distribution, and movements are influenced by various factors including weather, terrain, and habitat type. On sunny days deer were concentrated on the upper portions of south facing slopes in scattered groups of <15, as well as groups of 15-40. Deer behaviors observed included walking, feeding, and bedded down. Deer response to helicopter overflights was mixed, with most deer continuing their activity as before the overflight while others ran only short distances. The short running response was most evident when the overflights were below 500 feet AGL.

Transects flown with the FLIR camera set at 90 degrees down worked best in terrains with varied elevations and in habitats with defoliated deciduous trees. At this setting the strip width is equal to the altitude and leads to a narrow strip coverage at the lower altitudes. Transects flown with the FLIR camera set at 10-30 degrees down, have a strip width twice the altitude, and is a wider strip coverage. This setting is better for terrain with less variation and more open habitat. This setting may also preclude missing deer which have spooked ahead of the helicopter.

A 1000' altitude is the upper limit for distinguishing deer images on FLIR tape. Between 500-700' is optimum for identifying deer on FLIR video display and tape.

Recommendations-

A determination of detectability will be necessary to measure the precision of deer counts using the FLIR technology. This may include putting people on the ground to do deer counts in a specific predetermined area, and by doing deer counts before, during, and after an FLIR aerial surveys.

Depending on the varied weather conditions and habitat types found on Kodiak Island, FLIR deer surveys using the Intensive Search area method could be used throughout the winter months to spot check deer concentration areas, and help determine localized population changes. This would include replicate surveys. When Intensive Search surveys are added to other deer surveys, predictions on fall hunt populations could be made for those localized areas.

FLIR deer surveys using the Strip Transect method, could be useful as a form of deer population trend data, and be part of a population index done in conjunction with other surveys, i.e., deer mortality surveys and deer pellet group count transects.

c. Subsistence: (Stovall)

The Kodiak\Aleutians Subsistence Regional Advisory Council (Council) convened two public meetings as required by their charter in 1995. Meetings were held in the Village of Old Harbor on Kodiak Island in February, and in King Cove on the southern portion of the Alaska Peninsula in October. These meetings represent the true spirit of the Federal Regional Advisory Council System, where Council Members are directly interacting with the subsistence users. The public comment

period from both meetings was very informative, educational, and useful in understanding the Federal Subsistence Program, for the public as well as the Council Members.

In the February Council meeting, proposals for designated hunter, and restricting King crab pot size were discussed, amended, and approved by the Council. Other business conducted at the February meeting included recruitment to fill seats of Council Members whose terms expire this year, a request for removal of two members for non-attendance and a request for adding two new members from the Aleutians and Pribilof Islands. Public comment at the February meeting included a call for a subsistence bear proposal, closer sea urchin population monitoring and study, that the Regional Councils should have authority over marine resources as this resource is most important for Island communities, the negative effect of draggers to fisheries resource in and around the villages, and the need for voluntary harvest surveys for all subsistence use species. RM Bellinger attended this meeting and presented the Kodiak Refuge Report; WB Stovall also attended and provided information on the status of deer population surveys and studies.

The Federal Subsistence Board met during the week of April 10-14 to address subpart D (seasons and bags) proposals for the 1995-1996 regulatory year. They approved both proposals from the Kodiak\Aleutian Regional Advisory Council which included the designated hunter for deer and the King crab pot size restriction. The designated hunter decision was based in part on the recommendations from the Designated Hunter Task Force report. This Federal Subsistence Board decision allows a qualified rural resident (recipient) of GMU 8 to designate another qualified rural resident of GMU 8 to take deer on his\her behalf. They must obtain a Federal Subsistence Designated hunter permit, which is valid only on Federal lands, and abide by its conditions including, harvest limits while in the field and reporting permit results.

The first year of the Designated Hunter permit process went well. WB Stovall was able to visit all villages and distribute designated hunter permits to newly established contacts within each village Tribal Council or City Council. Village participation included the issuance of permits as follows: Old Harbor - 11 Permits, Akhiok - one permit, Larsen Bay - one permit, and Ouzinkie - one permit. A total of 59 permits was issued for the season with 45 permits issued from Refuge Headquarters.

The Federal Subsistence Board also approved a proposal to limit the size of subsistence crab pots to no more than 75 cubic feet in capacity. Crab pots of a larger (commercial) size catch excessive

numbers of small crabs which must be handled and released. This contributes to increased mortality of undersized and female crabs. The limiting of pot size should limit the number of undersized and female crabs subjected to the stress of handling.

In September WB Stovall was temporally promoted to Subsistence Regional Coordinator for the Kodiak\Aleutians Regional Advisory Council, to fill in for Moses Dirk who had taken a temporary leave of absence. His primary duty was to organize and run the October meeting of the Council in King Cove. This temporary promotion lasted until through November.

At the King Cove Meeting the two newest members were in attendance; they are Al Cratty Jr. from Old Harbor, and Ivan Lukin from Port Lions. Although the meeting was sparsely attended, the public comments were very helpful for all involved. The reopening of the caribou season in GMU 9D was the primary concern from two individuals. Other agenda items addressed at this meeting were to prioritize backlogged customary and traditional (C&T) use determinations for species, and initiate proposals for these C&T species to the Federal Subsistence Board, elect officers - Mark Olsen reelected as Council Chair, Al Cratty Jr. elected Vice Chair, Gilda Shellikoff re-elected Secretary, and Council member training.

During the meeting, the Council decided to act on C&T determinations for brown bear and elk in GMU 8. C&T determination proposals for brown bear and elk, along with seasons and bags proposals for bear and elk were submitted to the Federal Subsistence Board for the Council from their Regional Coordinator and Regional team. The Regional Coordinator also assisted local residents in preparing a proposal to reopen the caribou season for King Cove residents.

In 1994, the District Court for Alaska ruled that all navigable waters should be included in the definition of public lands for subsistence purposes. This decision was stayed pending an appeal to the Ninth Circuit Court of Appeals. In April of 1995, the Ninth Circuit Court of Appeals ruled that the Federal jurisdiction was limited to Federally reserved waters. This ruling has been appealed to the U.S. Supreme Court. In the meantime, the Solicitor's Office has been drafting regulations that would identify those waters in which the Federal Government retains an interest. The final ruling could have major ramifications for fisheries management in waters surrounding the State of Alaska.

10. Other Resident Wildlife

a. Mountain Goats: (Stovall)

ADF&G Big Game Biologists completed mountain goat summer composition surveys this year on only two of five Refuge hunt units during 1995, with the following results:

UNIT # 473 - # Adults = 143; # Kids = 25; Kids:100 Adults = 18:100;
Total = 168

UNIT # 474 - # Adults = 54; # Kids = 11; Kids:100 Adults = 20:100;
Total = 65

For unit # 473, these numbers represent an increase for adults but a decrease in kid numbers over 1994. A total of 497 goats was aeri-ally counted during August, with a composition of 432 adults (87%) and 65 kids (13%), for a kids:100 adults equal to 15:100.

ADF&G preliminary harvest for mountain goats on Kodiak Island is as follows:

HUNT UNIT	TOTAL HARVEST
471 (OFF REFUGE)	10
472 (OFF REFUGE)	3
473 (PART REFUGE)	12
474 (PART REFUGE)	4
475 (REFUGE)	8
476 (REFUGE)	4
477 (REFUGE)	3
478 (REFUGE)	5
TOTAL	49 (30 MALES, 19 FEMALES)

b. Roosevelt Elk: (Stovall)

Alaska Department of Fish and Game big game biologist, Roger Smith reported that the Waterfowl Lake elk herd inhabiting refuge lands on Afognak Island is estimated to number 140-160. The number of elk

observed during the composition surveys was 819 on Afognak Island, and 192 elk on Raspberry Island. The estimated elk population for the Kodiak Archipelago is over 1200 animals.

Total harvest for Afognak and Raspberry Islands was 96 animals. The reported harvest on the Refuge portion of Afognak Island was 7 (4 males, 3 females).

c. Feral\Reindeer Caribou:

Reindeer, originally introduced to Kodiak Island as a domestic herd, are now managed as caribou by the state of Alaska and year around hunting is allowed, with an average reported harvest of 10 animals. Local residents still utilize the species for subsistence when the herd moves near the coast. Historically, as many as 1500 animals have been reported in the Ayakulik River drainage. As these animals are introduced and predation of calves by brown bear can cause PR problems, the state and refuge hope these animals will eventually be extenpatated.

In recent times the herd has remained rather stable at approximately 300-400 animals. If any significant increase in the population is detected, monitoring of populations numbers would be reinstituted. Surveys were not completed in 1995.

11. Fisheries Resources: (Chatto)

There are 114 streams and numerous lakes located within the refuge boundary and on native conveyed (22g) lands adjacent to the refuge. These systems support one or more species of Pacific salmon, rainbow trout, Dolly Varden and arctic char whose populations contribute to a multi-million dollar commercial fishery, a subsistence fishery and sport fisheries within the Kodiak Archipelago. In addition, these species of fish, particularly salmon, provide a critical seasonal food source for dense populations of brown bear and bald eagles on the refuge and native lands.

The goal of the refuge for fishery resources is to conserve fish populations and habitat in their natural diversity for the benefit of both human and wildlife use. To accomplish this goal the refuge manages human use and works cooperatively with the Sport, Commercial and Habitat Divisions of ADF&G in conducting fishery studies and annual salmon escapement surveys in refuge streams. In addition, the refuge monitors the annual harvest of refuge based salmon returns through harvest statistics compiled by ADF&G.

In 1995 the estimated total indexed sockeye, pink, chum, coho, chinook and steelhead returns to the refuge (including conveyed 22g lands) were at or above refuge management objectives for these species (figure 1). The estimated total indexed return for pink salmon was approximately 490 percent of the maximum goal. Pink salmon returns to Kodiak in 1995 were of record proportions for odd year returns.

a. Salmon Escapement

In 1995 a total of five ADF&G fish counting weirs and aerial indexes on an additional 57 streams were used to monitor salmon escapement on the refuge. The escapement index for sockeye, pink, chum, coho and chinook is near or above the 1981-85 baseline goal outlined in the refuge Fishery Management Plan (figure 2). Indexed escapement of chinook was 43 percent above the desired goal of 21,600 fish. Escapement of steelhead was slightly above the midpoint of the minimum and desired range (12,500 fish)(figure 1). The steelhead estimate is predicated on an overwinter survival of approximately 67 percent from studies conducted by the refuge and ADF&G. The information in figures one and two does not represent any variation for individual streams on the refuge, but rather a composite overview of escapement.

b. The Commercial Fishery

The commercial fishery in Kodiak is regulated by the ADF&G. In 1995 the total harvest in the Kodiak area was approximately 44.2 million salmon worth an ex-vessel value to fisherman of approximately 46.7 million dollars. These figures are for natural stocks only and do not include the harvest of pink salmon from the ADF&G Kitoi Bay hatchery on Afognak Island. The refuge based salmon contribution (including conveyed 22g lands) is estimated at 32.2 million fish (Figure 3) worth an ex-vessel value of approximately 36.6 million dollars. These fish are harvested in bays and near shore areas surrounding the refuge by commercial fishermen using purse seine, set net and beach seine gear.

Overall in 1995 refuge based salmon stocks contributed approximately 73 percent of the total ADF&G Kodiak Management Area harvest and 78 percent of the ex-vessel value paid to commercial fishermen. Coincidentally the sockeye harvest made up approximately 54 percent of the dollar value of refuge stocks harvested in 1995.

c. The Sport Fishery

A majority of the sportfishing effort on the refuge takes place from late May through early November. Anglers target chinook and sockeye salmon in June and early July. Fishing for pink and chum salmon

occurs from mid-July through late August. Starting in mid-to-late August anglers target coho salmon and steelhead. Fishing for coho usually ends by the first week of October while anglers continue to target steelhead into late November. Anglers catch both Dolly Varden, Arctic char, and resident rainbow trout throughout the season.

There are approximately eight streams on the refuge currently used by sport fishermen. Sport fishing catch on the refuge is regulated through the Alaska Sport Fishery Regulations as promulgated by the Alaska Board of Fisheries. In addition, the refuge manages commercial sport fishing guides through the special use permit process.

With the exception of the Ayakulik River where a creel census is conducted every three years, the sport fishing catch and effort for unguided anglers on the refuge is unknown. Sport fish effort is monitored through analysis of the use reports for those sport fish guides under permit on the refuge.

In 1995 a total of 21 sportfishing guides operated under permit on the refuge and their clients expended 1120 angler days fishing (figure 4). A majority of the total angler use in 1995 occurred in the Dog Salmon (10%), Uganik (17%) and the Ayakulik (57%) River drainages. Fishing occurred between June and November with peak effort (327 angler days) in June through mid-July for king salmon on the Ayakulik River drainage.

Total Guided angler catch for 1995 is depicted in figure five. The highest number of fish caught by guided anglers were char (4771) followed by coho (3383), and chinook (2431) salmon. Sockeye, pink and chum salmon catch was 1433, 1146, and 42 fish respectively. A total of 518 rainbow trout and 362 steelhead were also caught in 1995 by guided anglers. Total fish kept were 693 coho, 328 sockeye, 240 chinook, 83 pinks, 19 chums and 282 Dolly Varden. The retention of steelhead and rainbow in 1995 was negligible.

Uganik River drainage yielded the highest percent (49) of the total char caught on the refuge by guided anglers. The Ayakulik River drainage accounted for >99 percent of the chinook caught and 72 percent of the coho salmon. Approximately 15 and 81 percent of the total steelhead caught were from the Dog Salmon and the Ayakulik River drainages respectively. A majority (95%) of the rainbow were caught by guided anglers on the Dog Salmon River.

H. Public Use:

1. General:

Clerk Barnes continues to collect use reports which are given to Pilot Patterson for input into the Paradox data base. Refuge Ranger Taylor manipulates data outputs, along with ADF&G hunt reports to develop Narrative and RMIS reports. The system is not smooth, but is based on real (albeit incomplete) data.

During 1995, two significant SOP's were written to help guide management of Special Use Permits. One standardizes procedure in the event permittees fail to submit reports or pay fees on time. The other defines overnight use privilege and standardizes procedure for non-use cancellation and the filling of permit vacancies.

2. Outdoor Classroom - Students:

Old Harbor Principle Merv Finstad and KANA Education Department employee Lisa Heitman approached Ranger Brooks about a collaboration on a summer science camp. Planning and a search for funding began in 1995 for this 1996 project.

The FUN program operated during summer 1995 with one T.N.T. intern, Jenny Millard, 20 hours per week as primary labor, a small stipend from a non-renewable ACF grant, instruction from Ranger Brooks, and approximately 50 hours volunteer time (partially from other T.N.T. members). Attendance ranged from 17 to 40 people, with a 1:1 adult/child ratio; most children were aged 3-6. Topics were chosen to be locally pertinent, seasonally appropriate, and based on common interests of our visitors. Families became more familiar with local natural history and resource issues, had opportunities for positive interaction, and became familiar with Kodiak National Wildlife Refuge. During summer of '95, nearly 400 people in a town of 5,600 (7%) participated. Many had never been to the Refuge's Visitor Center before. The Cooperating Association's book sales increased by about 13% during the same period possibly indicating increased use of other educational resources.



Local family participation in Saturday morning FUN program at refuge headquarters. 7/95, DLB

3. Outdoor Classroom - Teachers:

The first planned teacher workshop of the 95/96 school year was set for October 17. Due to the arrival of Perri Anderson (Diana's daughter) on October 16, Ranger Brooks canceled this Project WILD. The second workshop took place in four sessions March 7 & 8, 96 and was on the topic Seabirds, utilizing the new curricula recently completed by Alaska Maritime NWR. All Kodiak village teachers (A total of 29), except for the Ouzinkie village principal, attended one of the Seabird Workshops. The third planned teacher workshop was to be a Kodiak Bear session, but was canceled as Ranger Brooks had set a minimum of 8 participants and only five responded. Therefore, it was postponed until October of 1996. An article Ranger Brooks wrote reviewing a Bear Curricula called "Investigating Science Through Bears" was published in Legacy and Clearing.



Refuge Ranger Brooks conducted several popular EE programs this year. 5/95, PBT

4. Interpretive Foot Trails:

After the usual spring Pooschki chop and "sprucing up", the trail continued to see about the same level of activity as in the past. Continued efforts to block people from cutting in to the trail from one state park camping site seem to finally have achieved the desired effect.

6. Interpretive Exhibits/Demonstrations:

We repeated our successful Crab Festival Booth staffed by all Public Use staff over the Memorial Day Weekend. Weather was exceptionally poor and level of public contact reflected this Kodiak fact of life.

We again put up our booth at Coast Guard Day, staffed by seasonal Ranger Tuck.

Since there are no sportfishing opportunities suitable for children during National Fishing Week, Ranger Brooks and seasonal Ranger Tuck, assisted by volunteers Elinor Ramos and Nancy Maia, presented educational activities and puppet shows on salmon life cycle (written

by volunteer Nancy Maia) at the annual August Children's Pink Salmon Derby.

Ranger Brooks was a judge at 2 Science Fairs.

In response to a Central Office and Region 7 push for National Wildlife Refuge Week participation, Kodiak NWR partnered up with the Visual Arts League and the Dancing Salmon Gallery for a wildlife art exhibit in the Visitor Center. Following an opening night reception attended by 40 people, the exhibit was held over for the entire week. The event was well received, with many expressing interest in an annual format.

7. Other Interpretive Programs:

Staff members presented various talks and programs throughout the year to service and educational groups. Particularly active was Biologist Barnes who continues to provide solid information on refuge bear work.

8. Hunting:

In 1995 guides reported 50 primary use visits (clients + guides), averaging 4.95 days of hunting, for 248 use days of deer hunting. Guides reported an additional 199 use days of deer hunting as a secondary activity (mostly by guided bear hunters). Air transporters reported 417 visits, averaging 6.62 days of hunting, for 2,810 primary use days. Air transporters reported an additional 149 use days of deer hunting as a secondary activity. Total reported use for deer hunting was 467 visits and 3,406 use days.

Once again, Refuge law enforcement field checks indicate that at least 50% of surveyed deer hunters reached Refuge lands by means other than Refuge-permitted guides and air transporters. This would include private aircraft, private boats, marine transporters, mail planes and use originating from villages. Doubling the reported use results in a deer hunting estimate of 934 total visits and 6,812 total use days.

Since all bear hunting on Refuge lands is by permit only, bear hunting effort is mainly controlled by bag and season limits imposed by the State of Alaska. The State's Permit Report Summary data will be far more accurate than the information pieced together from guide and air transporter records. As a result, determination of use by bear hunters is based on available State information.

In 1992 RR Taylor and Bio Barnes determined that 183 resident bear permits and 113 non-resident bear permits (total 296) were available for hunt areas which incorporate the Refuge (201, 60% of 204, 205-225,

40% of 226, 231, 60% of 234, 235-255, 40% of 256).

Permit Report Summary Data indicate:

	<u>Areas 231-259</u>	<u>Areas 201-229</u>	<u>Combined Approx.</u>
Permits Actually Issued	69%	71%	70%
Hunters Afield	98%	98%	98%
Mean Days Hunted	8.6	7.8	8.2

Assumption: 70% of 296 available were issued = 207 permits issued

Assumption: 98% of 207 actually hunted = 203 visits

Assumption: 203 hunters averaged 8.2 days = 1,665 use days

Goat hunting use is considered in the same manner as bear hunting use. According to the 1995 harvest Summary (resident and non-resident), 73 goat permits were actually issued for hunt areas which incorporate the Refuge (33% of 473, 474, 475, 50% of 476, 477).

Permit Report Summary Data indicate:

	<u>Areas 471-477</u>
Hunters Afield	57%
Mean Days Hunted	4.1

Assumption: 57% of 73 actually hunted = 42 visits

Assumption: 42 hunters averaged 4.1 days = 172 use days

Hunting of other species (fox, squirrel, hare, ptarmigan, reindeer, waterfowl) does occur, but normally incidental to some other primary activity, and not in significant measure. No waterfowl or small game hunting use was reported by Guides or air taxis. Total unreported use is estimated at 30 visits and 350 use days.

9. Fishing:

Guides reported 1,080 visits, averaging 1.63 days, and resulting in 1,760 use days. Air transporters reported 378 visits, averaging 4.48 days, and 1,611 primary use days. Air transporters reported an additional 99 use days of sport fishing as a secondary activity. Total reported sportfishing use on Refuge lands was 1,458 visits and 3,470 use days.

For reasons identified in the 1993 Narrative, unreported use is estimated at 25% of reported use; unreported use would then be estimated at 365 visits and 868 use days. The resulting total estimate for all 1995 Refuge sportfishing effort is 1,823 visits and 4,338 use days.



Recreational fishing of refuge waters. 7/95, PBT

Normally, guided sportfishing use is based on figures prepared by Pilot/Biologist Chatto. Due to unavailability of that information at the time of this writing, 1995 guided sportfish use data were taken from guide reports summarized by Pilot Patterson, and may be slightly different from data which will be generated by Chatto.

For additional information regarding guided sportfishing, see Section xx (Tony's citation here).

10. Trapping:

The State trapping season does not follow the calendar year. The seasons for Kodiak species (primarily red fox, pine marten, river otter, beaver) begin in early November and end by late April. As a result, it is not practical to record calendar year use. Trapping reported in this narrative is that which occurred from fall of 1994 through spring of

1995. During that period, 13 permits to trap on Refuge lands were issued. No report of use is available at this time, but 130 visits and 780 use days is a reasonable estimate.

11. Wildlife Observation:

Wildlife observation use reported by guides was 738 visits and 1,144 use days. Air transporters reported 86 visits, averaging 3.69 days, for 317 primary use days. Air transporters reported an additional 186 use days of wildlife viewing as a secondary activity. Total reported use was 824 visits and 1,647 use days. It is estimated that unreported use (mainly marine transporters, private boats and aircraft, mail planes, Native villages) was an additional 25% (206 visits, 412 use days) of this reported use, resulting in a wildlife observation total of 1,030 visits and 2,059 use days.

12. Other Wildlife-Oriented Recreation:

The intention in 1995 was to build a relocated replacement for the Red Lake cabin which has been completely removed. The money was diverted, however, to outhouse repair and meat cache construction at other existing cabins. Bears had gotten into the old Uganik Lake cache, and no caches had ever been constructed at the new Little River or Blue Fox Bay cabins.

The caches which are now installed have been slightly modified from the original design. Trim has been removed. Corners are covered with angle iron. Venting has been moved to the roof. These three measures reduce the number of purchase points for interested bears. Additionally, a temporary plywood floor underlaid with plastic can now be replaced whenever it becomes saturated with blood and other fluids from hanging deer.

All 8 cabins are adequate for the immediate future. After a Red Lake relocation is accomplished, the next move will probably be a reconstruction of the North Frazer cabin. Because the outhouse at the cabin's current location cannot be moved 150' from the lake (too marshy), the cabin site will need to be moved either to the NE corner of the lake or to one of the points along the NW shore south of Bumble Creek. Much to the disappointment of the local bat population, the next structure will not have interior walls or insulation.

The Chief Cove cabin will go out of service in 1996, at least temporarily, due to a land ownership problem. Because it was suspected such a thing might occur, we have not recently expended any energy or money on this cabin. Assuming the Government sorts this mess out, the

Chief Cove cabin may need a bit of repair soon. At the very least, it has some loose boards and needs paint. If it does not rejoin the fleet, the Refuge will be one cabin short, even after a Red Lake relocation.

One other sore point which should be resolved is the location of the Uganik Lake outhouse. This outhouse should have been moved 150' from the lake when it was rebuilt a couple years back. It was not and we are in violation of our own policy on this one.

LOTTERY USE

LOTTERY	APPLCTNS ACCEPTED	APPLCTNS SELECTED	% SUCCESS		% PAID
October 1994	0	0	0		0
January 1995	12	10	83%	100%	
April 1995	73	51	70%	61%	
July 1995	<u>65</u>	<u>46</u>	<u>71%</u>	<u>59%</u>	
TOTAL	150	107	71%	64%	

SYSTEM USE

MONTH	PARTIES	PEOPLE	NIGHTS	USE DAYS	ACTHRSFEES	
January	0	0	0	0	0	0
February	0	0	0	0	0	0
March	0	0	0	0	0	0
April	8	19	81	201	4368	1620
May	4	15	28	118	2472	560
June	6	16	28	96	1920	560
July	21	60	83	298	5712	1660
August	23	66	96	345	6696	1920
September	20	68	91	385	7608	1820
October	27	89	170	649	13440	3400
November	21	66	118	450	9216	2360
December	<u>8</u>	<u>23</u>	<u>36</u>	<u>133</u>	<u>2640</u>	<u>720</u>
TOTALS	138	422	731	2675	54072	14620

The weather during summer of 1995 was not good! Flying was difficult and air taxi business way off. Concurrently, cabin use was down too. Although lottery participation was just about the same as in 1994, first-come, first-served telephone use fell off dramatically. That is consistent with the impact of poor weather. At any rate, the 1994 total of 160 parties during 843 nights fell to 138 parties during 731 nights in 1995. Revenue fell from \$17,060 to \$14,620.

The numbers in the next table do not exactly match those from the previous table. It is due to mid-season changes in data tracking. Rather than spend endless hours trying to reconcile it, call it a glitch and let it go at that.

INDIVIDUAL CABIN USE

CABIN	PARTIES	PEOPLE	NIGHTS	USE DAYS	ACTHRS	FEEES
Viekoda Bay	13	36	72	243	4968	1440
Uganik Island	16	43	92	282	5736	1840
Chief Cove	11	31	64	213	4368	1280
Uganik Lake	24	76	132	496	10080	2640
Little River	13	41	68	269	5472	1360
Blue Fox Bay	16	51	76	288	5688	1520
North Frammer	18	47	93	286	5736	1860
South Frammer	28	93	141	572	11496	2820
TOTALS	139	418	738	2649	53544	14760

13. Camping:

A significant portion of the use occurring on the Refuge is overnight use. Most camping, however, is incidental to the primary objectives of sightseeing/photography, fishing and hunting.

16. Other Non-Wildlife-Oriented Recreation:

It remains difficult to assess the actual level of snowmobile use on Refuge lands. In all probability, the use from Kodiak is sporadic and does not constitute a significant number of use days. The numbers supplied are a "best guess" only. Use emanating from villages is unknown.

17. Law Enforcement:

One citation for hunting without a license (Taylor) was dismissed after the defendant mailed to the court a copy of a license dated prior to the offense.

As a result of a nation-wide investigation of illegal waterfowl activity, three Kodiak area commercial guides were cited by Service special agents for misdemeanor and felony violations. In addition to citations, boats used during violation were seized from all three individuals. Two of the three plea bargained down to misdemeanors; charges against the third were dropped. All seized boats were returned.

A set net permittee was issued a warning letter for establishing an unauthorized tent camp at Broken Point on the Spiridon Peninsula. He had contended that his equipment was below mean high tide. Armed with

data supplied by NOAA, RM Bellinger met with the permittee at the Broken Point site at a date and time during which mean high tide would occur. At the high tide crest it was obvious that the permittees camp site was in fact above mean high tide. The permittee agreed to remove the camp and find some other way to work the site.

Operator of Larsen Bay Lodge called to request that two of his assistant guides be removed from his permit. He indicated that the two assistants had failed to follow instructions and had committed resource violations. Investigation by RO Taylor failed to produce sufficient evidence for prosecution, especially after all witnesses declined to sign written statements.

The following cases were successfully completed by Refuge Officers in 1995:

<u>OFFICER</u>	<u>CITATION</u>	<u>HEADING</u>
Taylor	36.32(c)(1)(I)	State law - Harvest ticket
Taylor	36.32(c)(1)(I)	State law - Harvest ticket
Munoz	27.97	Commercial activity without SUP
Munoz	27.97	Commercial activity without SUP
Munoz	36.32(c)(2)(I)	State law - Overbag, king salmon
Munoz	36.32(c)(2)(I)	State law - Overbag, king salmon

Fish and Wildlife Protection, Alaska State Troopers pursued 9 resource cases which may have involved Refuge lands. These included:

- * 7 citations for failure to validate harvest tickets
- * 1 citation for commercial guiding without a license
- * 1 wanton waste (dismissed)

18. Cooperating Associations:

Kodiak Branch FY 95 profits were \$14,683, up from \$11,874 in the previous year. Since visitation was quite comparable, it is believed that the change was caused both by continuing experiments with new stock, as well as a recent ability to accept credit cards. The move to credit cards had been reluctantly embraced by both Refuge staff (who occasionally relieve in VC, but not enough to become really fluent with new equipment), and volunteers who work weekends. We all found routine sales much simpler than we had anticipated. It seemed to positively affect both the size, dollar amount, and frequency of sales.

Other changes included a new set of sales shelves, which were free due to volunteer labor and the piecing together of shelves and slatboard offered as "leftovers" at last year's annual meeting (thank you to Adak ANHA and Anchorage APLIC branches, ANHA board member Gail Smith for free "shipping", and volunteer Charlie Elliot for construction assistance). We also changed to EXCEL for a number of reasons; we were having problems printing from our old Lotus program after a change of printer and computer, we had a new staff member, Maggie Tuck, who didn't know Lotus, and we had an opportunity to buy EXCEL quite reasonably. This change put us on the same system as the Central Office.

We funded many continuing projects: Bear Country (which had its first content change since its inception), brochures and a large amount of library and environmental education/ interpretive materials. These materials were mainly used in a new program we called "F.U.N. - *Families Understanding Nature*". Although the project had been planned prior to last year's ANHA annual meeting, we got many helpful ideas from Lenore Heppler's discussion of her experiences with "*Discovery Days*", another ANHA interpretive project. FUN was conceived as a way to encourage families to interact and learn about the local environment. The program featured a variety of activities, special exhibits, crafts, and interpretive talks. Up to 40 people attended the weekly programs, grossly exceeding our VC carrying capacity. ANHA funds paid for everything, from reference books, construction paper and pipe cleaners for crafts, to photos, color copies and foam core for exhibits. Getting such small and atypical items is difficult and often delayed by government funding and procurement sources. For purposes such as the FUN program, the flexibility to obtain such materials with minimum hassle is one of the finest parts of ANHA affiliation. A last word about FUN - without hard evidence, it appears that this program drew new ANHA customers. As a result, additional profit from sales may well have offset the cost of the program.

The hiking guide Kodiak Branch had planned to publish this year was postponed mainly due to problems obtaining permission to access trails on private land. Ranger Brooks and Volunteers Tschersich and Himelbloom intend to continue pursuing the project.

19. Concessions --- Special Use Permits (annual and multi-year)

Big Game Guiding	25
Big Game Guide Base Camp	5 Farnen, Rohrer (2) Munsey, Francisco
Sportfish Guiding	20
Sportfish Guide Base Camp	1 Kirstein
Trapping	13
Air Taxi	11
Wildlife Viewing/Photography/Site Seeing	13
Commercial Fishing	
Set Net	26
Beach Seine	1 Dumm
Other	
Cabin	1 Rohrer
Subsistence Base Camp	1 Anderson
Homesite	1 Schuckman
Radio Repeater Site	1 Cook Inlet
Helicopter	2
O&M Terror Lake Hydro Project	1 KEA
Site Visit, Terror River	1 KEA
Commercial Photography	1 Black
Storage Cache Site	0
Military Ground Training	0
Surface Geology	0
Scientific Collecting	0
Archeology Study	0
Fisheries Enhancement (salmon)	1 Hidden Lake
Fisheries Restoration	0
TOTAL PERMITS IN CALENDAR YEAR 1995	125

SUMMARY OF PUBLIC USE FOR THE CALENDAR YEAR 1995

\$\$\$\$\$ # OF: VISITS USE DYS ACT HRS

1. GENERAL

Visitor Center		8913	8913	4457
Volunteers	35			4000
News Releases	28			
Radio/TV Spots	12			

2. OUTDOOR CLASSROOM - STUDENTS

--- STAFF CONDUCTED

Offsite EE Students	85	1970	1970	1478
Onsite EE Students	19	412	412	412

--- NONSTAFF CONDUCTED

Offsite EE Students	0	0	0	0
Onsite Students	14	400	400	400

3. OUTDOOR CLASSROOM - TEACHERS

Teachers, OC	19	24	24	24
Teacher Wrkshp	1	29	29	232
EE Material Loans	55			

4. INTERPRETIVE FOOT TRAILS

Buskin View Trail		600	600	600
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5. INTERPRETIVE TOUR ROUTES

No activity in this section

6. INTERPRETIVE EXHIBITS/DEMONSTRATIONS

Exhibits/Demonstrations	4	2750	2750	225
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7. OTHER INTERPRETIVE PROGRAMS

Staff Talks (on-site)	16	170	170	170
Staff Talks (off-site)	12	145	145	145

\$\$\$\$\$ # OF: VISITS USE DYS ACT HRS

8. HUNTING

Deer		934	6812
Bear		203	1665
Goat		42	172
Other		30	350

9. FISHING

Sportfishing		1823	4338
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10. TRAPPING

Trapping	13	780	780
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11. WILDLIFE OBSERVATION

N/A	1030	2059
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12. OTHER WILDLIFE ORIENTED RECREATION

Cabin Use	\$14620.00	138	422	2675	54072
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13. Camping

No activity in this section

14. Picnicking

No activity in this section

15. Off-Road Vehicling

No activity in this section

16. OTHER NON-WILDLIFE ORIENTED RECREATION

Snowmobiling	24	48
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17. LAW ENFORCEMENT

Citations	6
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18. COOPERATING ASSOCIATIONS

ANHA	\$14683.00
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TOTALS		<u>VISITS</u>	<u>USE DAYS</u>
		20,701	34,312

I. EQUIPMENT AND FACILITIES

4. Equipment Utilization and Replacement

Marine Vessel (Zwiefelhofer)

Safe marine vessel operations in Kodiak waters, dictate dry docking for hull cleaning and inspection, replacement of sacrificial anodes, and the renewal of the anti-fouling bottom coating.

The dry docking of the refuge marine research/patrol vessel, M/V Ursa Major II at the local boat yard occurred once during 1995. The annual haulout to carry out routine hull maintenance occurred on September 22 to 28.

A new aluminum flying bridge was added to the vessel during January 6 to 15 prior to the annual marine bird and mammal winter surveys. The modification greatly improves the vessel's utility as a survey platform.

Computers (Zwiefelhofer)

The Kodiak refuge acquired 3 additional personal desktop computers with the refuge manager, assistant refuge manager, and administrative officer all upgrading their computing capacities with new and larger machines. Two color notebook computers were also acquired one to be used by the biological staff and one to be used by the river management planning team.