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US FISH & WILDLIFE SERVICE--ALASKA



BECHAROF NATIONAL WILDLIFE REFUGE
King Salmon, Alaska

ANNUAL NARRATIVE REPORT

CALENDAR YEAR 1981

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BECHAROF NATIONAL WILDLIFE REFUGE

King Salmon, Alaska

ANNUAL NARRATIVE REPORT

Calendar Year 1981

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



3.

2.

4.

1.

Personnel

| | | | | |
|----|-------------------|-------------------|----------------|--------------|
| 1. | John Taylor | Refuge Manager | GS-12/03 (PFT) | EOD 08/26/79 |
| 2. | Chris Dlugokenski | Fishery Biologist | GS-11/03 (PFT) | EOD 05/07/81 |
| 3. | Kelly Cook | YACC Enrollee | | EOD 10/11/81 |
| 4. | Kevin Cook | YACC Enrollee | | EOD 10/11/81 |

Review and Approvals

John Taylor
Submitted By

02/22/82
Date

ZC 3/2/82
Jan C. Riffe
DER 3/3/82

Regional Office Review

5/11/82
Date

Central Office Review Date



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A. HIGHLIGHTS

The refuge staff doubled in size on May 7, 1981, when Refuge Fishery Biologist Dlugokenski reported for duty. Manager Taylor has been the only refuge staff since September, 1979, when the refuge was first staffed. As a result of this major expansion, the refuge office was moved from Manager Taylor's residence to the National Marine Fisheries Service (NMFS) warehouse on June 1. Because the warehouse did not receive electricity until September, kerosene lamps and sweaters became standard equipment for three months.



Burning the coal oil.

81-01 CD

The Egegik District 1981 salmon harvest was the largest on record for sockeye and coho salmon, and the second largest for chinook and chum. Harvest was respectively 4,481,000; 31,000; 6,000 and 164,000 fish. The refuge comprises virtually the entire spawning and rearing habitats of the district.

Accompanied by Regional Director Schreiner, Alaska Governor Jay Hammond and many others, Interior Secretary Watt visited the Bristol Bay area on August 12. Although Secretary Watt came within 50 yards of the headquarters, he did not have time to drop in. He did get an aerial tour of the refuge by Regional Director Schreiner.

B. CLIMATIC CONDITIONS

Nearness to the ocean tends to provide Becharof with a climate that is predominantly maritime in character. The area occasionally experiences definite continental influences that cause temperature extremes which tend to exaggerate the climatic conditions generally prevailing. July, the warmest month, has an average of only 5 days with temperatures reaching 70° or above. The coldest temperature on record for King Salmon is -43° in January 1919. Cloud cover averages about eight-tenths the year around, while snow-fall averages about 45 inches. Winds of 50 m.p.h. or more have occurred in all months with an extreme of 94 m.p.h. in February 1952.

1981 was the fourth consecutive year in which the weather could best be described as mild. The best winter conditions occurred in late February and early March when we received 27" of snow, 11" of which fell on March 6. August was the warmest and wettest month. The mercury reached 80° F. and nearly 4" of rain fell. Clouds of mosquitos and white sox attested to these benevolent conditions. The coldest temperature -29° was recorded in December with wind chill factors reaching -70°F. The mean wind speed was 11 m.p.h. Besides providing insect relief, we are harnessing this energy source with a 4 KW wind generator.

TABLE I
1981 Climatic Conditions

| | Temp. (°F) | | | Total Precipitation (Inches) | | Windspeed (M.P.H.) | | Cloud Cover ¹ (Days) | | |
|--------------|------------|-----|------|---------------------------------|----------|-----------------------|------|------------------------------------|-----|------|
| | High | Low | Avg. | Rainfall | Snowfall | Avg. | Peak | Clear | PC | Cldy |
| | January | 44 | -16 | 30 | 1.8 | 10.5 | 10.5 | 51 | 2 | 3 |
| February | 51 | -12 | 22 | 2.3 | 11.3 | 11.8 | 55 | 4 | 7 | 17 |
| March | 50 | 15 | 34 | 1.8 | 15.8 | 13.1 | 55 | 3 | 9 | 19 |
| April | 55 | 13 | 36 | .5 | .6 | 10.9 | 38 | 6 | 12 | 12 |
| May | 73 | 25 | 47 | .7 | 0 | 11.6 | 46 | 4 | 10 | 17 |
| June | 74 | 30 | 50 | 2.3 | 0 | 10.3 | 35 | 1 | 13 | 16 |
| July | 75 | 33 | 55 | 2.2 | 0 | 11.9 | 38 | 0 | 4 | 27 |
| August | 80 | 28 | 55 | 3.9 | 0 | 11.5 | 43 | 1 | 5 | 25 |
| September | 62 | 26 | 45 | 1.8 | .1 | 10.0 | 35 | 4 | 3 | 23 |
| October | 54 | 5 | 33 | 1.6 | .3 | 11.0 | 48 | 5 | 8 | 18 |
| November | 44 | -8 | 23 | 1.3 | 4.9 | 9.7 | 49 | 2 | 10 | 18 |
| December | 40 | -29 | 13 | .6 | 5.9 | 8.6 | 40 | 5 | 10 | 16 |
| Average | | | 37 | 1.7 | | 10.9 | | 10% | 26% | 64% |
| Yearly Total | | | | 20.8 | 49.4 | | | 37 | 94 | 234 |

¹ Clear= 0-.3 cloud cover, Partly Cloudy= .4-.7, and Cloudy= .8-1.0

C. LAND ACQUISITION

1. Fee Title

On December 1, 1978, President Carter established the Becharof National Wildlife Monument by Proclamation 4613. The monument was set aside entirely from public domain. At that time there were 1,327 acres of privately claimed lands, 112,312 acres of state selected lands and 115,419 acres of native selected lands within the 1.2 million acre monument.

Since the monument's redesignation as a refuge, some of the State's selections have been relinquished. Approximately 23,000 acres of native selected lands have been conveyed and 89,312 acres are presently involved in a land exchange with the Koniag Native Corporation. Final disposition of privately claimed lands has not yet been accomplished.

D. PLANNING

1. Master Plan

Alaskan refuges do not utilize Master Planning as exists in the Lower 48, but comply with Public Law 96-487, the Alaska National Interests Lands Conservation Act (ANILCA). Section 304 of ANILCA authorizes the Secretary to enter into cooperative management agreements and to prepare comprehensive conservation plans. Bristol Bay was an area chosen for a cooperative management plan. The refuge's comprehensive conservation plan is scheduled for completion in December, 1983. Regional office planning staff met with us for three days in August to discuss planning issues. Manager Taylor participated in scoping meetings in Naknek, Igiugig, and Newhalen where the purposes for establishing the Refuge were explained and local input on issues was received for comprehensive planning. An outline addressing fishery activities was developed for the comprehensive conservation plan in December.

At the above mentioned scoping meetings, Manager Taylor and State Department of Natural Resources personnel also received input from local citizens which will be incorporated into the Bristol Bay Cooperative Management Plan. Local concerns were expressed regarding impacts on fish and wildlife resources regarding: (1) oil and gas development; (2) population growth, and (3) State land disposals.

3. Public Participation

The previously mentioned scoping meetings were conducted.

E. ADMINISTRATION

1. Personnel

Refuge Fishery Biologist Dlugokenski reported for duty on May 7. Staffing the two pervious years had been solely the Refuge Manager. An attempt was made to fill a clerical position in September. However, while waiting only on test scores from OPM, a hiring freeze was imposed which halted the filling of the position at the last moment.

2. Youth Programs

Two YACC enrollees began work at the refuge headquarters on October 11. They both did a fine job during the following weeks, upgrading the facilities closer to Service standards. Work they accomplished during the two and one-half months included:

- a. Constructed an arctic entrance for the refuge office.
- b. Cleaned and organized the refuge auto shop and two warehouses.
- c. Repaired the refuge forklift which had not run in four years.
- d. Constructed a 12' x 16' storage shed on Mobile Home #3.
- e. Other miscellaneous maintenance and clean up.

Another YACC enrollee was recruited on October 27 as clerical help. She found a better paying job one month later and could not be replaced due to a recruiting freeze. It was sure nice to have someone else doing the typing while it lasted.



YACC Enrollee Kelvin Cook puts the final touches on a refuge summer cabin which YACC reinsulated and sheetrocked. 81-02 JT

5. Funding

Fiscal year 1981 was the first year that Becharof Refuge had a budget of its own. Due to litigation between the State of Alaska and the U.S. Government, no budget could be assigned to the refuge during the previous two years. As a result, the refuge survived off Refuge Operations funds from the Regional Office. Funding for FY-81 was as follows:

| <u>Program</u> | <u>Funds</u> |
|----------------------|------------------|
| 1220 | \$ 82,000 |
| 1300 | 64,000 |
| 1300 (Cyclic Maint.) | 60,000 |
| Total | <u>\$206,000</u> |

FY-81 Supplemental

| | |
|-------|------------------|
| 1220 | \$ 20,000 |
| 1300 | 15,000 |
| Total | <u>\$ 35,000</u> |

6. Safety

Calendar year 1981 was another safe year - no accidents. Safety Officer Ginney Hyatt conducted a safety inspection on November 20. Action to correct safety hazards she noted have been either carried out or initiated.

7. Technical Assistance

Manager Taylor assisted the local Girl Scout group in developing a wildlife merit badge program.

8. Other Items

The refuge hosted the joint Wildlife/Fisheries Annual Work Plan Workshop from July 28 through 30. An estimated thirty refuge managers and regional office personnel attended and were housed in refuge facilities, being what they are.

F. HABITAT MANAGEMENT1. General

Becharof is part of the tundra biome. Spongy ground, dwarfed plants and the lack of trees are characteristic. The tundra of the refuge differs from other Arctic tundra by a general lack of permafrost. Species distribution and frequencies are determined by the lack of permafrost, rigorous climatic

conditions, topographic relief, soil types and drainage patterns. This results in a mosaic of vegetation within the refuge.

The species present in these communities are within five basic categories: wet tundra, moist tundra, alpine tundra, shrub/tree and open lowland spruce.

Approximately one-fourth of the refuge is covered by Becharof Lake. The lake is the second largest in the State and covers over 290,000 acres. Several hundred smaller lakes and the King Salmon and Kejulik Rivers are also found within the refuge.

On the southeast portion of the refuge, peaks of the Aleutian Mountain Range rise from a volcanic base.



Bear Creek, a very important brown bear and salmon stream, originates in the Aleutian Range. Note the old oil exploration road and air strip which were constructed in the 1950's.

81-03 JT



Puale Bay is located on the rocky Pacific Ocean coast of the refuge. It is a very important wildlife area with seabird colonies of 11 and 80 thousand birds and a sea lion haul out of 5-10 thousand animals. 81-04 CD

Habitat management of this diverse and pristine area has been solely that of protection by regulation of development and use, and the preclusion of new entry. No land or water manipulation is planned for the refuge. We basically need to find out what resources we have on the refuge, what the resources are doing, and then determine what we need to do to keep the resources in a healthy, natural condition. The Refuge Comprehensive Conservation Plan will, hopefully, give us direction on how to accomplish this.

9. Fire Management

On June 25, the National Park Service reported to the refuge that they had observed a fire in the abandoned village of Kanatak, located on the Pacific coast of the refuge. No planes were locally available for the refuge to check out the report that evening. The Bureau of Land Management was called the following day. They had received word of the fire on the 24th and were monitoring it. They told us they had no plans to suppress the fire since it was well contained by the coast and the mountains. Nevertheless, they later dropped 14 smoke jumpers into the area and suppressed the fire on the 29th.

The fire covered approximately 8-10 acres and burned all but two of the village's buildings. The village was proposed as a possible historic site. A bonfire, set by commercial fishermen, escaped their control and was the cause of the fire. The names of the individuals at fault were never determined.

12. Wilderness and Special Areas

Approximately one-third, 400,000 acres, of the refuge was established by the Alaska Lands Act as the Becharof National Wilderness Area. The act requires the refuge to permit the following activities within the wilderness area:

- a. The use of snowmachines, motorboats, airplanes, and non-motorized surface transportation methods for traditional activities and for travel to and from villages and homesites;
- b. the use and replacement of previous existing public use cabins, and
- c. the construction and maintenance of a limited number of new public use cabins and shelters if such cabins are necessary for the protection of the public health and safety.

The abandoned Kanatak village and the Kanatak Portage Trail are being studied as possible historical sites on the refuge. The portage trail connected the east and west coasts of the Alaska Peninsula. Oral history tells of year around use of the

portage in the early 1900's. In 1922 a post office was established in the village of Kanatak and mail would be transported over the portage to villages in the Bristol Bay area.

In 1945, the village of Kanatak was abruptly and mysteriously abandoned. Native villagers moved to Perryville and Kodiak, leaving all personal belongings behind. A story tells that the natives suddenly abandoned the village because of a shaman, or medicine man. To escape his influence, the people had to disown all personal belongings and move. The previously mentioned fire destroyed all but two of the village's buildings.

G. WILDLIFE

1. Wildlife Diversity

At least six species of marine mammals, 29 species of land mammals, over 137 species of birds, five species of salmon and several species of freshwater fish have been recorded on Becharof NWR.

2. Endangered and/or Threatened Species

An endangered peregrine falcon (F.P. anatum) may occasionally migrate across the refuge.

3. Waterfowl

Moderate numbers of waterfowl migrate along and probably winter in the coastal bays of the refuge. A few thousand emperor geese utilize these bays during the spring. The major use of the refuge by waterfowl occurs during the fall migration. Peak waterfowl numbers in September exceeded 46,000 and consisted mainly of pintails, scaup, widgeon, mallard and teal.

Nesting species include mallard, pintail, green-winged teal, gadwall, greater scaup, harlequin, common eider, white-winged scoter, black scoter, common and red-breasted merganser. An estimated eight hundred whistling swans also utilize the lake's Island Arm and the northern portion of the refuge for nesting. Total waterfowl production for 1981 was approximately 6,600 birds.



Whistling swan checking out a beaver swimming by. 81-05 JT



Old squaw hitching a ride on a chunk of ice during breadup.
81-06 JT

4. Marsh and Water Birds

Common and red-throated loons nest in several lakes within the northern refuge, but Arctic loons are less abundant. Yellow-billed loons occur in small numbers in the winter. Red-necked grebes are common migrants and breeders, while horned grebes are migrant and winter residents. Sandhill cranes are frequently observed in the spring, summer and fall, and are believed to nest in the wetland areas in low numbers.

5. Shorebirds, Gulls, Terns, and Allied Species

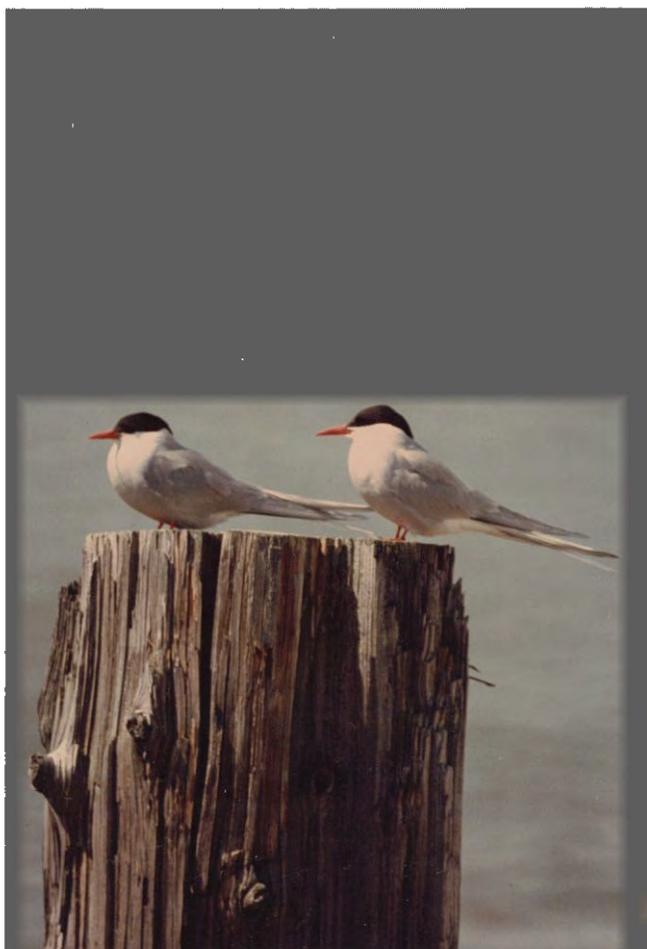
Thirteen seabird colonies are found on the refuge. The two largest colonies (11,000 and 80,000 birds) found on the mainland of the Alaska Peninsula are found on the refuge in Puale Bay. Nesting seabirds on the refuge include pelagic and red-faced cormorants, glaucous-winged and bonaparte's gulls, horned and tufted puffins, harlequin ducks, pigeon guillemots, black-legged kittiwakes, and common and thick-billed murre.

Becharof also plays host to some of the millions of shorebirds which move along the Alaska Peninsula during migration in the spring and fall. Peak populations of most of the twenty species present occur in August and September. Dunlins, western sandpipers and bar-tailed godwits are the three major species. Rock sandpipers inhabit the area all year. Species which are believed to nest on the refuge, but winter in other regions of the world include: least sandpiper, black turnstone, common snipe, greater yellowlegs, dunlins, short-billed dowitcher, northern phalarope and wandering tattler.



This Bonaparte's gull chose to nest in the headquarters compound.

81-07 CD



Arctic terns. 81-01 JT

6. Raptors

Bald eagles are common along the Shelikof Strait coast and major Bristol Bay drainages, particularly during salmon runs. Eagles nest on the rugged Pacific coast, and less frequently, on streams, rivers and Becharof Lake. After the salmon runs are completed, bald eagles concentrate in lagoons and bays inhabited by waterfowl. Rabbits and big game carrion provide winter prey.



Bald eagle on Big Creek.

81-09 JT

The Peale's peregrine falcon (*F.P. pealei*) nests on Shelikof Strait cliffs and offshore islands. During August a male bird was thrice observed hunting near Katrine Creek. The nearby cliffs on Cleo Creek appear likely as an aerie.

We encountered a gyrfalcon on two occasions on Big Creek. The bird made several passes at wigeon flushed by the refuge jet boat. Other raptors found at various times on the refuge include the goshawk, sharp-shinned hawk, marsh hawk, rough legged hawk, osprey, hawk owl, boreal owl, short-eared owl, and snowy owl.

An Egegik resident caught a bald eagle in one of his traps and wanted to know what to do with it. Arrangements were made with a local air taxi to pick the eagle up on a mail run to Egegik and bring it to King Salmon the following day.

Although the bird was weak and dehydrated upon arrival, it was able to stand on its unbroken leg and eat by the 15th. On the 16th it was flown into Anchorage where its broken leg was amputated. It later was donated to the St. Louis Zoo.

7. Other Migratory Birds

During the summer, the most abundant passerine on the refuge tundra is the lapland longspur. Water pipits are also abundant, but nest chiefly at higher elevations. During winter, flocks of both resident and migratory gray-crowned rosy finches and snow buntings feed along the beaches. In severe winters the comparatively rare McKay's bunting also appears.

Common throughout the year is the northern raven, gray jay, black billed magpie, black capped chickadee, dipper, and common redpoll. The abundant insects and scrub vegetation of the tundra provides suitable nesting habitat for warblers (yellow and Wilson's the most common), sparrows (savannah and white crowned), thrushes, swallows, and others. Refuge and local ADF&G staff conducted a Christmas bird count on December 19. A total of twelve species were observed.

8. Game Mammals

Game mammals found on the refuge include moose, barrenland caribou, brown bear, wolves, wolverine, red fox, tundra and snowshoe hare, and lynx. Moose, caribou and brown bear are generally the only animals actually pursued on the refuge, while other mammals are usually harvested incidentally during moose, caribou or bear hunts and while trapping furbearers.

Brown Bear. Present information indicates that about 300 brown bear utilize the refuge. The remoteness of the refuge, coupled with the proximity of key bear denning areas to salmon streams and other food sources, has helped to maintain this large population. The other food sources of the bears include sedge meadows, berry patches, beach carcasses and ground squirrels. Bears which den on the refuge may travel extensively north and south or as far as the Bristol Bay coast in the summer.



A sow and cubs keeping a close eye on a large boar fishing upstream. 81-10 JT

Key areas of bear denning and habitat within the refuge include: the upper Kejulik River watershed, Mount Peulik, the Island Arm area of Becharof Lake, and Puale and Alinchak Bays. The Island Arm is of particular importance due to its unique island denning by the bears.

Although bears were regularly seen in all spring, summer and fall months of 1980, a comprehensive bear survey of the refuge was flown throughout the month of August and early September. A total of twenty-three creeks, rivers and portions of Becharof Lake were surveyed. Seventeen of the streams were flown three or more times. A total of 542 bears were classified (Table II). The composition of the population surveyed was 89 cubs (16%), 48 yearlings (9%), 76 sows with young (14%), and 329 single bears (61%). The average litter size for cubs was 1.9 and 1.7 for yearlings. The largest number of bears seen on a single day's survey was 93 seen on August 14.

TABLE II

1981 COMPOSITION AND NUMBERS OF BROWN BEARSJuly 21 - September 25

| <u>STREAM</u> | <u>SOWS WITH CUBS</u> | | | <u>SOWS WITH YEARLINGS</u> | | | <u>SINGLES</u> | | | <u>TOTAL</u> |
|-----------------|-----------------------|------------|------------|----------------------------|------------|------------|----------------|----------|----------|--------------|
| | <u>♀1C</u> | <u>♀2C</u> | <u>♀3C</u> | <u>♀1Y</u> | <u>♀2Y</u> | <u>♀3Y</u> | <u>S</u> | <u>M</u> | <u>L</u> | |
| Albert Creek | | | | | | | 3 | 1 | | 4 |
| "B" Creek | | 2 | 3 | | 2 | | 3 | 6 | 2 | 35 |
| Bear Creek | 2 | 8 | | 3 | | | 31 | 25 | 6 | 96 |
| Becharof Creek | 2 | | | 1 | 5 | | 26 | 22 | 7 | 76 |
| Becharof Lake | | 3 | | 1 | | | 8 | 5 | 2 | 26 |
| Big Creek | | 1 | | | | | | 1 | | 4 |
| Burls Creek | | 1 | | 1 | | | 5 | 4 | 3 | 17 |
| Cleo Creek | 4 | 3 | | | 1 | | 11 | 17 | 12 | 60 |
| Costello Creek | | | | | | | | | | 0 |
| Featherly Creek | 1 | 1 | | 1 | 4 | | 6 | 8 | 3 | 36 |
| Frank's Creek | | 2 | 2 | | 2 | | 14 | 4 | | 38 |
| Gertrude Creek | | | | | | | | 3 | 1 | 4 |

| STREAM | SOWS WITH CUBS | | | SOWS WITH YEARLINGS | | | SINGLES | | | TOTAL |
|----------------|----------------|-----|-----|---------------------|-----|-----|---------|---|---|-------|
| | ♀1C | ♀2C | ♀3C | ♀1Y | ♀2Y | ♀3Y | S | M | L | |
| Katrine Creek | | 1 | | | | | 3 | 4 | | 10 |
| Kejulik River | 1 | 3 | | 1 | 2 | | 6 | 7 | 1 | 33 |
| Margaret Creek | | | | | | | 7 | 3 | | 10 |
| Marie Creek | | | | | | | 2 | 3 | | 5 |
| Otter Creek | | | | | | | 2 | 4 | 1 | 7 |
| Rusty Creek | | 1 | | | | | 2 | 2 | | 7 |
| Ruth River | | 2 | | | 1 | | 17 | 4 | 1 | 31 |
| Salmon Creek | | 4 | | | 1 | | 9 | 6 | | 30 |
| Stream 86.0 | | | | 1 | | | | 2 | | 4 |
| Stream 86.1 | | | | 1 | 1 | | | 3 | 1 | 9 |
| Stream 95.0 | | | | | | | | | | 0 |

| <u>Daily Totals:</u> | <u>Date</u> | <u>Total</u> | <u>Date</u> | <u>Total</u> |
|----------------------|-------------|---------------------|-------------|--------------|
| | 07/21 | 20 | 08/31 | 28 |
| | 07/27 | 57 | 09/10 | 18 |
| | 08/03 | 61 | 09/17 | 19 |
| | 08/04 | 8 (Partial Survey) | 09/25 | 17 |
| | 08/05 | 73 | | 542 |
| | 08/07 | 71 | | |
| | 08/09 | 19 (Partial Survey) | | |
| | 08/12 | 58 | | |
| | 08/14 | 93 | | |



Located on an island in the Island Arm of Becharof Lake, the ADF&G cabin is utilized during August for refuge bear/salmon field work. Plane and pilot Vern Berns were on loan from Kenai NWR. 81-11 JT

Compared to the 1980 survey, cubs declined from 26% to 16%, yearlings from 16% to 9% and sows with young from 22.5% to 14% of the surveyed population. Factors which may have contributed to this decline are:

- a. Increased use of slower flying aircraft in the 1981 survey which may have resulted in a higher percentage of single bears being observed.
- b. Increase of subadult bears recruited into the population due to increased hunting pressure on large male bears and resulting in reduced predation on young bears by large males.



This yearling had a fatal meeting with a boar on Cleo Creek. He was still warm when found and was not examined very long by Manager Taylor and Biologist Dlugokenski before they wisely retreated to return their EKG to normal. Reduced predation such as this may have accounted for the lower cub/yearling composition of the 1981 survey. 81-12 JT

The year's two final brown bear surveys were flown on September 17 and 25. The purpose of these late surveys was to confirm a suspected late use of the Ruth River by bear. Although packed with red salmon, the river receives virtually no bear use during the summer. In September, 1980, moose hunters reported that the river was crawling with bears. The refuge was under a travel freeze at the time and could not check out the reports. The 17th and 25th surveys did confirm significant late use of the area with 6 and 10 bears respectively being recorded fishing on the river. Except for the Kejulik River, virtually no bears were seen on other streams surveyed.

In September, one 3 year old bear was shot within 50 yards of the refuge headquarters when it attempted to board a boat in which two men were sleeping. Their attempts to scare the bear away supposedly were not enough, and they had to finally shoot the animal.

by ADF&G at 16,700 animals in the spring of 1981. It is this subherd that utilizes and winters on the refuge. The fall migration arrived on the refuge in August and was about 4,000 animals by the end of the month. A peak was reached in October when approximately 7,000 caribou were on the refuge. The migration south to their calving grounds occurs in February.

Although the caribou herd is apparently remaining stable, or increasing in size, it is probably near the carrying capacity of its range and the reproductive rate of part of the herd may be decreasing. To confirm this, the ADF&G radio collared ten cow caribou on the refuge in 1980. This has assisted in locating the herd during calving, thus allowing better monitoring of the reproductive rate.

ADF&G also conducts annual sex and age composition counts of caribou wintering on and near the refuge. Results of the 1981 counts were 19.5% bulls, 57.8% cows and 22.7% calves. Sample size was 2662 animals.



Some of the first caribou migrants to arrive on the refuge during August.

81-13 JT

Moose. The refuge supports small numbers of moose in the Pacific drainages and more substantial numbers in the lake drainages. The willow shrub communities preferred by the moose occur in the foothills of the Kejulik River watershed, the foothills adjacent to Becharof Lake, the Becharof Lake Island Arm and in the short Pacific coastal valleys.

Moose were present on the Alaska Peninsula early in the 1900's, but their numbers were low and their distribution localized. Population levels increased and the first moose season opened in 1952. Aerial surveys conducted by the Alaska Department of Fish and Game (ADF&G) documented a further increase in moose numbers with a peak in the late 1960's - early 1970's.

Since the early 1970's the Peninsula moose population east of Port Moller has declined. More restrictive seasons and bag limits were implemented when the decline became apparent in the survey data. Moose harvest in the area in 1978 was only 28% of that in 1973, the peak harvest year. By 1976, State biologists estimated the Alaska Peninsula moose herd population to number half of its level of the late 1960's.

ADF&G review and analysis of aerial survey data indicated the decline was the result of poor calf recruitment and reduced bull longevity. Poor calf recruitment has been considered the main factor in the decline. The surveys show significant differences in calf recruitment between the two periods 1962-69 and 1970-79, when mean calf : 100 cow ratios were 30.4 and 14.14, respectively. The ratio for 1981 was 22, but was probably the result of a reduced number of older age, less productive cows in the population. Nutritional status of cows prior to and during the rut has been adequate and the low calf : cow ratios have not resulted from reduced ovulation rates.

Little concrete data is available on the specific causes of the poor calf recruitment. It could conceivably be the result of poor production and/or calf mortality. ADF&G correspondence from past years revealed two major lines of thought on the ultimate factors in the Peninsula moose decline. One suggested that bear predation on moose calves was the moving force behind the decline. The other, that the decline closely followed a change in vegetation which resulted in reduced production and calf survival.

As was the case in 1981, the refuge will continue to assist the State in whatever way possible to find the management answers to this problem.

Caribou. The Alaska Peninsula caribou herd is one of thirteen major herds in Alaska, and is one of the few that has not experienced a dramatic decline during the last decade. It is made up of three distinct subherds. The largest subherd, which ranges between King Salmon and Port Moller, was censused

Wolf. Wolves inhabit the entire refuge, but are not abundant anywhere. One wolf was observed by refuge personnel on September 17 just north of the King Salmon River. State bounties of \$50.00 were paid on wolves killed prior to 1970, and aerial hunting was permitted in the area until 1972.

Wolverine. Wolverines occur in moderate numbers throughout the refuge. One wolverine was observed on a moose survey of Whale Mountain on December 21. State bounties of \$15.00 were paid on wolverines until 1969.

Red Fox. Red foxes are abundant throughout the refuge. Population levels are highly variable from year to year, and widespread outbreaks of rabies within the population are common. Olaus Murie postulates that the fox formerly occurred in both the red and black phase, but selective killing of the dark phase because of its higher value has eliminated the black fox from the Alaska Peninsula.

Lynx. Although this cat is cyclically abundant, generally following the cycle of the hares on which it prefers to feed, it has historically been uncommon within the refuge. None were observed in 1980.

Tundra and Snowshoe Hare. Numbers and population statuses of both hares are unknown at this time.

9. Marine Mammals

Major marine mammals which utilize the Pacific coast of the refuge include sea otters, harbor seals, and Steller sea lions. Harbor seals and sea lions migrate up and down the coast, frequently hauling out on the refuge. A major sea lion haul out site occurs on Puale Bay where 5-10 thousand animals are frequently observed.

Sea otters in western Alaska regularly come ashore, particularly at night and during storms. They usually stay within a few feet of the water, but occasionally move as far as 100 yards inland. Although not documented, this is assumed to also occur on the refuge.

Beluga whales (*Delphinapterus* sp.) ascend the Egegik River in the spring. These pure white, toothed cetaceans are from twelve to sixteen feet long. They enter the river to feed on salmon smolts, primarily sockeye, and smelt.

An orphaned baby harbor seal was "hand carried" into Anchorage by Manager Taylor and turned over to the Anchorage zoo. It had been found by a commercial fishing boat in the Bristol Bay.

10. Other Resident Wildlife

Other resident wildlife found on the refuge include land otters, beaver, short-tailed and least weasels, muskrat, arctic ground squirrels, porcupine, willow and rock ptarmigan and mink. Little information is available on the status of these animals.

11. Fisheries Resources

General. Straddling the Alaska Peninsula, the Becharof Refuge provides spawning and rearing areas for salmon, trout, char, grayling, pike, whitefish, smelt, and others. The Alaska Range divides the refuge with westerly flowing streams emptying into Bristol Bay and easterly flowing streams entering Shelikof Strait.

The Pacific streams entering Shelikof Strait are characterized by short, steep drainages. They provide a limited amount of rearing area for coho salmon, trout, chars, and grayling, but contain excellent quality gravels in their lower reaches. These lower reaches provide spawning habitat for chum and pink salmon, which migrate directly to salt water following emergence from the gravel.



Portage Creek is typical of streams entering Shelikof Strait.

The Bristol Bay drainages are basically tundra streams. They are for the most part shallow, meandering, spring and lake fed creeks and rivers. Big Creek, a tributary of the Naknek River, drains the northern portion of the refuge and provides suitable spawning and rearing habitat for chinook, coho, chum, char, rainbow trout, grayling, whitefish, and blackfish. The King Salmon River, a tributary to the Egegik, is glacier fed and consequently discolored during spring and summer. Its spring fed tributaries, primarily Gertrude and Granite Creeks, are clear, cold and support trophy rainbow trout populations, as well as spawning and rearing areas for chinook, coho, chum, and pink salmon. The mainstem King Salmon River also supports these salmon species.

The dominant geographic feature of the refuge is Becharof Lake. It is fed by 14 major creeks and two rivers that provide spawning area for sockeye salmon and spawning and rearing areas for coho, char, and grayling. At 290,000 acres the lake is a nursery area for the second largest run of sockeye salmon in the world. Eighty-five percent of the juvenile sockeye rear in the Island Arm area, the southeast portion of the lake. Due to high winds, the lake remains ice-free during most winters.



An estimated 3,500 sockeye entering Featherly Creek. 81-15 CD

Species Status and Distribution. Calendar year 1981 saw strong returns of sockeye, chinook, chum, and coho salmon to Bristol Bay, in general, and the refuge in particular. An early price settlement between fishermen and processors and excellent weather resulted in the second largest harvest in Bristol Bay history. The harvest of Becharof Refuge origin fish (Table III) was 20,835,000 sockeye, the largest recorded harvest; 87,000 chum, the second largest harvest; 31,000 coho, the largest recorded harvest, and 6,000 chinook, the second largest harvest. The escapement of 695,000 sockeye exceeded the goal of 600,000. Escapements for chinook, coho, and chum are unknown.

A map of the fisheries resources on the refuge was prepared and submitted to the Regional Office (Attachment 1).

Harvest Management and Other Activities. The Alaska Department of Fish and Game manages the harvest of the refuge salmon resources. This harvest occurs in Bristol Bay near the mouth of the Egegik River and in various bays in Shelikof Strait. Preseason forecasts of run strength take into account parental escapement, fresh water and marine survival, high seas interceptions, etc. In season management tools include test fisheries, catch monitoring, escapements past counting towers and emergency regulations to ensure adequate spawning recruitment. Fishery Biologist Dlugokenski participated in the daily harvest strategy sessions at ADF&G headquarters in King Salmon where regulations were promulgated for harvesting individual stocks.

What evolved from these meetings was a clear sense that a fishery program developed for the refuge should be complementary to ADF&G activities. Our activities will include spawning ground surveys, collecting temperature and flow data of spawning tributaries, conducting predation and limnological studies, and enumerating smolts.

During 1981, we conducted aerial spawning ground surveys (Table IV) in conjunction with brown bear surveys. These surveys indicated that streams in the Island Arm area of the lake contain 84 percent of the spawning sockeye population with the Ruth River, Becharof Creek, Frank's Creek, Bear Creek, and Featherly Creek being the most important. We also discovered a population of beach spawners on the west shore of the Island Arm. The surveys were conducted in a Super Cub on floats. We removed otoliths (middle ear bones) from spawned out sockeye on five tributaries to determine age class composition.

The figure for Sockeye harvested
is wrong.^(#1) The correct number
is 4,481,000 fish. (The figure
cited - (20,835,000) is the weight
of the fish (pounds)

Michael Rees

TABLE III

Escapement, Catch and Value of 1981Fisheries Resources of Becharof NWR Origin

| <u>Drainage</u> | <u>Sockeye</u> | <u>Pink</u> | <u>Chinook</u> | <u>Coho</u> | <u>Chum</u> |
|--|----------------|--------------|----------------|-------------|-------------|
| <u>Egegik</u> | | | | | |
| Escapement | 695,000 | ¹ | Unknown | Unknown | Unknown |
| Catch | 4,481,000 | | 6,000 | 31,000 | 87,000 |
| Pounds ² | 27,780,000 | | 111,000 | 220,000 | 686,000 |
| Ex-vessel value ³ (value to fisherman) | \$20,835,000 | | \$139,000 | \$165,000 | \$288,000 |
| Fresh/Frozen ⁴ | \$20,722,000 | | | | |
| Canned ⁵ | \$18,364,000 | | | | |
| Roe ⁶ | \$ 6,159,000 | | | | |
| Total ⁷ | \$45,246,000 | | \$307,000 | \$307,000 | \$637,000 |
| <u>Shelikof Straits ⁸</u> | | | | | |
| Escapement | | 76,000 | | | 37,000 |
| Catch | | 191,000 | | | 77,000 |
| Pounds | | 840,000 | | | 539,000 |
| Ex-vessel value | | \$357,000 | | | \$226,000 |
| Total | | \$788,000 | | | \$500,000 |

¹ Even year pinks, return to parent stream 1982, 1984, etc.

² Average weights sockeye 6.2, pink 4.2, chinook 19 and coho and chum 7 pounds. The percent breakdown of all species processed for the Egegik district by product type was approximately: Canned in Bristol Bay 28.8%, Frozen/Cured in Bristol Bay 26.9%, Fresh Airlifted Export 27.6%, and Brine Tendered Export 16.8%. This analysis assumes 55% were marketed as fresh/frozen and 45% as canned sockeye.

³ Average prices sockeye \$.75, pink \$.425, chinook \$1.25, coho \$.75, chum \$.42.

⁴ F.O.B. Seattle \$1.75, 1980; 23% waste from average weight.

⁵ F.O.B. Seattle \$2.26, 1980; 35% waste from average weight.

- ⁶ F.O. B. Tokyo \$7.39, 1980; assumes 50% females, 6% of average weight.
- ⁷ For pink, chinook, coho, and chum assumed 70% wholesale increase from ex-vessel value (Kramer, Chin & Mayo, 1979. Washington Salmon Study) and an arbitrary 30% retail mark-up.
- ⁸ Includes catches from Alinchak, Puale, Dry, and Portage Bays.

TABLE IV
 SOCKEYE SALMON
 AERIAL SPAWNING GROUND SURVEY

| <u>STREAM</u> | <u>DATE</u> | <u>FISH OBSERVED</u> | <u>COMMENTS</u> |
|-------------------|-------------|----------------------|--|
| Gertrude Ck. | 7-21-81 | 20 Chinook | |
| | 7-27-81 | 515 Chinook | |
| 'B' Ck. | 7-21-81 | 2,500 Sockeye | Partial survey |
| | 8- 4-81 | 8,300 Sockeye | |
| Marie Ck. | 7-21-81 | 3,000 Sockeye | |
| | 8- 4-81 | 1,100 Sockeye | |
| Kejulik River | 7-21-81 | | Poor visibility |
| | 8- 4-81 | 3,200 Sockeye | Only side channel fish were visible |
| | 9-10-81 | 2,000 Coho | " " " " " |
| Margaret Ck. | 7-21-81 | 1,200 Sockeye | |
| | 8- 4-81 | 1,000 Sockeye | |
| Katrine Ck. | 7-21-81 | 800 Sockeye | |
| | 8- 4-81 | 5,200 Sockeye | |
| Costello Ck. | 8- 4-81 | 4,500 Sockeye | |
| Becharof Ck. | 7-21-81 | 10,000 Sockeye | |
| | 7-27-81 | 16,200 Sockeye | |
| | 8- 3-81 | 28,000 Sockeye | |
| | 9-10-81 | 1,000 Coho | Partial survey |
| Cleo Ck. | 7-21-81 | 3,300 Sockeye | |
| | 7-27-81 | 3,500 Sockeye | |
| | 8- 3-81 | 2,000 Sockeye | |
| | 8- 5-81 | 6,400 Sockeye | |
| | 9-10-81 | 0 | |
| Bear Ck. | 7-27-81 | 6,000 Sockeye | |
| | 8- 3-81 | 17,500 Sockeye | |
| | 9-10-81 | 500 Coho | |
| Salmon Ck. | 7-27-81 | 2,500 Sockeye | |
| | 8- 3-81 | 9,700 Sockeye | |
| Otter Ck. | 8- 3-81 | 1,500 Sockeye | |
| Ruth River | 7-27-81 | 12,000 Sockeye | |
| | 8- 3-81 | 25,000 Sockeye | |
| | 8- 7-81 | 32,000 Sockeye | |
| | 9-10-81 | 33,000 | Believed mix of late run Sockeye & Coho |
| Frank's Ck. | 8- 3-81 | 16,000 Sockeye | |
| | 8- 7-81 | 24,000 Sockeye | |
| | 9-10-81 | 200 Coho | |
| Beach Spawners | 8- 3-81 | 13,500 Sockeye | South of Burls Ck. |
| Burls Ck. | 7-27-81 | 1,500 Sockeye | |
| | 8- 3-81 | 5,500 Sockeye | |
| Featherly Ck. | 7-27-81 | 5,800 Sockeye | |
| | 8- 3-81 | 13,000 Sockeye | |
| | 9-10-81 | 300 Coho | |
| Rusty Ck. | 7-27-81 | 500 Sockeye | |
| | 8- 4-81 | 1,300 Sockeye | |
| Peak System Count | | 194,000 Sockeye | Includes 16,500 Sockeye for Ruth River (late run) on 9-10-81 |



Biologist Dlugokenski removing otoliths for age determination of spawned out salmon on Featherly Creek. 81-16 JT

Ryan thermographs with a six month recording capacity were installed in Becharof, "B", Rusty, and Featherly Creeks, and the Ruth River. Stream flow was also recorded from these tributaries.

Following ice out, the data will be reported upon retrieval of the thermographs and should provide us with a picture of incubation conditions on the spawning grounds.



Biologist Dlugokenski prepares a thermograph for placement in Becharof Creek while Bev Minn, Bristol Bay Plan Coordinator, stands guard. 81-17 VB

A cooperative smolt enumeration project for the Egegik River was agreed on by Manager Taylor and Charles Meacham, ADF&G, Bristol Bay Harvest Management Director. The project will commence in May, 1982, and will provide population estimates of seaward migrating sockeye salmon. The results will enable the refuge and ADF&G to improve the accuracy in predicting adult returns, thus ensuring that correct exploitation rates will be applied to maximize the harvest and to ensure adequate parental escapement.

The escapement goal for the Becharof Refuge was 1,000,000 sockeye in the early 1970's and is currently set at 600,000. Bear predation on spawning sockeye is not a matter for concern. While the 150 or so brown bears consume about 15,000 sockeye, about 90 percent of these fish have completed spawning. This was the finding of ADF&G in the 1960's. At current staffing and funding levels, the optimum escapement goal for salmon production will remain a matter of speculation. Nevertheless, current escapement levels are more than adequate to provide for bears, eagles, etc.

A Special Use Permit was issued to ADF&G Commercial Fisheries Division to hydraulically sample chum and pink salmon spawning areas of the refuge to determine egg deposition.



One of the "benies" of the job --- stream sampling with hook and line. 81-18 CD

H. PUBLIC USE

1. General

Six villages with a total population of approximately 1,000 are located adjacent to the refuge. Several of these residents utilize the refuge's resources for subsistence. Although salmon is the most important subsistence food in the region, caribou, and moose to a lesser extent, are the primary resources harvested from the refuge. Some fur trapping is also done during the fishing off-season. Berries are the primary plant food used for subsistence.

The recently passed Alaska Lands Act defines subsistence as:

"The customary and traditional uses by rural Alaska residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of non-edible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade."

The act also states that "nonwasteful subsistence uses of fish and wildlife and other renewable resources shall be the priority consumptive uses of all such resources." In other words, if a refuge wildlife population decreases to a level where the harvest must be reduced, the "sport hunters and fishermen" would be the first to be curtailed and the subsistence users the last. We hope to never reach such a position.

Needless to say, the question of subsistence is a burning issue in Alaska. The provisions of ANILCA requests the State to manage subsistence, and the State government is generally willing. Currently, however, there is a proposal before the State legislature which, if passed, would not allow the State to recognize subsistence priority. This would result in subsistence management being returned to the refuge.

An ADF&G subsistence position is now station in King Salmon. The refuge will be working closely with this person to determine refuge subsistence use and future subsistence management on the refuge.

7. Other Interpretive Programs

Becharof has no formal interpretation or E.E. programs. Visitors to the refuge headquarters for 1981 numbered less than twenty. On-refuge visitors, almost entirely hunters and fishermen, are contacted whenever possible, but available aircraft landing areas often does not even permit this. Total public use of the refuge for 1981 was estimated at 1,420 visitors.

The only alternative is to sell our program wherever and whenever anyone will listen. To facilitate this and improve community relations, Manager Taylor joined the local Lions Club and gave off-refuge talks to the following groups:

Bristol Bay Planning and Zoning Board
Bristol Bay Borough CZM Meeting
Bristol Bay High School Senior Class
King Salmon Air Force Base

8. Hunting

By far the majority of public use on the refuge is from hunting. A large guiding industry, which is primarily for brown bear, moose and caribou, operates on the refuge. Eleven exclusive guiding areas on the refuge have been designated by the State Guiding Board. Overlapping seasons for moose, caribou, and every other year, brown bear, makes multi-species hunts possible and serves to attract many hunters to the refuge.

Caribou. The availability and abundance of Peninsula caribou has contributed to the increase in hunting pressure, mostly by nonresidents. As good hunting areas near Alaskan cities become more difficult to find, unguided residents also are coming to the refuge in increasing numbers because of the bag limit of four animals and the high hunter success. It is estimated by the State that about 75% of the caribou are taken by non-local hunters. This is most often a bull and is predominantly during August-October when only one caribou may be taken. From November-March the remainder of the four bag limit may be harvested.

Harvest of caribou on the refuge for 1981 is estimated to have been 161 animals. Given the depleted condition of many interior Alaskan herds and the healthy condition of the Peninsula herd, it is unlikely that caribou hunting pressure on the refuge will decrease in the near future.



Big Creek is the most heavily used access route into the refuge. Local residents boat up the creek during the summer and fall, and drive snowmobiles and vehicles up it during the winter when the creek freezes to hunt, fish and trap.

81-19 JT

Moose. Trophy moose hunting by residents and nonresidents also has become popular on the refuge. Many hunters travel from Anchorage and Fairbanks, although about half of the moose harvested on the Peninsula during the last decade has been by nonresidents.

Due to a declining population in the area, the ADF&G reduced the moose season in 1975. Further restrictions on hunting were put into effect in 1976. Hunting was restricted to an early (bull) season and a late (either sex) season, and antlered moose must have a minimum antler spread of 50" or 3 brow tines on one side. With these restrictions, total harvest dropped by 66%, number of hunters dropped by 64%, and hunter success dropped by 20%, based on three year means immediately before and after the change in regulations.

As with caribou, hunting in the late season is primarily done by local residents interested in obtaining winter meat. The early season attracts mostly guided, nonresidents. At least six moose were harvested on the refuge during the fall (bull)

season, and no animals were known to have been harvested during the winter (either sex) season. Exact harvest data will be known in March when State harvest reports are available.

Brown Bear. Little brown bear hunting was done on the Alaska Peninsula until the early 1960's, but since that time, about 50% of the brown bears harvested in Alaska have come from the area. Harvest records indicate that at least 400 bears have been taken on the refuge since 1961. The majority of the kill has been by guided nonresidents and has occurred during the fall season. Harvest levels increased until the mid-60's and then declined slightly to the current level of harvest (20-30 per year). Current seasons for the refuge are a spring and fall season every other year. A fall season (October 7-21) was held in 1981, and 7 bear were known to have been harvested on the refuge.

As hunting pressure has increased in the area, regulations have necessarily become more restrictive. Seasons have been shortened and the use of aircraft for hunting curtailed. Despite restrictions, a gradual decrease in the size and age of bears killed indicates that the large, old bears are becoming increasingly scarce although the total bear population is apparently not changing in number.

Occasionally a bear is killed in defense of life or property, but little hunting pressure actually exists locally.

Some waterfowl and ptarmigan hunting during big game hunts also takes place on the refuge. Total hunting pressure for 1981 was estimated at 461 visits and 10,089 activity hours.

9. Fishing

The refuge receives only light sport fishing pressure, because of its remoteness. Local residents in Egegik on camping trips, hunters with pack rods, and guided clients take advantage of some trophy sized trout, char, grayling, and salmon.

Three commercial guides were issued Special Use Permits to guide sport fishing clients within the refuge. Nick Bartlett operates Becharof Lodge in Egegik and guides on the King Salmon River. His 59 clients spent 314 angler days on the refuge between June 21 and September 16. Charles Weir of Sport Fishing Safaris of Alaska and Gerald Yeiter of Ugashik Narrows were issued permits, but have not yet returned their angler data.

A small number of Alaskan residents, flying float and tail drag aircraft and heading primarily for Ugashik Narrows, also fish Becharof Lake and its tributaries. We estimate the angler use days at around 660 visits and 2,000 activity hours.

10. Trapping

Five individuals are now known to trap on the refuge. Their harvest for 1981 was nine wolverine, fourteen otter, one wolf and an undetermined number of beaver, mink and red fox.

11. Wildlife Observation

Virtually all wildlife observation on the refuge is done via aircraft. This activity was estimated at 460 visits and 1,380 activity hours for 1981.

12. Other Wildlife Oriented Recreation

Photography is the only activity within this category which takes place on the refuge. It is usually done in conjunction with hunting, fishing, or wildlife observation. An estimated 120 visits and 240 activity hours were expended in this activity.

13. Camping

Virtually all camping done on the refuge is in direct support of hunting or fishing. Overnight trips are usually 3-4 nights, but sometimes last a week or two. Uncooperative weather often makes trips days longer than planned.

Most commercial guides have cabins on the refuge, but some do operate out of base camps. Those who obey the law must often have to set up an overnight camp when an animal is located by air (State law prohibits shooting a big game animal on the same day airborne).

Camping on the refuge in 1981 was estimated at 455 visits and 19,860 activity hours.



One commercial hunting guide sometimes operates out of this house boat on Becharof Lake. He purchased the boat several years ago after two of his cabins on the refuge had been torched. A notorious trapper who lived on the refuge was suspected. 81-20 JT

17. Law Enforcement

Becharof does, and will probably continue for some time, ^{to} have law enforcement problems. First, a 1.2 million acre refuge does not lend itself to easy and effective patrol, especially with a staff of two. Second, without a refuge airplane, contacting people on the refuge is next to impossible. Local air charter operations are usually not willing to sit on the ground while you investigate a situation or contact a visitor. They can make more by flying other folks on a seat rate during these busy times of the year. They are also reluctant to be associated with bringing the "law" in on a customer.

Third, many guides are the worst outlaws on the refuge, and the most difficult to apprehend. With 3-10 thousand dollars per client on the line, it is worth their while to take chances by shooting the same day airborne or herding animals with aircraft to awaiting hunters, often using shotguns and birdshot.

The best success in pinching illegal guides has been through the use of undercover agents posing as clients. Realizing this, most illegal guides have gone to only guiding foreign or previously guided clients. This, of course, makes it much more difficult for the agents. Most illegal guides also keep an assistant guide between them and the illegal activity to buffer him from prosecution. "I didn't know anything about it!", is often heard when the assistant guide is caught.

The only effective means to curb these illegal activities is to take away a guide's license when he is convicted. The State Guide Board is the only body that can do this. In the past, it has taken up to years for the board to act adversely against a guide and usually only results in a slap on the wrist. Although there are a few legitimate guides in the area, they are getting harder and harder to find due to the money involved in the business and the pressure of guaranteeing their clients an animal.

On March 16, Manager Taylor flew to Chignik Bay, Chignik Lagoon and Chignik Lake to assist in an investigation of an individual apprehended shipping sea otter skins and skulls and a bald eagle head out of the area. Substantial evidence to support the government's case was obtained, but the case was still pending at this reporting.

Manager Taylor flew into Anchorage on September 9 to attend the hearing of a waterfowl case he had made on September 1, 1980. Because two of the defendants were native, it had taken six months to get clearance to prosecute. This was followed by two postponements by the defendants earlier in 1981. Ninety minutes before the hearing on the 10th, we received word of yet another postponement until September 30. Manager Taylor returned to Anchorage on that date to again attend the hearing. On that morning we were informed that two of the defendants had opted for a plea hearing and would not be present. At the hearing the third defendant failed to show, and the magistrate issued a bench warrant for arrest with bail set at \$1000.

A tip on where the individual might be living in Anchorage was passed along to Law Enforcement. He was subsequently arrested and thrown in jail. Manager Taylor returned one last time for another hearing on January 21, 1982, where the defendant pleaded guilty and was sentenced to 10 days in jail (suspended) \$175.00 and one year's probation. His two partners paid \$375.00 each for fines.

I. EQUIPMENT AND FACILITIES

2. Rehabilitation

During 1981, we spent approximately 40% of our total budget to establish and upgrade facilities on the NMFS eight acre complex in King Salmon. NMFS no longer uses the complex and

has no immediate plans to return to the area. We continue to occupy the complex only under a verbal understanding. A draft agreement authorizing utilization of the complex continues to reside in the negotiation stage after two years.



The King Salmon complex now serves as headquarters for the Becharof and Alaska Peninsula NWR's. 81-21 CD

Improvements to the complex during 1981 include:

- Warehouse/Office - Installation of electricity, telephone, central fuel oil heat, and arctic entrance.
- Warehouse - Installation of electricity and overhead doors.
- Automotive Shop - Installation of electricity.
- Mobile Homes - Installation of three mobile homes (two of which now belong to the Alaska Peninsula NWR) with electricity, water, septic holding tanks, phones, propane, fuel oil, arctic entrances, and foam insulation.
- Pump House - New fuel oil boiler and tempered water system.
- Seasonal Cabin - Installed insulation and sheetrock to walls and ceilings.



Before ...

81-22 JT



and after three mobile homes were installed at the dirt cheap cost of \$93,940 (lowest bid). The mobile homes were picked up as excess from BIA in Fairbanks.

81-23 JT

4. Equipment Utilization and Replacement

Equipment purchases during the year included:

- | | |
|-------------------------|---|
| Boats | - 15' Boston Whaler and a 14' Zodiac |
| Motors | - 1 55 HP Johnson/Evinrude and 1 35 HP Johnson/Evinrude |
| Radios | - Sunair Electronics HF Transceiver base set, antenna and tower |
| Fisheries Sampling Gear | - Bausch & Lomb dissecting microscope, Marsh-McBirney stream flow meter, five Ryan six month continuous temperature recording thermographs, experimental gillnets, dip-nets |
| Miscellaneous | - Tools, office supplies, etc. |

6. Energy Conservation

We also purchased a 4 KW Eneritech wind generator to reduce station operating costs. The system will be interfaced directly to the electrical grid, thus eliminating battery storage, etc. The local electric association currently charges \$.30/KWH plus a 10% fuel surcharge, and there are four private wind generating systems currently operating effectively in the King Salmon/Naknek area. This, however, will be the first system supplying power to a business or public agency, and is the largest system in the area.

7. Other

Headquarters for the December 1980 established Alaska Peninsula National Wildlife Refuge was also designated as King Salmon. Its staff will share the NMFS facilities with Becharof Refuge. Kent Hall (Assistant Manager for Alaska Peninsula NWR) and his wife, Bev Minn (Field Coordinator for the Bristol Bay Cooperative Management Plan) arrived in June to assume their respective duties. We were disappointed to see them transfer to Kotzebue in September. Alaska Peninsula Manager Glenn Elison arrived in King Salmon on October 8.

J. OTHER ITEMS

1. Cooperative Programs

A series of public meetings on the recently passed Alaska Lands Act was held by Manager Taylor and Katmai National Park Superintendent Dave Morris. Meetings were held in Naknek (February 25), King Salmon (March 9) and Meshik (March 11). Objectives of the meetings were to explain the proposed regulations and boundaries, answer any questions, clarify any misunderstandings about the roles of the two agencies, and encourage those who had comments about the proposed regulations to submit them. Overall, all meetings went very well and most

people left a little less apprehensive about the "Federal land lock-up."

To conserve funds and energy, joint aerial surveys and law enforcement patrols were frequently conducted with the ADF&G and National Park Service.

Refuge facilities were very popular with other divisions and agencies working or passing through the area, but not directly working on refuge programs. Among those spending several nights at the refuge compound were seven personnel from Wildlife Operations Program (Anchorage), four members of the Bristol Bay Planning Team, three personnel from NMFS, two Special Agents from the Division of Law Enforcement, and four people from the Marine Mammals Lab.

Under an agreement with NMFS, Ole Mathieson from the University of Washington, spent two months living within the compound and working on sockeye salmon in the area.

The refuge also houses and changes the tapes in a computer designed to record seismographic activity in the area. The computer is operated by the Geophysical Institute of the University of Alaska.

The refuge also authorizes a local church organization to conduct a two to three week bible camp on the shore of Becharof Lake each summer.

Special Use Permits were issued to Arco, Amoco, and Chevron oil companies to conduct surface geological surveying, collecting and mapping within the refuge. A Special Use Permit was also issued to Prof. D. Volker Lorenz and Georg Buechel, Department of Geology, University of Mainz, West Germany, to do surficial volcanological research on the Ukinrek Maars of the refuge.



Working under a SUP, this Amoco geologist is making a surface collection from Puale Bay. 81-24 CD

2. Items of Interest

Alaska Governor Jay Hammond visited the refuge on August 12. During the 1960's Governor Hammond worked and flew for the U.S. Fish and Wildlife Service (Bureau of Commercial Fisheries) at King Salmon.

Jim Pulliam (DWR), Galen Buterbaugh (AFR), Bill Daugherty (HFM), and Bill Godby (EN) from Washington, D.C. visited the refuge on August 4 and 5 to discuss refuge projects and needs.

Linda Nebel and Ron Kirby, Central Office Planning Staff, visited the headquarters from August 4-6 to get a look at refuge planning needs in Alaska.

Carl Crouse, National Wildlife Federation, visited the refuge from June 8-10.

Manager Taylor and Fishery Biologist Dlugokenski attended the National Audubon Society's regional conference (May 8-10) in Anchorage. The conference theme was "Wildlife Refuges: What Future for Alaska?"

Accompanied by refuge personnel, five of the conference's speakers, including Audubon President Russ Peterson and NWRA President Forrest Carpender, were given a "show me" tour of Becharof and Alaska Peninsula Refuges on May 12. After seeing several hundred caribou, 20-30 moose, five brown bear, two gray whales, 500-600 harbor seals, a few eagles and lots of nice country, all were sold on the value of the refuges.

Bob Shields and Ernie Jaminson, Regions VI and II, visited the refuge on September 3 to discuss and formulate a cabin policy for Alaskan Refuges. They were aerially shown several different cabin situations on Becharof.

3. Credits

Manager Taylor wrote Sections A, E, G(8), H, and J.

Fishery Biologist Dlugokenski wrote Sections B, C, D, F, G, I, and K.

K. FEEDBACK

Threats to the Resources

Two activities, which have significant potential for impacting Becharof NWR fish and wildlife resources, are hydroelectric power development and outer continental shelf oil and gas development.

The Alaska Power Authority is investigating 36 sites for hydroelectric power development in the Bristol Bay Region as identified by Stone and Webster Engineering (Map 3). Two of the sites lie within the refuge. Some of our comments to them were:

Site 3. King Salmon River (Egegik Drainage). The development of hydropower at this site would have detrimental, irreversible effects upon the fishery and wildlife resources of the refuge. The King Salmon River supports all five species of Pacific Salmon, including the only run of chinook salmon in the drainage. The proposed dam would create a migration barrier to returning adult salmon, trout, char, etc., inundate spawning and rearing areas, and adversely impact downstream migrants. Rainbow trout, Arctic grayling, Dolly Varden, and Arctic char are actively sought by sport fishermen as these fish fall into the "Trophy" size category. Commercial sport fishing guides currently operating on the King Salmon River would also be impacted.

The area to be impounded is also directly within a major migration route for the Alaska Peninsula caribou herd. Construction of this site would adversely impact the herd by hindering migration to their major wintering grounds, just north of the King Salmon River. Access roads or corridors to the site would allow increased exploitation of these resources with potential impacts to their quality and numbers. Moderate brown bear, and moose populations would be displaced

and probably lost, as would their habitat. For these reasons, we believe the site classification should be considered as one having major constraints.

Site 22. Becharof Lake. This system is home to the second largest run of sockeye salmon (1981 run size, 5 million sockeye) in the world. No dam can be permitted which blocks the Egegik River. Besides an annual loss to the commercial fishery (1981 ex-vessel value of \$20.8 million), denying access to spawning areas would impact the majority of the brown bear population. This site should be dropped from any further consideration.

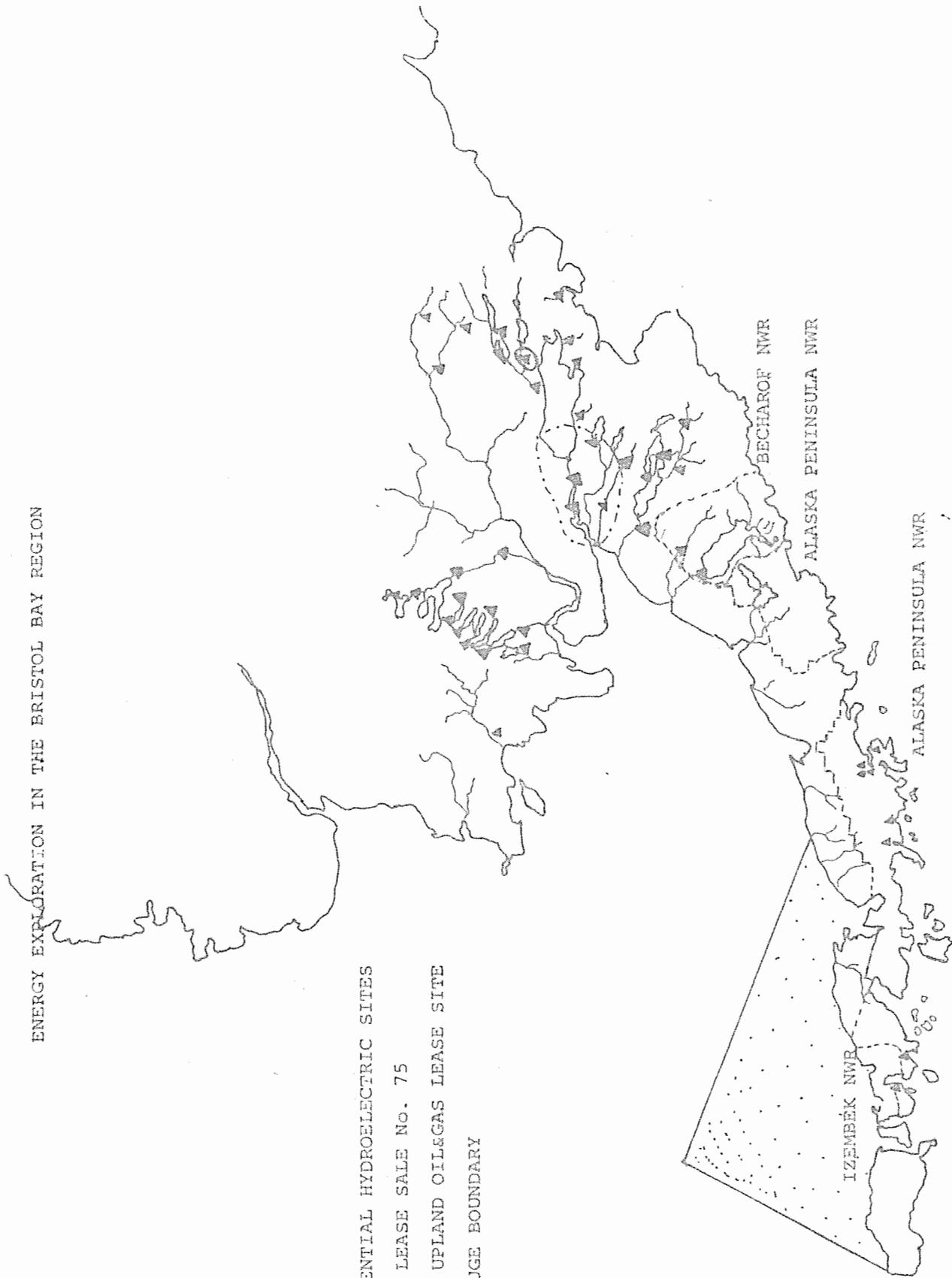
ADF&G comments regarding development of these sites were very similar to ours.

OCS oil and gas development in Bristol Bay also has the potential for impacting Becharof's resources. The largest number of age .0 sockeye salmon, first year in salt water, were captured by the USFWS,¹ Bureau of Commercial Fisheries, in the area now designated as OCS Lease Sale No. 75 (Map 3). Chronic spills or blowouts could have devastating impacts to the Bristol Bay fishery. ADF&G has recommended that this lease sale be postponed until all other OCS sites are thoroughly exploited and that the participating oil corporations fund the necessary studies to refine our knowledge of the area.

Development of oil or gas in the Bay could result in pipelines across the refuge. This could no doubt have very adverse impacts on migrating caribou, salmon spawning, and brown bear and moose habitat. Increased human populations resulting from the development could also have significant impacts on refuge resources by increasing consumption and disturbance of many species.

¹ Hartt, Alan 1969. Juvenile Salmonids in the Ocean. In McNeil and Himsworth, 1980. Salmonid Ecosystems of the North Pacific. Oregon State University Press; Corvallis, Oregon.

ENERGY EXPLORATION IN THE BRISTOL BAY REGION



A POTENTIAL HYDROELECTRIC SITES

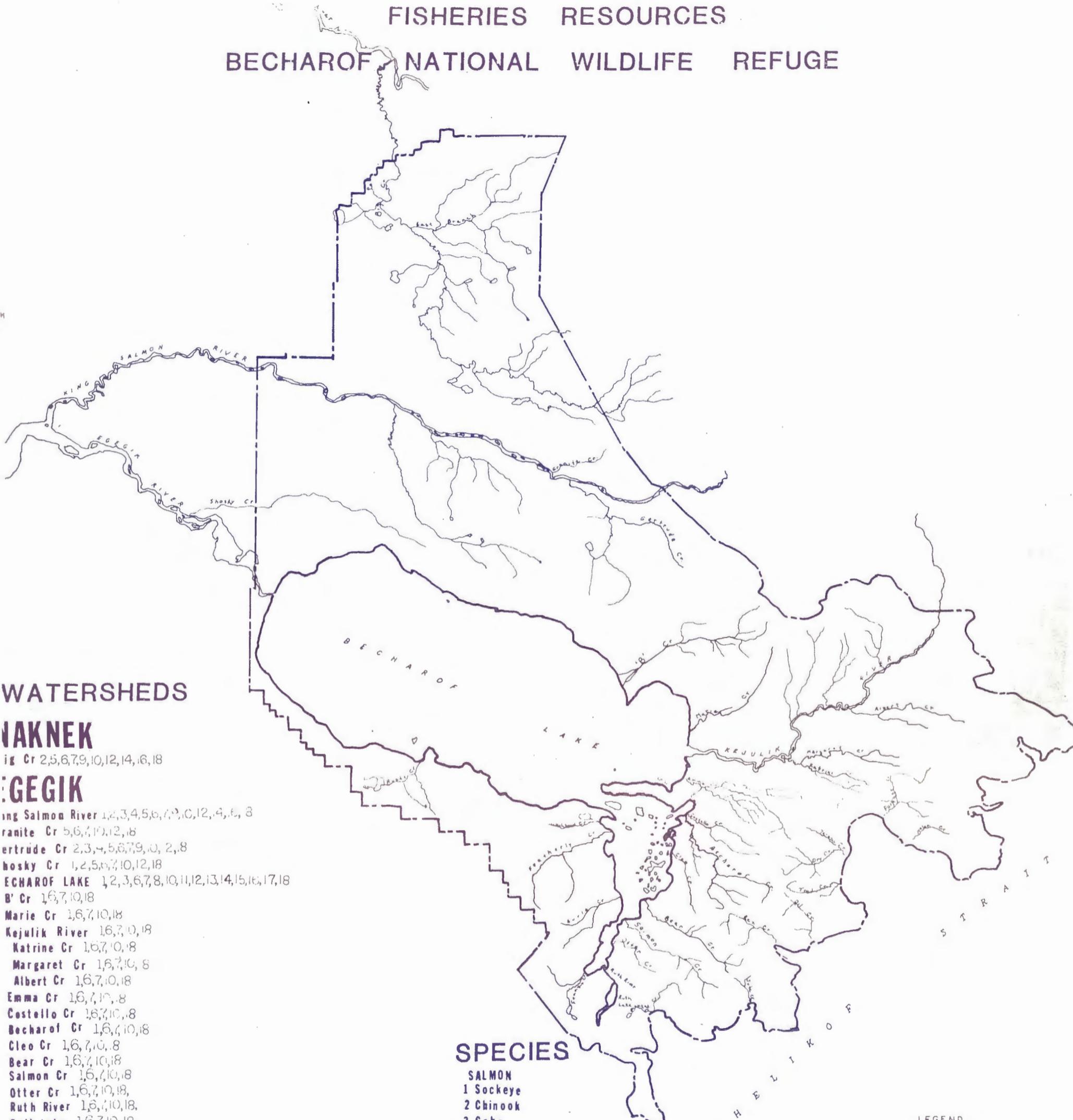
■ OCS LEASE SALE No. 75

- - - BLM UPLAND OIL & GAS LEASE SITE

- - - REFUGE BOUNDARY

()

FISHERIES RESOURCES BECHAROF NATIONAL WILDLIFE REFUGE



WATERSHEDS

YAKNEK

King Cr 2,5,6,7,9,10,12,14,16,18

EGGIK

King Salmon River 1,2,3,4,5,6,7,9,10,12,14,16,18

Granite Cr 5,6,7,10,12,18

Gertrude Cr 2,3,4,5,6,7,9,10,12,18

Hosky Cr 1,2,5,6,7,10,12,18

BECHAROF LAKE 1,2,3,6,7,8,10,11,12,13,14,15,16,17,18

B' Cr 1,6,7,10,18

Marie Cr 1,6,7,10,18

Kujulik River 1,6,7,10,18

Natrine Cr 1,6,7,10,18

Margaret Cr 1,6,7,10,18

Albert Cr 1,6,7,10,18

Emma Cr 1,6,7,10,18

Costello Cr 1,6,7,10,18

Becharof Cr 1,6,7,10,18

Cleo Cr 1,6,7,10,18

Bear Cr 1,6,7,10,18

Salmon Cr 1,6,7,10,18

Otter Cr 1,6,7,10,18

Ruth River 1,6,7,10,18

Ruth Lake 1,6,7,10,18

Frank's Cr 1,6,7,10,18

Burl Cr 1,6,7,10,18

Featherly Cr 1,6,7,10,18

Washbowl Cr 1,6,7,10,18

Rusty Cr 1,6,7,10,18

SHELIKOF

Helen Cr 4,5,7,11,18

Portage Cr 4,5,7,11,18

Teresa Cr 4,5,7,11,18

Dry Cr 4,5,7,11,18

Trail Cr 4,5,7,11,18

Oil Cr 4,5,7,11,18

Rex Cr 4,5,7,11,18

Jute Cr 4,5,7,11,18

Kanatak Cr 1,4,5,6,7,18

SPECIES

- SALMON
- 1 Sockeye
- 2 Chinook
- 3 Coho
- 4 Pink
- 5 Chum
- CHARRS
- 6 Dolly Varden
- 7 Arctic Charr
- 8 Lake Trout
- 9 Rainbow Trout
- 10 Arctic Grayling
- 11 Least Cisco
- 12 Round Whitefish
- 13 Smelts
- 14 Northern Pike
- 15 Blackfish
- 16 Burbot
- 17 Sticklebacks
- 18 Sculpins

LEGEND

- NATIONAL WILDLIFE REFUGE BOUNDARY
- DISCHARGE ≤ 25 CFS
- " ≤ 50 CFS
- " ≤ 100 CFS
- " > 100 CFS



SCALE 1:250,000
1 inch equals approximately 4 miles