ANADROMOUS FISH INVENTORY

SELAWIK NATIONAL WILDLIFE REFUGE, ALASKA
and Associated Area of Ecological Concern

Prepared for

Fish and Wildlife Service

by

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Anadromous Fish Inventory
Information Framework

a. Bibliography

The files of the Arctic Environmental Information and Data Center were utilized for the compilation of an initial bibliography. Referenced titles were then obtained and citations pertaining to the area and species of interest which appeared in these reports were added to expand the initial bibliography. References were deleted if, when obtained, the study was not found to pertain to the area or species of interest. In a few cases where references were unobtainable, such citations are followed by the note "(not seen)" to indicate that any pertinent data contained in this reference is not included in the remainder of the inventory.

All possible reference sources are listed with the exception of those containing extremely general subject matter, most early (before 1910) exploratory reports, and annual report series such as Alaska Fishery and Fur-Seal Industries in (year) which were issued prior to 1960.

b. Species Lists

A list of anadromous and coastal marine fishes for each proposed refuge or proposed additions to existing refuges was compiled. An initial list was taken from each final environmental statement; however, three major taxonomic references were consulted to add to, or delete from this initial list - List of Fishes of Alaska and Adjacent Waters with a Guide to Some of Their Literature (Quast and Hall 1972), Pacific Fishes of Canada (Hart 1973), and Freshwater Fishes of Canada (Scott and Crossman 1973). Species on the lists which were considered to be coastal marine inhabitants were verified with A List of Common and Scientific Names of Fishes from the United States and Canada (Bailey

et al. 1970). However, further studies of certain families of fishes inhabiting Alaskan waters are needed - e.g. Cottidae - since some species have not been included in the American Fisheries Society list because their taxonomic status has not been determined. Species which have been included in some of the earlier ichthyological literature and have not recently been verified are not included in the present lists.

An anadromous species was considered to be one which spawns in fresh water, and at some point in its early life cycle, undergoes a migration to salt or brackish water. In some regions (Koyukuk, Yukon Flats) a non-migratory form of an anadromous species (inconnu, some whitefish) was determined from the literature, and therefore, this species was not included in the list. Coastal marine species were considered to be residents of nearshore neritic, lagoon, or estuarine habitats. Species which generally inhabit fresh water, but have been found to enter coastal, brackish water, were included as coastal marine forms and were indicated thus - e.g. ninespine stickleback.

c. Histories of Commercial, Sport, and Subsistence Fisheries

Historical references were consulted as well as management reports and periodicals for any data which document the commercial, sport, or subsistence utilization of anadromous fish within the boundaries of ecological concern for each proposed refuge. Knowledgeable research and management personnel with state and federal agencies also were consulted to provide additional unpublished data. In many refuge areas, historical information was sparse. However, considerable use was made of descriptions of subsistence life styles documented in Alaska Natives and the Land (Federal Field Committee 1968). Sport and commercial historical information was largely

taken from Alaska Department of Fish and Game publications.

Each refuge historical summary is a brief description of trends of activity, rather than a year-by-year account. For example, some publications have traced the history of cannery operation in a particular region and have indicated when and where each company began or ceased operation. These types of data were synthesized into a general account of the contribution and significance of cannery operation in that area. Significant sources of information are appropriately referenced.

d. Habitat

Anadromous fish habitat was regularly calculated to the most upstream record for any species. All habitat, except the largest lakes, was measured in linear statute miles from drainage mouth to most upstream record using a fine string to follow the main channel as charted on standard U.S. Geological Survey 1:250,000 scale quadrangle sheets. For major lakes, habitat areas are recorded in square miles.

For major rivers such as the Yukon, Kobuk and Kuskokwim, standard mileage reference points utilized by the Alaska Department of Fish and Game were used.

In the Wood River and Kvichak River drainages, extensive spawning ground catalogs have been published (Demory, Orrell and Heinle 1964; Marriott 1963). In these two systems linear miles of habitat are taken directly from these previous calculations.

In the tabular record of this data, tributaries are listed immediately following and indented from the larger watercourse into which they flow. Each refuge listing begins at the northwesternmost corner of the area of interest.

Where species are not known but anadromous fish are recorded as present (Alaska Department of Fish and Game 1975), waterways are so indicated. All other systems are recorded by species present. A series of annotated U.S. Geological Survey quadrangles compiled by the Alaska Department of Fish and Game, Habitat Division, was helpful in clarifying certain habitat areas and species.

e. Key Spawning and Rearing Areas

This section is one of the weakest of this report. Almost all information came from Atkinson, Rose and Duncan (1967) except for the excellent data in the spawning ground catalogs for the Wood River and Kvichak River drainages (Demory, Orrell and Heinle 1964; Marriott 1963). Little other compiled information exists and that in Atkinson, Rose and Duncan (1967) was, at times, found to be questionable in its accuracy--for example, the existence of spawning grounds in the main channels of the lower Yukon River and above the Tazimina River falls in the Lake Iliamna area is suspect.

Areas of major lakes which are prime rearing areas for sockeye salmon, are recorded in square miles. In the Wood River and Kvichak River drainages, spawning grounds are measured in both linear miles of waterway and in acres of utilized or potentially utilizable area.

Tabular data, including the method of listing tributaries, is handled in the same manner as the habitat information.

f. Runs/Escapement

Escapement counts or estimates of total spawning run were obtained almost entirely from Alaska Department of Fish and Game management reports and surveys conducted by the University of Washington's Fisheries Research

Institute on the Kvichak River and Wood River drainages. These counts are a variety of weir, aerial and tower counts and are so indicated. In a few cases, population estimates from tagging studies are available.

g. Harvest Data

Harvest includes separate statistics for the subsistence, commercial and sport fisheries. Data are in numbers of fish as reported to the managing agency.

Harvest data were obtained almost entirely from Alaska Department of Fish and Game management reports and International North Pacific Fisheries Commission Statistical Yearbooks. Where possible, commercial harvest data are tabulated by statistical district sub-units. Often such detail is not readily accessible, and data are portrayed by entire statistical district. Subsistence data are listed by village or by statistical district. Sport harvest data are almost nonexistent except for a few selected survey sites in the Kvichak River and Naknek River drainages.

h. Effort

Effort includes the amount of gear used, number of licenses and time fished where these data are available. Commercial effort is moderately documented while little sport and subsistence effort is available.

Effort information has been derived almost entirely from Alaska Department of Fish and Game management reports. The statistical divisions used in reporting the data vary. In some cases, entire areas may not have been subdivided for effort statistics, while in other parts of the state, this information is available by statistical district or even subdistrict.

Value of catch to the fisherman has been calculated from "price per fish" data provided in Alaska Department of Fish and Game management reports.

i. Mylar Overlays

The following information was plotted on mylar overlays of U.S. Geological Survey 1:250,000 scale quadrangles:

1. All waterways inhabited by anadromous fish are indicated to their most upstream record of any species of interest.

2. Anadromous inhabitants are named for all waterways where present.

3. Spawning and rearing areas are identified and are rated in value for each species. This rating is most often based on a minimum of data and should be used with extreme care and recognition that, at most, only the relative abundance of spawners utilizing such an area is indicated. Where data for salmon are more readily available, a low rating indicates a spawning population of less than 5,000 fish; a medium rating indicates a spawning population of between 5,000 and 20,000 fish; and a high rating indicates in excess of 20,000 spawners may regularly use such an area. Much of the information base for this section was obtained from escapement statistics reported in Alaska Department of Fish and Game management reports and in Demory, Orrell and Heinle (1964) and Marriott (1963).

4. Recorded harvest areas are indicated as commercial, sport or subsistence along with major species harvested. Again, much of this information involved the interpretation of data presented in Alaska Department of Fish and Game management reports.

5. All operating or recently operating federal or state research research stations or field sites are plotted.

6. Various activities which might become sources of impact on the fisheries resources were plotted including potential gas pipeline stream crossings (Arctic National Wildlife Refuge), oil and gas wells (Arctic

National Wildlife Refuge), potential dam sites, existing airfields, and locations of mineral occurrence of potential economic value including concentrations of existing mineral claims.

j. Statewide Mylar Overlay of Major Anadromous Fish Streams

"Major" is defined as having a regular run of the indicated species in excess of 50,000 fish. Primary data for this section was obtained from Atkinson, Rose and Duncan (1967).

Coastal Marine and Anadromous Fishes
Selawik National Wildlife Refuge

(0)	Arctic lamprey	*Lampetra japonica*
	Pacific herring	*Clupea harengus pallasi*
0	Bering cisco	*Coregonus laurettae*
(0)	Broad whitefish	*Coregonus nasus*
0	Least cisco	*Coregonus sardinella*
0	Pink salmon	*Oncorhynchus gorbuscha*
0	Chum salmon	*Oncorhynchus keta*
0	Coho salmon	*Oncorhynchus kisutch*
0	Sockeye salmon	*Oncorhynchus nerka*
0	Chinook salmon	*Oncorhynchus tshawytscha*
*	Round whitefish	*Prosopium cylindraecum*
(0)	Arctic char	*Salvelinus alpinus*
*	Inconnu	*Stenodus leucichthys*
*	Pond smelt	*Hypomesus olidus*
	Capelin	*Mallotus villosus*
(0)	Rainbow smelt	*Osmerus dentex*
	Arctic cod	*Boreogadus saida*
	Saffron cod	*Eleginus gracilis*
	Fish doctor	*Gymnelis viridis*
	Wattled eelpout	*Lycodes palearis*
	Polar eelpout	*Lycodes turneri*
	Sparse toothed lycod	*Lycodes raridens*
*	Ninespine stickleback	*Pungitius pungitius*
	Fourline snakeblenny	*Eumesogrammus praecisus*
	Slender eelblenny	*Lumpenus facricii*
	Stout eelblenny	*Anisarchus medius*
	Arctic shanny	*Stichaeus punctatus*
	Langbarn	*Leptoclinus maculatus*
	Pacific sand lance	*Ammodytes hexapterus*
	Greenling (Species unknown)	*Hexagrammos* sp.
	Hamecon	*Artediellus scaber*
	Antlered sculpin	*Enophrys dicerans*
	Arctic staghorn sculpin	*Gymnocanthus tricuspis*
	Irish lord (Species unknown)	*Hemilepidotus* sp.
	Spatulate sculpin	*Icelus spatula*
	Belligerent sculpin	*Megalocottus platycephalus*
	Plain sculpin	*Myoxocephalus jaok*
	Flathead sculpin	*Myoxocephalus platycephalus*
	Fourhorn sculpin	*Myoxocephalus quadricornis*
	Arctic sculpin	*Myoxocephalus scorpioides*
	Shorthorn sculpin	*Myoxocephalus scorpius*
	Warty sculpin	*Myoxocephalus verrucosus*
	Eyeshade sculpin	*Nautichthys pribilovius*
	Ribbed sculpin	*Triglops pingeli*
	Sturgeon poacher	*Podothecus acipenserinus*
	Aleutian alligatorfish	*Aspidophoroides bartoni*
	Arctic alligatorfish	*Aspidophoroides olriki*

Leatherfin lumpsucker	Eumicrotremus derjugini
Striped seasnail	Liparis liparis
Unnamed Cyclopterid	Liparis bristolense
Arrowtooth flounder	Atheresthes stomias
Flathead sole	Hippoglossoides elassodon
Bering flounder	Hippoglossoides robustus
Yellowfin sole	Limanda aspera
Arctic flounder	Liopsetta glacialis
Starry flounder	Platichthys stellatus
Alaska plaice	Pleuronectes quadrituberculatus

0 Anadromous

(0) Both anadromous and resident

* May enter coastal, brackish water

History of Subsistence Fishery
Selawik National Wildlife Refuge, Alaska

Most of the subsistence fishing information for the proposed Selawik Refuge area is documented for the Kotzebue area. Very little data are available for the villages of Noorvik, Kiana, Selawik, Shungnak, Ambler, and Kobuk. However, similar activities to those reported for the Noatak area were practiced by native Eskimos in this region. Traditionally, village inhabitants depended heavily upon fish for human and sled dog food. Spears, nets, decoys, fish hooks and traps were utilized to catch char, chum salmon, whitefish and inconnu from Hotham Inlet, Selawik Lake, and the Kobuk and Selawik Rivers. Fish taken were preserved by air drying or by allowing roe to partially decompose for the purpose of making a delicacy or a seasoning (Rostlund 1952). These activities probably date to around 1880 for Selawik village Natives to 1909 for Kiana Natives, and to the 1920's for Shungnak, Kobuk, and Noorvik villagers.

In more recent years, subsistence fishing activities have changed little with the exception of the advent of motorized boats and snowmobiles. Fishing follows a seasonal pattern as in the Noatak area. Shungnak is used here as an example. In the fall Natives fish for whitefish near the village by nets or traps under the ice. Intermittently during the winter, burbot are taken through the ice for immediate consumption. In June after the ice has left the river, seine and gill net fishing for inconnu, whitefish, and grayling predominates until the chum salmon run begins. This species is one of the most important food resources for the people of this area. It is obtained in quantity, beginning in June, by seining and gill netting. Fish camp sites are scattered along the Kobuk River above and below the village. Salmon are used fresh during the season, but most of the

catch is dried and stored to be used in the winter as dog food. Other species taken by villagers in the proposed refuge area include Arctic cod, lake trout, blackfish, northern pike, Arctic char, flounder, herring, suckers, smelt, pink salmon, king salmon, silver salmon and miscellaneous shellfish.

In the 1950's at the village of Kiana on the Kobuk River, the women and young boys and girls traditionally seined or gill netted fish for the winter food supply. Nets and associated gear were hand made. Seining was either along beaches or nets were deployed from a skiff or rowboat. Whitefish and inconnu were the predominant catch. Some chum salmon, smelt, Arctic char and burbot were also seined. The fish were dried and cached as food for humans or sled dogs.

Winter fishing by Kiana Eskimos was primarily for whitefish and inconnu. Ice fishing occurred on the Kobuk River, as well as on Hotham Inlet. Fish were frozen in the air and stacked. Some were sold to bush pilots and to traders in Kotzebue.

Recent subsistence activities have centered on Hotham Inlet and Selawik Lake where large numbers of inconnu and whitefish are jigged through winter ice. In spring, residents of Selawik, Norvik, and Kiana take large numbers of inconnu from Selawik Lake. The 1965 late winter and early spring harvest of inconnu from Selawik Lake was 7,240 by Selawik villagers and 4,000 to 5,000 by Noorvik and Kiana residents. In this year, over 85% of the total inconnu catch in northwest Alaska was utilized by Eskimos for subsistence (Alt 1969). In 1974 residents of Kiana and Noorvik took 52,000 whitefish from the area for personal use.

History of Commercial Fishery
Selawik National Wildlife Refuge, Alaska

Commercial fishing in the proposed Selawik Refuge area has centered predominantly around Kotzebue. For several years, ending in 1918, the Midnight Sun Packing Company operated in Kotzebue, canning fish taken by local commercial fishermen. Fish taken commercially by all villagers were transported to Kotzebue for processing. Approximately 10,130 cases of 48 one-pound tall cans of salmon were produced. Also, 330 barrels of hard salt salmon, probably chum, were processed. It is reported that this operation ceased either because of a scarcity of fish or lack of sufficient knowledge of the fisheries of the area (Wigutoff and Carlson 1950).

In 1949 the Kotzebue district was opened to commercial fishing. Subsequently, salmon have been taken primarily in Kotzebue Sound or Hotham Inlet. The commercial fishing area prescribed by the Alaska Department of Fish and Game extends east of a line from markers placed near Aukoolak Lagoon on Sheshalik Spit to Cape Blossom on Baldwin Peninsula. Gill nets were set in coastal waters near stream mouths taking primarily chum salmon. Ice fishing on Hotham Inlet and Selawik Lake during the winter provides inconnu and whitefish. During the winter of 1948-1949 over 100,000 pounds of these two species were marketed, primarily by air to Barrow, Anchorage, Fairbanks, and Nome. During this period, local bush pilots would land on the ice and buy several hundred pounds of frozen fish to take with them on return flights to these larger communities. One of these traders reportedly shipped nearly 100,000 pounds of inconnu to Seattle. In both 1949 and 1950 over 150,000 pounds of inconnu were shipped from Kotzebue to Barrow.

In more recent years salmon has been the predominant species sought by the commercial fishery. A large catch was made in 1962, amounting to 130,075 salmon

with a steady increase recently. The 1974 catch was over 600,000 fish. Fresh salmon, inconnu, and Arctic char are processed by the Kotzebue Sound Area Fishery Cooperative, and fresh inconnu, Arctic char, and whitefish are processed by Hansons Trading Company in Kotzebue. Recent products in the Kotzebue district include canned chum salmon, fresh-frozen chum salmon and salmon roe, and cured salmon roe.

The commercial fishery for inconnu in the Kotzebue Sound-Hotham Inlet area has yielded up to 100,000 pounds annually (Wigutoff and Carlson 1950). In general, the commercial catch declined in subsequent years. Some feel that the inconnu is being overharvested (Alt 1969) and an expansion of the commercial fishery for inconnu into other areas in the future seems unlikely.

History of Sport Fishery
Selawik National Wildlife Refuge, Alaska

Little sport fishing occurred in the proposed refuge area in early years. Some resident sport angling by villagers from Kotzebue occurred in the pre-1950's in Hotham Inlet, both through winter ice and in the summer. Kotzebue residents also fished the lower Kobuk River. Later in the 1950's, some sport fishing pressure was exerted by airplane pilots, which increased during the 1960's, when two guides began an operation on the Kobuk. Subsequently, more private pilots sport fished on the Kobuk and Selawik Rivers, with many people also flying in on mail planes and hiring Native boat operators. Also, during the 1960's, charter pilots from Kotzebue, Kobuk, and Ambler began flying sport angelers to the Kobuk and Selawik Rivers, and float trips increased during this period. No great increase in sport fishing pressure occurred from the late 1960's to the mid 1970's.

The main target species for sport fishing is the inconnu, probably because of its large size and its scrappy, fighting behavior. Other species taken include pike, grayling, Arctic char and salmon. Sport fishing pressure was, and still is, light on the Selawik River and Selawik Lake, and only slightly greater on the Kobuk River. Probably an increase in sport fishing pressure, predominantly on inconnu, can be expected as the sporting qualities of this species are advertised and accommodations for sport anglers are provided (Alt 1969). Nearly all sport fishing within the Selawik area of interest requires travel by plane or boat.

Anadromous Species Abbreviations

AL = Arctic lamprey

AC = Arctic char

PS = Pink salmon

CS = Chum salmon

RS = Sockeye salmon

KS = King salmon

SS = Coho salmon

In = Inconnu

BWF = Broad whitefish

ACI = Arctic cisco

LC = Least cisco

WF = Whitefish (species unidentified)

RBS = Rainbow smelt

BC = Bering cisco

UN = Species unidentified

Anadromous Fish Habitat
Selawik National Wildlife Range
and Associated Areas of Ecological Concern

Drainage Name	Anadromous Species (Habitat in miles)								
	AC	PS	CS	RS	KS	SS	IN	BWF	LC
ckland	7		7						
uk			X						
identified Baldwin Penin. R.			X						
lawik	X		X				135	X	X
Selawik L.	X		X				X	X	X
Tuklomarak R.							X		
Tuklomarak L.							X		
Fox R.							X		
Inland L.							X		
eat R.							X		
Nuleargowik R.							X		
Tagagawik R.									
Kugarak R.									
buk	190	75	190	X	35	X	190	X	X
Squirrel R.		45	45						
Ambler R.			25						
Redstone R.									
Shungnak R.			15						
Kogoluktuk R.									
atak							5		
Total Habitat	197	120	282		35		330		

Anadromous Fish Habitat
Selawik National Wildlife Range
and Associated Areas of Ecological Concern

Drainage Name	Anadromous Species (Habitat in miles)								
	RBS	BC	UN						
ckland	--								
uk									
identified Baldwin Penin. R.									
lawik	X								
Selawik L.	X								
Tuklomarak R.									
Tuklomarak L.									
Fox R.									
Inland L.									
T eat R.									
eargowik R.									
Tagagawik R.			X						
Kugarak R.			X						
buk	X	X							
Squirrel R.									
Ambler R.									
Redstone R.			X						
Shungnak R.									
Kogoluktuk R.			X						
atak									
Total Habitat									

Key Anadromous Fish Spawning and Rearing Areas
Selawik National Wildlife Range
and Associated Areas of Ecological Concern

Drainage Name	Anadromous Species (Key Area in miles)								
	AC	PS	CS	RS	KS	SS	IN.	BWF	LC
uckland	7		4						
auk									
nidentified Baldwin Penin. R.									
elawik							10		
Selawik L.							X		
Tuklomarak R.									
Tuklomarak L.							X		
Fox R.									
Inland L.							X		
reat R.									
ileargowik R.									
Tagagawik R.									
Kugarak R.									
obuk		65	135				80		
Squirrel R.		40	40						
Ambler R.			25						
Redstone R.									
Shungnak R.			15						
Kogoluktuk R.									
oatak									
Key Area Total	7	105	219				90		

Key Anadromous Fish Spawning and Rearing Areas
Selawik National Wildlife Range
and Associated Areas of Ecological Concern

Drainage Name	Anadromous Species (Key Area in miles)								
	RBS	BC	UN						
ickland									
uk									
identified Baldwin Penin. R.									
lawik									
Selawik L.									
Tuklomarak R.									
Tuklomarak L.									
Fox R.									
Inland L.									
eat R.									
leargowik R.									
Tagagawik R.									
Kugarak R.									
buk									
Squirrel R.									
Ambler R.									
Redstone R.									
Shungnak R.									
Kogoluktuk R.									
atak									
Key Area Total									

Magnitude of Runs or Escapements

Selawik National Wildlife Range

Selawik River — Inconnu

Year	No. of Fish	Year	No. of Fish
1963		1970	
1964		1971	1,105 to 1,196*
1965		1972	
1966		1973	
1967		1974	
1968	1,383		
1969			

Notes: Aerial survey
*Incomplete survey - count probably low

Kobuk (total drainage) — Inconnu

Year	No. of Fish	Year	No. of Fish
1963		1970	3,220
1964		1971	8,166
1965		1972	
1966	2,203	1973	
1967	1,025	1974	
1968	4,973		
1969	3,654		

Notes: Aerial Survey

Kobuk (Kobuk village to mouth of Pah River) — Inconnu

Year	No. of Fish	Year	No. of Fish
1963		1970	1,328
1964		1971	650
1965		1972	
1966	1,200	1973	
1967	75	1974	
1968	4,482		
1969	2,101		

Kobuk (total drainage) — Inconnu

Year	No. of Fish	Year	No. of Fish
1963		1970	7,130
1964		1971	12,648
1965		1972	
1966		1973	
1967		1974	
1968			
1969			

Notes: Petersen Tag/recapture population estimates. Probably a high estimate (recapture depended upon subsistence harvest which included immature inconnu).

Magnitude of Runs or Escapements

Selawik National Wildlife Range

obuk (total drainage) Chum Salmon

ear	No. of Fish	Year	No. of Fish
63	8,940	1970	23,326
64	28,032	1971	30,667
65	11,480	1972	52,354
66	8,164	1973	21,706
67	8,112	1974	37,309
68	13,306		
69	16,934		

es: erial Survey

Kobuk (Mouth to Kobuk Village) Chum Salmon

Year	No. of Fish	Year	No. of Fish
1963		1970	
1964	7,985	1971	
1965		1972	
1966		1973	
1967		1974	
1968			
1969			

Notes: Aerial Survey

obuk obuk Village to Pah River) Chum Salmon

ear	No. of Fish	Year	No. of Fish
63		1970	1,753
64		1971	4,953
65	1,000	1972	
66	266	1973	
67		1974	
68	530		
69			

es: Aerial Survey

Kobuk (Upstream of Pah River) Chum Salmon

Year	No. of Fish	Year	No. of Fish
1963	4,535	1970	12,155
1964		1971	12,249
1965	1,750	1972	18,155
1966	1,208	1973	2,470*
1967	2,495	1974	
1968	1,840		
1969			

Notes: Aerial Survey
*Incomplete survey - count probably low

Magnitude of Runs or Escapements

Selawik National Wildlife Range

obuk – NOATAK (total drainage) Chum Salmon			
ear	No. of Fish	Year	No. of Fish
63		1970	
64		1971	
65		1972	
66	257,076	1973	
67	256,628	1974	
68	172,844		
69			

es: etersen tag-recapture population estimate of combined Noatak-Kobuk populations.

Kobuk (Squirrel River) Chum Salmon			
Year	No. of Fish	Year	No. of Fish
1963	2,200	1970	4,418
1964	8,009	1971	6,628
1965	7,230	1972	32,126
1966	1,350	1973	12,345
1967	3,332	1974	32,523
1968	6,746		
1969	6,714		

Notes: Aerial Survey

obuk Chum Salmon Salmon River & Tutuksuk River)			
ear	No. of Fish	Year	No. of Fish
63	2,205	1970	5,000*
64	12,038	1971	6,837
65	1,500*	1972	2,073*
66	5.340	1973	6,891
67	2,286	1974	34,455
68	4,190*		
69	2,720		

es: *Incomplete survey – count probably low

Aerial Survey

Year	No. of Fish	Year	No. of Fish
1963		1970	
1964		1971	
1965		1972	
1966		1973	
1967		1974	
1968			
1969			

Notes:

Subsistence Harvest

Selawik National Wildlife Refuge

Chum Salmon			Kotzebue 331
Year	No. of Fish	Year	No. of Fish
1963	5,835	1970	6,184
1964	7,753	1971	1,737
1965	8,058	1972	1,151
1966	3,640	1973	1,172
1967	4,032	1974	
1968	4,324		
1969	1,768		

Notes: Kotzebue village
ADFG estimates these harvest figures represent at least 70% of the actual harvest

Chum Salmon			Kotzebue 331
Year	No. of Fish	Year	No. of Fish
1963	4,304	1970	6,077
1964	2,167	1971	7,144
1965	5,596	1972	1,774
1966	3,141	1973	2,312
1967	2,350	1974	2,726
1968	2,424		
1969	1,301		

Notes: Noorvik village
ADFG estimates these harvest figures represent at least 70% of the actual harvest

Chum Salmon			Kotzebue 331
Year	No. of Fish	Year	No. of Fish
1963	1,973	1970	3,457
1964	783	1971	5,177
1965	1,598	1972	1,435
1966	433	1973	4,470
1967	1,489	1974	2,726
1968	2,488		
1969	2,458		

Notes: Kiana village
ADFG estimates these harvest figures represent at least 70% of the actual harvest

Chum Salmon			Kotzebue 331
Year	No. of Fish	Year	No. of Fish
1963	755	1970	2,899
1964	2,142	1971	2,299
1965	1,340	1972	1,469
1966	912	1973	1,529
1967	679	1974	1,651
1968	457		
1969	3,525		

Notes: Ambler village
ADFG estimates these harvest figures represent at least 70% of the actual harvest

Subsistence Harvest

Selawik National Wildlife Refuge

Chum Salmon			Kotzebue 331
Year	No. of Fish	Year	No. of Fish
1963	1,240	1970	3,450
1964	3,134	1971	2,653
1965	2,160	1972	2,665
1966	899	1973	4,406
1967	1,500	1974	6,243
1968	1,600		
1969	2,550		

Shungnak village
ADFG estimates these harvest figures represent at least 70% of the actual harvest

Chum Salmon			Kotzebue 331
Year	No. of Fish	Year	No. of Fish
1963	200	1970	700
1964	1,020	1971	1,931
1965	877	1972	2,119
1966	625	1973	1,917
1967	175	1974	2,251
1968	1,030		
1969	1,655		

Notes: Kobuk village
ADFG estimates these harvest figures represent at least 70% of the actual harvest

Chum Salmon			Kotzebue 331
Year	No. of Fish	Year	No. of Fish
1967	162		
1968	38		
1970	344		
1971	155		
1972	59		
1973	1,722		

Buckland Village
Prior to 1962 - annual subsistence = 11,500

Year	No. of Fish	Year	No. of Fish

Notes:

Subsistence Harvest

Selawik National Wildlife Refuge

onnu			Kotzebue 331	Inconnu			Kotzebue 331
ar	No. of Fish	Year	No. of Fish	Year	No. of Fish	Year	No. of Fish
-67	10,060			1966-67	7,164		
-68	21,871			1967-68	5,080		
-69	4,362			1968-69	4,140		
	3,520			1970	1,601		
	682			1971	3,416		
	311			1972	-		
	-			1973	-		

es: Kotzebue village

Notes: Selawik village

onnu			Kotzebue 331	Inconnu			Kotzebue 331
Year	No. of Fish	Year	No. of Fish	Year	No. of Fish	Year	No. of Fish
66-67	3,792			1966-67	925		
67-68	1,910			1967-68	766		
68-69	1,324			1968-69	409		
70	7,126			1970	790		
71	5,975			1971	1,060		
72	2,213			1972	307		
73	4,384			1973	-		

otes: Noorvik village

Notes: Kiana village

Subsistence Harvest

Selawik National Wildlife Refuge

nconnu		Kotzebue 331	
Year	No. of Fish	Year	No. of Fish
66-67	194		
67-68	559		
68-69	554		
70	125		
71	711		
72	350		
73	83		

ot Ambler village

Inconnu		Kotzebue 331	
Year	No. of Fish	Year	No. of Fish
1966-67	166		
1967-68	837		
1968-69	530		
1970	608		
1971	671		
1972	639		
1973	195		

Notes: Shungnak village

Inconnu		Kotzebue 331	
Year	No. of Fish	Year	No. of Fish
66-67	99		
67-68	270		
68-69	553		
70	158		
71	1,068		
72	12		
73	226		

ot Kobuk village

Year	No. of Fish	Year	No. of Fish

Notes:

Subsistence Harvest

Selawik National Wildlife Refuge

itefish			Kotzebue 331				
Year	No. of Fish	Year	No. of Fish	Year	No. of Fish	Year	No. of Fish
970	58,165 *						
974	52,000 **						
N	MAJORITY ARE NON-ANADROMOUS HUMPBACK WHITEFISH, BUT INCLUDES SOME ANADROMOUS BROAD WHITEFISH AND LEAST CISCO. * ALL FIVE VILLAGES ON KOBUK RIVER ** NOORVIK AND KIANA VILLAGES.			Notes:			

Year	No. of Fish	Year	No. of Fish	Year	No. of Fish	Year	No. of Fish
N				Notes:			

Commercial Harvest

Selawik National Wildlife Refuge

King Salmon — Kotzebue 331

Year	No. of Fish	Year	No. of Fish
1963	7	1970	
1964		1971	1
1965		1972	3
1966	1	1973	5
1967	1	1974	
1968	2		
1969			

Notes:

Pink Salmon — Kotzebue 331

Year	No. of Fish	Year	No. of Fish
1963	136	1970	
1964	5	1971	
1965		1972	
1966		1973	5
1967	3	1974	
1968			
1969	48		

Notes:

Sockeye Salmon — Kotzebue 331

Year	No. of Fish	Year	No. of Fish
1963		1970	
1964		1971	
1965		1972	
1966		1973	
1967		1974	
1968			
1969			

Notes:

Coho Salmon — Kotzebue 331

Year	No. of Fish	Year	No. of Fish
1963		1970	
1964		1971	
1965		1972	
1966		1973	
1967		1974	
1968			
1969			

Notes:

Commercial Harvest

Selawik National Wildlife Refuge

Chum Salmon — Kotzebue 331

Year	No. of Fish	Year	No. of Fish
1963	54,445	1970	159,664
1964	76,499	1971	154,956
1965	40,034	1972	169,664
1966	30,764	1973	375,537
1967	29,400	1974	627,912
1968	30,384		
1969			

N

Tagging study indicates approximately 75% of chum salmon caught in this district are bound for the Noatak River drainage; remaining 25% are bound for Kobuk drainage.

Arctic Char — Kotzebue 331

Year	No. of Fish	Year	No. of Fish
1963		1970	2,095
1964		1971	3,649
1965		1972	7,746
1966	3,325	1973	640
1967	367	1974	2,605
1968	3,181		
1969	1,089		

Notes:

Whitefish — Kotzebue 331

Year	No. of Fish	Year	No. of Fish
1963		1970	
1964		1971	
1965		1972	
1966		1973	
1967		1974	254
1968			
1969			

N

Data limited.
No harvest quantities available

Inconnu — Kotzebue 331

Year	No. of Fish	Year	No. of Fish
1966-67		1974	
1967-68			
1968-69			
1970			
1971	277		
1972	1		
1973	3		

Notes: Taken during salmon season only

Commercial Harvest

Selawik National Wildlife Refuge

Inconnu			Kotzebue 331
Year	No. of Fish	Year	No. of Fish
65-66		1973	1,087
66-67		1974	
67-68			
68-69			
70			
71	179		
72	2,325		

ot Special permit harvest only

Inconnu			Kotzebue 331
Year	No. of Fish	Year	No. of Fish
1965-66	4,243	1973	1,090
1966-67	992	1974	2,535
1967-68	2,375		
1968-69	2,206		
1970	305		
1971	456		
1972	2,326		

Notes: Total harvest

Year	No. of Fish	Year	No. of Fish

ot

Year	No. of Fish	Year	No. of Fish

Notes:

Commercial Value

Selawik National Wildlife Refuge

um Salmon — Kotzebue 331

Year	$ Value	Year	$ Value
63	19,140	1970	186,000
64	34,660	1971	200,000
65	18,000	1972	260,000
66	25,000	1973	925,735
67	28,700	1974	1,475,600
68	46,000		
69	71,000		

Arctic Char — Kotzebue 331

Year	$ Value	Year	$ Value
1963		1970	
1964		1971	3,685
1965		1972	9,600
1966		1973	737
1967		1974	
1968			
1969			

Notes:

connu — Kotzebue 331

Year	$ Value	Year	$ Value
66-67	1,390	1974	
67-68	3,560		
68-69	2,010		
70	470		
71	650		
72	3,420		
73	1,875		

Year	$ Value	Year	$ Value

Notes:

Commercial Effort

Selawik National Wildlife Refuge

r	Commercial Licenses	Boat Days*	Set Net Registrations	Fathoms of Set Net	
3	110	693	60	8,550	Notes: * (No. of Boats) x (Hours Fished) / 24 = Boat Days
4	81	560	52	5,550	
5	61	410	45	5,450	
6	64	548	44	4,650	
7	54	410	30	3,600	
8	90	643	59	6,750	
9	77	800	46	5,400	
0	160	1,368	77	9,800	
1	198	1,393	91	11,100	
2	202	3,666	101	13,100	
3	390	3,663	156	19,250	
4	401		191	26,500	

Sport Harvest

Selawik National Wildlife Refuge

Inconnu (Selawik)			Kotzebue 331	Inconnu (Kobuk)			Kotzebue 331
Year	No. of Fish	Year	No. of Fish	Year	No. of Fish	Year	No. of Fish
1965	< 500						
1970	< 500						

Selawik River and Lake, Tuklomarak River and Hotham Inlet

Notes: 200 anglers per year harvest less than 1,000 fish per year

Whitefish			Kotzebue 331				
Year	No. of Fish	Year	No. of Fish	Year	No. of Fish	Year	No. of Fish

Some broad whitefish and least cisco taken incidently to inconnu sport fishery in Kotzebue vicinity, Selawik River and Lake, and Hotham Inlet.

Notes:

ANADROMOUS FISH INVENTORY NEEDS

Selawik National Wildlife Refuge, Alaska

1. The anadromous fish species and habitat of the upper Kobuk River drainage are poorly known. Recent and continuing mineral activity in this area would indicate the need to conduct more detailed surveys of this river and its tributaries upstream from its confluence with the Squirrel River.

2. Sport harvest data (creel census) needs to be collected in more detail than is currently available, primarily for inconnu in the Kobuk and Selawik River drainages and in Hotham Inlet.

Anadromous Fish Inventory Update System
Sekawik National Wildlife Refuge, Alaska

Almost all the recent commercial fisheries investigations in the area have been done by the Division of Commercial Fisheries, Alaska Department of Fish and Game. This work has been conducted by a commercial fish biologist headquartered in Nome. Paul Cunningham is the biologist currently responsible for this area. Usually the most comprehensive statistical summaries are compiled in the Annual Management Report, Arctic-Yukon-Kuskokwim Region, an informal unpublished report compiled by the A-Y-K regional management biologists. This document is prepared at the Anchorage office with major contributions from the various field personnel. Usually this data will be available in the spring following the field season - probably April or May would be the optimum time to request data from the previous year.

Sport fish information is normally handled through the Fairbanks office of the Division of Sport Fish, Alaska Department of Fish and Game. A key contact for previous years has been Kenneth Alt, primarily due to his work with inconnu (sheefish) in the Kobuk and Selawik Rivers. These studies on inconnu and some additional investigations of Arctic char, primarily in the Wulik River northwest of Kotzebue, were conducted under the Federal Aid in Fish Restoration Study Program prior to 1972. No studies are currently active in the Kotzebue area under this program.

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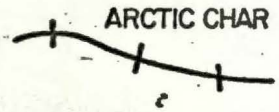
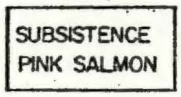


Anadromous Fish Stream with Identified Species

Key Spawning or Rearing Area

Key Area Value for Identified Species



Significant Harvest Locale
with Important Species Named

SELAWIK NWR — Proposed Refuge Name

Boundary of Proposed Refuge
and Area of Ecological Concern

Existing Refuge Boundary

Fisheries Research Station

Airfield

Mineral Location

Hydroelectric Dam Site

Oil or Gas Well