United States Department of the Interior, Oscar L. Chapman, Secretary
Fish and Wildlife Service, Albert M. Day, Director

Fishery Leaflet 375

Washington 25, D. C. May 1950

A SURVEY OF THE COMMERCIAL FISHERY POSSIBILITIES OF SEWARD PENINSULA AREA, KOTZEBUE SOUND, AND CERTAIN INLAND RIVERS AND LAKES IN ALASKA

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Introduction

Since the Nome gold rush in 1900, there have been periodic concerted efforts made by residents and business men of that area to interest government in exploration and to encourage private development of the commercial fisheries in that area. Not until 1945, however, was there a survey made to determine what possibilities, if any, existed for such development. Anderson and Carlson [1] spent several days in Nome in the summer of 1945 and interviewed a number of people who had knowledge of the local fishery resources. Their report summarized the information thus obtained. In general, the report indicated that knowledge of the extent and location of the local fishery resources was inadequate for private industry to attempt to exploit them. To overcome this handicap they recommended a program of exploratory fishing of several years' duration. It was not until the late summer of 1948 that an exploratory vessel became available for this work. The U. S. FWS Washington arrived at Nome September 12, 1948 [2]. Adverse weather conditions did not permit fishing in the immediate vicinity for more than a few days. Six drags were made in the Nome area and then the Washington set a course for St. Lawrence Island. The results of these six drags were not very encouraging. However, in several of the drags there were "many shrimp". In June and July of 1949 the trawler, Deep Sea, operating under a charter to the U. S. Fish and Wildlife Service made 51 drags in the northeastern Bering Sea, 17 of which were made in Norton Sound and waters off Nome [3]. Results of these drags were promising.

Object of Survey and Area Covered

The present report is that of a shoreside survey made beginning in the middle of June and ending August 10, 1949. The object of this survey was to determine what fishery resources exist or are presently utilized in the immediate vicinity of Nome and in and near the communities on the Seward Peninsula, Kotzebue Sound and in certain inland rivers and lakes.

1/ Anderson, A. W., and Carlson, C. B. 1945. A preliminary report on the fishery possibilities of the Nome area. U. S. Fish and Wildlife Service, September. (mimeographed)

2/ Ellson, J. G., Knake, Boris, and Dassow, John. 1949. Report of Alaska exploratory fishing expedition, fall of 1948, to northern Bering Sea. Fishery Leaflet 342, U. S. Fish and Wildlife Service, June.

3/ Ellson, J. G., Powell, Donald E., and Hildebrand, Henry H. 1950. Exploratory Fishing Expedition to the Northern Bering Sea in June and July, 1949, Fishery Leaflet 369, U. S. Fish and Wildlife Service, March.

The survey made by Anderson and Carlson was at the request of the Alaska Development Board. More recently the Board prepared a report on the economic opportunities in the Second Judicial Division of Alaska 4/. In this report it was indicated that development of a fishery industry "would be a great contribution to the entire economy of the region".

The Legislature of the Territory of Alaska, in session during February and March 1949, appropriated funds to the Fisheries Experimental Commission for the biennium 1949 - 1951 for the present survey.

Since Nome is the center of the economic life of this area, and since transportation and communication facilities to the surrounding country are centered in Nome, a "headquarters" was established there with the assistance and cooperation of the administrative assistant of the Alaska Native Service. From Nome, the survey covered Teller, Wales, Shishmaref, Kotzebue, and Kiana to the north and west, and Port Safety, Golovin, White Mountain, and Unalakleet to the east and south. Time did not permit coverage of the Yukon and Kuskokwim Rivers at more than Holy Cross, and McGrath and Bethel, respectively. All travel to these places, with the exception of Port Safety, was performed by airplane. Port Safety can be reached from Nome by road. Figure 1 shows the location of the above named places.

Type of Information Sought

The existence of a commercially exploitable resource is in itself insufficient for the development of a commercial fishery. Adequate facilities must be available ashore before there can be developed an industry which will benefit the local economy. For this reason the availabilities of power, potable water, storage space, transportation, labor, etc. were also studied.

Nome and Vicinity

There are about 40 towns and villages in the Seward Peninsula area. Of these only one, Nome, is incorporated. In none of these places, again excepting Nome, is there a public or municipal water supply, a sewerage system, or a central source of electric power.

4/ Browne, Ralph. 1949. Northwestern Alaska, a report on the economic opportunities of the Second Judicial Division. Alaska Development Board, Juneau, June.

Nome

Nome has an estimated stable population of about 1600. Mining for precious metals, primarily gold, is the economic backbone of the area. The central electric power plant is diesel driven. Rates per kilowatt hour of power are the highest in Alaska (Table 1.).

Table 1 - Rates for Electricity in Nome

Light Rate		Rate per KWH per month
1st	300 KWH	15 cents
All over	300 KWH	12½ cents
Power Rate		
1st	500 KWH	12½ cents
Next	1,000 KWH	10 cents
Next	1,500 KWH	7½ cents
All over	3,000 KWH	5 cents

Power is available in 60 cycles, 3 phase and in the standard voltages - 110, 220, and 440. The management of the utility, privately owned, has indicated that power for a cold storage and freezing plant could perhaps be furnished at less than 5 cents per kilowatt hour per month on off peak loads.

Perhaps even more important than electric power and a more serious problem is the availability of potable water. Permafrost conditions and long cold winters present a major handicap to the solution of this problem. During the summer months, from about late June to the first week in October, water is available through the municipal water supply system. A major portion of the piping in this system is laid above ground to facilitate disconnecting before the freeze-up. During the remainder of the year water is sold by the gallon and delivered in tank trucks by private companies. Domestic users pay 25 cents for five gallons. Commercial users contract for water at lower rates, depending on volume used.

Commercial cold storage and freezing space is not available in Nome. Because ocean shipping to Nome is possible for a very limited time, food supplies for the year must be stored. Therefore stores selling meat and perishables, and some restaurants, have small units adequate for their own needs. The numerous small storages are more costly to maintain and operate than would be one central plant.

All passenger travel to and from Nome is by air. Three airlines carry passengers, express, and freight to and from Nome via Fairbanks or Anchorage. The bulk of supplies and equipment is shipped by boat. An average of three ships per year come to Nome. These ships bring frozen meats, and other frozen foods. At present, there is no refrigerated cargo, in fact very little ship cargo of any kind, outbound from Nome. It has been indicated by the local agent of the steamship company that special rates, attractive to new industry, could be established for outgoing frozen and dry cargo. Tables 2 and 3 give the freight rates for a selected list of products and supplies.

There is an ample supply of labor in Nome. The Eskimo, who constitutes two thirds of the population of the area, forms the major labor potential 5/. The Eskimo people work in all trades - unskilled, semi-skilled, and skilled. Because they have traditionally depended on natural resources, both fish and game, for their livelihood, they are an especially good source of labor for fisheries production. The Eskimos are becoming trained in the commercial handling of fish. Every year a larger number of them are being employed in the Bristol Bay salmon canneries. The ability and willingness of the Eskimos to work at productive endeavors is praised by most employers. They are especially deft.

Browne 5/ indicates that salmon runs in the Nome area are reported to be fairly heavy and that sufficient salmon is available to supply a cannery. Anderson and Carlson 6/, on the other hand, indicated that such a view was over-optimistic. They reported further that the salmon runs in the Nome area were insufficient to support a cannery operation. The latter statement cannot be too strongly stressed. The 1949 salmon run in Nome River was practically non-existent. The species occurring are chum, silver, pink, and an occasional sockeye and king.

Halibut have not been known to be present in the close vicinity of Nome. In the six drags made by the Washington 7/ in 1948 near Nome there were reported "1 small halibut" and "1 halibut weighing six pounds". The Eskimos seldom take halibut on their jig lines in winter fishing through the offshore ice for tomcod.

5/ Browne, Ralph. 1949. Northwestern Alaska, a report on the economic opportunities of the Second Judicial Division. Alaska Development Board, Juneau, June.

6/ Anderson, A. W., and Carlson, C. B. 1945. A preliminary report on the fishery possibilities of the Nome area. U. S. Fish and Wildlife Service, September. (mimeographed)

7/ Ellson, J. G., Knake, Boris, and Dassow, John. 1949. Report of Alaska exploratory fishing expedition, fall of 1948, to northern Bering Sea. Fishery Leaflet 342, U. S. Fish and Wildlife Service, June.

Table 2 - Ocean Freight Rates between Seattle and Points in Alaska
(In cents per 100 lbs. or per cubic foot)

Between Seattle and	Nome, Golovin Unalakleet [1]		Teller, Wales [1]		Kotzebue, Shishmaref [1]	
Items	per 100 lbs.	per cu.ft.	per 100 lbs.	per cu.ft.	per 100 lbs.	per cu. ft.
Boxes, Fibreboard, K. D. flat or folded flat	-	48	-	-	-	-
Box Shooks (Wood)	-	40	-	-	-	-
Cans, empty, set up, viz.:Salmon, Clam, Shrimp, Crab, Oyster or Liver	-	38	-	-	-	-
Cans, Salmon or Clam, collapsed or semi-formed	-	40	-	-	-	-
Can ends or Tops	80	-	-	-	-	-
Cooperage (barrels, including iron barrels, kegs or tierces) set up or knocked down, including heads and bungs	-	50	-	55	-	60
Cordage, Rope (not including Wire Rope) Cotton and Linen Fish Netting, Twine, Fish Seine, Wood or Cork Fish Seine Floats	-	50	-	-	-	-
Fish, Canned (Salmon, Halibut, Clams, Crab, Shrimp, Trout)	-	35	-	-	-	-
Fish, Dried or Salted, in packages	-	40	-	42½	-	45
Freight, N.O.S., ordinary, i.e. General Merchandise [2]	150	75	155	77½	160	80
Salt, Common, in sacks or barrels	80	-	85	-	90	-

Source: Tariff No. 660, Alaska Steamship Company, Bering Sea Route.

[1] Rates apply between Seattle and anchorage offshore. Lighterage charges from steamer at anchorage to shore are approximately 40 to 50 percent additional.

[2] No rate has been established for frozen fish. The rate is therefore this rate plus 50 percent additional for refrigerator service. Rates are shown in both columns. The one which creates the greater charge applies.

Table 3 - Ocean Freight Rates between certain way ports in Alaska
(In cents per 100 lbs. or per cubic ft.) 1/

	Nome, Golovin Unalakleet 2/		Teller, Wales 2/		Kotzebue, Shishmaref 2/	
	per 100 lbs.	per cu. ft.	per 100 lbs.	per cu. ft.	per 100 lbs.	per cu. ft.
Nome, Golovin, Unalakleet 2/	75	37½	75	37½	100	50
Teller, Wales 2/	75	37½	75	37½	75	37½
Kotzebue, Shishmaref 2/	100	50	75	37½	75	37½

Source: Tariff No. 660, Alaska Steamship Company, Bering Sea Route.

1/ Rates are named in both columns. The rate which creates the greater charge applies. Rates in this table are for FREIGHT, N.O.S., Ordinary, i.e. General Merchandise. Refrigerator service charges are 50 percent additional.

2/ Lighterage charges to and from steamer at anchorage offshore are approximately 40 to 50 percent additional at both port of origin and destination.

Whitefish, Coregonus sp., are taken in both fresh and salt water. Fishermen on the Nome River use gill nets for whitefish set at right angles to the beach in the sea off the mouth of the river. They also take whitefish with gill nets inside the mouth of the river and up the river as well. Here again, the fish are not very numerous and could not support a commercial fishery.

King crab and shrimp were taken by the Washington near Nome in encouraging numbers. During the subject survey attempts were made to take shrimp in box traps such as are commonly used with good success in Southeastern Alaska. Two traps were set about 1/2 to 3/4 mile offshore and 1/4 mile to the east of the mouth of the Snake River. The traps were hauled up daily for three days, July 9 through 11. No shrimp were taken.

King crab are taken through the ice by the Eskimos using lines baited with chunks of tomcod or pieces of red cloth. Often shrimp are found to be clustered over the bait when the line is hauled up. Local residents report taking shrimp up to 5 inches long in crude traps.

The king crabs taken in Norton Sound and in general north of latitude 60 degrees are smaller than those taken in Bering Sea by the Alaska Crab Investigation 8/. It has been conservatively estimated that daily production per fisherman fishing through the ice off Nome beach could be expected to be 50 crabs. These crabs will each yield about a pound or slightly less of meat.

Port Safety

Approximately 18 miles east of Nome by road is Safety or Port Safety. No organized or assembled community exists. Several families live at this place and others locate here from Nome during the summer months. Electricity is not available from a central source. Some residents use windchargers for electric lights and small radio receivers. There is no regular transportation available to this place. The road from Nome is presently being improved. There are no storage facilities at Safety. Some residents have dug wells in the thawed high beach ground. This water is good but if drawn upon too rapidly for just ordinary home use, the salt water rapidly comes up. There is insufficient fresh water for any commercial use.

Local residents set nets inside the lagoon or sound and take salmon, whitefish and Dolly Varden trout. The salmon, mostly chums but

8/ U. S. Department of the Interior. 1942. Report of the Alaska Crab Investigation. Fishery Market News Supplement, U. S. Fish and Wildlife Service, May.

including some silvers and pinks, are sold in the stores in Nome or directly by the fishermen to housewives. Fish are split and air-dried for local human use and for dog feed. Some fishermen smoke salmon for home use. Some herring and salmon bellies are salted. A choice pan fish which often occurs in large numbers in the ocean surf is the capelin, Mallotus sp., a species of smelt. It runs close in on the beach on the surf to spawn. This species completes its life cycle in one year 9/. It is a food of the coho or silver salmon. It can be taken on the beach with dip nets. Inquiries indicate that this species could be put up frozen in consumer size packages for sale in Nome, Anchorage, Fairbanks, and Barrow.

In the winter, king crabs and shrimp are taken through the offshore ice. One local fisherman reported taking at will commercial quantities of shrimp in a crude net.

Golovin and White Mountain

Golovin is a small Eskimo village on the eastern shore of Golovin Bay in Norton Sound. The population is estimated at about 100. There is no central source of potable water or electric power. It might be possible to obtain a supply of water in the summer from one of the nearby rivers but human pollution necessitates treatment or purification for use on food fishes for sale.

At White Mountain, about 50 miles up the Fish River from Golovin, the Alaska Native Service maintains a boarding school. The school has a central power supply and a water and sewage system. The village of White Mountain has none of these facilities. The airplane is the primary means of communication and travel to these villages. Supplies arrive by steamer at Golovin anchorage from which they are lightered to Golovin proper or to White Mountain. At both Golovin and White Mountain there is an ample supply of labor for any possible commercial fishery activities.

Anderson and Carlson 10/ tabulated the production of salted herring in the Golovin Bay area. Between 1923 and 1941 a total of 1,932,875 pounds of herring were salted. Herring salting was discontinued largely because of the advent of World War II. Every able-bodied man was recruited either for military service or on necessary military construction. Shipping space was at a premium and rates became high because of war risk and other charges attributable to the emergency.

9/ Clemens, W. A. and Wilby, G. V. 1946. Fishes of the Pacific Coast of Canada. Bulletin No. LXVIII. Fisheries Research Board of Canada, Ottawa.

10/ Anderson, A. W., and Carlson, C. B. 1945. A preliminary report on the fishery possibilities of the Nome area. U. S. Fish and Wildlife Service, September. (mimeographed)

The herring run in Golovin Bay occurs late in the summer. For this reason, and because the herring are reported to be present offshore and beyond the reach of gill nets and haul seines, Anderson and Carlson 11/ suggested the use of purse seines to permit capture of the herring earlier. However, the fishery regulations 12/ prohibit the use of purse seines in this area in commercial fishing for herring, except for bait purposes.

In 1918 and 1919 herring were seined in Golovin Bay 13/. All herring were scotch cured and sold in markets in the eastern United States. Three size grades were packed. The large herring, Number 1, measuring 12 to 13 inches total length were packed about 450 to the barrel. Number 2 herring ran about 550 per barrel and Number 3s were 650 to 700 per barrel. Each barrel contained a net of 250 pounds of herring. It is reported herring are being taken and salted at Elim in Norton Bay. Information on the extent to which herring are utilized at Elim is not available. It is likely that this use is only for local food supply and not commercial production. The former operator at Golovin maintains that the herring runs at Golovin and Elim are definitely large enough for commercial exploitation for food purposes but not for use in a reduction plant. The possibility appears to exist for the production of salted herring.

At the White Mountain school, the students and teachers use gill nets and beach seines on the Fish River for salmon (mostly chums), whitefish, Dolly Varden trout and occasionally other species. Some of the fish are split and air-dried and some are frozen for dog food and for use in the school dining facilities. As a result of a demonstration and instructions on canning given during this survey, some of the salmon will also be canned for the school food supply.

Teller

Of all of the communities covered in this survey, Teller is the only ocean port with a good harbor. A long spit separates Port Clarence, the outer harbor, from Grantley Harbor, the inner one. According to the United States Coast Pilot 14/ "Port Clarence and Grantley Harbor were once the rendezvous for the large whaling fleet that annually visited Bering Sea and the Arctic Ocean". Commercial fishing vessels of all kinds could use these harbors during the normal navigation season, about June 25 to November 1.

11/ Anderson, A. W., and Carlson, C. B. 1945. A preliminary report on the fishery possibilities of the Nome area. U. S. Fish and Wildlife Service, September. (mimeographed)

12/ U. S. Department of the Interior. 1949. Laws and Regulations for protection of the commercial fisheries of Alaska. Regulatory Announcement 25, Fish and Wildlife Service, March.

13/ The information included in this paragraph was obtained from Jack Young, now a resident of Ketchikan, Alaska, who was the herring operator in Golovin from 1923 to 1941.

14/ U. S. Department of Commerce. 1947. United States Coast Pilot, Alaska, Part II. Coast and Geodetic Survey, May.

At one time Teller was the supply point for considerable mining activity in the vicinity. At present, there is little mining activity in the area. The village of Teller has a population of approximately 125. Potable water is obtained by collection of rain water off roofs and from snow and ice. There is no central power plant. A number of homes use windchargers or gasoline generators for radios and for lighting. One steamer a year delivers freight directly to Teller anchorage. Freight rates are shown in Tables 2 and 3. Additional supplies are lightered from Nome. A mail-boat from Nome operates during the season of open navigation. Airplane service from Nome is available as traffic warrants and weather permits.

The natives of Teller fish for whitefish and salmon with gill nets in Tuksuk Channel, connecting Grantley Harbor with Imuruk Basin. These fish are split and dried for dog feed and human food. Some fish is salted.

For many years chum salmon have been hard-smoked at Teller for local consumption. Some has gone to Nome and other places in the area. This species here is quite fat and the meat is much redder than is the meat of the same species in southeastern Alaska. Some silvers and occasionally kings are also taken at Teller. All the salmon in this area appear to be of very high quality. This is true even of the fish which have entered the brackish and even the fresh water for some distance.

Herring are found in the vicinity of Port Clarence. However, little attempt has been made to exploit this species in any volume. Some herring is taken in gill nets and is salted for local consumption. It is doubtful whether the herring resource is large enough to support anything but an incidental small salting operation together with some salmon smoking for markets in Nome, Barrow and perhaps in Anchorage and Fairbanks. The smoked salmon could be put up in cans or jars and sterilized to avoid the necessity for refrigerating this highly perishable product.

As can be seen from Figure 1, Teller is located some distance from the open sea. The natives of the village hunt seal and whale for food but little fishing through the ice is done. King crabs are known to occur and can be taken offshore through the pack ice. Shrimp are also reported to be present.

Wales

On the westernmost tip of North America is the small Eskimo village of Wales. The population does not exceed 75 which includes the white school teacher, the weather observer and their families. Very little fishing is done at Wales. In the summer of 1949, there were only two individuals who were using crude and ineffective gill nets on the beach. These had taken less than a dozen fish by the middle of July.

King crabs, shrimp, herring, whitefish, and salmon are known to occur in the vicinity of Wales but not directly offshore from the village. The natives report that king crab and shrimp have been taken in small numbers offshore east of Cape Prince of Wales. Off the cape the ocean and winds are rather unpredictable and treacherous. Navigation close to shore is therefore quite dangerous. In addition, the ocean current sweeps by the cape northward at a velocity of 2 to 3 miles per hour. In the winter, winds accompanied by ever present fog make conditions equally difficult. Even airplane travel in the vicinity of Cape Prince of Wales is quite hazardous and local pilots are not eager to accept requests for flights to the village. High winds varying continually and momentarily are a perpetual danger.

For food the natives utilize birds and their eggs, some seal, walrus, and whale. A bounty of six dollars per seal and some relief payments and pensions provide a cash income.

Shishmaref

The first village on the mainland coast in the Arctic Ocean is Shishmaref. There is an estimated population of about 75. Wind-chargers for electric lights and small radios are used extensively. There are also several gasoline powered electric generators in the village. Potable water is very scarce. It is obtained almost entirely from ice and snow. In the winter these are readily available. For water from about the end of June to early October, a supply of blocks of ice is stored in underground storage rooms. The ice for this use is obtained in the winter from nearby ponds and small lakes and, to some extent, from the ice pack in the ocean. When water is needed a chunk of ice is brought into the house and placed in a container to melt. One steamer per year, usually in late July or by the middle of August, brings supplies. Freight rates are shown in Tables 2 and 3. The natives of the village perform the lighterage services from the steamer to the high water mark in skin boats under the name Shishmaref Cooperative Lighterage Company. The lighterage rate is $7.00 per ton. From the high water mark the freight is hauled to the homes, stores, etc. by individual Eskimos at a fee per hour.

Very little fish is taken at Shishmaref. Shrimp are reported to be washed up on the beach in great numbers. However, these are usually dead and are not used as food. King crabs apparently do not occur on the coast north of Cape Prince of Wales. Occasionally a shed skeletal portion of a king crab is washed up on the beach. It is reported that herring come in and in fairly good numbers. The natives dry and eat some but do not like the fish very much. The herring are reported to be too fat for dogs. Some chum salmon is taken in gill nets and air-dried. Local food consists largely of seal, whale, birds and other wildlife. Skin sewing

and ivory carving provide some income. A bounty on hair seals and welfare payments provide additional support.

Kotzebue Sound

For several years there have been reports of large runs of sheefish or inconnu, Stenodus mackenzii, see Figure 2, in the vicinity of Kotzebue Sound. This anadromous fish varies in size from about 5 to 50 pounds with an occasional fish as large as 80 pounds reported. They are said to average about 20 pounds.

Kotzebue

The village of Kotzebue is located on the Baldwin Peninsula about 35 miles north of the Arctic Circle on the northwest shore of Kotzebue Sound. The village is a supply and service center for the villages and mining operations on the Kobuk and Noatak Rivers. The population of Kotzebue is estimated at 400. One steamer per year brings the major portion of supplies. Two airfields, one community owned and one operated by the U. S. Civil Aeronautics Administration, provide facilities for airplanes. Kotzebue is an important link in the air route to Barrow. Electric light and power is now obtained from windchargers and several privately owned diesel and gasoline generators. There is no adequate water supply system. In July, 1949, the U. S. Geological Survey made test drillings to determine whether there was a good source of underground water. Results of these drillings are not known. Two small cold storage rooms, mainly for meats, are owned by local traders. At one time Kotzebue was more prosperous than it is now as a result of which there are several vacant buldings in good repair which could be converted for storage.

For several years ending in 1918, the Midnight Sun Canning Company operated in Kotzebue and packed Dolly Varden trout. Several thousand cases, of 48 one-pound talls, were produced. It is reported that this operation was discontinued after 1918 either because of a scarcity of fish or lack of sufficient knowledge of the fisheries of the area or perhaps for both reasons. At present, Dolly Varden trout are not numerous in the Kotzebue vicinity.

The native resident in Kotzebue does not fish in the sound proper. Fishing is carried on inland from the village in Hotham Inlet and Selawik Lake. During the winter, especially from January through March, large numbers of sheefish are taken on jigs, see Figure 3, through the ice on Hotham Inlet and Selawik Lake. Sheefish are not taken in these bodies of water after the ice is gone. At that time, the fish are reported to have gone upstream into the Kobuk and Selawik Rivers to spawn. Whitefish (Coregonus sp.) are also taken through the ice.

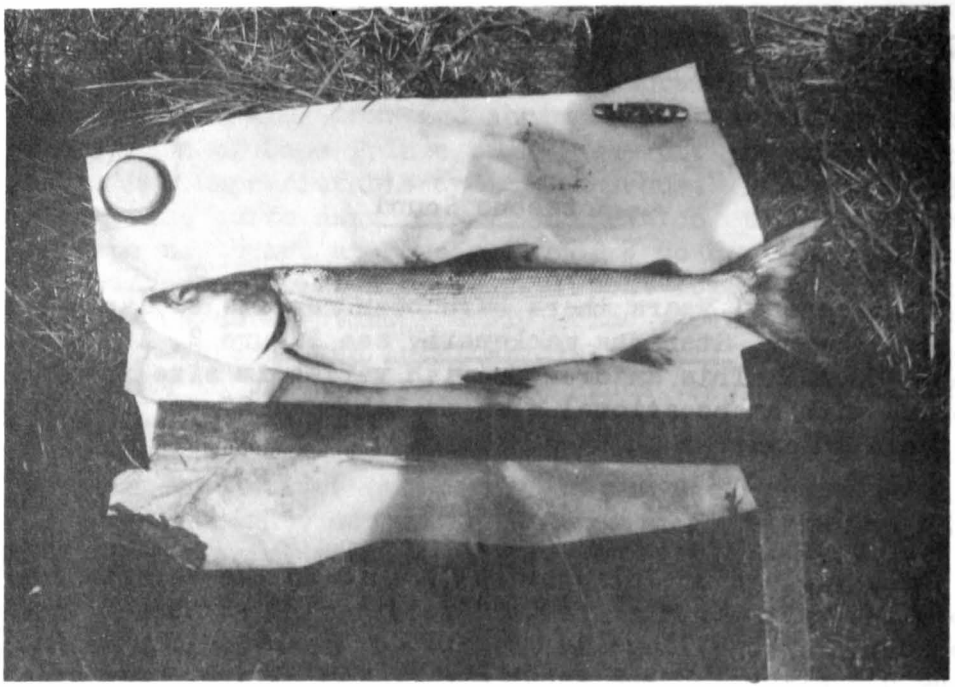

Fig. 2 - Sheefish, Stenodus mackenzii taken in gill net at Kiana, Alaska, June 29, 1949 - weight 5 pounds, length 25½ inches.
(24 inch builder's square below fish)

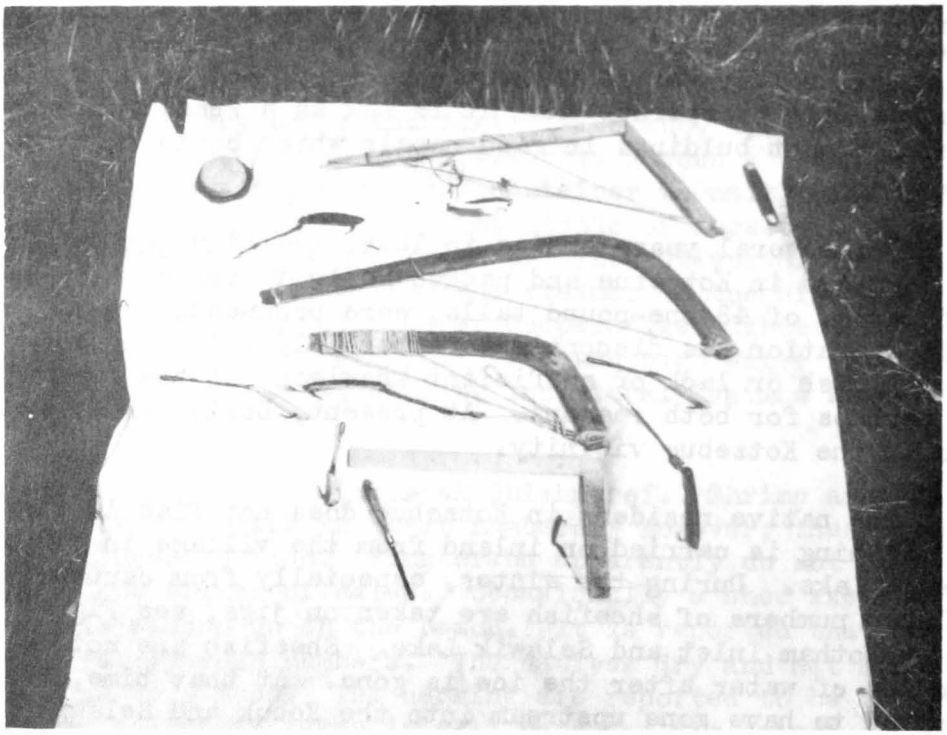

Fig. 3 - Jigs, lines, and jigging equipment used for winter fishing.
(12 inch builder's square at bottom of figure)

During the winter of 1948-49 over 100,000 pounds of sheefish and whitefish were marketed. Both species were shipped by air to Barrow, Anchorage, Fairbanks, and Nome. All of these fish are thrown out onto the ice and freeze in the air in a relatively short time. The fish are not butchered in any way. They are stacked in piles like cord wood. Local bush pilots land on the ice on skis and buy several hundred pounds to take with them on return flights to Nome, Anchorage, and Fairbanks. Shipments by larger planes are purchased from the Eskimos at the fishing site or they deliver the fish into the village of Kotzebue. Local traders purchase the fish and arrange for their sale in other cities and towns in Alaska. One of the traders shipped close to 100,000 pounds of sheefish to Seattle. Samples were also sent to New York, Chicago, and other cities in the states. It appears that the major handicap to the successful marketing of these fish was the price. For the price asked, (about 60 cents per pound for round fish delivered in Seattle) buyers apparently considered they would not risk promoting an unknown species of fish. In addition, other species of better known and more readily accepted fish, notably salmon and halibut, could be purchased for less.

The Eskimos are employed in all types of work in and around the village and in mining camps. Whales, seal, and some birds and other mammals provide food and some income. The most important source of food for the Eskimos and their dogs is fish.

Kiana

At the time of this survey, there were no sheefish or whitefish being taken near Kotzebue. Kiana is a small Eskimo village about 60 miles east of Kotzebue. The population is estimated to be about 65. Water is readily available from the Kobuk River. Most of the local residents simply dip water from the river when it is needed. Windchargers and some gasoline generators are used to supply electricity. Supplies are brought in by river boat from Kotzebue at which place they are landed by steamship. Some supplies are brought in by small airplanes, which land on the dry sand bars in the river in the summer and on the ice or snow in the winter. In the summer, most of the able-bodied men of the village work in nearby mining camps. The women and young boys and girls seine and gillnet for fish for the winter food supply. Some gill nets are set off the banks of the river. Others are set at outlets from small lakes or ponds or across the mouths of sloughs which connect two branches of the river. The gill nets are of 4 and 4 1/2 inch mesh. Floats are home-made of spruce roots, - flat, oval shaped 6 to 8 inches long, 2 1/2 to 3 inches wide and about 1/2 inch thick. Leads or sinkers on the gill nets are made of chunks of caribou antler, ivory or sometimes of small stones. All the nets are made by hand by the Eskimo women and are measured by the number of balls of twine used. Each ball of twine weighs five pounds. The gill nets are 3 feet or half a fathom deep and the length varies with the needs.

Haul seines or beach seines are employed in summer fishing on the Kobuk River at Kiana. As with the gill nets described above, the seines are home-made by the Eskimo women and they do the fishing, for the most part. Floats and sinkers or leads on the seines are similar to those used on gill nets. Seine mesh is 3 inches, the depth of the net usually one fathom and the length varies. The nets used at the time of the survey were 30 fathoms long. At each end of the seine a 1 1/2 inch diameter willow pole is tied to aid in keeping the net upright when pulled through the water. The seine is set from a skiff or rowboat and is handled by three women. The net is piled in the stern of the boat, one of the group remains upriver on the bank with a line on the seine. As the boat is rowed out into the river and downstream the net is payed out. A long arc is described and the boat brought ashore downstream. The net is then slowly taken back into the boat as it is maneuvered upstream. The rower steps out and pushes or tows the boat upstream. The upper end of the seine is allowed to drift slowly downstream with the current. When the seine is almost all back in the boat the fish are picked out and thrown ashore. The river bank where the fishing is done is sandy and slopes gradually into the main channel where it drops off rapidly. At the time of the survey only a few whitefish and sheefish were taken. The natives report that the fish come upstream in very large numbers about the middle of July.

The fish taken in the summer are split lengthwise up to but not through the tail, the sides are cut free from the backbone but the latter is not removed, nor is the head removed. They are hung over racks to dry and then stacked in caches for food for humans and dogs in the winter. The viscera are usually fed cooked to the dogs. The dried backbones are also fed to the dogs. Because the dogs do not work in the summer they are fed short rations.

In the winter the residents of Kiana fish through the ice on the river and in Hotham Inlet and Selawik Lake. The gear used is shown in Figure 3. The fish are frozen in the air and stacked like cord wood. Some are sold to bush pilots and to traders in Kotzebue. Some chum salmon, herring, smelt, Dolly Varden trout, and burbot are taken in the river seines. The major species in both summer and winter fishing are the whitefish and the sheefish. These appear to be present in large enough numbers to permit a limited commercial exploitation.

Unalakleet

Of all of the towns and villages in this survey, Unalakleet is one of the most promising for the development and establishment of a commercial fishery. The population of this village is estimated at 400. A central source of water or power is not available. Because the village is entirely on unfrozen ground it would appear possible to provide both

a water and sewerage system. Driven wells provide water for some of the homes and the school. Stored ice blocks provide additional water. Electricity is provided by windchargers and some gasoline driven generators. Steamer service to Unalakleet anchorage is provided by the ships traveling to and from Nome. Freight rates are shown in Tables 2 and 3. A CAA maintained airfield capable of accommodating commercial airplanes is connected with the town by road. Dry storage space can be readily made available. Cold storage facilities are not available. Almost every household in Unalakleet is provided in season with fresh vegetables and root crops from home gardens. A large volume of potatoes is produced annually. Other vegetables and wild berries are also produced in volume. Some of these items are shipped by plane to Nome.

There is ample labor supply in Unalakleet. A large number of the men have worked in the Bristol Bay salmon canneries each season in the past few years.

The Unalakleet River has comparatively large runs of salmon, mostly chums, pinks and some silvers. King salmon had formerly disappeared but appear to be returning. Chum and pink runs start early in July and continue all month. Silvers appear about July 25. Browne 15/ reports that some years the salmon runs are so heavy that it is impossible to operate an outboard-powered umiak or skin boat in the river. The information obtained in this survey appears to corroborate this claim. Each family in the village makes use of several thousand dried fish, mostly salmon, each year for feed for dogs and humans. Other species taken are grayling (a sport fish), herring, whitefish, and Dolly Varden trout. Seal and beluga whale are taken from the sea.

As reported before in this paper, the salmon in this area appear to be of a very high quality. In addition to the salmon runs in the Unalakleet River there are reported to be good runs about 12 miles up the coast to Egavik and for a similar distance down the coast from the village. The natives of the village fish in the Unalakleet River with gill nets but no attempt has been made to fish in the salt water except with an occasional set net. There appears to be a possibility for a small salmon cannery at Unalakleet.

Herring runs are reported to be large, starting about the middle of August. King crabs and shrimp are not reported from Unalakleet. There appears to be definite evidence that king crabs are not present close to shore in this area any farther south than the village of Shaktolik about 30 miles up the coast from Unalakleet.

15/ Browne, Ralph. 1949. Northwestern Alaska, a report on the economic opportunities of the Second Judicial Division. Alaska Development Board, Juneau, June.

Yukon and Kuskokwim Rivers

It was reported in Nome and other places on the Seward Peninsula that sheefish were to be found in the Yukon and Kuskokwim Rivers. On both of these rivers there are commercial fishery operations for salmon. The regulations 16/ set a maximum quota of 300,000 kings and reds combined which may be taken for commercial purposes in the Yukon and Kuskokwim districts. These are taken largely by drift gill nets and set nets.

At and near the villages of Bethel, McGrath, and Holy Cross fish wheels and some gill nets are used for the taking of salmon for local human use and for dogs. These are split and air-dried. At the Catholic Mission in Holy Cross some salmon is hard-smoked for local use. Some sheefish and whitefish occur at these villages but the populations of these fish at these places do not warrant any commercial exploitation.

Interior Lakes

There have been many reports of commercially exploitable resources of lake fishes. There are numerous lakes in the area covered by this survey. It was possible to obtain information about only a few.

Walker Lake on Kobuk River

In the village of Kotzebue and at Kiana there were reports of "very large" fish in Walker Lake in the headwaters of the Kobuk River. A native legend reports fish in this lake so large that they swallow people. This legend results from the disappearance of several persons in the vicinity of Walker Lake many years ago. It is reported by some of the younger people who have been at the lake in recent years that it abounds with lake trout (Cristivomer sp.) and pike (Esox sp.). The lake has no definite outlet or stream draining it. There appears to be a floating bog with large chasms or fissures in it into which the lost natives may have disappeared. It was not possible to visit this lake during this survey. It appears desirable, however, that the fishery resource in Walker Lake be investigated.

Whitefish Lake on Kuskokwim River

Whitefish Lake is in the Kuskokwim River drainage on the direct air route from McGrath to Bethel. It was not possible to visit this lake during this survey. The lake is reported to be heavily populated by whitefish, hence its name. It appears desirable that a future survey include an investigation of the commercial fishery possibilities of this lake

16/ U. S. Department of the Interior. 1949. Laws and Regulations for protection of the commercial fisheries of Alaska. Regulatory Announcement 25, Fish and Wildlife Service, March.

Lake Minchumina on Yukon River

It is reported that Lake Minchumina has been fished commercially for whitefish on a small scale in the winter of 1947-48. A local bush pilot reports he hauled 800 to 900 pounds of frozen whole whitefish from Lake Minchumina to Fairbanks. The fishing was done by two local residents with drift gill nets through the ice. It is reported on reliable authority that the lake could not be fished commercially for more than about a few thousand pounds of fish per year. This fish could probably best be used at the CAA boarding facilities on the nearby airfield and at perhaps one or two villages in the immediate vicinity.

Conclusions

Fish needed for Native food supply

With a few exceptions the local fish and shellfish resources are a very important and primary source of food for the native residents. Where fish and shellfish are generally available the local economy appears to be better than in those places where these resources are not found. Although the commercial exploitation of certain of the fishery resources would provide a source of cash income, it is believed this would be of only temporary benefit. In fact, if, as appears likely, these resources became depleted, the damage to the essential food supply would endanger the existence of the natives dependent on them. It has been pointed out in this report that fish are also used as feed for dogs. Without the dog, winter travel in most of this country would not be possible.

Fisheries which could now be exploited

Some species of fish and shellfish are believed to be available in sufficient quantity to be exploited for commercial purposes. In many instances it would be necessary to establish facilities for the processing and handling of the products.

King Crab

The king crab could be exploited on a limited scale in the immediate vicinity of Nome. It is recommended that no attempt be made to can this species here. It should be marketed in the form of cooked and frozen packaged meat. A ready market should be available in Nome proper and in Barrow, Anchorage, Fairbanks and other cities and towns in northern and central Alaska. King crab meat is a specialty product and should bring a fairly good price. In addition to the crabmeat which could be produced at or near Nome, some crabmeat from Golovin, Little Diomede Island, and King Island could be distributed from and perhaps packaged in Nome. This survey did not include any of the islands in the northern Bering Sea but there is evidence that King Crab can be readily taken through the ice at the above named islands.

Sheefish and Whitefish

The sheefish and whitefish population in the Kotzebue area is large enough to warrant limited commercial exploitation. No attempt should be made to market these species outside of the Territory of Alaska. To do so under present conditions would require long shipment, largely by air which would practically price it out of the market. The extent of the resource is not definitely known and overexploitation to supply a large market might result in depletion. Marketing of these species should be concentrated in Alaska for consumption at Barrow, Anchorage, Seward, Fairbanks, and Nome.

Salmon

This species could be utilized commercially at Unalakleet. Chums and pinks could be canned in limited quantity. However, before attempting such operations, consideration should be given to determining the size of the runs and the possibility of cutting off the natives' source of food by depletion of the resource. The male residents of the village are experienced in salmon canneries and the women are especially deft at butchering. The Mothers' Club at Unalakleet has engaged in various community canning projects. A hand cannery at Unalakleet should prove successful. No attempt should be made to ship the canned salmon outside of Alaska. A production of 3,000 to 4,000 cases could find a ready market in the Territory.

Need for biological and technological studies

Particular reference has been made in this report to the lack of definite information on the extent of the fishery resources. The previous section indicates the possibility for commercial exploitation of king crab, sheefish, whitefish, and salmon. Before exploitation is attempted, the natural history of these species should be carefully studied. Little is known of the life history of the sheefish and whitefish in this locality. The salmon runs in the Unalakleet River need biological study. The life history of the king crab population along the coast of the Seward Peninsula should also be given attention by biologists.

It has been indicated that the flesh of the whitefish and perhaps also of the sheefish is rather soft. Technological studies into the quality of these species, their freezing and storage characteristics, and even their cooking qualities need to be carried out.

Need for exploratory fishing

The work of the Washington [17] indicates that shrimp are to be found in fairly good numbers near Nome. Local residents have taken good quality shrimp in crude traps and on baited lines for other species.

17/ Ellson, J. G., Knake, Boris, and Dassow, John. 1949. Report of Alaska exploratory fishing expedition, fall of 1948, to northern Bering Sea. Fishery Leaflet 342, U. S. Fish and Wildlife Service, June.

King crab have been shown to be present in limited commercial quantities. Residents of Nome report large populations of codfish in some years.

It is recommended that inshore exploratory fishing on a continuous year-round basis be carried on in the vicinity of Nome. Exploratory fishing with a small beam trawl and with crab pots and traps is desirable. The work of the Deep Sea indicates that small craft equipped with suitable gear might find good fishing in the shallow waters near shore 18/.

The extent of the whitefish resource in the lakes needs to be determined by exploratory fishing. Other lakefishes such as lake trout and pike are reported to be commercially exploitable. Similar investigations in Canadian lakes has resulted in several successful commercial operations.

Need for shore facilities

In the places where fish or shellfish can be exploited there is need for proper shore facilities. Labor supply appears to be adequate in all communities where there are at present known commercial fishery possibilities. Markets in Alaska are readily accessible by local bush airplanes and by water. Some of the facilities required are:

1. Nome - potable water, cold and dry storage.
2. Kotzebue - electric power, potable water, cold storage.
3. Unalakleet - electric power, potable water, dry storage and possibly cold storage.

18/ Ellson, J. G., Powell, Donald E., and Hildebrand, Henry H. 1950. Exploratory Fishing Expedition to the Northern Bering Sea in June and July, 1949, Fishery Leaflet 369, U. S. Fish and Wildlife Service, March.

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