

~~Joseph E. King~~



A PRELIMINARY REPORT ON THE FISHERY POSSIBILITIES
OF THE NOME AREA

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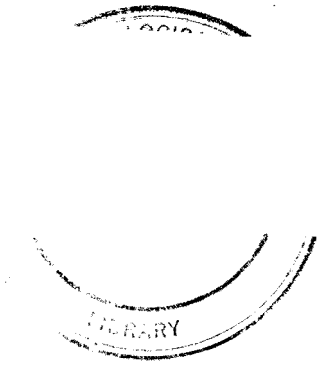
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PRELIMINARY REPORT ON THE FISHERY POSSIBILITIES OF THE NOME AREA

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PRELIMINARY REPORT ON THE FISHERY POSSIBILITIES OF THE NOME AREA

Introduction

This report was requested by the Alaska Development Board in order to determine what fishery resources exist in the Nome Area and which of these could most feasibly be developed. The general area under consideration is the northern portion of Bering Sea and Norton Sound. The fisheries in this region are now only exploited by local people to supply needed food, and no surplus is sought for export.

Several commercial fisheries have been prosecuted in former years, such as salting herring and canning Dolly Varden trout. During the one year in which Dolly Varden were packed, 2,500 cases are reported, by local residents, to have been prepared. Records are available of herring being salted in Golovin Bay from 1923 to 1935. Traders have occasionally landed codfish at Nome which were caught during their freighting runs, but the present local fishing effort is chiefly directed to catching salmon for personal and local needs. A paradox exists in that some fishery products, such as small quantities of salted Icelandic herring and frozen Atlantic Coast cod, are imported from these distant localities in to Nome for local consumption.

Prior to the war, a few of the natives obtained seasonal employment in the mining industry, but the vast majority obtained their livelihood by hunting and fishing, and derived a limited cash income by selling ivory. During the war period, many of these natives have been employed at high wages on defense jobs in Alaska. Consequently, their economic standard has been raised, and many are reported to have developed a sense of responsibility to a job and desire to be gainfully employed. Persons in the Nome Area and natives of St. Lawrence and King Islands are familiar with the sea and might well be trained as commercial fishermen.

Transportation facilities to Nome are furnished by steamship and by airlines. At present, proper refrigeration equipment for the preparation, storage and shipping of frozen seafoods is inadequate or absent, but these could be provided if a resource worthy of exploitation exists. Because of the remoteness of Nome from markets, transportation costs will, in all probability, be high. This factor must be considered in determining the types of fishery products which offer the greatest promise of profit. Those which compete with similar items produced nearer consuming areas will furnish a lower return commensurate with the shipping charges. If speciality products which are not found in other areas, or items which are scarce in supply can be developed, transportation costs become a less significant consideration. Among the latter varieties are king crabs, shrimp, clams, salt cod, halibut, and salmon. At the time of the survey reduced air freight rates of 15 cents per pound were being accorded to fresh produce of the Matanuska Valley shipped from Anchorage to Nome in order to determine the feasibility of such a venture. If these rates prevail a similar return freight rate for specialties such as king crab meat might be possible, thus affording a year around outlet.

Summary of Possibilities

This summary is based on information obtained from the following persons, all of whom were interviewed in Nome and have spent considerable time in the

Nome Area:

| | |
|-------------------|-------------------|
| Carl Lomen | Father Anabel |
| Antonio Polet | Al Braton |
| Grant Jackson | John Kost |
| Jack Anderson | Winfred Aningayon |
| Father La Fortune | |

No contacts were made in other localities adjacent to Nome, as nearly all of those who have had any fishery experience were engaged in other activities in distant areas or their whereabouts were unknown. Further, the persons interviewed felt that, because of the general limited knowledge of the potential

fisheries, little could be added to the present report. Fisheries in the Nome Area capable of development include those for king crabs, codfish, herring, shrimp, clams, halibut, flounders, and salmon.

King Crabs

Of the possible fisheries king crabs probably offer the greatest promise and could be immediately exploited on a limited scale without fishery exploration work to determine the year around location of the resource, or procuring extensive fishing equipment. King crabs are now fished from December through March by chopping holes through the ice and using lines baited with tom cod or red cloth to attract the crabs. After being raised to the surface of the water, the crabs are captured in dip nets and dumped on the ice. Catches of 10 to 30 crabs in several hours of fishing are reported common by this rather cumbersome and inefficient procedure. The use of a suitable crab trap or the type of hoop net used in the crab fishery out of San Francisco should materially increase the productivity per man.

An estimate of possible production could be ventured on the basis of assuming a daily catch of 50 crabs per fisherman with more effective gear. If these crabs average the same size as those taken in Bering Sea by the Alaska Crab Investigation,* 14.1 would be required per case of 48 $\frac{1}{2}$ -pound flat cans. The present ceiling price is \$20 per case. On this basis, 100 fishermen could produce 5,000 crabs per day, which should yield over 300 cases or more than \$6,000 worth of canned crab meat on days which the weather would permit fishing. It was reported in Nome that samples of crab meat, which had been frozen locally, were of excellent quality. Technological work to establish the best procedure for freezing and storing king crab meat should be performed before marketing any large quantities because processing difficulties have arisen with other similar products.

*"The Alaskan King Crab", Fishery Market News, May 1942 Supplement, Fish and Wildlife Service.

Cod

Cod form the basis for an established fishery in Bristol Bay. Cod inhabit cold waters, and the conditions in the Nome Area might be conducive to an abundant supply of this variety. Cod have been caught by native fishermen and others off Nunivak, St. Lawrence, and King Islands and near Nome. Although the quantities were minor, it should not be judged that the resource is limited because the fishing effort has been unorganized and meager. Rather the extensive operations of the Japanese floating factory ships from St. Lawrence Island to Nunivak Island tend to the conclusion that either bottom fish or crabs, and perhaps both, are plentiful.

Herring

Known herring runs exist in Golovin Bay during the spring and fall, but it is questionable if any intensive commercial fishing effort has ever been applied to this resource. Consequently, no conclusions can be drawn regarding abundance until a fishery of magnitude is initiated. The following production of salted herring is recorded for recent years from data in the Pacific Fisherman:

| <u>Year</u> | <u>Full bbls. 1/</u> | <u>1/2 bbls. 2/</u> |
|-------------|----------------------|---------------------|
| 1923 | 352 | - |
| 1924 | 750 | - |
| 1925 | 200 | - |
| 1926 | 620 | - |
| 1927 | 490 | 100 |
| 1928 | 850 | 370 |
| 1929 | 200 | 917 |
| 1930 | 1549 | 1415 |
| 1931 | 219 | 415 |
| 1932 | 533 | 908 |
| 1933 | 8 | 75 |
| 1934 | 100 | 42 |
| 1935 | 96 | 57 |
| 1936 | - | - |
| 1937 | - | - |
| 1938 | 62 | 35 |
| 1939 | 30 | 27 |
| 1940 | 101 | 22 |
| 1941 | 30 | - |
| 1942 | - | - |
| 1943 | - | - |
| 1944 | - | - |

1/ 250 lbs. of herring

2/ 125 lbs. of herring

The following estimated freight rates were obtained from an agent of the Alaska Steamship Company for a full sized barrel and the necessary salt, under their general merchandise rates. Included in these steamer rates from Seattle to Nome and return is a 16 per cent war charge, but no rates were available on lighterage from Nome to Golovin Bay.

| <u>Routing</u> | <u>Cost</u> |
|---|-------------|
| Seattle to Nome--knock-down barrel | \$1.50 |
| Steamer to Nome Beach--lighterage knock-down bbl. | 1.00 |
| Nome Beach to steamer--lighterage full barrel | 1.60 |
| Nome to Seattle--full barrel | 4.00 |
| Seattle to Nome--100 pounds of salt | .76 |
| Steamer to Nome Beach--100 pounds of salt | .38 |
| Total | <u>9.24</u> |

Persons interviewed in Nome believed that a reduced steamer rate from Nome to Seattle might be granted to encourage a return cargo.

Reports from Seattle brokers dealing in salted herring indicate that the spring run of herring was too thin, but that the fall run was of good quality. One broker mentioned that the fall run appeared very late in the season, and difficulty was often experienced in preparing a pack in time to catch the last steamer to leave before the freeze. The present prices for salted herring of good quality are \$36 to \$40 per full barrel and \$18 to \$20 per half barrel, f.o.b. Seattle.

Herring operators in Southeastern Alaska, Prince William Sound and Kodiak Island feel that, because of the high cost of imported labor, they cannot meet the price competition of salted herring from Norway, Iceland, and Newfoundland in normal times. In Dutch Harbor, where local labor was available, prior to the war, the salting of herring appears to have been economically feasible, but the herring runs occurred during the summer and the herring were available for a considerable period.

As previously mentioned, a discouraging factor in salting or otherwise utilizing the herring at Golovin Bay is the lateness of the run. It was reported that

the herring were present offshore and beyond the reach of the gill nets and haul seines for some time before setting in to the beach and thus becoming available for capture. Under these conditions, the use of purse seines might enable the earlier capture of herring offshore and extend the season.

There may be a herring resource capable of supplying a reduction plant, a venture which might be economically sound if operated with local help. However, the high transportation rates to and from Nome, the apparent short season, and the known economics of herring reduction in other Alaska areas closer to markets, all indicate such an operation should be approached with caution.

Herring are also reported in Port Clarence, but no one has fished for them.

Shrimp

Shrimp is a specialty product which finds a ready market in the States. The shrimp fishery of the Petersburg-Wrangell Area furnishes employment to a considerable number of people on both the water and shore. Natives in the Nome Area report shrimp are found in the stomachs of fishes and eider ducks. The presence of shrimp as a feed demonstrates that they are present. It is impossible, however, to evaluate the resource until exploratory work has been performed to find the most productive fishing grounds.

Clams

Considerable concern has been expressed over the depletion of the clam resources of the United States, and new supplies should find a ready market. Canned or frozen clams are relatively dear fishery products, and their preparation should be economically sound if an abundant resource exists and the labor supply is adequate, capable, and reasonable. Clams are found on the Nome beach during periods of extreme low water caused by the heavy northerly winds in the fall. A wide distribution of clams is indicated, as they are reported to be one of the principal items of food found in the stomachs of the walrus killed near the various

islands of the northern part of the Bering Sea. As the rise and fall of the tides at Nome is only about 1.5 feet, it would not be practical to dig clams in the tide land. Consequently, experimental fishing with clam dredges similar to those of the New England fishery must be performed to locate and evaluate the resource.

Halibut

A potential halibut fishery may exist in the Nome Area, but the waters might well be too cold during a portion of the year to be suitable for a large population. The findings of the International Halibut Fisheries Commission indicate that halibut are not abundant in waters having a temperature of less than 3° C. If a halibut fishery exists, it will probably be found in the deeper waters, or in the southern portion of the Nome Area.

Other Flat Fish

Starry or "rough back" flounders have been caught about a mile offshore from Nome. This variety is not esteemed by the fresh fish trade, and some difficulty is experienced with sales even in wartime. "Soles" and flounders were found to be abundant in Bristol Bay, and it is anticipated that other more valuable varieties might be found in the Nome Area by exploratory fishing with otter trawls. Fishery products of this nature would have to compete in price with fish caught in continental United States and Canada.

Salmon

Several persons in Nome believed that sufficient salmon were available to supply a cannery. It is thought that this is an over-optimistic view. All information available to the Fish and Wildlife Service indicates that the salmon runs in the Nome Area are insufficient to support a cannery operation of any magnitude. The fishermen on the Nome River indicated that a seasonal catch of 500 to 1,000 fish per man was all that could be expected. Consequently, "it is deemed most advisable to leave the salmon runs as a source of local food rather than attempt to exploit and probably destroy the fishery."

Recommendations for Development of the Fisheries of the Nome Area

The present knowledge of the extent and location of the fishery resources in the Nome Area is entirely inadequate to encourage private industry to assume the initiative in developing the resources. As a result of the exploratory fishing work performed by the Alaska King Crab Investigation, two concerns are definitely starting fishing operations in Bristol Bay during 1946, and several other well-financed firms have definite plans for entering the fishery in the future. Similar information could be expected to encourage private individuals to exploit the fisheries of the Nome Area.

Japan's position of being the world's leading producer of fishery products was largely due to demands for food and Government subsidy of exploratory fishing. These explorations were carried on from Bering Strait through many portions of the South and Southwest Pacific.

The Government of the United States has been woefully lacking in conducting explorations for new fishing grounds. The available evidence demonstrates that valuable fishery delicacies such as king crabs, shrimp, and clams; and standard commodities such as cod, halibut, and herring, exist in the Nome Area. Knowledge of the extent of the resources and the location of the most productive fishing grounds, and the development of suitable fishing techniques must precede the exploitation of these fisheries.

The residents of Nome believe that a serious unemployment situation may confront the natives of the region if some other sources of employment are not found to supplant the emergency war work. The installation of shore stations, and the operation of a local fishery would greatly increase the amount of available employment and lead to the development of the general Nome Area.

An economic study must be made to determine the feasibility of utilizing the various fishery resources, and to what extent the products could be profitably shipped to the United States, or sold in Alaska. This study, together with a

knowledge of the availability of raw materials obtained from exploratory fishing, would furnish local and outside interests with the basic information necessary to exploit the more profitable fisheries.

For one exploratory vessel to survey properly the Nome Area a program of several years' duration is required. The vessel should be approximately 65 feet in length and of shoal draft to permit entry to available ports of shelter and storage during the six or seven month winter season. A vessel of this type could fish for king crabs with tangle nets, pots, otter trawls, and beam trawls to determine the most effective gear. Both otter and beam trawls of small mesh size could be used for shrimp explorations. Set lines, hand lines, and otter trawls could be operated to catch cod, "flatfish", and halibut. A 65-foot vessel would have adequate capacity to operate a small herring purse seine and determine the possibilities for offshore herring fishing.

The exploratory efforts should be directed to locating the most promising varieties of fishery products, such as king crabs, shrimp, and clams. All of these varieties could be marketed as canned products, or probably more preferably in the frozen packaged state, with considerable economic advantage. Salted cod offers a definite possibility if freight rates can be obtained to permit competition with schooner caught fish. It is suspected that the quantity of halibut available might not be sufficient to warrant an independent fishery, but they could be taken incidental to cod fishing. The late appearance of the herring run renders it dubious in value for a large scale operation.

The work should be planned to extend over a period of several years. At least the first full summer's time should be devoted to the exploration of the area with comparatively small mesh otter trawls of commercial size, to establish the most productive fishing grounds. This procedure would yield results comparable to commercial operations, and determine which varieties were most plentiful.

The results of the summer's work would be analyzed during the winter, and specific equipment designed most effectively to catch the more valuable species. The findings should also be interpreted by a fishery economist in the light of production costs, freight rates, available markets, and selling costs. If further work does not appear to be justified on any particular phase the project should be abandoned.

However, if the analysis is favorable, a second summer's work should be devoted to intensive fishing of the most valuable and abundant species with specialized equipment to obtain optimum production data. This work would be carried out on the most prolific grounds discovered in the first summer's work. The third summer should be spent on intensive fishing with specialized gear for the species of lesser value in the areas of greatest abundance disclosed in the previous work, and extended to other promising regions. The third summer's work should be predicated on the economic soundness of exploiting the varieties in question.

The cost of such a program, involving field work during the five months when weather permits, would be approximately as follows:

Personnel

| | |
|---|---------|
| 1 Fishery Engineer and Captain, P-4 grade | \$4,300 |
| 1 Fishery Biologist, P-3 grade | 3,640 |
| 1 Fishery Economist & Administrative Assistant, P-3 grade | 3,640 |
| 1 Engineer-Fisherman, 5 months, unclassified | 2,500 |
| 5 Fishermen, 5 months (unclassified) | 10,000 |
| 1 Cook, 5 months (unclassified) | 2,000 |
| 1 Clerk-Stenographer, CAF-3 | 1,900 |
| Total Personnel | 27,980 |

Operating Expenses

| | |
|---|---------|
| Per diem for Fishery Engineer, Fishery Biologist and Fishery Economist for 6 months | \$3,780 |
| Fishing gear | 4,000 |
| Scientific and photographic equipment | 340 |
| Fuel and lubricating oil | 3,000 |
| Travel | 3,000 |
| Transportation of things | 700 |
| Vessel upkeep and repairs | 2,000 |
| Commutation of rations for 7 men | 2,600 |
| Total Operating Expenses | 19,420 |

| | |
|--------------------------|----------|
| 1 65-foot fishing vessel | \$40,000 |
| Total Cost of Project | \$87,400 |

The cost of the fishing vessel, \$40,000, would be a non-recurring item, and consequently, the cost of the project for subsequent years would be approximately \$47,400.

The general plan of the project would be to perform 5 months field work in the Nome Area, and dry-dock the vessel during the winter season when ice and weather do not permit operations. The fishery engineer, biologist and economist would then spend 5 months in Seattle preparing a report of the activities and findings, laying out a program for the following season, and procuring the necessary equipment and supplies.

Alternative Recommendations

The Territory of Alaska should have an exploratory vessel engaged on a long term project to locate and evaluate the resources of fish which are now unused.

It is obvious that tremendous reserves of "soles", flounders, and other fish must exist in the various coastal waters of Southeastern, Central and Western Alaska.

The work of the Alaska King Crab Investigation was primarily concerned with locating crabs, and all the evidence pointed to their being present in the various protected waters. Consequently, only a negligible amount of work was done on the tremendous offshore grounds south and east of the Alaska Peninsula. The exploration of these grounds will stimulate the development of fisheries and the development of local industries.

Bodies of herring are suspected to be present off the south side of Kodiak Island, near Chignik, and in the Shumagin Island area. While trawling operations are progressing, a recording depth measuring device, capable of detecting herring, should be in operation. A watch should be maintained for visible signs of herring.

This procedure would contribute to the available knowledge on herring, and if the observations show appreciable abundance, practical trials with commercial gear would be undoubtedly warranted.

Little or no information is available on the location of dungeness crabs, clams, and shrimp in localities other than near Petersburg, Wrangel, Cordova, and Seldovia. Various unsubstantiated reports of clams and crabs are voiced from time to time. Inquiries are received from potential small operators, including small groups of service men, who desire to enter independently the fisheries of Alaska. The lack of knowledge and available publications renders it impossible to give specific information as to the location and abundance of those resources which are required to encourage the founding of new enterprises. Explorations in these fields could be carried on during the fall, winter, and spring seasons when off-shore operations are not feasible in the Nome Area.

Offshore clam resources are now exploited with dredge gear in New England, and supply a substantial portion of the total production. It is quite possible that extensive offshore clam resources might well exist on the Pacific Coast of the United States and Alaska.

These, and probably other, fishery possibilities exist which will only be disclosed through fishery explorations. To carry on this type of work, a vessel of at least 80 feet in over-all length will be required. It is estimated that a suitable vessel would cost \$80,000. The 65-foot vessel previously discussed must be of special design to take advantage of the shelter offered by shoal harbors during periods of stormy weather. An 80-foot vessel would be substantial enough to withstand severe storms and not seek frequent protection. Further, this vessel could be moved to and from Nome during the adverse weather of the early spring and late fall with reasonable safety, and be put to gainful use during the winter season instead of being laid up. Vessels of the 80-foot class may be available through Army and Navy surpluses. Transfer of such a vessel might result in a substantial saving over the original cost. Considering the year around service possible, it appears most advantageous to start an exploratory fishing project in the Nome Area with an 80-foot vessel.

Details of Interviews

King Crabs

King crabs are taken by means of a baited hook and line dropped through holes chopped in the ice. They are available for capture from December through March, but become soft and of poor quality during April. The procedure is to drop the baited hook to the bottom and allow it to rest until a crab is attracted. The feeding crab is then slowly raised to a point near the surface and entrapped with a dip net. The bait may be tom cod or a piece of red cloth.

King Island

Off King Island, the crabs are fish through ice as much as 7 feet thick and about 20 constitutes an average catch, although some persons have caught up to 75 crabs during the daylight hours of 9:00 a.m. to 2:00 p.m. The largest crabs taken measure about 36 inches between the tips of opposite legs, but the average size is about 24 inches. Two kinds are caught, one is brown and the other is white, but the white ones have an inferior flavor. The natives believe that the crabs move from North to South, and they fish on all sides of the Island, depending on this movement. They find that the North side and a depth of 60 feet of water offers the best fishing. No attempt is made to fish for crabs during the summer, as other food is plentiful.

Nome

The crabs at Nome are about the same size as those taken at King Island, but have a purple tinge. This tinge, coupled with a slight difference in carapace form, may indicate that they are *P. platypus*. This species is plentiful off Japan and Siberia, but was rarely encountered by the Alaskan Crab Investigation.

St. Lawrence Island

Some crabs are also taken off St. Lawrence Island during the winter, and the natives mention encountering them in 25 fathoms of water during the summer in a northwest direction from the village of Gambell. The Japanese fished for king

crabs from Nelson Island off Nunivak Island to St. Lawrence Island. A favorite spot was 20 miles N. W. 1/2 W. off Gambell, and the vessels could be seen with the aid of binoculars during clear weather. In addition to crabs, cod and halibut were caught. The Japanese also fished south of the Island occasionally.

The interviews gave evidence that cod are widely distributed and are probably abundant.

King Island

During the winter slush, ice forms near the bottom and rises to the surface. The fish are trapped in this rising ice, and are brought to the surface and become frozen. This information might indicate King Island to be the northern range of cod as temperature conditions must be near the borderline of survival. The natives report that fishing is more productive further south.

St. Lawrence Island

Cod are caught 1 to 20 miles north of the island, but the main effort is directed to the area from 1 to 4 miles offshore. Most of the fishing is done during July and August and on the north of the island, as the natives prefer to live on that side. The average catch is about 20 fish in 3 or 4 hours' time, although the fishing rate may rise to 100 per man if an exceptionally good school is found. These large schools are apparently some distance off the bottom and may be concentrated enough to prevent the hook from reaching bottom. At times, the cod can be seen near the surface.

Nome

A cod "spot" has been found between 30 and 35 miles S. by W. of Nome in 13 fathoms of water and on grassy bottom. The cod on this spot were not wormy, but those taken near the islands are. A fishing party caught 100 cod in 3 hours, but a set line having 69 hooks baited with salmon and herring, yielded 30 fish in one

set. This fishing ground is not very large, but other productive areas should exist.

Nunivak

Cod have been taken by steamer passengers while the vessels laid at anchor from 4 to 8 miles offshore. Pete Paulson, who operates a trading store at Point Hope, has fished off Nunivak and caught some cod for the Nome market to barter for supplies.

The Japanese floating factory vessels are reported to have fished near Nunivak Island and taken cod and halibut in quantity.

Herring

During June, a run of herring passes close to the beach of Nome and some are taken by gill nets. On occasions, the herring appear to be heavily schooled, but generally the run consists of rather small groups of fish. A similar run exists in the fall during September or October.

The largest concentration of herring is found in Golovin Bay, the fish being taken with gill nets operated very close to the beach. Schools of fish are visible offshore, but no attempt is made to catch them. The fish appear to be more heavily schooled in the spring and are larger and thinner than the fall fish. The fall caught fish are quite fat.

Herring are known to be present in Fort Clarence, but no one has fished for them.

Shrimp

Shrimp might present a possibility for fishery development, but the available evidence is rather scanty. Certain shrimp are cold water inhabitants and several varieties are known to exist in sub-arctic regions in undetermined quantity.

Pribilof Islands

Shrimp are reported by Nome residents to have been captured by Captain John Beck of the Fish and Wildlife Service patrol vessel Eider in 1923 or 1924. The

logs of the Eider for this period were not available, and no indication of shrimp was found during the limited work near the Pribilofs performed by the Alaska Crab Investigation.

Nome

Shrimp are occasionally entangled in the salmon and trout gill nets fished near the beach. The shrimp are about 3 or 4 inches long.

King Island

The stomachs of the eider ducks are full of shrimp all year around. During the winter, they catch shrimp by diving through cracks in the ice.

St. Lawrence Island.

Halibut and cod have some shrimp, about 3 or 4 inches long, in their stomachs when caught.

Clams

King Island

Clams are the principal food found in the stomachs of walrus killed near King Island. The natives find several different varieties of clams in the stomachs and consider these partly digested morsels to be a food delicacy.

Nome

Clams are found on the tide land during the periods of extreme low water experienced with northerly winds. Many clam shells are washed to the beach during southerly storms.

St. Lawrence Island

Walrus captured between Savoonga and Gambell by the St. Lawrence natives also have clams in their stomachs.

Halibut

A few halibut are caught off King Island during September and October on lead and ivory jigs, but the natives do not believe that halibut are abundant near the

island.

The fishermen at St. Lawrence must go well offshore to catch halibut, but do not regularly do so as other food is plentiful.

The natives of Nunivak Island spear halibut in shoal waters all around the island in June.

Flounders

Flounders and "soles" were found to be abundant in Bristol Bay by the Alaskan Crab Investigation. Very limited work was done between St. Matthew and St. Lawrence Islands, and the "flatfish" were not found to be as abundant as in the Bristol Bay area. However, the amount of exploratory fishing was insufficient to draw conclusions.

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Appendix

Recommendations with Respect to Utilization of Mammal Bones on St. Lawrence Island.

The Alaska Development Board requested that an examination of the animal bone deposits on St. Lawrence Island be made with a view to determining whether it would be possible to utilize them in the form of dried bone meal. Preliminary information concerning the deposits and the possibilities are discussed in a letter dated June 1, 1945, addressed to the Governor of Alaska from Lyle Anderson the technologist in charge of the Fishery Products Laboratory at Ketchikan at that time. The

*A recent letter - Nov. 10 - from a native at Gambell stated that "at Savoonga those people over there were catching halibut last summer whenever they got a chance to go out fishing. They reported some halibut were so big sometimes the lines broke."

letter follows:

"The existence of a bone deposit on St. Lawrence Island near Gambell was first called to my attention by Mr. Frank Hynes, who said he had seen the bones but could not tell much more than that about them. After a year or more of delay, the matter came up again at the first meeting of the Alaska Development Board and I beseeched Mr. Polet of Nome to secure a sample for us to study. My Hynes also said he would see what he could do.

"About May 10, 1945, some excellent samples of bone were received by mail from the Gambell Native Store. We did not acknowledge receipt of these samples. These were ground, analyzed and submitted to brokers for consideration. The brokers (the Wilbur-Ellis Company, Seattle) responded enthusiastically and stated that although the market was dry and there was none being sold, such a product could be expected to bring about \$52.50 a ton; brokerage fees would be about \$1.50 a ton. By way of verification of these figures, the Oil, Paint & Drug Reporter, May 21, 1945, lists steamed feeding grade bone meal at 60% calcium phosphate in bags at \$50 a ton at Chicago. Also, the market price at present is perhaps \$10 a ton higher than "normal" because of the present smallness of Argentine imports.

"By way of background it might be said that the most desirable element present in bone is phosphate; that "green" bones contain quite a bit of fat, protein, and moisture. Upon hogging and cooking green bones they are changed to "steamed" bones that are more desirable for many uses since the "inert" ingredients are reduced and the percentage of phosphates increased, somewhat. The bone, in a meal form, is used for fertilizer and for feeding. If it has very much dirt in it, the feeding value is impaired.

"The analysis of the samples submitted were as follows:

| Sample #1--Whale Bone | <u>% Moisture</u> | <u>% P₂O₅</u> (Dry basis) |
|--|-------------------|---|
| (ground and mixed sample of jaw, rib, and vertebrae bones) | 11.5 | 27.6 |

| | <u>% Moisture</u> | <u>%P2O5 (Dry basis)</u> |
|--|-------------------|--------------------------|
| Sample #2--Whale bone (ground sample of badly weathered head bones) | 11.4 | 30.3 |
| Sample #3--Walrus bone (ground and mixed sample of thigh, jaw, skull, rib, and vertabrae bones) | 9.9 | 29.4 |

"These figures for phosphate are rather high, since, as far as most bone goes, a figure of 25% P2O5 would be more common. Sometimes the analysis of bone is reported on a $Ca_3(PO_4)_2$ basis, also.

"As was discussed by the Development Board, it seems best to get this resource exploited by the natives and for their benefit.

"Now it is not considered that we have sufficiently reliable information on which to proceed at present and it is recommended that a capable man be sent to Gambell to get the necessary facts.

"Factual information is needed on the extent of the deposit. The deposit should be zoned and the bones counted; some of them should be weighed. From this study a reliable minimum estimate can be made of the tonnage available.

"Other points that definitely must be made clear are the actual interest of the natives; the ease with which the bones can be brought to a central station; the amount of dirt with the bones as they will be gathered; facilities for storing and drying the bones; how wet the bones are when first retrieved; conditions for shipping; ability of the natives to manage this affair; weather conditions for air drying the bone.

"Since our information at present is either only hearsay or the result of only casual observation, it is recommended that Mr. Donovan be sent out there to gather these facts. And since it takes time to acquire machinery, it is recommended that he go at once. It is really a job for an engineer but there aren't any available.

"After we have the report of a field man, we will know how to process these bones, if at all. If the bones are wet and the weather unsuited for air drying and it is impractical to set up an oil-fired jame rotary drier, then the best that

can be done is to hog the wet bones, pack them in burlap (if available) and ship them to Seattle to be ground in a hammer mill after drying. As a principle, we are strongly in favor of performing all processing possible in Alaska. At first thought it seems that the capital involved, if any grinding is done, will be of the order of \$5,000 to \$10,000. If a drier is put in it will take another \$5,000. An ingenious buyer could get the equipment for less.

"As a whole, the machinery and processes involved are well known, and there is a demand for the product. Although I will be perfectly happy to render advice if called upon, it will probably remain with you to pursue this matter, if it is pursued. It is not necessarily a fisheries problem--the bones are ashore and they are those of mammals."

Investigations into this proposal began in Washington with a visit to Dr. Gilmore and Dr. H. B. Collins, Jr., both of the Smithsonian Institution, and both acquainted with the bone deposits through archeological work on St. Lawrence Island. It was learned that St. Lawrence Island is protected by what is known as the American Antiquities Act (Act of June 8, 1906, 34 Stat., p. 225) which is designed to preserve American antiquities. Further inquiry brought forth the information that the Act, insofar as St. Lawrence Island was concerned, was administered by the National Park Service of the Department of the Interior.

Permission to examine the deposits and utilize them for commercial purposes would require approval by the National Park Service. In an informal conference with these officials it was stated that, due to the archeological significance of the bone deposits, they would request the opinion of some such institution as the Smithsonian before authorizing their use for any purpose which would involve destruction of the bones as well as evidences of early Alaskan culture.

It was quite apparent from further discussions with Dr. Collins that he believed it would be a grave mistake to destroy priceless archeological sites

and specimens for the sake of commercial exploitation. It was equally obvious that if the Smithsonian Institution were asked for a recommendation by the National Park Service it would be adverse.

When in Fairbanks the same matter was discussed with Dr. Charles E. Bunnell, President of the University of Alaska. While he has not been on St. Lawrence Island he is very familiar with the situation through his interest in expeditions to the island that the University has sponsored. He was in full agreement with the sentiments expressed by Dr. Collins, believing that the value of the deposits from an archeological standpoint far outweighed any commercial use that might be made.

In Nome further inquiry was made with respect to the income of the natives, size of the deposits, probable production costs, shipping rates, etc. Those familiar with natives, the conditions under which the deposits would have to be exploited, and the probable income that might be received were of the opinion that no great benefit would accrue to the natives. It appeared almost certain that production costs and shipping rates would leave very little profit.

Because of the uncertain weather and the unanimity of opinion against utilizing the deposits commercially for bone meal a survey trip to St. Lawrence Island was not made. It is our considered opinion that it would be a mistake to attempt to open the bone deposits to commercial exploitation for two reasons. First, the probable net income would be negligible. Second, the archeological value of the sites and the bone deposits far exceeds any possible commercial value.