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GULF OF ALASKA SCALLOP EXPLORATIONS--1963

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ABSTRACT

Exploratory fishing for scallops (Patinopecten caurinus) was conducted in the waters of the Gulf of Alaska during 1963. The objective of this survey was to determine the practicality of more detailed explorations for scallops in that area. Catches of scallops were made in amounts as high as 7 bushels per 30-minute drag with an 8-foot dredge. The individual scallops ranged up to 7 inches in diameter and yielded approximately 4-6 pounds of shucked meats per bushel measure. Good catches of scallops were taken at several locations including: off Cape Fairweather at depths from 34-42 fathoms, off Icy Bay from 39-44 fathoms, and east of Cape Saint Elias where catches were taken between 54 and 56 fathoms. It is not expected that this potential resource will receive significant exploitation until (1) the range and abundance are better defined and (2) thorough consideration is given to all aspects of the economics including production, processing, and marketing.

INTRODUCTION

Over the past decade various fishery surveys in the Gulf of Alaska have established that a species of large scallop (Patinopecten caurinus) was present in moderate numbers at certain locations. Shellfish investigations were conducted with the U. S. Bureau of Commercial Fisheries vessel John N. Cobb during 1953 in the Yakutat Bay area (Schaefers and Smith 1954). In the course of those explorations, small quantities of scallops were taken with a "New Bedford"-type scallop dredge and a beam trawl. In 1961, a trawl survey over much of the Continental Shelf of the Gulf of Alaska was started under the direction of the International Pacific Halibut Commission. During that survey, moderate quantities of scallops (up to 1,000 per one-hour drag) were taken at various locations between Cape Fairweather and Cape Saint Elias at depths between 30 and 70 fathoms.

Prior to the above, there was no apparent documentation of effort to establish the abundance of the potential scallop resource in the Gulf of Alaska. However, several attempts were made in the Kodiak and Cook Inlet (Seldovia) areas to capture quantities of scallops for local use. An additional source of information was derived from reports by halibut fishermen who related that scallops occasionally clamped on to their gear (long lines) while it was on the bottom.

Surveys were also conducted in the waters adjacent to British Columbia (Quayle 1961, 1963). Those findings did not indicate any potential for a scallop industry off British Columbia.

Occasional catches of scallops were reported by trawl fishermen off the coasts of Washington and Oregon; and Fitch (1953) indicates that they are "frequently taken in considerable numbers by flatfish trawlers operating out of Eureka" (California).

A fishery for a related species Patinopecten yessoensis is carried on in the waters of Hokkaido, northern Japan (Cahn 1951).

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With this background, a modest plan of exploration was developed to determine the practicality of more complete surveys for the (Patinopecten caurinus) scallop in Alaskan waters.

METHODS

The U. S. Bureau of Commercial Fisheries vessel John R. Manning was made available for the work from May 20 to June 14, 1963 (Cruise 63-1). The John R. Manning (fig. 1) is a combination type purse seiner-trawler, 86 feet 6 inches in length. The primary sampling gear employed during the exploratory operations consisted of an 8-foot, New Bedford-type, deep-sea scallop dredge, with a $\frac{1}{2}$-inch diameter sweep chain supporting the bag of 3-inch diameter rings and $\frac{5}{16}$-inch connectors. Supplementary equipment included the attachment of

Fig. 1 - The vessel John R. Manning, U. S. Bureau of Commercial Fisheries vessel, used for scallop exploratory cruise during the spring of 1963.

"rock chains" which prevent the passage of large boulders or rocks into the bag of the dredge (figs. 2A and 2B). That equipment was obtained from a manufacturer in Massachusetts. The dredge was fished from the starboard gallows frame. The vessel's trawl winch was used for stowing and retrieving the $\frac{9}{16}$-inch diameter wire rope used to drag the dredge during the explorations. A ratio of 4:1 was maintained for wire-out-to-depth relationship.

The duration of individual scallop drags varied from 5 to 60 minutes. Most frequently the time elapsed while the dredge was fishing averaged 30 minutes. A detailed description of the gear and its operation is given by Posgay (1957).

Positions were established by direct bearings from landmarks or were made with Loran fixes. Depth and general bottom characteristics were determined with a sensitive electronic depth-recording device. Throughout the cruise fishing speed was maintained at about 2-3 knots.

Measurements of the scallops caught were taken by direct count of bushel samples from catches greater than one bushel. When catches were less than one bushel, the entire catch of

ig. 2A - Eight-foot scallop dredge similar to the equipment used in the scallop fishery of the Northwest Atlantic. Note the rock chains ahead of the sweep chain.

Fig. 2B - Eight-foot scallop dredge being hoisted over the rail of the John R. Manning with catch of scallops. Note that the rock chains shown in figure 2 have been removed.

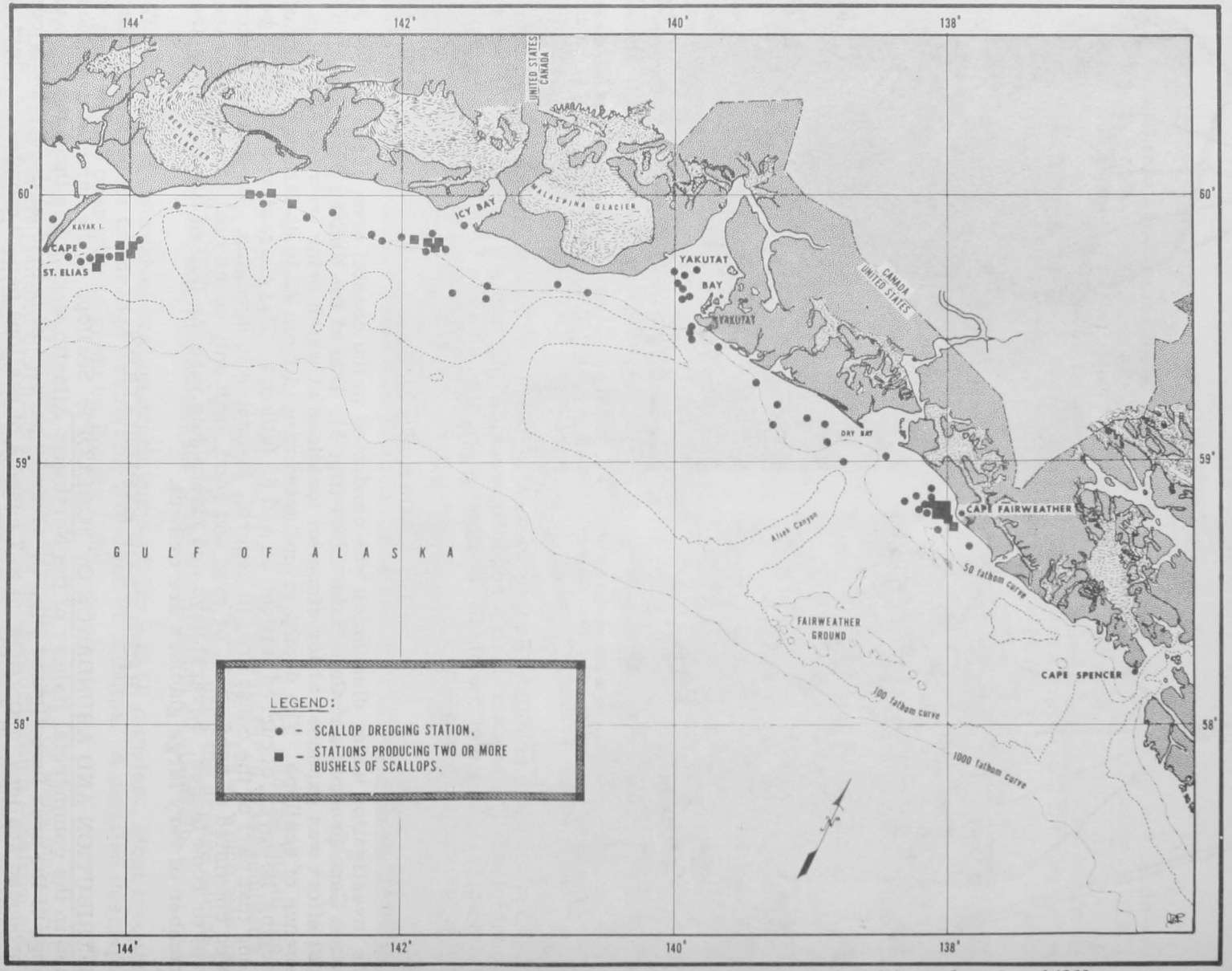
ndividual scallops was counted. At intervals, size-frequency measurements were made of andom samples. The measurements recorded provided the diameter of the shell from the inge to the outer margin of the shell. Scallops were also shucked to determine the number f meats (eyes) per pint measure.

AREA COVERED

The investigation under discussion was conducted in the coastal area of the Gulf of Alas- between Cape Spencer and Cape Saint Elias (fig. 3). Due to the limited period available, rincipal effort was expended at (or close to) locations at which prior trawling had revealed e presence of scallops. The depths investigated ranged from 22 to 85 fathoms. Most of e dredging, however, occurred between 30 and 60 fathoms. The characteristics of the bot- m along that part of the coast are, in general, favorable to dredging. Most of the bottom raversed consisted of sand, mud, or mud and sand, with only occasional patches of gravel, oulders, or rock ledges. Several bays and rivers join with the Gulf of Alaska in that area nd a number of very large glaciers are evident.

RESULTS OF EXPLORATIONS

DISTRIBUTION AND ABUNDANCE OF SCALLOPS: Scallops of the same size as those roduced in the commercial fishery of the Northwest Atlantic were taken throughout the en- re range of the area investigated (fig. 4). Over 70 percent of individual dredge hauls com- leted produced scallops in amounts up to 7 bushels of scallops per 30 minutes of effort. The est catches were made between 30 and 70 fathoms where the scallops seemed to be concen- rated in beds. Locations at which the concentrations of scallops were most promising in-



·Fig. 3 - Map depicting the area of the Gulf of Alaska where scallop fishing was conducted during the spring of 1963.

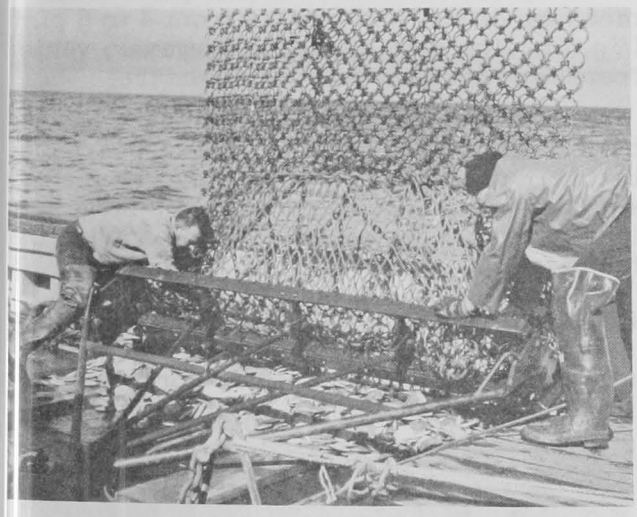
luded: off Cape Fairweather at depths of 34 to 42 fathoms; off Icy Bay in 30 to 44 fathoms; nd east of Cape Saint Elias, where the best catches were made between 54 and 56 fathoms.

Distribution of Scallops (by Depth) Taken During Exploratory Fishing, 1960-63[1/]

Depth (in Fathoms)	9,333 Scallops Collected During Trawl Surveys, 1960-1962	11,754 Scallops Collected By the John R. Manning, 1963	Combined Data
	Expressed in Percentage of Total		
10-20	Less than 1	-	Less than 1
21-30	Less than 1	-	Less than 1
31-40	19	52	37
41-50	27	28	27
51-60	27	14	20
61-70	23	5	13
Over 70	3	1	2

1/All records are from area between Middleton Island and Cape Spencer in the Gulf of Alaska.

A total of over 20,000 scallops was taken by exploratory fishing vessels from the northastern Gulf of Alaska between 1960 and 1963. The distribution of those captures by depth is ummarized in table. The sampling by the John R. Manning during 1963 was primarily at epths and locations expected to be the favorable habitat for scallops as indicated by the recrds of earlier explorations. Catch rates of scallops ranged from 0 to 7 bushels per 30-minte drag. As the time available for explorations was limited, no production fishing was atempted. The explorations indicate a widespread distribution of the resource throughout the rea surveyed.



ig. 4 - Catch of scallops from the Gulf of Alaska being dumped on the deck of the John R. Manning.

Fig. 5 - A catch of large scallops taken from the waters near Cape Saint Elias in the Gulf of Alaska.

SIZE AND YIELD OF SCALLOPS: The scallops captured during individual drags were frequently similar in over-all size, indicating a tendency toward natural segregation by sizes. A tendency toward larger average sizes was noted as sampling progressed westward from Cape Fairweather toward Cape Saint Elias. East of Yakutat Bay, the size of scallops measured ranged from $2\frac{3}{4}$ to $6\frac{1}{2}$ inches (measured from the hinge to the outer margin of the shell). Of those, 73 percent were between 3 and 4 inches. West of Yakutat Bay, the size range was from 3 to 7 inches, with 82 percent of the scallops falling between 5 and $6\frac{1}{2}$ inches (fig. 5). The number of scallops per bushel measure ranged from about 240 per bushel at the 3- to 4-inch sizes to approximately 60 per bushel for the 6- to 7-inch sizes.

Fig. 6 - Crewman shucking scallop meats from the shell. The yield of meats varied from approximately 4 to 6 pints per bushel of whole (shell stock) scallops.

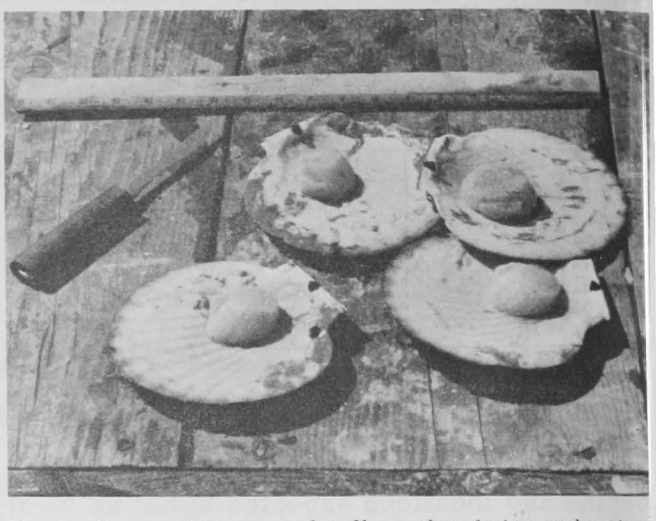


Fig. 7 - Representative size of scallops taken during explorations. Over eighty percent of the scallops were over 4 inches, when measured from the hinge to the margin of the shell.

The yield of shucked meats per bushel measure of scallops varied from 4 to 6 pints (fig. 6). The size of meats, however, varied from 15 to 60 count per pint measure.

The over-all quality of the meats was excellent and comparable in size, appearance, texture, and taste to scallops now on the market (fig. 7). Some meats from the large scallops were slightly yellow in color and had been taken from a bottom of fine green mud.

COMMERCIAL POTENTIAL

Since 1960, the commercial production of sea scallops from United States ports has averaged over 25 million pounds of meats per year. During the last 10 years production of scallops by Canadian (east coast) fishermen has increased from less than 2 million to over 10 million pounds a year. A comparison of catch rates and scallop sizes between the existing (Georges Bank) fishery and the Gulf of Alaska exploratory results reveals some cause for speculation. The maximum catch rates of 5 to 7 bushels per 30-minute drag experienced in the Gulf of Alaska stand up well to catch rates for a similar unit of effort by New England fishermen on the Georges Bank grounds (fig. 8). It is not possible to predict with any certainty the relative density of the Gulf of Alaska stocks as compared with those on Georges Bank.

The size and yield, however, is directly comparable. The average yield per gallon of meats in the Atlantic fishery is just under 200 per gallon and the approximate yield

Fig. 8 - Scallop catch aboard John R. Manning being measured in bushel baskets. Up to 7 bushels of scallops were taken during individual 30-minute drags with an 8-foot scallop dredge.

range for scallops caught by exploratory fishing in the Gulf of Alaska is 120 to 500 meats per gallon.

Alaska fisheries developments over the past 10 years have demonstrated good gains in production. Other shellfish products, king and dungeness crab, as well as shrimp, are good examples of fisheries with substantial increases.

Among the less encouraging features of the available information are the following:

1. Inadequate definition of the Gulf of Alaska scallop stocks.
2. Lack of vessels and fishermen with background suitable to enter into the fishery.
3. High labor input required to shuck scallops.
4. High operating and transportation costs.
5. No established processing and marketing chain.

In conclusion, the possible commercial utilization of recently discovered beds of scallops in the Gulf of Alaska will depend on more detailed information on abundance of the stocks along with several economic considerations.

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