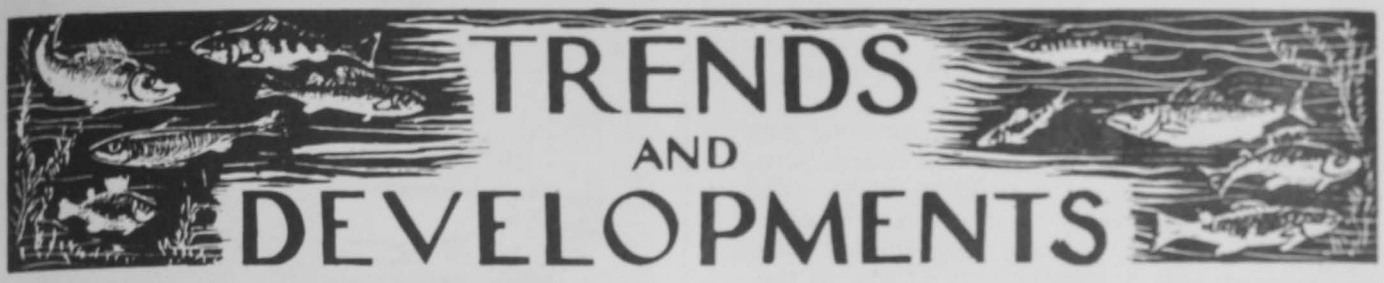

Fishing Vessel and Gear Developments

EQUIPMENT NOTE NO. 9--THE SURF-CLAM FISHERY OF NEW JERSEY:

The surf-clam fishery of New Jersey currently produces over 20 million pounds of meats annually (table 1). This fishery, once primarily a bait fishery, has achieved national importance as a primary source of supply for minced, chowder, and frying clams. The substitution of surf clams (Spisula solidissima) for soft clams (Mya arenaria) has been conducive to the development of the fishery.

Table 1 - Surf Clam Landings, New York and New Jersey 1/

Year	New York	New Jersey
	(1,000 Lbs. of Meats)	
1960	721,453	23,382,157
1959	514,381	20,164,000
1958	429,400	12,461,900
1957	1,599,100	15,224,200
1956	2,368,300	11,583,500
1955	2,026,400	8,277,500
1954	3,359,700	6,876,900
1953	3,345,400	6,878,100
1952	4,138,100	6,418,300
1951	4,046,100	6,419,400
1950	3,184,000	4,298,700
1949	4,903,700	407,700
1948	3,520,900	167,300
1947	3,314,700	156,600
1946	6,482,500	Not available
1945	3,982,200	526,500
1944	920,000	14,700
1943	475,000	170,100
1942	340,000	413,200
1941	Not available	Not available
1940	660,000	573,000

1/From "Fishery Statistics of the United States," U. S. Fish and Wildlife Service, 1940-1960.

UTILIZATION OF SURF CLAMS

Surf clams are marketed as canned clam chowder, minced clams, and as "strippings," the latter substituting for soft clams in certain instances. Strippings are made by a mechanical process in which the shucked meats (foot portion of the clam) are thoroughly eviscerated and washed, then passed through a machine that cuts the meats in narrow strips. By stripping, the meat of the surf clam is reduced to small pieces suitable for frying.

LOCATION OF THE FISHERY

The surf-clam fishery for food, as distinguished from the bait fishery which for many years was an important source of bait to cod fishermen and the party boat fishermen, first developed in the New York coastal area in World War II. It soon spread to more productive beds off the New Jersey coast (Atlantic States Marine Fisheries Commission, 1958). Landings were made at various ports along the coasts of New Jersey, Delaware, and Maryland. In 1950, a plant for processing surf clams was opened in Wildwood, N. J., and the New Jersey-Delaware coasts became the center of the fishery. Today, owing to the presence of readily-accessible beds of clams nearby, the fishery is conducted almost entirely out of Point Pleasant, N. J., and most New Jersey landings are made in that port.

Fishing is conducted in an area approximately 15 to 25 miles southeast of Point Pleasant. The more productive clam beds now fished are in depths ranging from 60 to 90 feet. Vessels make individual trips of less than one day and usually fish four days a week. The daily catch is either shucked and shipped by truck as fresh clams to other plants for further processing, or shipped whole as shell stock.

FISHING GEAR

There are about 30 vessels engaged in the New Jersey surf-clam fishery. These range in length from 65 to 90 feet, are Diesel-powered, and are mostly of Florida shrimp-boat design (fig. 1). An average

crew consists of the captain and two fishermen. Vessels are pilothouse-controlled and rigged with a special towing bit and steel outrigger boom for retrieving fishing gear.

The fishing gear (figs. 2-5) consists primarily of a sled dredge, a centrifugal pump, and a 5-inch (internal diameter) hose. The hose is permanently attached to the dredge during fishing operations. Sea water is pumped under pressure through this hose to the dredge manifold where it is ejected through a series of nozzles into the ocean floor. By

Fig. 1 - A typical Diesel-powered surf-clam vessel. Vessels in use range from 65 to 90 feet in length. An auxiliary Diesel engine is mounted below deck, aft, to drive a 5-inch centrifugal pump that supplies water for the hydraulic dredge.

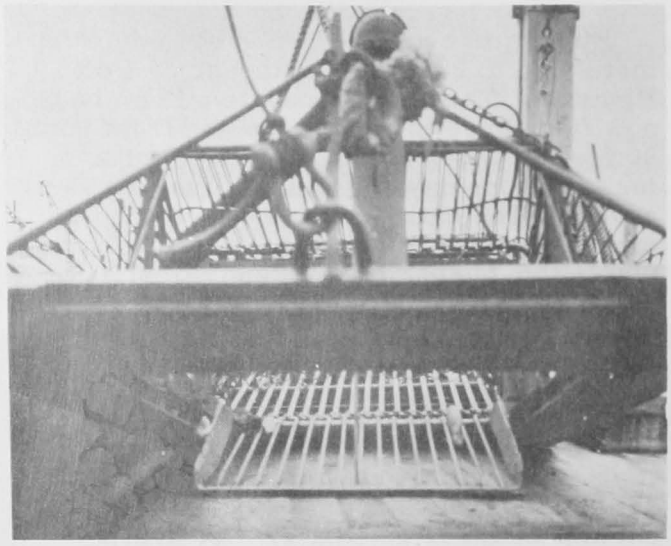

Fig. 3 - The steel cutting edge or knife is set to cut from $6\frac{7}{8}$ to 8 inches below the dredge shoes.

Fig. 2 - Hydraulic Jet Dredge. Dredges consist of two basic parts, the dredge section proper and the sled section. The dredge section (forward) has a manifold of 5- or 6-inch pipe with a series of horizontally-spaced nozzles aimed down, back, and immediately forward of the cutting knife. Water pressure is maintained at about 70 pounds with a volume of from 1,000 to 1,500 gallons per minute. The sled section is attached to the dredge section to retain the clams washed back from the dredge.

Fig. 4 - The towing bit is set from the keel and is high enough to allow the dredge towline to pass clear of the stern. The towline is reeved through a snatch block that is fastened to the towing bit before holding turns are applied to reduce chafing of towline. Hose used for jetting measures 5 inches in internal diameter and is constructed of heavy-duty collapsible nylon-reinforced rubber. Sections of the hose (seen along the rail) are fastened together with pressure clamps over aluminum sleeves. The hose is always longer than the towing warp.

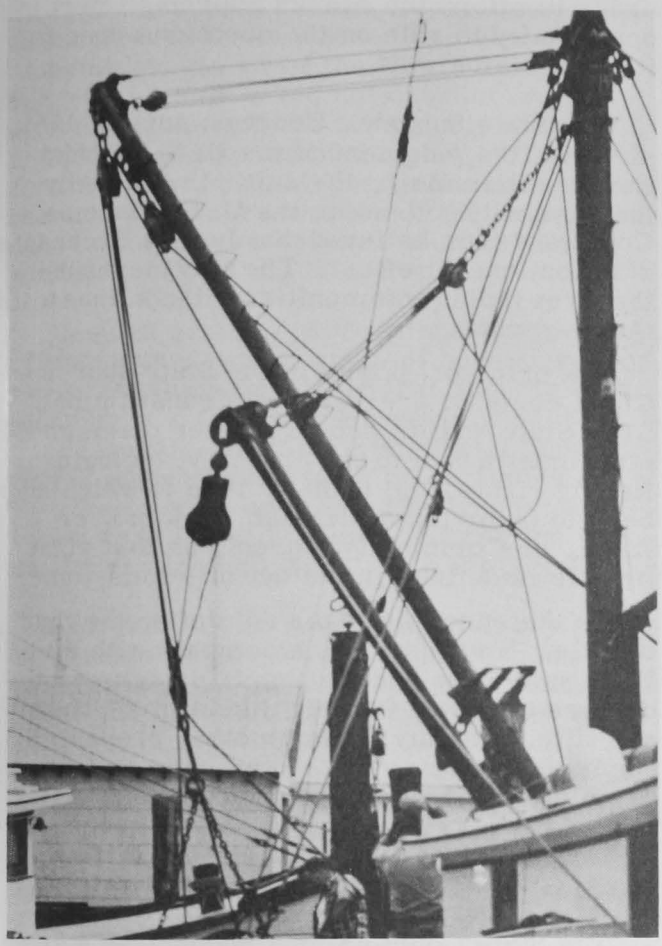

Fig. 5 - When fishing, the outrigger keeps the dredge section outboard. For unloading the clam catch, the sled section with the chain bag is brought inboard.

Fig. 6 - Clams are culled and stowed in bushel bags on deck aft. Vessels make 15- to 30-minute drags, which average from 11 to 23 bushels per drag.

proper direction of the nozzles, the hydraulic action of the water washes the sand from over and around the clams. This action allows the deep-set knife blade to pass under the clams and lift them from the bottom so that they pass back into the sled section.

Surf clams (fig. 6) because of their size, relatively thin shells, and ability to bed in hard, coarse-grained sand, present a problem in dredging. The non-hydraulic dredges, used in the hard clam (Venus mercenaria) fishery of southern New England, tend to crush the surf clams when forcing them from the bottom. The high-pressure jet clam dredge was, therefore, developed specifically for harvesting surf clams.

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--By Michael Ruggiero
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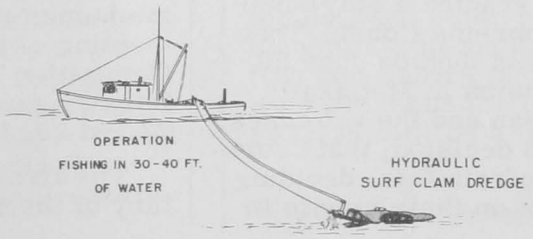
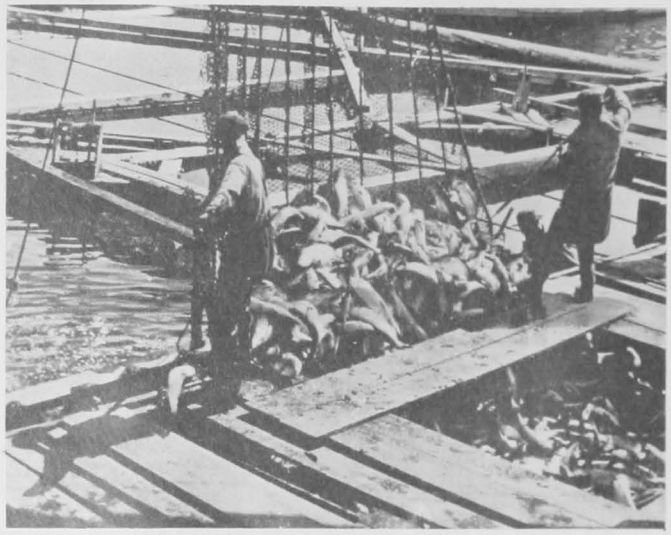


Alaska

STATE SUPREME COURT RULES ON CASE WHICH AFFECTS USE OF FISH TRAPS BY INDIAN COMMUNITIES:

On June 2, 1961, the Alaska Supreme Court issued its opinion on the trap case (Metlakatla Indian Community et. al. vs. State). This case revolves around the right of Indian Communities to use fish traps in Alaska. Question involves the rights of three native communities to operate traps, since the State of Alaska Constitution and State laws prohibit traps and the State served notice that it would enforce the law.



Brailing a salmon trap in southeastern Alaska. This type of gear is now banned by Alaska State laws.

The U. S. Department of the Interior, following passage of the Statehood Act, issued regulations prohibiting traps except for operation of 11 traps by 3 native communities. This was done on the basis that the Statehood Act secured to the Indians certain fishing rights.

Native communities filed suit in the U. S. District Court to enjoin the State from enforcing the trap prohibition. Suits were dismissed.

Justice Brennan of the U. S. Supreme Court (on July 11, 1959) granted a stay pending appeal to the U. S. Supreme Court. That Court heard arguments and then on June 20, 1960, handed down a decision in Metlakatla Indian Community vs. Egan and the two cases related to it. By a 6 to 3 decision, that Court announced that it would refrain from deciding the issues presented to it on their merits in order to afford the Alaska Supreme Court the opportunity to rule on the questions open to it for decision.

The State Supreme Court on June 2, 1961, affirmed the judgment of the U. S. District Court in dismissing the suit. Undoubtedly the case will go back to the U. S. Supreme Court and it is believed that Justice Brennan's stay continues in effect. The stay means that the three Indian communities will continue to use the fish traps.

The principal points of the State Supreme Court decision are: (1) State constitution: "The State and its people further disclaim all right or title in or to any property, including fishing rights, the right or title to which may be held by or for any Indian, Eskimo, or Aleut, or Community thereof, as that right or title is defined in the act of Admission."

(2) Statehood Act does not define the right or title. It reads: "As a compact with the U. S. said State and its people do agree and declare that they forever disclaim all right and title.... to any lands or other property (including fishing rights), the right or title to which may be held by any Indians, Eskimos, or Aleuts (hereinafter called natives) or is held by the U. S. in trust for said natives,... ."

The State Court opinion recognizes a different status for the Metlakatla Indian Community, referring to it as "the only fishing privilege held by a native community at the time of enactment of the Alaska Statehood Act." However, it dismisses this privilege as a "temporary privilege" which disappeared with statehood.

American Fisheries Advisory Committee

OCEANOGRAPHIC RESEARCH STRESSED AT MEETING:

Utilization of the sea for the benefit of the human race was the theme of the 12th meeting of the American Fisheries Advisory Committee held in the Department of the Interior Building in Washington, D. C., May 22 and 23, 1961.

The first session was opened by Secretary of the Interior Stewart L. Udall, who

pledged the support of the Department in making research of the sea one of the outstanding programs of the New Frontier. Secretary Udall asked not only increased efforts in learning the biological, chemical, and physical secrets of the sea, but called for increased technological efforts in making the vast protein resources of the sea available to the undernourished peoples of the world.

Besides general expressions of approval of the stepped-up program of oceanographic research which many Federal agencies are planning, the Committee recommended that the research program on artificial propagation of oysters and clams be continued and that there be an intensified program to discover ways to put to beneficial use the large stocks of underutilized fish in the Great Lakes.

Secretary Udall urged the advisory group to broaden its advice and counsel to the Department "to include counsel on all fisheries matters."

Donald L. McKernan, Director of the U. S. Bureau of Commercial Fisheries, gave a detailed report on "What Lies Ahead" from the Bureau standpoint. He re-emphasized the necessity of learning how to use the sea for the benefit of mankind. He pointed out the stake America as a Nation has in the oceans of the world and then discussed what the American fishing industry can do in the huge task of supplying nutrients to the people of this Nation and of the world. Interwoven with his remarks were instances of the Bureau of Commercial Fisheries' responsibility to the American fishing industry, in helping the industry to make maximum sustained harvests, with a minimum of time and effort.

Specifically, McKernan said that those concerned with the fishing industry must understand the sea and its effect upon the distribution and abundance of fish; they must know the life history of many species and all there is to know about the dynamics of fish populations; they must learn how to predict abundance of a species, know their movements, and how and when to catch them most economically; know more about the upwellings in the sea, their effect upon the food chains, and how to protect the resource from predators which at times plague it; and finally there must be more technological knowledge on full utilization of the products of the sea.

The importance of "vital statistics" and additional knowledge of the sea in predicting abundance and distribution of fish was stressed by Dr. J. L. McHugh, Chief of the Bureau's Division of Biological Research. McHugh stressed the damage which pollution can do to fisheries, especially in estuaries. He pointed out the damage done by hurricanes, not only the physical damage, but the havoc sometimes wrought by the churning of waters, the elevation of bottom water to the top, the introduction of long-settled chemicals into surface waters, and their sometimes deleterious effect upon fish which are not inured to that particular type of water. He pointed out the value of knowing how many fish of a given species are caught, the size and age characteristics, the hours of the catch, and numerous other bits of information about landings which, over a period of time tell a story to the fishery biologist.

The advantage of a small pilot plant to help the fishing industry study problems of mass production of fish flour was discussed. It was pointed out that fish flour is equal to dried egg solids in amount and value of protein and that dried eggs have been accepted as the standard for determining protein quality.

The American Fisheries Advisory Committee has 20 members, appointed by the Secretary of the Interior. Frank P. Briggs, Assistant Secretary of the Interior for Fish and Wildlife, is the chairman of the group, and presided at the sessions. The first meeting of the Committee was held in Washington in April 1955. Recently the Committee has been meeting annually instead of semi-annually.

The Advisory Committee was authorized by the Saltonstall-Kennedy Act passed in 1954. This Act provides that an amount of money equal to 30 percent of the funds received in import duties on fishery products be made available to the Department of the Interior to promote the free flow of domestically-produced fishery products into channels of trade, to conduct biological, technological, and other types of research necessary to aid in the harvest or utilization of fish and fishery products. The Saltonstall-Kennedy funds for these purposes vary from $4 to $6 million a year.

Antarctic

MARINE RESEARCH INCLUDED IN STUDIES TO BE CONDUCTED BY VESSEL ON PERMANENT STATION:

The National Science Foundation will operate its first research ship on more or less permanent station in Antarctic waters. The vessel, which will be open to qualified scientists in much the same way that institutions such as the Brookhaven and Oak Ridge national laboratories are, is a 3,000-ton converted Navy freighter named the Eltanin. A ship with a reinforced hull, last used for carrying supplies to radar stations in the Arctic, she should be ready to sail on her next mission by the end of the year.

The Eltanin will have accommodations for a scientific party of 38 and a crew of about 40. The Foundation will operate the vessel by inviting proposals for work aboard her from universities, Government agencies, and other interested institutions. Scientists and crew will be rotated by air from the United States. The ship itself will remain in the far south for two to three years at a time.

The Foundation's unusual venture was born of the need for increased studies of Antarctic waters. In recent years most Antarctic work has been done on the ice. Only one U. S. oceanographic institution, Columbia University's Lamont Geological Observatory (whose schooner Vema is currently on her sixth cruise in Antarctic waters in six years), has had substantial experience in research in Antarctic seas. Lamont is among eight institutions cooperating in designing equipment for the Eltanin, which will be fitted out for research in meteorology, cosmic rays, radio propagation and geomagnetism, as well as in oceanography, marine geophysics, and marine biology. (Scientific American, May 1961.)

Atlantic Marine Game Fish Research

SURVEY OF MARINE SPORT FISHING NEAR COMPLETION:

A survey of marine sport fishing, which the U. S. Bureau of the Census is conducting under a contract with the U. S. Bureau of Sportfish and Wildlife's Atlantic Marine Game Fish Research Center at Sandy Hook, N. J., was nearing completion early this year. The survey is based on a nationwide sampling of people who engaged in salt-water fishing during 1960, and will provide estimates of the quantities of fish caught, species, fishing methods, and regions. Analysis of the data is near completion and a report is to be submitted at the end of the 1961 summer.

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TWO APPROACHES TO COVER RANGES OF MARINE GAME FISH:

Marine biologists are constantly troubled by the overwhelming problem of how to cover, in their field programs, the entire ranges of species which they study. The Sandy Hook Center in the first quarter of 1961 announced two approaches to attacking this problem:

1. By using the services of qualified amateur skin divers, selected for education and experience as underwater observers, to conduct, through their clubs, systematic observations of coastal fishes. The type of activity will vary with different clubs. One club of divers which has formed "Research Divers Society" is particularly interested in tagging with darts. They will do this in close cooperation with state fishery agencies and, as required, with the Sandy Hook Center. Another group being sponsored is "The Littoral Society," which parallels in its conception the Audubon Society, and, like that organization, will conduct a periodic synoptic census of shore fishes. Several meetings were held at the Sandy Hook Center to plan the first count which is scheduled for September 4, 1961, and also to plan a limited summer program of natural history observation. At least two divers have volunteered their services to the Center and will work on behalf of the Littoral Society for several weeks this summer.

2. To understand the vagaries in the occurrences, distribution, and abundance of fishes, it is essential to have synoptic and systematic pictures of the physical and biological features of their environments throughout their ranges. This is possible only by cooperation among all marine laboratories in making the necessary observations. The Sandy Hook Laboratory Director has presented to biologists in three regional meetings of the Atlantic States Marine Fisheries Commission Bio-

logical Committee, the idea of conducting periodic multipleship surveys in a program to be called the Atlantic Shelf Environmental Campaign. This would take place in 1963 or 1964. The proposal has been unanimously recommended for formal presentation to the forthcoming annual meeting of the whole Commission. After the Commission approves the plan, funds are available from an Office of Naval Research (ONR) grant to pay travel expenses of five scientists who will attend the first meeting to advise in designing the campaign.

California

UNDERWATER CHAMBER WITH GLASS PORTS ADDED TO RESEARCH VESSEL "ALASKA":

Four one-inch-thick crystal-glass viewing ports were placed in the hull of the research vessel Alaska of the California Department of Fish and Game. The ports are on the starboard side and reveal submarine goings-on into a watertight compartment that was built within the ship. Viewers enter this compartment through a hatch opening through the main deck. Thus, the ship is safe and seaworthy, even if the compartment fills with water.

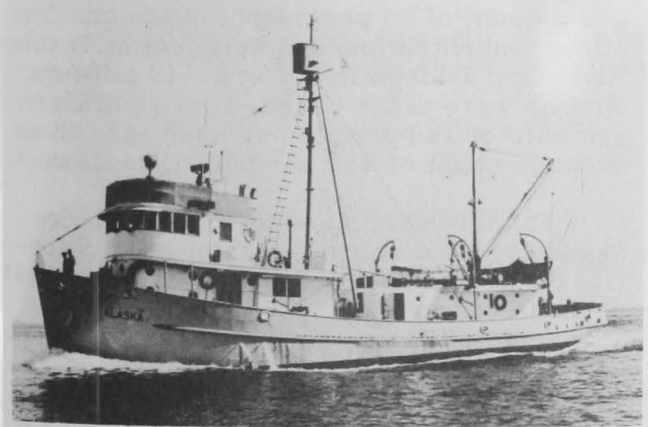

Fig. 1 - Research vessel Alaska operated by the California Department of Fish and Game.

The chamber is unique in that it is amidships and provides wide-angle viewing in relatively spacious comfort.

Admittedly, the idea of an underwater viewing-port is not new. Almost 100 years ago, Jules Verne provided viewing windows for the imaginary Nautilus in his novel, "Twenty Thousand Leagues Under the Sea." Diving bells, bathyspheres, bathyscapes, and glass-bottom boats have utilized similar "looking-glasses" and enabled man to see and study the denizens of the deep. Recently, the U. S. Bureau of Commercial Fisheries fitted one of their vessels, the Charles H. Gilbert, with underwater ports to observe tuna behavior in the mid-Pacific.

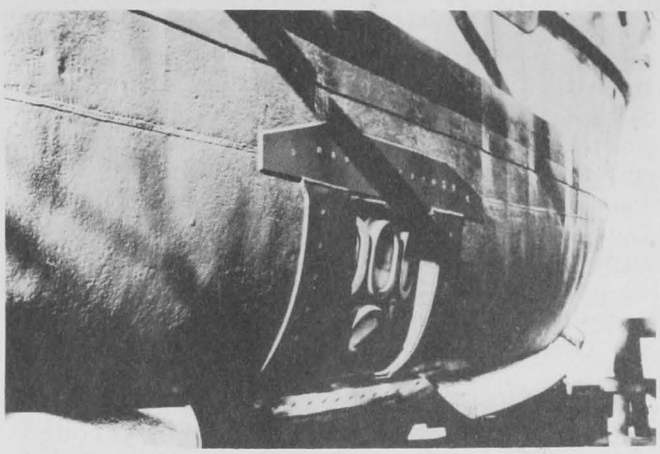

Fig. 2 - Underwater chamber with glass ports on the M/V Alaska is located on the starboard side. Note steel plate reinforcement. Photo was taken when vessel was in drydock.

Quick and positive identification of fish schools will be one of many uses of the new underwater eyes on the Alaska. On a recent field trial, biologists observed a flock of sea birds actively feeding nearby. A single pass through the area while looking through the viewing ports revealed that they were working on a school of anchovies.

Fig. 3 - Diver-biologist of the California Department of Fish and Game working in conjunction with observers inside the underwater chamber of the Alaska. White plastic sheet used to write messages and record observations while in the water.

The viewing chamber will provide a direct means of observing underwater fauna without getting wet. By observing fish behavior, biologists hope to develop more efficient collecting devices. They will also be provided a better look at schooling pelagic fish, such as sardines, in their natural environment.

To date, the Alaska has been used to collect samples of sardines for abundance and distribution studies. These have been attracted to the vessel by a light suspended over the water at night. When a sufficient quantity has been attracted they are caught with a special blanket net developed by Department personnel. At times, however, the sardines remain deep and are beyond the range of the net. Often, by altering the intensity of the light, it has been possible to lure these deep schools to the surface. Occasionally too, "wild" schools are encountered and these are always difficult to catch with the net.

By applying the knowledge gained from observing the behavior of sardines through the viewing ports, the biologists feel certain that many of their misses will be changed to hits. What holds for sardines should hold for other fishes too. (Excerpted from article by Doyle Gates, in Outdoor California, May 1961.)

* * * * *

SHRIMP STUDY OFF CALIFORNIA COAST CONTINUED:

M/V "N. B. Scofield" Cruise 61S2-Shrimp: The coastal waters from Brookings, Oreg., to Avila, Calif., were surveyed (March 13-April 28, 1961) by the California Department of Fish and Game research vessel N. B. Scofield for concentrations of pink shrimp, Pandalus jordani. Other objectives were to determine size, sex, and weight of the shrimp, to obtain bottom temperatures in the areas explored; and to determine species of fish and invertebrates and weight of all species caught incidentally during shrimp fishing operations.

The strong northerly and southerly winds accompanied by heavy seas greatly hampered trawling operations during most of the cruise. A total of 115 tows was made, using a 20- by 8-foot beam trawl with a cotton net of $1\frac{1}{4}$-inch mesh. The tows were: 34 in the area from the California-Oregon border to Rocky Pt.; 15 from Bear Landing to Westport; 55 from Salt Point to Bodega Head; and 11 from Pt. San Luis to Pt. Sal.

In the area from the California-Oregon border to Rocky Pt., the heaviest shrimp concentrations were off of the Klamath River in 66 to 68 fathoms and in the vicinity of Redding Rock in 72 to 76 fathoms. Tows made off of the Klamath River produced an average of 1,155 pounds of shrimp per hour. The average count was 165 per pound, heads on. From the area off Redding Rock, shrimp were taken at a rate of 715 pounds per hour. Here the count was 140 shrimp per pound. Three tows in the area off of Pyramid Pt. failed to yield heavy concentrations of shrimp. In this area the catch was 44 pounds per hour of shrimp averaging 129 per pound, heads on.

In the area from Bear Landing to Westport, the best concentrations were found in a bed extending from Bear Landing to Cape Vizcaino, approximately $2\frac{1}{4}$ miles wide. Of the 15 tows in this area, 7 produced 1,322 pounds per hour, from depths of 61 to 80 fathoms. These shrimp averaged 128 to the pound, heads on.

In the area from Salt Point to Bodega Head, there were two widely separated concentrations. One was between Salt Point and Fort Ross at 57 fathoms. Here shrimp were caught at a rate of 370 pounds per hour and had a count of 95 per pound, heads on. The other concentration was between the Russian River and Bodega Head, in 42-49 fathoms. Shrimp were taken in this area at an average rate of 149 pounds per hour and had an average count of 150 per pound, heads on.

Two main shrimp concentrations were separated by a narrow area of low production (73 pounds per hour). The northernmost of these beds yielded 245 pounds per hour, at a count of 51 per pound; and the southern bed produced 555 pounds per hour at a count of 57 per pound. These two concentrations were between Pt. San Luis and Pt. Sal in 110 to 127 fathoms.

Approximately 50 shrimp were taken from each tow that contained shrimp (92 of 115 tows) and these were sexed, sized, and weighed. The majority of the females had completed spawning. Very few still contained roe. This was especially true in the Avila-Pt. Sal area.

A total of 76 bathythermograph casts was made--the majority over shrimp beds.
Note: Also see Commercial Fisheries Review, June 1961 p. 17.

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MIDWATER TRAWL TESTED IN CATCHING SALMON FINGERLINGS:

M/V "Nautilus" Cruise 61-N-2-Salmon: A midwater trawl, with a 15-foot square opening, was tested in San Francisco Bay (March 13-16, 1961) by the California Department of Fish and Game research vessel Nautilus to become familiar with its operation and prepare for salmon studies. The mouth of the net is held open by 4 quarter doors acting as kites. The trawl may be fished at the surface by using only the 4 quarter doors, or may be fished deeper by placing 2 small otter doors 150 feet forward of the net.

Sets were made using the quarter doors alone and using the otter doors in conjunction with the quarter doors. Various speeds and depths were used, so that operations would be familiar under different conditions. Enough sets were made to develop a smooth technique in handling winches, otter doors, and the net itself.

M/V "Nautilus" Cruise 61-N-3-Salmon: The midwater trawl operations were continued (April 10-14, 24-28, 1961) in the Carquinez Straits to (1) capture marked salmon fingerlings; (2) determine time of day or night that salmon fingerlings may be captured; (3) determine areas where salmon fingerlings may be captured; and (4) standardize trawling methods for future operations.

Eighty-five tows were completed. A total of 807 king salmon (Oncorhynchus tshawytscha) finglerings were captured, 8 of which were marked. The marked salmon were from a release made in San Pablo Bay seaward of the fishing area. Of the 20 rainbow trout (Salmo gairdneri) taken, 2 had been marked and released into the American River. The most abundant species taken, incidentally, in the area fished were northern anchovy (Engraulis mordax) and Pacific herring (Clupea pallasi). Other species captured included striped bass (Roccus saxatilis), American shad (Alosa sapidissima), splittail (Pogonichthy macrolepedotus), jack smelt (Atherinopsis californiensis), staghorn sculpin (Leptocottus armatus), Sacramento smelt (Spirinchus thaleichthys), Pacific tomcod (Microgadus proximus), Northern midshipman (Porichthys notatus), pipefish (Syngnathus griseo-lineatus), starry flounder (Platichthys stellatus) and carp (Cyprinus carpio).

The largest numbers of salmon fingerlings were caught between 7 a.m. and 5 p.m. The best catches of 30, 33, and 36 salmon fingerlings per tow were made between the hours of 10 a.m. and 2 p.m. Between 8 p.m. and 4 a.m., catches averaged about 3 salmon per tow.

Catches were similar in the center and each side of Carquinez Straits, indicating a uniform distribution of salmon fingerlings throughout the sampling area. Catches were also similar for tows made with and against the current.

A standard procedure was worked out for subsequent cruises. This plan calls for alternating tows between upstream and downstream and between the south shore, center, and north shore of the straits. Each tow will be for 20 minutes, and fishing will be conducted from 8 a.m. to 3 p.m. daily.

M/V "Nautilus" Cruises 61-N-8 and 61-N-9-Salmon: Operations were continued (May 8-12, 22-26, 1961) in the Carquinez Straits to capture marked salmon fingerlings.

All trawling was conducted between 7 a.m. and 3 p.m; each tow was for 20 minutes. Tows were alternated between upstream and downstream, and between the north shore, center, and south shore of the channel. A flow meter was used to measure the amount of water strained by the net on each tow.

During the 101 tows completed, a total of 1,820 king salmon (Oncorhynchus tshawytscha) fingerlings was captured--catch per tow varied from none to 115. A total of 24 marked salmon was recovered, 22 from releases made in San Pablo Bay, approximately two miles seaward of the fishing area. One marked salmon was recovered from releases made at Coleman Hatchery and one from releases made at Rio Vista. Eighteen rainbow trout (Salmo gairdneri) were also taken--three were marked and had been released in the American River.

Other species appearing in the catch, listed in order of abundance, were: northern anchovy (Engraulis mordax), Pacific herring (Clupea pallasi), striped bass

(Roccus saxatilis), American shad (Alosa sapidissima), starry flounder (Platichthys stellatus), jack smelt (Atherinopsis californiensis), splittail (Pogonichthys macrolepedotus), staghorn sculpin (Leptocottus armatus), Sacramento smelt (Spirinchus thaleichthys) Pacific tomcod (Microgadus proximus), and carp (Cyprinus carpio).

Two tows were made at a depth of 50 to 60 feet to determine if salmon were evenly distributed in depth. Small numbers caught at these depths (1-2) compared to the larger numbers caught subsequently at the surface (13-22) indicates that better catches may be made on the surface during the hours fished. With the exception of these two deep tows, all fishing was done at the surface.

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PELAGIC FISH POPULATION SURVEY CONTINUED:

M/V "Alaska" Cruise 61-A-3-Pelagic Fish: The coastal waters from Ensenada, Baja California, northward to Santa Barbara, Calif., were surveyed (April 7-24, 1961) by the California Department of Fish and Game research vessel Alaska. The objectives were (1) to sample spawning sardines to determine what relationship exists between the spring spawners off southern California and northern Baja California and the genetically distinct groups which have been defined as "northern" and "southern" stocks; (2) to locate and sample fish from the transition zone between the two stocks to determine the extent of mixing; (3) to determine if a 500-watt underwater light would increase fish attraction when used in addition to the regular (1,500-watt surface) survey light; and (4) to make incidental collections requested by other investigations.

Of the 75 night-light stations occupied, anchovies were attracted at 9, Pacific mackerel at 7, jack mackerel at 6, and sardines at 4. Sardines were collected in sufficient numbers for blood genetic studies at 2 stations off Santa Catalina Island. Blood tests were completed for both samples and they consisted of the "northern" stock type.

A 500-watt underwater light was used with the 1,500-watt surface light at alternate stations. With the surface light only, fish were attracted at 8 of 35 stations. The underwater light used in conjunction with the surface lights attracted fish at 10 of 35 stations. No significant difference could be detected between the two types of lights for the small number of stations tested.

The vessel scouted 341 miles during which 114 schools of anchovies, 28 small schools of mackerel, and one school of bonito were observed. Anchovies were observed almost continuously between Pt. Hueneme and Santa Barbara, and from Pyramid Head, San Clemente Island, eastward for 20 miles. They were also abundant in Todos Santos Bay, Mexico. The pelagic red crab (Pleuroncodes planipes) occurred in large numbers at 2 night-light stations between Oceanside and La Jolla.

Live kelp bass were collected for the Department's tuna investigation. Blood from kelp bass, relatively easy to obtain, will be used to develop serological techniques.

The 4 underwater viewing ports afforded an excellent view of sardine behavior and aided in obtaining a sample of "wild" sardines.

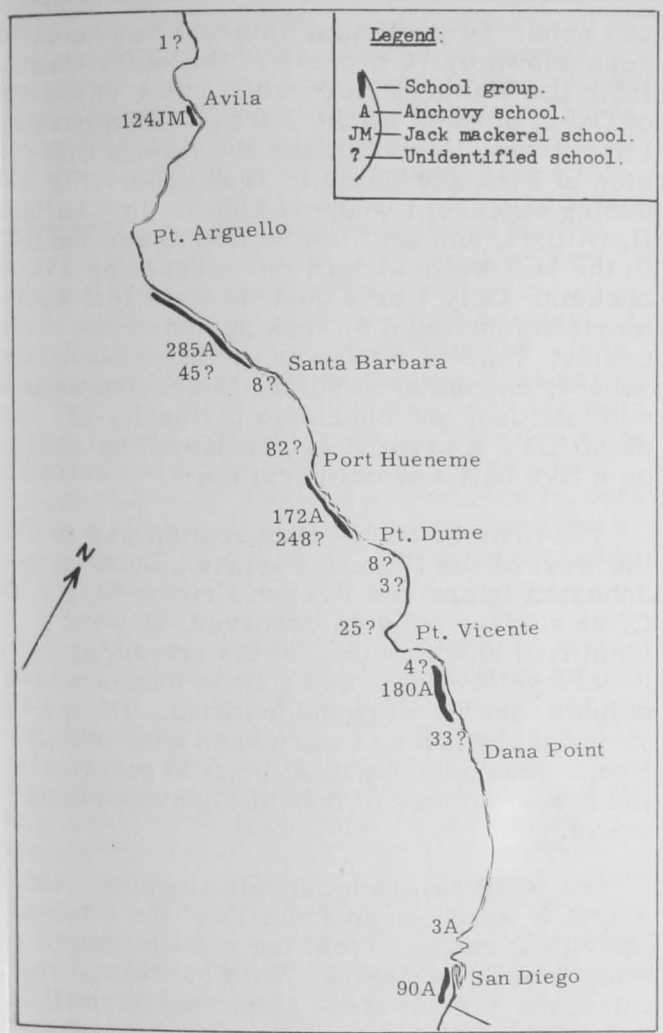
Sea surface temperatures ranged from 12.4° C. (54.3° F.) near Pitas Pt. near Santa Barbara, Calif., to 16.4° C. (61.5° F.) in Los Angeles Harbor.

Airplane Spotting Flight 61-6-Pelagic Fish: The inshore area from the United States Mexican Border to Point Piedras Blancas, Calif., was surveyed from the air (May 16 and 19, 1961) by the Department's Cessna "182" 9042T, (1) to determine the distribution and abundance of pelagic fish schools; and (2) to determine the magnitude of sportfishing activity, other than party boats, with particular emphasis on barracuda and white sea bass.

Adverse weather limited flying time to only 2 days of the 4 scheduled. Conditions were generally unfavorable on May 16, but were good on May 19.

Many more fish schools (1,311) were seen than during the April flight when only 185 schools were counted. During the May flight 730 anchovy, 124 jack mackerel, and 457 unidentified schools were observed. The jack mackerel were within a mile of shore between Pismo Beach and Avila. Four school groups of anchovies were seen.

These were off the Coronado Strand (90 schools), between Newport Beach and Seal Beach (180 schools), between Point Dume and Port Hueneme (172 schools), from Santa Barbara to Point Conception (285 schools). Three additional schools were observed off Torrey Pines. Most of the unidentified schools were deeper but in the same areas as the anchovies.



Flight 61-6 Pelagic Fish (May 16 and 19, 1961).

A moderate to severe "red tide" condition prevailed from Port Hueneme to La Jolla. It was generally confined to the extreme inshore area but at times appeared to extend several miles to sea. The most severe outbreaks were noted off Santa Monica and El Segundo, between Laguna Beach and Dana Point and in the vicinity of Oceanside.

Between the hours of 10 a.m. and 2:30 p.m. on May 16, 54 boats, excluding party boats, were observed fishing the inshore area from Pt. Dume to the Mexican Border. The largest concentration of skiffs (36) was in the Los Angeles-Long Beach Harbor area at 11:30 a.m. By 3 p.m., only 13 boats were still fishing. Six boats were seen in Santa Monica Bay, 6 between Seal Beach and Newport Beach and 6 between Newport Beach and Point Loma. It was not possible to obtain a count of the fishermen, but spot checks revealed 2 to 4 per boat, with 2 in most.

A total of 50 surf fishermen was counted in Santa Monica Bay at about 10:45 a.m. Most were along sandy beaches between Will Rogers State Beach and Playa del Rey. A few people were fishing from rocks and jetties. Some surf fishermen were noted south of Seal Beach but an accurate count was not possible. No attempt was made to count pier fishermen.

A commercial barracuda troller was seen off Pt. Fermin.

Note: Also see Commercial Fisheries Review, July 1961 p. 10.

Cans- Shipments for Fishery Products

JANUARY-APRIL 1961:

Total shipments of metal cans during January-April 1961 amounted to 37,265 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 32,874 tons in the same period a year ago. Canning of fishery products in January-April this year was confined largely to tuna, shrimp, Gulf oysters, and jack and Pacific mackerel.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 23.0 base boxes of steel equal one short ton of steel.

* * * * *

BY AREA AND QUARTERS, 1959 AND 1960:

In 1960, out of total shipments of 123,929 short tons of steel for use in the manufacture of cans for fishery products, the Pacific Area or West (including Hawaii and Alaska) utilized 88,366 tons or 71.3 percent. The bulk of the fish-canning facilities are located in the Pacific area. The Pacific Area was followed by the Eastern Area (New England, Middle Atlantic, South Atlantic, and Puerto Rico) with 30,968 tons or 25 percent. The Central Area (including the Gulf of Mexico

Table 1 - U. S. and Puerto Rico Shipments of Steel for Cans for Fishery Products, 1959 and 1960

Area	First Quarter		Second Quarter		Third Quarter		Fourth Quarter		Total	
	1960	1959	1960	1959	1960	1959	1960	1950	1960	1959
	(Short Tons)									
West	16,090	14,223	30,540	25,300	23,776	26,775	17,960	15,511	88,366	81,809
East	5,311	4,701	6,546	7,318	11,854	10,990	7,257	6,290	30,968	29,299
Central	622	533	1,451	1,740	1,725	1,485	797	613	4,595	4,371
Total	22,023	19,457	38,537	34,358	37,355	39,250	26,014	22,414	123,929	115,479

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 23.0 base boxes of steel equal one short ton of steel.

States and Inland States) used only 4,595 tons or 3.7 percent.

The over-all total of 123,929 tons was up 7.3 percent from the 115,479 tons used in 1959, due primarily to an increase of 8.0 percent in the amount of steel used for cans in the Pacific Area. Also, shipments of steel for cans for both the Eastern and Central areas were up 5-6 percent in 1960.

Shipments of steel for the manufacture of cans for fishery products on a quarterly basis were heaviest during the second quarter of 1960 for the Pacific Area, but for the Eastern and Central Areas the heaviest shipments occurred in the third quarter. In the West, 34.6 percent or 30,540 tons were consumed in the second quarter of 1960. The Eastern Area used 11,854 tons (38.3 percent of the 30,968-ton total) in the third quarter. The Central Area used 37.5 percent of the 4,595-ton total for the area in the third quarter and 31.6 percent in the second quarter.

Note: Also see Commercial Fisheries Review, July 1960 p. 23.

Central Pacific Fisheries Investigations

TUNA BAIT, GEAR, AND OCEANOGRAPHIC STUDIES MADE NEAR HAWAIIAN ISLANDS: M/V "Charles H. Gilbert" Cruise 52: The primary missions of a 52-day cruise (ended May 17, 1961) by the U. S. Bureau of Commercial Fisheries' research vessel Charles H. Gilbert were to tag and release skipjack tuna outside the area of the Hawaiian live-bait fishery, determine the distribution of temperature and salinity in the surface waters, release drift bottles for studies of surface currents, collect skipjack blood samples for serological studies, and test the feasibility of gill nets for use in catching skipjack from surface schools.

Skipjack were sampled by live-bait fishing, using five different species of bait--threadfin shad, mosquito fish, tilapia, iao, and nehu. Of particular interest was hardiness shown by 70 buckets of threadfin shad from the Wahiawa Reservoir on the island of Oahu, stocked by the Bureau's Biological Laboratory, Honolulu, and the Hawaii Division of Fish and Game in 1959. Mortality during capture, transportation to the Charles H. Gilbert, and acclimatization to sea water in the bait wells aboard the vessel was 17 buckets. Only 1 or 2 buckets were lost by mortality during a 5-week period of the cruise. Unfortunately, as the skipjack schools encountered during the cruise were wild and fast and consisted primarily of small fish, a critical evaluation of the shad as a live bait was not possible.

The principal area of operation was to the west of the Hawaiian Islands, between Johnston Island and French Frigate Shoals. Of 95 surface schools observed, 26 were identified as skipjack. Of the remaining 69, 3 were yellowfin, 1 was a little tuna, 1 was dolphin, and 64 were unidentified. The majority of the schools were seen near islands. Rough seas accounted, at least in part, for the fewer number of school sightings in mid-ocean.

Out of 20 skipjack schools chummed, 435 skipjack were caught from 12 of the schools. Individual catches from the schools ranged from 1 to 115 skipjack. With but two exceptions, the schools were composed of small, 2-5 pound fish.

Skipjack (242) were tagged, all near Johnston Island. Of those tagged, 218 weighed 2 to 5 pounds and 24 weighed an average of 13 pounds. Blood samples were obtained from 100 fish from two schools near French Frigate Shoals and 42 more samples were collected from a school near Kailua, Hawaii.

The results of temperature observations (surface and bathythermograph) and surface salinity samples await detailed analyses. However, those salinity samples analyzed on board indicated that conditions were

typical for summer months in the central Pacific, with the boundary between the higher salinity North Pacific Central waters and those of intermediate salinity positioned to the north of the Hawaiian Archipelago.

About 700 drift bottles were released in waters to the leeward of the Hawaiian Islands (Oahu to Hawaii) and in various channels among the islands. By the end of May, 50 of the bottles had been recovered. Their drift was similar to that observed for the bottles recovered from the January-February 1961 cruise of the Charles H. Gilbert. The majority of the bottles dropped in leeward waters drifted northerly or easterly until they moved through the channels into windward waters, then the movement was to the west. The similarity between the drift during late winter and early summer periods is particularly striking, considering the fact that the winds were southerly (Kona) during the first period and from the northeast during the latter part of the cruise. An additional 200 bottles were released in waters within 5 miles of shore around Oahu. In general, recoveries to date (40 in number) have been only of those bottles released on the windward (eastern) side of the island.

Several experiments were made to test the feasibility of catching skipjack by means of gill nets. In the first test, a monofilament net (600 feet long by 24 feet deep) was set in an area where skipjack were seen breaking the surface. After a 3-hour period, the net was retrieved. No skipjack were caught. During the second test, both monofilament and nylon nets were used and chumming with live bait was carried out during and after the net was set. Thirty-four skipjack were caught in the monofilament section, none in the nylon. Direct observations from the underwater chambers of the vessel revealed that the nylon net was visible at a distance of 20-30 feet from the vessel, while the monofilament was nearly invisible. The skipjack, although feeding on the bait, were observed to avoid the nylon net.

In the third experiment, the skipjack school was chummed to the stern of the vessel and an attempt was made to encircle the school with the net. Unfortunately, the leading edge of the net became entangled in the screw and the experiment was discontinued. However, upon hauling the net, 60 skipjack were taken from the monofilament section, 3 from the nylon.

In the final test, a skipjack school was fished by the pole-and-line method. After capture of five live specimens for use in the Kewalo experimental tanks, the gill net was set with the vessel moving forward at chumming speed (2 knots). After setting the net, live bait was used to keep the school in the vicinity of the net. A total of 225 skipjack were caught in the monofilament section, 2 in the nylon. Although chumming was concentrated near the middle section of the monofilament net, skipjack were found gilled throughout the 100-fathom length of the monofilament webbing.

Express Rates

FISHERY PRODUCTS COMMODITY RATES INCREASES SUSPENDED:

A new tariff has been filed to become effective June 27, 1961, publishing a uniform scale or rates on all fish and seafoods moving via express. These new rates are based upon 60 percent of First Class Express Rates.

At the same time, the express agency cancelled all commodity rates on fish and seafoods. Many of these rates were applicable on various volume weights and were based upon levels ranging from 30 to 50 percent of First Class Rates. For example, as of mid-June the rates from Green Bay, Wis., to New York, N. Y., were $6.45 up to 1,000 pounds, $4.64 on shipments of 1,000 to 2,000 pounds, and $4.29 over 2,000 pounds. The new rate would be $8.92 per 100 pounds, regardless of volume. The express agency took this action due to alleged increased costs in handling this traffic.

The Interstate Commerce Commission just before the effective date refused to allow the express agency to cancel all commodity rates on fish and shellfish. The suspension order is only for seven months (to January 26, 1962) after which time the increases may go into effect if the ICC has not ruled on the lawfulness of the rates. The Commission ordered an investigation of the lawfulness of the proposed rates, charges, and regulations. The fishing industry is expected to protest the increases at the hearings which are expected to be scheduled.

The tariffs involved are Railway Express Agency, Incorporated: I.C.C. 8512 in full; Supplement 7 to I.C.C. 8320; Supplement 10 to I.C.C. 8321; Supplement 12 to I.C.C. 8326; Supplement 6 to I.C.C. 8331; also in Supplement 1 to I.C.C. 8494, the cancellation notice insofar as it directs the cancellation of matter held in force by reason of this suspension.

Federal Aid to Commercial Fishery States Endorsed by Interior Department

A proposal of Federal aid to states with commercial fisheries was endorsed on June 15, 1961, by the U. S. Department of the Interior. In a letter to Chairman Warren G. Magnuson of the Senate Committee on Interstate and Foreign Commerce, Assistant Secretary John A. Carver, Jr., endorsed the objective of Senate Bill 1230 but recommended several amendments. Most of these amendments would establish a policy of state matching funds, somewhat on the order of the existing Federal aid to states for sport fish restoration.

Under the Department's proposal, an amount equal to 30 percent of the customs duties on fishery products ($4 to $6 million) would be available as grants to colleges or research institutions and as Federal aid to states having commercial fisheries. The Department of the Interior would distribute one-third of this amount to educational and research institutions for fishery studies and for training personnel. The Department would distribute the remaining two-thirds to states with commercial fisheries.

The Department's report declared that many serious problems face the commercial fishing industry and recommends that the Government give aid to states in meeting these problems either under the fiscal procedures set forth in the bill or by direct appropriations.

The report stated that "in addition to Federal research, there is need to encourage and strengthen state fishery research, rehabilitation, and development programs, as set forth in this bill, in those states where our domestic fishing industry is active. State activities of this kind complement the fishery activities this Department is carrying forward. Certain phases of fishery research and rehabilitation are most susceptible of state management. Adequate programs of state and Federal research will be mutually beneficial in promoting the Nation's commercial fisheries."

This proposal would not affect the present Saltonstall-Kennedy program for the betterment of the domestic fishing industry which is also financed by annual amounts equal to 30 percent of the customs duties on fishery products.

Federal Aid Funds for Sport Fish and Wildlife Restoration

A preliminary apportionment of $12,850,000 of Federal Aid funds will be made available July 1, 1961, for State fish and wildlife projects, Secretary of the Interior Udall announced May 29, 1961. The balance of Federal Aid fish and wildlife restoration program funds for the year ending June 30, 1962, will be apportioned in October 1961. The comparable preliminary apportionment for the fiscal year beginning July 1, 1960, was $12,800,000.

The Secretary stated that the early apportionment was made to help States program their Federal Aid activities more advantageously. It has been of special importance to those States operating on a revolving fund basis.

Under the Federal fish and wildlife restoration programs, States spend their own funds on approved projects and are then reimbursed up to 75 percent of the cost. Many States have exhausted or will have exhausted their Federal Aid funds for programming projects to start during the next fiscal year. The partial apportionment makes it possible for these States to secure approval for projects to start on July 1, 1961, or soon thereafter and to claim reimbursement therefor. Otherwise, many States would have to hold up projects until the regular apportionment in the autumn.

Federal Aid funds are derived from an excise tax on sporting arms and ammunition

and on sporting rods, reels, creels, and artificial lures. Distribution of the two funds is made on formulas based upon the number of paid license holders in a State and on its area, as prescribed by law. Both Federal Aid Acts (Pitman-Robertson Act, approved September 2, 1937, and the Dingell-Johnson Act, approved August 9, 1950) are administered by the Bureau of Sport Fisheries and Wildlife, U. S. Fish and Wildlife Service.

Of the $12,850,000, a total of $9,850,000 is for the restoration of wildlife and $3,000,000 for the restoration of fish. No indication was given relative to the possible total apportionment, but in the last five years wildlife restoration funds have amounted to between $14-$15.5 million and fish restoration funds have been approximately $5 million. For the fiscal year ending June 30, 1960, fish restoration funds amounted to $5,836,000.

Note: Also see Commercial Fisheries Review, August 1960 p. 21 and January 1960 p. 34.

Florida

FISHERIES RESEARCH, JANUARY-MARCH 1961:

The Marine Laboratory of the University of Miami is carrying on research on fisheries with funds provided by various sources, including the Florida State Board of Conservation and the U. S. Fish and Wildlife Service. The research of interest to commercial fisheries which appeared in the Laboratory's March 1961 Salt Water Fisheries Newsletter follows:

Larval Shrimp: The famed Tortugas pink shrimp (Penaeus duorarum) has been under study by Marine Laboratory scientists since soon after the discovery of the resource in 1950. A new development in this study is the use of a plankton sled net recently brought from Norway. The plankton sled net is a deep sea net which slides over the bottom of the ocean. Because it can be towed in close proximity to the sea bottom, it can collect organisms rarely taken by conventional plankton nets.

The plankton sled was used in Florida to sample water very near the bottom on the Tortugas shrimp fishing grounds as part of a study sponsored by the U. S. Fish and Wildlife Service. Large numbers of shrimp nauplii were collected. Nauplii are the first larval stage to develop from the egg. Also eggs of the right size and form to be shrimp eggs were found in great numbers. Further use of the sled, it is hoped, will shed light on the distribution of eggs and early nauplial stages of pink shrimp.

Spotted Sea Trout: An experiment designed to estimate the total number and mortality rate of spotted sea trout in the Pine Island, Fla., population is being conducted. Of 5,407 spotted sea trout tagged in January 1961, a total of 930 have been returned. The rate of return of 17 percent is indicative of the high rate of mortality that this population is subject to from fishing.

All fish were tagged with internal anchor tags. This type of tag consists of a 1.4 by 0.3 inch green plastic tag to which is attached a yellow plastic streamer. The streamer protudes from the fish's body to aid detection. Fishermen are urged to cooperate by taking the tag to their local fish house with catch information.

Nonutilized Species Incidental to Shrimp Fishing: The investigation of the utilization of nonutilized fish from the shrimp fishery is being investigated with emphasis on the development of methods for preparing useful products.

The key to the process is an enzymatic breakdown of the fish. Enzymes are chemicals produced by the body, which break down the complex proteins that constitute the body of the fish, into less complicated materials and convert them to a liquid in a short time. The action of enzymes is not completely unfamiliar to us, in fact we are surrounded by their activity, they are the architects and demolition crews that build up and destroy all biological materials. The life process itself is intimately related to enzymatic activity.

Although enzymes are almost insignificant in size, their activity is in every respect formidable. When protein digesting enzymes act on the fish, they convert it to a liquid in a matter of 1 or 2 days when the temperature is 98° to 100° F., or in 5 to 6 days at lower temperature of 75° F. To do the same work a chemist would have to add a concentrated acid, heat the material at 570° F., under a pressure of 50 pounds per square inch, and hold it for three hours.

The enzymatic digestion of the fish gives a product called "liquid fish," which contains all the basic constituents of the original fish, only in a liquid or slurry form. We have received various suggestions for applications, and are considering a few at the present time.

In the fertilizer field, liquid plant nutrients are easier to apply, to transport, and to handle than solid nutrients. Nitrogen, one of the important plant nutrients is present in good quantity in liquid fish, furthermore it comes in an organic form which is absorbed slowly by the plant. We see an important use for liquid fish as a base or matrix for the manufacture of special tailor-made fertilizer formulas, in which plant nutrients would be added to the existing organic substances.

During the process of enzymatic digestion, a clear liquid floats to the top. This is a concentrate of soluble fish proteins, much like the beef proteins of bullion cubes. This liquid has a bland odor and flavor and constitutes a good source of readily digestable protein material. We hope that the pet food manufacturers will look to this material as a possible ingredient for their products.

Fish Behavior Studies: The apparatus for determining whether sharks can detect, and orient to, low-frequency vibrations has been constructed at considerable expense and is now being used. Very little is known, of a scientific nature, about these large predators and it is felt that a more thorough knowledge of their sensory systems might provide a better understanding of the "shark problem." This project is sponsored by the Office of Naval Research.

A Japanese scientist is now working at the Marine Laboratory on the eyes of pelagic fishes, under a contract with the National Science Foundation. We hope to be able to determine the axis of vision and range of accommodation in sailfishes, dolphin, tuna, etc. These animals have escaped intensive investigation of their sensory systems because of the difficulty of maintaining them in captivity. We hope to uncover leads for further research with their visual apparatus and eventually to discover the importance of vision in their lives.

Frozen Foods

VOLUNTARY HANDLING PRACTICES APPROVED:

A joint five-year program with the major objective of further advancing handling standards in the frozen foods industry and thereby speeding the growth of the broadest possible customer acceptance was announced early in June 1961 by the Frozen Foods All-Industry Coordinating Committee. Major facets of the program include immediate promulgation of voluntary operating practices throughout the industry, progressively tightened throughout the next five years, indoctrination of employees at all levels to understand the importance and proper techniques of maintaining product quality, and encouragement of the development and use of better and more efficient equipment.

In announcing the program, the Committee Chairman, said: "We believe that never before have so many diversified interests in so large and complex an industry joined forces to lift a young industry by its bootstraps, so to speak. Although current sales are at the $3 billion a year level it is estimated that perhaps half of the nation has never even tasted frozen foods, at least knowingly. . . ."

Cooperating Associations and Organizations: The Voluntary Operating Practices to be promulgated throughout the industry have been painstakingly worked out in great detail through many conferences in the past year and are now approved and signed officially by the following organizations: American Trucking Associations, National Associations of Food Chains, National Association of Frozen Food Packers, National Association of Retail Grocers of the United States, National Association of Refrigerated Warehouses, National Frozen Food Association, National Fisheries Institute, and National Prepared Frozen Food Processor Association.

Cooperating with the Committee are the following organizations: American Meat Institute, Institute of American Poultry Industries, National Food Brokers Association, National Institute of Locker and Freezer Provisioners, and Super Market Institute. Each has volunteered fullest support to the very large job of indoctrinating employees and supervisors throughout so far-flung an industry. Other national, regional, and local associations have also been invited to enlist in the various educational projects and have responded most cooperatively.

Invaluable cooperation in scientific and research aspects of the program have been provided and further promised to the Committee by the Western Regional Research Laboratory of the U. S. Department of Agriculture, the Refrigeration Research Foundation, and other public and private research organizations. The U. S. Bureau of Commercial Fisheries will undertake Time-Temperature-Tolerance studies on fishery products as soon as funds are made available to the Bureau's Gloucester Technological Laboratory.

Problem of Educating Handlers: The employee indoctrination program will take the longest period to complete because of the numbers involved. Preliminary educational seminars for wholesalers and retailers have already been held in Massachusetts by the University of Massachusetts and in North Carolina by North Carolina State College. The Refrigeration Research Foundation is conducting a series of seminars for refrigerated warehouse supervisors in different areas across the nation. The release of two educational motion pictures during 1961 is planned: "Operation Zero" for all types of trucking employees and allies, produced by the American Trucking Associations, and "Frozen Foods Have a Memory" for retail grocery personnel in particular but with wider applications, produced through the cooperation of the U. S. Department of Agriculture. Booklets on the proper handling of frozen foods have been prepared by many associations. Federal and State Extension Services have also generously offered their cooperation in the industry's program.

The Committee has been in touch with various inventive approaches to improving equipment by suppliers outside as well

as within the industry. It is generally believed that the industry's well-publicized program will itself prove a major stimulus to further research looking toward more efficient storage, trucking, display cabinets, and other handling equipment.

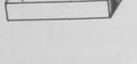
Over-all Handling Practices Spelled Out for the First Time: "The basic initial task of the Frozen Foods All Industry Coordinating Committee has been largely completed," stated the Chairman, "and I can find no words adequate to pay tribute to the hard-working committee members who made it possible. Indeed, it may be considered somewhat of a miracle that the sponsoring associations, with their diversity of memberships and purposes, could be guided to a common course of action. This has probably never happened before in the food industry."

The Voluntary Operating Practices for the industry, approved by the sponsoring associations, have been submitted to the members of industry for their guidance. It is up to the associations, their members, and their many allies to implement the practices. The Committee will remain in active existence and its members will pursue several educational projects.

It was pointed out that the practices are, in essence, a timetable to a decidedly higher level by 1965. They are realistic in that they take into account the fact that a very heavy investment in equipment now in use was made before much of the newer and better equipment became available. They also were written with the knowledge that many of the workers who handle frozen foods have been only partially trained and supervised in this young, fast-growing industry and that time will be needed to correct these conditions. For that reason, during the remainder of this year and through next year, the Practices permit limited and realistic deviations above zero for limited periods at certain stages of handling. During 1963 and 1964, when more good equipment will be in use and the employees will be better trained, these tolerances will be tightened. In 1965 a further tightening will take place. Beginning then, the practices call for handling frozen foods at zero or lower all the way, except for slight deviations and limited time, when the product is in transit or changing locations.

The tolerances for 1961 through 1964 have been set to provide feasible stages for upgrading the methods of those of the industry's members who are faced with the greatest natural difficulties and the greatest proportionate new investment. It is expected that most industry members will better these operating practices from the start and will arrive at the improvement goal before 1965. It would be a serious mistake, on the other hand, if too rapid a program brought about such junking of still-valuable equipment and consequent business failures as substantially to raise the price to the consumer of frozen foods.

It is the intention of the members of the Committee to meet again before the end of 1961 and determine whether these initial Voluntary Operating Practices have been properly interpreted and found adequate to achieve the desired objectives and whether modifications or revisions, leading to an even more rapid rate of improvement, are feasible and should be incorporated.



Great Lakes Fishery Investigations

WESTERN LAKE SUPERIOR FISHERY SURVEY FOR 1961 SEASON BEGINS:

M/V "Siscowet" Cruise 1: The 1961 season operations of the U. S. Bureau of Commercial Fisheries research vessel Siscowet were begun May 16-31, 1961, in the western area of Lake Superior.

Studies were devoted to the collection of larval stages of fish, the bathymetric distribution of chubs, and a survey of native and planted lake trout in the Apostle Islands region. The work took place in the following areas: south of Stockton Island; west of Outer Island; north of Ironwood Island; Raspberry Bay; Frog Bay; Red Cliff Point; west Madeline Island; and Pike's Bay.

A 5-foot net constructed of 1/16-inch mesh nylon was towed at depths ranging from 8 to 80 feet below the surface. Eight 15-minute tows captured 38 fish larvae. They did not appear to be concentrated at any particular level--catches were about the same at all depths. Many of the larvae appeared different but positive identification could not be made in the field.

A standard gang of experimental gill nets (1- to 5-inch mesh by $\frac{1}{2}$-inch intervals) set at 62 fathoms south of Stockton Island took 263 chubs. Most all of the chubs had spawned late last fall or during the winter.

In cooperation with the Wisconsin Conservation Department, arrangements were made for 23,500 lake trout to be planted from shore in Frog Bay. These fish represented three stocks: 11,700 were of the Marquette domestic stock reared at Pendills Creek Rearing Station, Mich.; 5,900 were of the Green Lake, Wis., stock and 5,900 of the Apostle Island stock--both hatched and raised in the Bayfield Hatchery.

The Siscowet made trawl tows during and after planting of the trout to determine the time required for shore-planted lake trout to find suitable habitat and begin natural feeding.

The first lake trout were taken at a depth of 5 fathoms about 40 minutes after planting. They reached 10 fathoms in 1 hour, 50 minutes, and 15 fathoms in $3\frac{1}{2}$ hours after planting. The depth of 15 fathoms is about 1 mile from the planting site. It is considered suitable lake trout habitat because both native and formerly planted trout were captured in that area. Stomachs from all the recently planted trout were examined. It was not until 48 hours after planting that active feeding (Pontoporeia, insect larva) took place. All three stocks were proportionately represented in the trawl catches.

Trawl tows made in other areas among the Apostle Islands revealed a high percentage (nearly 80 percent) of hatchery-reared trout from previous years' plantings. The

1960 Bayfield-stocked fish were predominant in the catches.

Surface water temperatures ranged from 37.9° F. south of Stockton Island to 48.2° F. in Frog Bay.

M/V "Siscowet" Cruise 2: Spring environmental conditions were studied (June 1-9, 1961) at three limnological stations. Collections of limnological data and materials included: records of water temperatures, water samples for chemical analyses, bottom and plankton samples, and Secchi-disc readings. Information was gathered also on the bathymetric distribution of fish stocks, the distribution and survival of planted lake trout, the larval stages of fish, and experimental midwater trawling.

Areas visited during cruise 2 were: Frog Bay; south of Stockton Island; Pike's Bay; south of Oak Island; north of Sand Island; west of Bear Island; Sand Bay; west Madeline Island; north of Madeline Island; and north of Eagle Island.

Trawl catches made in Frog Bay and west of Bear Island and catches in gill nets set in Sand Bay included lake trout which had been planted from shore this spring. Bear Island is about 10 miles from the nearest planting site. One 15-minute trawl tow west of Madeline Island (17 fathoms) took 14 small trout, all of them fin-clipped. Ten of these trout bore the left-front fin clip which was the mark used by the Wisconsin Conservation Department for the 1960 plant. The success of the 1960 shore plant was further demonstrated in trawl catches from other areas. Excepting trout of the 1961 plant, the Siscowet captured 48 small trout during cruises 1 and 2. Thirty-nine were fin-clipped (81 percent) and of these, 30 were from the 1960 Bayfield plant. Other species common in the trawl catches were smelt, whitefish, cottids, sticklebacks, and trout-perch.

A gang of experimental gill nets set at 83 fathoms north of Sand Island took only a few deep-water chubs (C. kiyi) and several deep-water sculpin which were nearly ready to spawn.

A 43-foot semi-balloon trawl was converted to a full-balloon type and equipped with small hydroplane floats--in addition to the otter doors--for midwater trawling. Catches were generally small but one catch of 121 smelt 50 feet below the surface in 22 fathoms is evidence that this type of gear may be useful in sampling pelagic fish during certain stages of their life history. Plans include further experimentation with this gear.

Surface-water temperatures varied from 37.6° F. north of Sand Island to 50.7° F. in Sand Bay. The water temperature on the bottom was about 40° F.

Note: Also see Commercial Fisheries Review, June 1961 p. 24.

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LAKE MICHIGAN 1961 FISH POPULATION SURVEY:

M/V "Cisco" Cruise 1: The primary objective of the U. S. Bureau of Commercial Fisheries research vessel Cisco during the 1961 season will be to inventory the chub populations of northern Lake Michigan so that there will be a basis for future comparisons. The same program was carried out in 1960 in the southern part of the lake. Gangs of nylon gill nets consisting of 9 mesh sizes totaling about one-half mile in length, and 50-foot balloon trawls of a type used by several of the Lake Michigan commercial trawlers will be fished this year. Gears of the same specifications were used in 1960.

Most of the effort during the first cruise (May 16-30, 1961) was devoted to gill-net fishing. Overnight sets were made at 25 and 50 fathoms off Charlevoix and Manistique, Mich., and Sturgeon Bay, Wis., and at 80 and 135 fathoms off Frankfort, Mich. Chub catches were light and predominately Leucichthys hoyi, except at 80 and 135 fathoms off Frankfort where the very few chubs taken were L. kiyi. No L. alpenae or L. zenithicus were caught in any of the lifts, but small numbers of L. reighardi, which appeared to be at the height of their spawning season, were taken in several of the sets. A few L. reighardi eggs were collected for taxonomic studies at the Northville, Mich., hatchery. Other species in the gill nets included a few lake herring, smelt, deep-water sculpins, trout-perch, and alewives; one individual of the latter species was caught at 135 fathoms.

Trawl hauls were made at 15, 25, and 50 fathoms off Manistique, 30 and 50 fathoms off Sturgeon Bay, and 30 fathoms in Little Traverse Bay east of Charlevoix. Chub

catches, on the basis of pounds per hour, ranged from none at 15 fathoms off Manistique to 900 at 30 fathoms off Sturgeon Bay. A 30-minute tow at 15 fathoms off Manistique yielded a pure catch of 800 pounds of alewives. Also, great numbers of small alewives were seen escaping through the cod end as the net was being brought in. In addition to chubs and alewives, the trawls took small numbers of trout-perch (as deep as 30 fathoms), smelt, slimy sculpins, and deep-water sculpins (50-fathom tows only).

Hydrographic collections and observations were made at 40-fathom stations off Charlevoix, Manistique, Sturgeon Bay, Frankfort, and midlake between Charlevoix and Manistique, and at 144 fathoms off Frankfort. Surface water temperatures were extremely cold throughout the cruise; open-lake temperatures were mostly 3° to 4° C. (average about 38° F.), and the lowest recorded was 2.5° C. (36.5° F.). Near shore, where there was very slight thermal stratification, surface temperatures ranged up to 7° C. (44.6° F.). The winter-like thermal condition of the northern portion of the lake accounts for the catches of alewives in very deep water and trout-perch in relatively deep water. When pronounced thermal stratification sets in, these species will move into the warm water near shore. Unusually clear water was observed at the 144-fathom station, where a Secchi disc reading of 60 feet was recorded. Disc readings at other stations ranged from 18 to 27 feet.

M/V "Cisco" Cruise 2: Most of the effort during Cruise 2 was devoted to trawling. Extensive areas of rough and steeply sloping bottom in the north end of Lake Michigan make it much more difficult to locate good trawling bottom than in the southern portion, especially when it is desired to maintain a given depth throughout the tow. Half-hour tows were made at 6, 15, 25, 35, and 50 fathoms off Frankfort, Mich.; at 30 fathoms off Charlevoix, Mich.; at 15, 25, 35, and 50 fathoms off Manistique, Mich.; at 30 and 50 fathoms off Sturgeon Bay, Wis.; and at 12, 15, and 25 fathoms off Kewaunee, Wis. Chub catches were small and in most cases were made up entirely of bloaters.

Alewives were the commonest species in the trawl catches besides chubs. At least a few were taken in nearly every tow, but catches were larger in the tows at 25 fathoms and shallower. The largest catch of alewives was 80 pounds, at 15 fathoms off Frankfort. It is certain that in some cases great numbers of small individuals of this species escaped through the 1-5/8-inch mesh of the cod end.

Also taken in the trawl were few smelt (mostly in shallower tows; largest catch was 43 pounds at 15 fathoms off Manistique); few deep-water sculpins (up to 25 pounds in the 50-fathom tows); slimy sculpins (very few except for a modest catch at 50 fathoms off Manistique); and lake herring (uncommon).

Preliminary experimentation with a 40-foot modified British Columbia midwater trawl was conducted off Charlevoix. The trawl appeared to function well, but there were no concentrations of fish to test its fish-catching ability.

Standard gangs of nylon gill nets (50 feet each of $1\frac{1}{4}$ and $1\frac{1}{2}$, and 300 feet each of 2, $2\frac{3}{8}$, $2\frac{1}{2}$, $2\frac{3}{4}$, 3, $3\frac{1}{2}$, 4-inch mesh) were set at 25, 50, and 80 fathoms off Frankfort. Chub (Leucichthys sp.) catches were very light. The L. reighardi appeared to have just completed their spawning season.

Hydrographic collections and observations were made at 40-fathom stations off Frankfort, Charlevoix, Manistique, Sturgeon Bay, and in midlake between Charlevoix and Manistique; and at a 144-fathom station between Frankfort and Sturgeon Bay. Surface water was warming slowly and beginning to stratify, but the warming had been very slight in midlake between Frankfort and Sturgeon Bay. Surface temperatures ranged from 3.9° to 13.2° C. (39.0° to 55.7° F.). Secchi disc readings were 13 to 19 feet, except at the 144-fathom station, where the reading was 45 feet.

Note: Also see Commercial Fisheries Review, July 1961 p. 21

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LAKE ERIE FISH POPULATION SURVEY CONTINUED:

M/V "Musky" May 1961: Although the success of the U. S. Bureau of Commercial Fisheries research vessel Musky operations on Lake Erie is not dependent nor to any degree measured by the quantity of fish taken, its trawl catches during May were probably the most productive on record. Literally, thousands of fish were caught and sampled. Yellow perch of the 1959-year-class were dominant in the catch. Other species taken in considerable numbers were spottail shiners and sheepshead.

Of exceptional note was the trip to East Harbor during the first week of operations. Parallel 10-minute tows at the 15-foot and 20-foot depths produced rather uniform catches totaling several hundred fish of assorted sizes and kinds. At the 10-foot depth, the catch was of such magnitude that it necessitated sub-sampling procedures to record the essential data. The cod end of the net was so packed with fish that many more could not have been taken regardless of time limit. A final tally placed the trawl catch at more than 1,500 pounds and 11,000 fish. Approximately 98 percent of the lift consisted of male two-year-old perch. A second inshore tow provided almost identical results. While yellow perch are known for their segregation by sex prior to spawning, the percentage and numbers observed in so limited an area during the height of the spawning period was most unusual.

During two weeks of May the three-day-night sampling and observation series were carried out at East Harbor and Bono. High winds interrupted operations at East Harbor while bottom topography was a problem at Bono. Nevertheless, both series were completed without undue delay. Conspicuous by their absence were yearling smelt, alewives, and gizzard shad, which were among the few species that produced a good hatch in 1960.

Other trawl stations occupied were at Sandusky Bay, Sand Point, East Kelleys, and Rattlesnake. Various half-meter net tows collected numerous fry which were preserved for identification at a later date. Water temperatures in the western end of the lake which averaged 46° F. at the beginning of the month rose to about 65° F. by the end of May. This temperature range is somewhat cooler in comparison to averages of a year ago. The difference is presently evidenced by the lag in spawning and other seasonal activity for some species. Limnological information was gathered by the vessel and crew for several days on each of two different occasions. Bottom samples were taken at established stations in the western sector which were previously visited early in the 1930's and more recently by the Cisco (1958). Approximately 25 stations were covered with three samples being collected at each location.

Pessimism on the part of the commercial producers is quite apparent. Landings have dwindled to the extent that many fishermen are removing their nets from the lake. While this practice is customary during the summer season, it has come about much earlier than in the past years. The only immediate prospect of the fishery lies in the 1959-year-class of yellow perch putting on sufficient growth to make them readily available for the fall fishery. Even at that, the outlook is not too promising.

Note: Also see Commercial Fisheries Review, July 1961 p. 19.

Maine Sardines

CANNED STOCKS, JUNE 1, 1961:

Distributors' stocks of Maine sardines totaled 215,000 actual cases on June 1, 1961--18,000 cases more than the 197,000 cases on hand June 1, 1960. Stocks held by distributors on April 1, 1961, amounted to 267,000 cases, and on January 1, 1961, totaled 233,000 cases, according to estimates made by the U. S. Bureau of the Census.

Canners' stocks on June 1, 1961, totaled 294,000 standard cases (100 3¾-oz. cans), an increase of 59,000 cases (25.0 percent) as compared with June 1, 1960. Stocks held by canners on April 1, 1961, totaled 506,000 cases and on January 1, 1961, amounted to 1,029,000 cases.

Table 1 - Canned Maine Sardines--Wholesale Distributors' and Canners' Stocks, June 1, 1961, With Comparisons 1/

Type	Unit	1960/61 Season				1959/60 Season				
		6/1/61	4/1/61	1/1/61	11/1/60	7/1/60	6/1/60	4/1/60	1/1/60	11/1/59
Distributors	1,000 actual cases	215	267	233	277	172	197	252	235	296
Canners	1,000 std. cases 2/	294	506	1,029	1,258	359	235	397	843	1,001

1/ Table represents marketing season from November 1-October 31.
2/ 100 3¾-oz. cans equal one standard case.

The 1961 packing season opened on April 15, 1961, but because fish have been scarce the pack by the end of June was light--only 55,000 cases as compared to 337,000 cases in the same period in 1960. This was the smallest June pack since 1951. When the new packing season began on April 15, 1961, the carryover stocks totaled 457,000 cases

as compared to 335,000 cases when the 1960 season opened.

Note: Also see Commercial Fisheries Review, June 1961 p. 28.

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INCREASED COSTS AND LACK OF FISH WORRY CANNERS:

Drastically increased production costs and the latest run of fish in ten years are two major problems that are of serious concern to the Maine sardine industry. As of early June 1961 the supply of fish was virtually nonexistent along the entire Maine coast, whereas normally a sizable pack would have been made by June. Only two plants, one in Belfast and another in Port Clyde, had operated by early June and the amount of fish processed was so small that it served only as a shakedown run for the equipment.

However, it is the cost factor and not the fish supply that has caused the greatest number of headaches. The lack of fish was attributed to the late, cold spring and plenty of fish were expected, especially in the Portland area, by mid-June.

Apparently there is nothing that can change the production cost outlook. A cost accounting firm, employed by the industry, has advised the canners that they can expect to have an increase of from 40 to 50 cents a case to pack the standard keyless product this season and more on the key-opening and special items.

Contributing to this situation are advances in oil, cans and covers, packing cases, and general operating expenses as well as new minimum wage legislation which becomes effective in September.

Percentage-wise this is the greatest increase of any single year in the history of the industry.

The Maine Sardine Council's Executive Secretary said on June 8 that the canners would be forced to raise prices in order to stay in business and that this would be reflected on the rapidly diminishing inventories from last year's pack.

Last year the industry produced 1,997,600 standard cases of all types of canned sardines and it expects to pack about the same amount this year if the fish finally show up.

Michigan

CHANGES PROPOSED IN GREAT LAKES COMMERCIAL FISHING REGULATIONS:

Public hearings were scheduled for late June and early July 1961 on changes in commercial fishing regulations tentatively approved early in June by the Michigan Conservation Commission.

Among the changes discussed at the meetings were measures aimed at giving immature whitefish and/or lake trout greater protection to aid the recovery of these once-abundant species in the Great Lakes. These proposals call for: (1) Raising the minimum legal size of whitefish from 17 to 18 inches, or two pounds in the round; (2) permitting use of pound and trap nets for taking whitefish and lake trout in any depth of water, provided the mesh size is increased to $5\frac{1}{4}$ inches to allow more undersized fish to escape; and (3) increasing the minimum size of mesh in gill, pound, and trap nets from $4\frac{1}{2}$ to $5\frac{1}{4}$ inches for taking whitefish and lake trout in all of Michigan's Great Lakes waters, and limiting gill nets to $20\frac{1}{2}$ meshes in depth.

The third change would not become effective until January 1, 1965. Since most nets normally need to be replaced in 3 to 4 years, this would allow commercial fishermen to plan ahead and save them from unexpected changeover costs in equipment which might be difficult to absorb if the change took immediate effect. The same reason holds true for another change proposed to take effect in 1965 which would reduce the size of mesh in gill nets from 8 to $7\frac{1}{2}$ inches for taking carp in Wildfowl Bay, off Saginaw Bay.

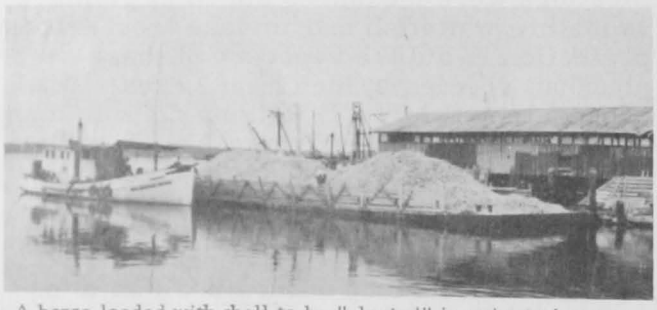
It was proposed that the closed season on pickerel (northern pike) in Saginaw Bay be changed to match the March 5-April 10 off-limits period on yellow pike (walleye) fishing in those waters.

Completing the list of proposals was a change which would enable Michigan's Department of Conservation director to issue permits for trawling smelt and alewife in L'Anse Bay off Keweenaw Bay in Lake Superior where there is an abundance of smelt.

Mississippi

SURVEY OF OYSTER BOTTOMS:

A survey of the productive and potentially productive oyster bottoms of all state waters in Mississippi Sound and bays was completed early in 1961 by a staff member of the Mississippi Gulf Coast Laboratory at Ocean Springs, Miss. Conducted in connection with his work with the Mississippi Marine Conservation Commission, the survey was done to ascertain the condition of the existing reefs and bottoms so that future plans for rehabilitating and enlarging oyster-growing areas could be undertaken.



A barge loaded with shell to be "planted" in order to improve public oyster-growing areas in Mississippi.

During the month of April, the replanting of 2,500 barrels of seed oysters in the Sound was supervised by the Laboratory. The seed oysters were removed from overcrowded areas and replanted on established oyster beds where oysters were sparse.

Another phase of the oyster bottom improvement program was the dragging of the once productive outside oyster reefs with oyster dredges; this was done with the idea that the shells would be turned over and the clean, unfouled surfaces would be exposed just prior to the spawning and setting period.

North Atlantic Fisheries

Exploration and Gear Research

MIDWATER TRAWLING FOR ATLANTIC HERRING PROMISING:

M/V "Delaware" Cruise 61-8: Promising midwater trawl catches of Atlantic herring and other fishes were made during the May 24-June 7, 1961 cruise of the U. S. Bureau of Commercial Fisheries research vessel Delaware.

Fig. 1 - Midwater trawl catch of about 4,500 pounds of herring on the deck of M/V Delaware.

Utilizing a technique developed in West Germany, a midwater trawl net was operated successfully in Gulf of Maine waters. Control of the depth of the net over the bottom was effected through the use of a depth-sounder transducer mounted on the headrope of the trawl net. A constant indication of the net opening, its relation to the bottom and the presence or absence of fish schools, was transmitted to the vessel through a two-conductor cable. This information was then recorded on board the vessel using the modified depth sounder (see fig. 1). Rapid changes in the depth of the net were brought about by increasing or decreasing the speed of the Delaware's main engine.

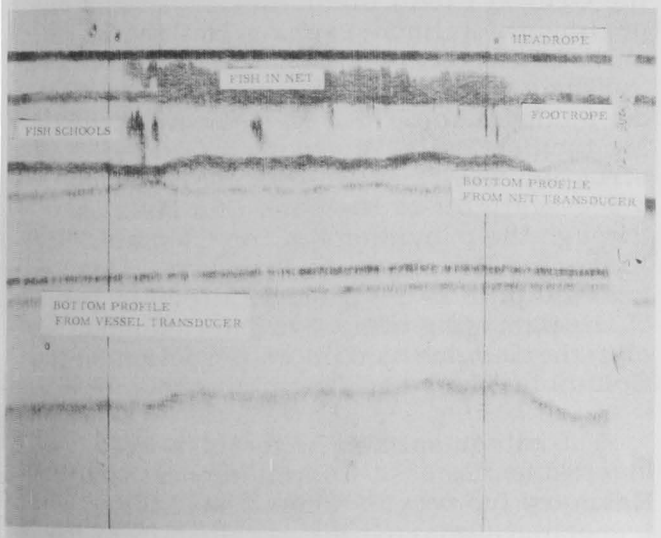


Fig. 2 - Echo-sounder recording of net over bottom as seen in the pilothouse of M/V Delaware. A constant indication is given of the net's position in relation to the bottom, the presence of fish schools, and the net opening (in this case about 40 feet between headrope and footrope).

The cruise was divided into two parts: The first phase, conducted off Gloucester, Mass., was for the purpose of testing the recently acquired electronic apparatus and the fishing gear. After some modifications to various components, the second phase was carried out. This portion of the cruise included experiments with controlling the gear's depth in relation to the bottom and experimental fishing.

During a 4-day period, 13 midwater trawl tows were made during daylight hours along the northern edge of Georges Bank. The duration of individual tows varied from 30 minutes to over two hours. The best catch per single tow included approximately 4,500 pounds of herring (Clupea harengus harengus). This catch was made in about 35 fathoms of water along the northern edge of Georges Bank with the trawl fishing 6 to 10 fathoms above the bottom. Other species represented in the catch were Atlantic mackerel (Scomber scombus), silver hake (Merluccius bilinearis), and squid (Loligo sp.).

Note: Also see Commercial Fisheries Review, June 1961 p. 34; April 1961 p. 26.

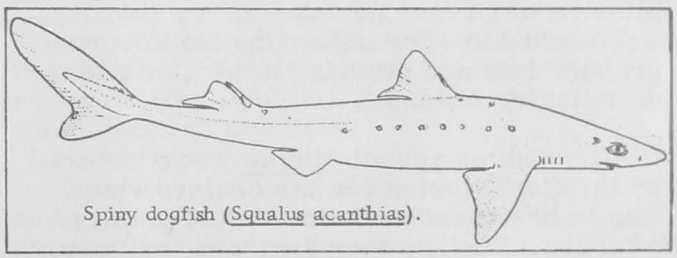
North Atlantic Fisheries Investigations

GROUNDFISH DISTRIBUTION AND ABUNDANCE ON INSHORE FISHING GROUNDS STUDIED:

M/V "Delaware" Cruise 61-7 (June 11-15, 1961): Haddock were caught in Ipswich Bay, on Stellwagen Bank, and off Nauset Beach by the U. S. Bureau of Commercial Fisheries research vessel Delaware. The vessel was on a 5-day survey to investigate the distribution and abundance of groundfish on the inshore fishing grounds off New England. The area off Race Point at the tip of Cape Cod was found to have the largest concentration of small haddock. Twenty other species of fish were caught in varying quantities.

Several species of live fish were returned to the Woods Hole Laboratory for display in the aquarium which was scheduled for opening to the public on July 1, 1961.

Spiny Dogfish Tagged Off New England Coast: In addition to the survey on distribution and abundance of groundfish conducted on this cruise, a total of 276 spiny dogfish were tagged and released, as part of a study to determine the movements and growth of that species.



Spiny dogfish (Squalus acanthias).

Two kinds of tags were used. Half the number of fish were marked with yellow plastic discs attached through the snout with stainless steel pins, while the other half were marked with yellow plastic tubing attached through the base of the first dorsal fin. A reward of $1.00 will be paid for each tag turned in, and an additional dollar will be paid if the fish is turned in

with the tag intact so that measurements can be made. A letter with information on the tagging will also be sent to the finder.

The recent dogfish tagging experiment is part of a general fisheries research program to determine the migrations and growth of the spiny dogfish in the waters off New England. Many of the tagged dogfish are expected to be caught during the summer in Massachusetts and Maine coastal waters. Finders of tagged dogfish should take them to the nearest Federal or state fisheries representative, or mail only the tag to the U. S. Bureau of Commercial Fisheries Biological Laboratory, Woods Hole, Mass., giving the date and place the fish was caught.

Previous dogfish tagging experiments conducted by the Woods Hole Laboratory have shown that these small sharks make regular seasonal migrations from one area to another. Several dogfish tagged on Jeffreys Ledge in 1956 were recaptured over a period of years from one area off Portland, Maine, while one was recaptured on Georges Bank this past spring, five years after it was tagged. A dogfish tagged in 1960 on Stellwagen Bank was recaptured this year in a fish trap in Buzzards Bay.

Oregon

ALBACORE TUNA STUDY LAUNCHED: An exploratory cruise to study albacore tuna movements off the Oregon coast was launched on June 29, 1961, by Fish Commission of Oregon personnel. Twelve days were scheduled for collecting basic oceanographic data and studying migration and distribution of tuna.

The fishing vessel Minnie was chartered by the Commission for the cruise, which was to be conducted from 40 to 140 miles offshore. Surface temperatures, salinity, and clearness of the water was to be recorded. Charts showing temperatures at various depths, and observations by use of a light lowered into the water at night to attract fish, were also to be made. These records are important in plotting migration patterns and distribution of the albacore. All of the albacore caught will be tagged and released so that their migratory habits can be further investigated.

These studies are being made by the Commission in an attempt to correlate oceanographic data with the presence or absence of albacore off the Oregon coast. The information will be made available to the troll fishing fleet so the fishery can be carried out with a greater degree of efficiency.

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NEW POND FOR REARING SILVER SALMON UNDER NATURAL CONDITIONS: Stocking the Wahkeena Salmon Rearing Pond with 100,000 silver salmon fingerlings marked the completion late in May 1961 of the Oregon Fish Commission's newest experimental salmon-rearing facility.

The new 20-acre fish-rearing lake borders the Columbia River Highway, near Multnomah Falls, Multnomah County. Construction was financed by Federal funds, made available to the Fish Commission through the provisions of the Columbia River Fisheries Development Program. This Federal aid plan is designed to alleviate some of the damaging effects to the Columbia River fisheries due to dam construction on the Columbia River and its tributaries.

The silver salmon fingerlings were hatched at the Fish Commission's Sandy Hatchery from eggs taken from adults trapped at Cedar Creek, a tributary of the Sandy River.

The young salmon will be on their own for the next several months, feeding on insects and other natural foods available in the pond. When they are a year old, they will be allowed to escape into the Columbia River to begin the downstream trip to the ocean where they will remain until approaching maturity lures the survivors back into the Columbia River on the spawning run to the home waters, the outlet of Wahkeena Pond.

Pond-rearing of salmon is relatively new in the Pacific Northwest. The technique is showing considerable promise in Oregon, with the most outstanding success to date being that of the Fish Commission's silver salmon rearing project at Millicoma Pond in Coos County where about 80 percent of the fingerlings placed in the pond reached the yearling state. These fish showed an excellent rate of growth and were in prime condition when released into the Coos River.

Outstanding features of natural pond rearing include low production cost, through the elimination of the necessity for artificial feeding, and the high quality of young fish produced.

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SALMON PASSAGE PROBLEM ON McKENZIE RIVER:

A taxi service for chinook salmon as of June 1961 is in operation on the South Fork of the McKenzie River under the supervision of Oregon Fish Commission personnel. Site of the unusual fish transport installation is the U. S. Army Corps of Engineers' Cougar Dam construction project.

A serious fish passage problem at Cougar arises from the fact that the velocity of the water passing through the diversion tunnel, into which the South Fork has been directed during dam construction, is so high that adult salmon are unable to swim against it on their upstream migration.

The temporary passage facility, operated under the Commission's direction, consists of a steel and cement diversion rack extending at an angle across the river and so placed that upriver migrant fish are guided into a 1,000-gallon steel holding tank placed in a pit at one end of the rack. When a sufficient number of salmon have entered the trap, the tank is lifted by crane onto a truck, which then hauls the fish to a point well above the construction site and releases them into the river to continue the one-way trip to fulfill their destiny on the spawning grounds. A pair of tanks, one of which is placed in trapping position while the other is being used to haul fish, assures that the trapping operation will be continuous.

Oysters

NEW DISEASE DISCOVERED IN VIRGINIA:

While searching for the destructive Delaware Bay oyster disease, a new disease has been discovered by Virginia scientists of the Virginia Institute of Marine Science. A marine biologist from the Institute's Wachapreague station followed the June 1961 epidemic and made daily collections from trays and beds on Virginia's Eastern Shore.

This new protozoan organism, the discovery of which was announced on June 6, 1961, has been called SSO (Seaside Organism) because it occurs entirely on the seaside of Eastern Shore. The disease has been called "curdle disease" because of its effect on oyster tissue.

SSO is a somewhat sneaky killer which attacks oysters during the oystermen's off-season in May and June. Heavy losses are suffered on beds of old oysters held beyond their usual harvesting period, but damage is minor to beds of young oysters. The period of losses from SSO is short--about six weeks--with peak losses occurring the first week in June.

SSO is evidently an adjusted oyster parasite which has been on the seaside of Eastern Shore a long time. As such, it presents no great problem to the oyster farmer and is harmless to the consumer.

Salmon

ATTACK PLANNED ON HATCHERY DISEASE:

At a conference early in 1961, representatives of state agencies of Washington, Oregon, and California, and the U. S. Bureau of Commercial Fisheries met with Bureau pathologists and hatchery biologists to consider research on "coagulated yolk disease" which has caused severe losses of salmon and trout at western hatcheries.

Although cause of the disease is not known, the group considered 20 possible causes, ranging from bacteria and viruses to parasitic infection, handling, inherited susceptibility, and quality of the water in which the fish are held.

A new coordinated study of the disease and possibilities for its prevention was agreed upon among the researchers. The plan calls for division of study into such categories as histopathology; heredity; effects of metals and of metabolic wastes; bacteria; temperature and water chemistry influences; and the effects of routine treatment of eggs and fry for fungus infections.

The group will meet again in the spring of 1962 to review results and plans for further exploration of the disease.

Sea Lions

POSSIBILITY OF DEVELOPMENT OF AN INDUSTRY:

Research to control the Steller sea lion, which too often wreaks havoc on fishing gear and catches during harvest time and which is accused of preying on valuable fishing stocks at other times, may result in a new industry, according to a report issued recently by the U. S. Bureau of Commercial Fisheries.

The report summarizes an experimental sea lion harvest conducted by a commercial fishing company under contract with the Bureau. Pertinent information from earlier biological studies is included in the report.

The experimental harvest yielded more than 200 tons of high-protein ground meat which was sold through established channels to fur farmers feeding mink. The report notes a big demand for high-protein, low-fat, meat by the fur farms and fish hatcheries of western and midwestern States. Possibilities for other uses exist but these are dependent upon a stable annual harvest. Sea lion meat is about 73 percent water, five percent fat, and more than 20 percent protein.

Numerous complaints have been made by fishermen and fishing companies for a number of years concerning the depredations of sea lions. There has been no incentive to control the sea lion by annual harvest because the hide is practically valueless for commercial use and because there was little or no apparent market for the meat commensurate with the cost of harvest.

The Bureau studies and those conducted by the Fisheries Research Institute of the University of Washington and the Alaska Department of Fish and Game indicate that there are enough sea lions in Alaskan water to support a commercial operation. There are an estimated 150,000 sea lions in the Alaska area. The Bureau says in its report, "providing that facilities for processing can be improved the potential for a commercial operation is high." The Bureau recommends that specialized equipment should be used to reduce the amount of labor required to process the 2,000-pound carcasses.

An additional hazard is the weather, the report says. During the breeding season, which is the best time to harvest, the sea lions occupy rookeries along the windswept Alaska Peninsula. At times, inclement weather makes harvesting impossible.

During the experimental harvest the harem bulls made up most of the harvest. Their places were taken immediately by bachelor bulls. Harvest of male animals would likely not decrease the herd appreciably for a long while. If studies indicate that a sharp reduction in the herd is necessary, the harvest would have to include female sea lions.

Anyone interested in commercial harvest of sea lions should acquaint himself with both the Federal and Alaska State fishery regulations.

Shellfish

NEED FOR MORE RESEARCH STRESSED BY INTERIOR DEPARTMENT:

Proposals for a greatly expanded shellfish research program were placed before the Congress on May 22, 1961, by the U. S. Department of the Interior.

In a letter to the Chairman of the House Committee on Merchant Marine and Fisheries, Assistant Secretary Frank P. Briggs urged the passage of a bill (H.R. 2894) which would provide for the construction of a shellfish laboratory at Milford Conn. The report declared that present facilities are too small for the new phases of shellfish research which are now possible and necessary.

"Our development of techniques in recent years for artificially spawning and rearing oysters and clams has opened numerous possibilities for more productive research toward solving many important industry problems," the Assistant Secretary explained in his letter. "Such methods of artificially producing seed, selective breeding for desirable characteristics, and chemical control of predators now appear possible. Much of this research has been accomplished with small numbers of shellfish in the laboratory; however, it is important to note that seed production and selective breeding will require the growing of a large number of bivalves under controlled conditions for considerable periods of time. Our present facilities are inadequate to allow suitable development of the techniques that will be of material aid to the industry."

To carry out the work, the U. S. Bureau of Commercial Fisheries will need such special facilities and equipment as an extensive sea-water system consisting of storage and settling tanks, filtering and ultraviolet treatment equipment, a heating system, and nontoxic piping and pumps. Special constant-temperature rooms are needed for raising shellfish food and for controlled experiments.

The plans include pilot-plant studies of the commercial possibilities of shellfish hatchery procedures as well as training personnel from the industry and from State conservation agencies in the use of these methods.

Tuna

ALBACORE FISHING FORECAST OFF WEST COAST OF NORTH AMERICA, 1961:

For the past year, scientists at the U. S. Bureau of Commercial Fisheries Biological Laboratory, San Diego, Calif., have been analyzing historical oceanographic, meteorological, and fishing records in an effort to understand variations in availability of the albacore tuna off the west coast of North America. The ultimate objective of this analysis is the accurate prediction of the distribution and availability of albacore from year to year as a practical aid to the fishing industry. Various sources of data are being used in the analysis: historical meteorological data from the Extended Forecast Section, U. S. Weather Bureau, Washington, D. C.; current synoptic weather and sea temperature information from ships at sea via U. S. Weather Bureau teletype circuits; historical sea temperature data from the U. S. Bureau of Commercial Fisheries Biological Laboratory, Stanford; salinities and sea temperatures from California Cooperative Oceanic Fisheries Investigation reports; coastal water temperatures from Scripps Institution of Oceanography; and albacore catch and landings data from the California Department of Fish and Game.

Forecasts will necessarily be restricted until the analysis of the historical data is completed, detailed up-to-date albacore catch and effort data are available, and it is possible to gather more oceanographic data at sea currently. On the basis of relationships so far uncovered, a limited prediction for the area south of the International Border (United States-Mexican) is possible for 1961. It is based on the following assumptions: (1) large-scale trends now established in the ocean climate will persist into the summer; (2) the albacore will respond to the ocean environment as it has in the past; and (3) fishing effort will be similar to that in the past. Any major changes that may occur which substantially alter these assumptions will accordingly affect forecast reliability.

Table 1 - California Landings of Albacore Tuna, 1945-1959

Year	Landings from South of International Border	Landings from California Waters
	.....(Million Pounds).....	
1959	0.00	32.52
1958	0.72	25.39
1957	20.91	22.61
1956	21.06	15.87
1955	19.69	9.31
1954	11.82	14.29
1953	20.49	13.30
1952	26.70	23.10
1951	17.62	13.28
1950	23.60	38.14
1949	23.58	20.40
1948	25.93	10.50
1947	5.76	7.40
1946	8.96	9.10
1945	12.26	8.78
Annual Average	15.94	17.60

The fishery will begin farther south than in the past three years and 10.0 million pounds of albacore will be taken from south of the International Border. The average catch from that region for 1945 to 1959 was 15.9 million pounds (table 1).

The data suggest that the fishery should reach as far south as Guadalupe Island, and even though the center of abundance will probably remain offshore, a limited to moderate coastal fishery may develop.

It is too early in the year to permit a prediction for regions north of the International Border. For previous years, relationships have been noted between temperature in June and early July and area of catch off Oregon and Washington. Sea surface temperature from the northern region will be examined continously and industry will be kept advised of the interpretation of the information if it is thought useful in suggesting whether or not there will be a substantial fishery off Oregon later in the year.

* * * * *

FIRST 1961 SEASON CATCHES OF ALBACORE MADE BY BUREAU RESEARCH VESSEL:

On June 6, 1961, biologists aboard the U. S. Bureau of Commercial Fisheries research vessel Black Douglas reported catching 3 albacore tuna--the first of the season. The albacore were taken about 350 miles west of San Pedro (34° 56' north latitude, 124° 27' west longitude) in waters with a temperature of 59.9° F. The research vessel was engaged in a 3-week albacore-oceanographic cruise which began on June 1, 1961.

United States Fishing Fleet[1/] Additions

APRIL 1961:

A total of 34 vessels of 5 net tons and over were issued first documents as fishing craft, during April 1961, a gain of 10 vessels over April 1960. The Pacific area led with 14 vessels, while the Chesapeake

Table 1 - U. S. Vessels Issued First Documents as Fishing Craft By Tonnage, April 1961

Net Tons	Number
5 to 9	14
10 to 19	13
20 to 29	1
30 to 39	2
40 to 49	2
90 to 99	1
190 to 199	1
Total	34

1/Includes both commercial and sport fishing craft.

followed with 9, and the Gulf with 7. The New England, South Atlantic, and Great Lakes areas contributed the remaining 4 vessels.

Table 2 - U. S. Vessels Issued First Documents as Fishing Craft By Areas, April 1961

Area	April		Jan.-Apr.		Total
	1961	1960	1961	1960	1960
	(Number)				
New England	2	2	11	5	34
Middle Atlantic	-	-	1	5	13
Chesapeake	9	4	21	13	76
South Atlantic	1	1	12	15	45
Gulf	7	3	31	16	85
Pacific	14	14	37	33	138
Great Lakes	1	-	4	3	17
Puerto Rico	-	-	2	-	-
Total	34	24	119	90	408

Note: Vessels assigned to the various areas on the basis of their home ports.

A total of 119 vessels were issued first documents as fishing craft during the first 4 months of 1961--29 more than during the same period of 1960.

U.S. Fish Meal and Solubles Production and Imports, January-April 1961

During the first four months of 1961, the United States production of fish meal amounted to 13,800 tons, compared with 16,100 tons for the same period in 1960. In 1961 there was a drop of a little more than 4,000 tons in tuna and mackerel meal, but menhaden meal was up 2,000 tons. Production of other types of fish meal in 1961 was below the comparable period in 1960.

U. S. Supply of Fish Meal and Solubles, January-April 1960-61 and Total for 1960

Item	January-April		Total
	1961	1960	1960
	(Tons)		
Fish Meal:			
Domestic production:			
Menhaden	4,165	2,119	218,423
Tuna and mackerel	6,490	10,655	26,325
Herring, Alaska	-	-	6,071
Other	3,080	3,344	38,897
Total domestic production	1/13,735	1/16,118	289,716
Imports:			
Canada	9,879	14,786	30,982
Peru	45,324	22,388	68,156
Chile	3,582	5,245	21,183
Angola	1,433	-	888
Union of South Africa	3,036	3,195	7,073
Other countries	139	87	3,279
Total imports	63,393	45,701	131,561
Available fish meal supply	77,128	61,819	421,277
Fish Solubles (wet weight):			
Domestic production2/	7,820	8,841	98,929
Imports:			
Canada	465	273	869
Denmark	-	1,858	1,858
Other countries	264	179	447
Total imports	729	2,310	3,174
Available fish solubles supply	8,549	11,151	102,103

1/Based on reports from firms which accounted for 93 percent of the 1960 total production.
2/Includes production of homogenized-condensed fish.

Imports of fish meal for the first 4 months in 1961 totaled 63,400 tons--17,700 tons more than in the same period in 1960. Imports from Peru (45,300 tons) during January-April 1961 comprised about 70 percent of the total, and were more than double the imports from that country in the same period of 1960. Canada was the next largest supplier with 9,900 tons, but still imports were down 5,000 tons as compared with the first 4 months of 1960. The British Columbia 1960/61 herring fishing season started in November 1960 following a tie-up of the fishing vessels for about a year because of an ex-vessel price disagreement. The season closed early in March.

The remaining 8,000 tons of imported fish meal during the first 4 months were from Chile, Union of South Africa, and Angola. Only very small quantities were received from other countries. Market conditions for domestically-produced and imported fish meal improved considerably since the end of 1960, and prices advanced steadily from the beginning of the year through April.

Loaded menhaden purse seiners awaiting turn to unload catch at industrial products plant in Empire, La.

During the first 4 months of 1961, the domestic production of fish solubles amounted to 7,800 tons--a drop of 1,000 tons as compared with the same period in 1960. Imports of fish solubles January-April 1961 totaled only 700 tons as com-

pared with 2,300 tons for the comparable period in 1960. Very low prices were responsible for the drop in domestic production and imports of fish solubles.

Both in the United States and in foreign countries the solubles are being added to the meal to produce "whole meal." Markets for fish solubles also showed some improvement in the early months of 1961 although not to the same extent as for fish meal.

U.S. Foreign Trade

EDIBLE FISHERY PRODUCTS, APRIL 1961:

Imports of edible fresh, frozen, and processed fish and shellfish into the United States during April 1961 decreased by 16.3 percent in quantity and 24.5 percent in value as compared with March 1961. The decrease was due primarily to lower imports of fillets other than groundfish fillets (down 1.2 million pounds), frozen albacore (down 2.8 million pounds), canned tuna in brine (down 1.8 million pounds), lobster and spiny lobster (down 1.6 million pounds), and frozen shrimp (down 1.1 million pounds). The decrease was partly offset by an 0.4-million-pound increase in the imports of frozen tuna other than albacore.

Compared with April 1960, imports in April this year were lower by 7.8 percent in quantity and 7.5 percent in value due to lower imports of canned tuna in brine (down 1.7 million pounds), lobster and spiny lobster (down 1.4 million pounds), and canned salmon (down 1.0 million pounds). Compensating, in part, for the decrease was an increase of about 1.5 million pounds in the imports of frozen shrimp.

U. S. Imports and Exports of Edible Fishery Products, April 1961 with Comparisons

Item	Quantity			Value		
	April		Year	April		Year
	1961	1960	1960	1961	1960	1960
	(Millions of Lbs.)			(Millions of $)		
Imports:						
Fish & shellfish: Fresh, frozen & processed 1/	70.1	76.1	1,011.2	20.9	22.6	304.8
Exports:						
Fish & shellfish: Processed only 1/ (excluding fresh & frozen)	1.7	3.5	48.7	1.1	1.3	19.2

1/ Includes pastes, sauces, clam chowder and juice, and other specialties.

United States exports of processed fish and shellfish in April 1961 were higher by 2.1 percent in quantity and 10.0 percent in value as compared with March 1961. Compared with the same month in 1960, the exports this April were lower by 51.3 percent in quantity and 15.4 percent in value. The lower quantity of exports in April this year as compared with the same month in 1960 were due mainly to sharply lower exports of California canned sardines and squid.

* * * * *

IMPORTS AND EXPORTS OF SELECTED FISHERY PRODUCTS, JANUARY-MARCH 1961:

Imports: The leading suppliers of groundfish and ocean perch fillets and blocks--Canada, Iceland, Norway, and Denmark--sent increased quantities of these products to the United States the first quarter of 1960. Principal increases were in imports of fish blocks from Canada and Iceland. The increase in fresh and frozen tuna imports was primarily the result of greater shipments from west Africa and from Trinidad into Puerto Rico.

Table 1 - U. S. Imports of Selected Fishery Products, January-March 1960 and 1961

Commodity	Jan.-Mar. 1961	Jan.-Mar. 1960
	(1,000 Lbs.)	
Groundfish and ocean perch:		
Fillets	20,891	19,015
Blocks or slabs	27,514	13,179
Total	48,405	32,194
Flounder fillets	3,008	2,733
Swordfish	6,644	4,852
Tuna, fresh or frozen:		
Albacore	25,883	23,861
Other	28,985	25,736
Total	54,868	49,597
Tuna, canned in brine:		
Albacore	6,130	2,284
Other	5,779	6,649
Total	11,909	8,933
Tuna, canned in oil	133	334
Bonito, canned	3,164	2,951
Shrimp	31,617	24,798
Crab meat, canned	996	929
Scallops, fresh or frozen	1,026	887
Fish meal	88,666	70,608
Fish solubles	1,018	4,352
Lobsters:		
Northern	3,031	2,857
Spiny	11,362	10,319
Oysters, mostly canned	2,429	1,477
Salmon:		
Fresh or frozen	1,718	1,427
Canned	1,332	10,083
Sardines:		
Canned in oil	7,375	5,483
Canned not in oil	3,830	3,079

The rise in imports of tuna canned in brine was mainly caused by an increase in

Japan's albacore shipments. Country-by-country data on shrimp imports show that all leading suppliers, except Japan, increased their shipments to the United States. Mexico's shipments increased by 22 percent; those from El Salvador and Iran nearly doubled. Imports of fresh or frozen lobster and spiny lobster from the Union of South Africa and Canada increased while imports from Australia declined. The drop in canned salmon imports was largely accounted for by the 91-percent decrease in imports from Japan.

Norway supplied more than half of the canned sardines in oil, and Portugal sent nearly 30 percent. Japan increased shipments of canned crab meat by 8 percent and continued to be practically the only supplier of that product. Likewise, Japan again sent over 95 percent of the total canned oyster imports. A decline in receipts of fresh or frozen sea scallops from Japan was more than offset by an increase in receipts from Canada. Fish meal imports from Peru increased 76 percent as that country supplied 69 percent of these imports. Shipments from the Union of South Africa also were up, but those from Canada and Chile were down considerably. Denmark, supplying 85 percent of the imports of fish solubles one year ago, did not send any to the United States in the first quarter of 1961.

Exports: In the first quarter of 1961, the two leading foreign markets of the United States for canned sardines not in oil--the Philippines and Ecuador--took only one-fourth the quantity taken during January-March 1960. No exports went to Cuba. The United Kingdom took 42 percent of the total canned salmon exports, and Canada and Australia increased their purchases substantially. Exports of fresh or frozen salmon to Canada were down about two-thirds. Canada took 62 percent of the canned and fresh or frozen shrimp. A sharp reduction in canned squid exports is the result of an unfavorable change in Philippine exchange classification putting squid in the non-essential consumer category. Exports of fish oils increased by sizable amounts, i.e., Canada, over 100 times; Norway, almost 3 times; and Belgium, from nothing to 1,322,000 pounds. This trade to Sweden declined from 6,642,000 pounds to nothing, and West Germany took less than half its January-March 1960 quantity.

Table 2 - U. S. Exports of Selected Fishery Products, January-March 1960 and 1961

Commodity	Jan.-Mar. 1961	Jan.-Mar. 1960
	(1,000 Lbs.)	
Fish oils	36,549	29,053
Oysters, shucked	249	218
Salmon:		
Fresh or frozen	197	389
Canned	2,649	1,350
Mackerel, canned	976	474
Sardines:		
Canned not in oil	3,085	6,912
Canned in oil	65	57
Shrimp:		
Frozen	638	636
Canned	561	604
Squid, canned	413	4,577
Misc. canned fish, mostly Calif. anchovies	156	238

* * * * *

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

The quantity of tuna canned in brine which may be imported into the United States during the calendar year 1961 at the 12½-percent rate of duty is 57,114,714 pounds. Any imports in excess of the quota will be dutiable at 25 percent ad valorem.

Imports from January 1-June 3, 1961, amounted to 20,035,659 pounds, according to data compiled by the Bureau of Customs. From January 1-June 4, 1960, a total of 18,262,874 pounds had been imported.

* * * * *

FISHING TACKLE IMPORTS, 1960:

Imports of fishing tackle by the United States, valued at $10,197,461 in 1960 declined 4.7 percent from the 1959 all-time peak of $10,696,808.

A combination of causes probably brought about the 1960 decrease in imports. Among these was the exceptionally high influx of imports in 1959 which increased 56.0 percent over 1958 imports. This was the largest year-to-year percentage increase since 1950 and contrasted sharply with the annual average rate of increase of 20.7 percent in the growth of imports from $1,552,992 in 1950 to the 1960 figure.

Despite the over-all decline, four classes of tackle imports increased in value in 1960. These were leaders and casts, fishing rods, baskets and creels, and tackle and parts, not specially provided for, except lines, nets, and seines.

The number of reels imported fell 1.3 percent to 3,377,457 in 1960 from the 1959

figure of 3,420,411 and the value declined 4.3 percent to $5,976,152 from $6,246,153. In both years reels accounted for 58 percent of all tackle imports.

Purchases from Japan declined in quantity from 2,681,891 in 1959 to 2,657,700 in 1960, but the value increased from $2,194,965 to $2,326,316. As a result the unweighted average price or value of Japanese reels in 1960 increased to 88 cents each from 83 cents in the prior year. Quantitywise, reel imports from Japan held steady at 78 percent of the total while dollarwise her share increased from 35 to 39 percent.

Most noteworthy in the reel import data is the loss in sales by Sweden. Quantity dropped from 175,048 to 141,280 and value fell off from $1,093,537 to $885,218. Percentagewise this was a drop of about 20 percent in both unit and dollar volume.

Fishhooks, other than snelled, the second largest of current classes of tackle imports, made the largest drop percentagewise of all classes in 1960. The 19.9 percent fall from $1,310,710 in 1959 to $1,050,598 in 1960 was sustained almost entirely by shipments from Norway and Japan. Imports from Norway, traditionally the largest supplier to the U. S. market, fell 18.4 percent from $920,913 in 1959 to $751,896. Percentagewise, imports from Japan for the same period fell off 40 percent and amounted to $246,875 in 1959 and $149,561 in 1960.

Contrariwise, hook imports from the United Kingdom, the third largest supplier by volume, increased from $116,041 to $129,325.

Prior to 1960, the second largest class of imports was described as fishing tackle and parts n.s.p.f. (not specially provided for) except fishing lines, nets, and seines, including artificial baits, fly books, fly boxes, artificial flies, and snelled hooks. This class in 1959 accounted for imports valued at $1,996,879. In 1960 this major class was divided into four classes for each of which imports were as follows: Artificial baits not including flies, $742,773; artificial flies, $148,051; snelled hooks, $230,599; and other fishing tackle, including fly books and fly boxes, $883,133. Had the class remained intact, the 1960 value would have been $2,004,556 for an increase of about 4 percent.

Trade with the United States in the foregoing four classes is dominated by Japanese products. In 1960 these accounted for 76.5 percent or $1,534,261 of the total: 57.4 percent of artificial baits, amounting to $426,513; 95.1 percent of artificial flies, $140,910; 84.2 percent of other tackle, $743,720; and 96.8 percent of snelled hooks, $223,121. France and Sweden also participated in this trade. France supplied 19.4 percent or $144,132, and Sweden, 17.5 percent or $130,083 worth.

Imports of Japanese fishing rods averaged 71.5 cents each in 1959 and 81.8 cents each in 1960. Trade reports indicate this increase may be due to a higher ratio in the total of fitted fiberglass rods than heretofore. Virtually all the imports were supplied by Japan.

Rod imports from all countries were valued at $486,939 in 1960 and showed a 10.4-percent increase over the 1959 figure of $440,878. Unit volume, however, declined from 609,809 rods to 594,816.

Rod parts are supplied to the U. S. market principally by Japan, Germany and Portugal. In every instance the 1960 figures are lower than those for 1959. Moreover, excepting Portugal, the percentage decreases for each were lower than those for the entire class. Total imports fell off 13.6 percent from $278,512 to $240,504. Imports from Japan fell 19.3 percent from $46,904 to $33,168; Germany, 22 percent, from $77,550 to $60,521. Portugal's sales dipped only 6.8 percent from $145,675 to $135,845. Six other countries participated in a small way in this trade in either 1959 or 1960 but only Spain had trade in both years: 1959, $4,780; 1960, $2,675.

Leaders and casts increased 16.6 percent in 1960 in dollar volume and decreased 31.8 in unit volume from 1959 levels. Total unit volume decreased from 431,268 dozen to 291,614. Dollar volume rose from $68,454 to $79,857. Japan supplied all but a small part.

Baskets and creels, supplied principally by Japan and Hong Kong, increased 8 percent in unit and 18 percent in dollar volume. Japanese shipments to the United States decreased from 7,474 units, valued at $63,588, in 1959 to 71,544 units, valued at $67,592, in 1960. Those from Hong Kong in the 1959-

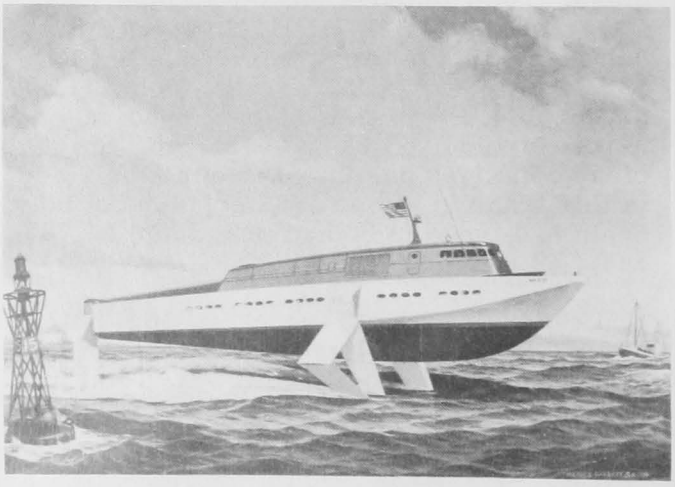
60 period increased from 48,775 units to 61,976 and gained in value from $26,551 to $38,358.

On the basis of dollar volume of shipments, the nations supplying the major U. S. imports of tackle remained in the same relative positions in 1960 as in 1959, except that the United Kingdom moved up from eighth to seventh place while Portugal dropped from seventh to eighth. (Foreign Commerce Weekly, May 15, 1961.

Vessels

FIRST OCEAN-GOING HYDROFOIL CRAFT NEARING COMPLETION:

In the next year or two, Americans living along major rivers, on the Great Lakes, or the bays and harbors of the United States may see a 60- to 100-foot ship skimming along at some 60 to 70 miles an hour with its hull completely out of the water. Such craft exist today and more are on the way. They are hydrofoil craft which, put simply, skim the water on skis. Raising the entire hull out of the water eliminates much of the resistance to forward motion, thereby achieving the relatively high speeds.



Artist's conception of an 80-ton, 60 to 80 knot ocean-going hydrofoil craft. Forward motion of craft will lift the ship out of the water where it will run supported by the hydro-dynamic lift of its foils, thus avoiding the drag of the friction created by contact of the hull of the ship with the water.

One such craft, a massive 104-foot, 80-ton hydrofoil to be christened the Denison, is being built for the U. S. Department of Commerce's Maritime Administration in a research and development program that may have wide implications for the future, both in domestic waters and offshore travel.

The first hydrofoil craft in the world to be designed specifically as an oceangoing vessel, the H.S. (Hydrofoil Ship) Denison is nearing completion at Bethpage, Long Island, N. Y., under a Maritime Administration contract with Dynamic Developments, Inc., an affiliate of Grumman Aircraft Engineering Corp., and should be ready to take to the water by late summer or early fall, the U. S. Department of Commerce announced on July 4, 1961.

The contract to build the craft was negotiated after design studies had indicated its feasibility. The government is paying about $1.5 million of the estimated $5 million value of the ship, the remainder of the production costs being borne by interested firms. The ship will utilize a 19,000 shaft horsepower gas turbine power plant and be capable of speeds up to some 60 knots or about 70 miles per hour.

Constructed of aluminum alloy, the 104-foot Denison will have a $21\frac{1}{2}$-foot beam, $6\frac{1}{2}$-foot draft ($17\frac{3}{4}$ feet with the foils down), 80 tons displacement, and be capable of carrying a payload of 37 tons of cargo and fuel combined.

With the foils retracted, the ship can maneuver in some 6 feet of water at a speed of 8 knots under auxiliary power.

The 37 tons of weight which the ship is capable of carrying must be distributed between cargo in the form of individuals or goods, and the necessary fuel and operating personnel. Obviously, if the range is short, less fuel will be required for a trip with an attendant increase in commercial cargo carrying capacity. It is estimated that a trip of 850 miles would permit the carriage of 10 tons of paid cargo or the equivalent in passengers.

Designed to cruise at 60 knots, the "take-off" speed, or speed required to lift the hull out of the water, when fully loaded will be 30 knots. While foil-borne, the craft's turning radius will be approximately 1,000 feet. The design hull clearance is 5 feet above the surface of the water, and the craft should be capable of operating in 5- to 7-foot waves without undue slamming.

Test and technical evaluation of the H. S. Denison should be completed in early 1962, at which time plans call for placing the ship in commercial service.

Already 28 firms have applied for consideration as operators of the ship. Applicants proposed a wide variety of projected services, ranging from commuter service in metropolitan areas, service from the United States mainland to Bermuda, and also to Nassau, an inter-island service for the State of Hawaii, other contiguous and noncontiguous domestic services, and U. S.-Foreign in the Caribbean and Gulf of Mexico. Other areas of suggested commercial operation included deep-sea fishing, offshore drilling operations, and use on the Atlantic Missile Range.

In addition to interest of private companies in commercially operating the Denison, two companies have been inspired by the Maritime Administration's research and development into hydrofoil craft and their possible use to begin planning the construction and operation of their own ships.

It is known that the Russians have built at least two experimental commercial hydrofoil motor ships suitable for operation on their many rivers, lakes, and canals. One vessel, the Raketa, is of 24 tons, has a seating capacity of 66 persons, and travels at a speed of 40 miles per hour. The other, the Meteor, is of 53 tons, has a capacity of 150 passengers and a speed of 45 miles per hour. The Russians have announced plans to build 200 Raketa-type and 85 Meteor-type ships. Reportedly, 60 of the smaller craft are already in operation.

To date, however, the nearly completed H. S. Denison is the first such craft in the world designed for ocean-going operation. It is also believed to be the largest built to date, and may well be the forerunner to a new era in transportation.

Virginia

SCIENTIST EXPRESSES HOPE FOR OYSTER INDUSTRY:

A ray of hope for improvement of the Virginia oyster industry within the near future was expressed by a scientist of the Virginia Institute of Marine Science. Virginia oysters are currently in the throes of an epidemic caused by the infectuous organism called MSX.

"Evidence is building that oysters exposed to MSX from spat size have much lower mortalities later as adults than oysters first exposed to the disease as large oysters," reports the scientist. "This acquired resistance is a very important and conspicuous feature of our resistance to so-called children's diseases such as measles, chickenpox, and polio. Perhaps in a year or two we can begin using seed from such places as Brown Shoal and Wreck Shoal (where the disease has been active) with much better success than we are having now with James River seed. This means that the future of the oyster industry may depend more upon using seed from infested areas than from disease-free areas."

The Gloucester Point laboratory of the Institute has been conducting a full program of research and field study of the oyster disease since its introduction into Chesapeake waters in 1959.

There is no cure-all in sight for the complex problem presented by the oyster disease. The use of chemicals to eradicate the organism is questionable since the tremendous water mass of the bay and rivers would make this prohibitive.

The Institute staff is cooperating with other scientific groups (including Rutgers University, Maryland Department of Research and Education, U. S. Fish and Wildlife Service at Oxford, Md., and the University of Delaware) in discovering the life history of the MSX organism. This information will be useful in developing oysters resistant to the disease.

Turning to the present extent of damage by MSX, the scientist pointed out: "In the past year the lower half of the James River seed area has become infested, and the Rappahannock beds below Towles Point (Urbanna) have shown a rapid increase in intensity of disease.

"Infected material from Hampton Roads has apparently followed the channel up the James to form a 'tongue' of infested area in the seed beds. Wreck Shoal is badly infested (about one-third of larger oysters, but fewer spat and yearlings) although few

deaths have occurred yet. Infections are much less severe inshore of the channel on either side of the river. Brown Shoal has already had a big death rate, and over half the survivors are infected. Heavy losses are expected in infested areas throughout the rest of the summer.

"MSX is still rare above Hoghouse (Urbanna) in the Rappahannock River, although it can be expected to go higher before the year is out. At present no mortality in upper Rappahannock is expected before August, and whether a late summer loss occurs will depend upon how effectively the lower Rappahannock River oysters provide infective material to the upper river. Upper Rappahannock River oysters are essentially free of disease now."

It has been determined that MSX is an organism that affects oysters only, and is harmless to humans.

Whaling

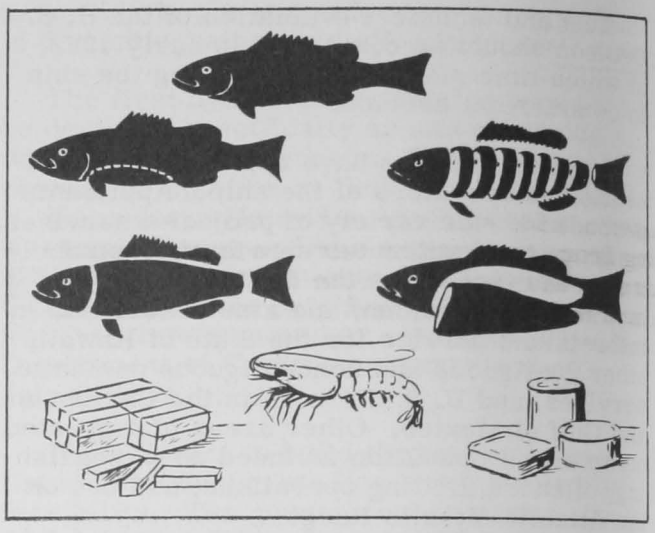
CALIFORNIA WEST COAST LAND STATIONS LICENSED FOR 1961 SEASON:

For the United States 1961 whaling season, 2 California land stations, 2 secondary processing stations, and 5 whale catchers had been issued licenses as of the end of April. In addition, there was one license pending for a land station with one catcher vessel in Oregon.

Wholesale Prices, June 1961

Due to changes made periodically in the weightings assigned to the product groups used in the wholesale price index, some slight revisions have been made in the wholesale price index for edible fishery products. The over-all price index for edible fishery products (fresh, frozen, and canned) for June 1961 was 129.5 percent of the 1947-49 average--0.7 percent higher than in May and 2.4 percent higher than in June 1960.

The fresh and frozen drawn, dressed, and whole finfish subgroup index in June 1961 was about unchanged from the preceding month, but was higher by 1.5 percent from June last year. From May to June, price increases of 11.2 percent for fresh large drawn haddock at Boston and 6.2 percent for fresh drawn halibut at New York City were just about offset by a slight price decline for fresh king salmon plus a more substantial decline for Lake Superior drawn whitefish (down 7.6 percent) and Lake Huron or Lake Michigan yellow pike (down 21.0 percent). This June as compared with June a year ago, prices were up for fresh dressed halibut by 10.4 percent, fresh dressed salmon by 3.9 percent, and Lake Superior whitefish by 7.0 percent. Price declines of 15.0 percent for Great



Lakes yellow pike at New York City and 1.6 percent for fresh large haddock at Boston partially offset the increases.

From May to June this year the fresh processed fish and shellfish subgroup rose 2.3 percent. Higher prices for fresh shrimp (up 1.2 percent) and fresh oysters (up 3.5 percent) were responsible for the increase. As compared with June 1960, the prices in the subgroup this June were up slightly (0.4 percent). A price increase of 9.1 percent for fresh oysters more than compensated for price declines of 21.6 percent for fresh small haddock fillets and 5.0 percent for fresh shrimp at New York City.

Wholesale prices this June for frozen processed fish and shellfish were up almost 1.0 percent from a month earlier due to increases of less than one cent a pound for frozen flounder and haddock fillets and frozen shrimp at Chicago. During the same period, the wholesale price for frozen ocean perch fillets dropped 1.7 percent. Compared with June last year, the subgroup price index this June was down 4.4 percent due to a 14.0-percent lower frozen shrimp price at Chicago. Price increases of about 30.0 percent for frozen haddock fillets and 3.6 percent for ocean perch fillets failed to offset the lower price for shrimp.

The canned fishery products subgroup index in June this year remained unchanged from the preceding two months. However, the subgroup index was up about 6.9 percent from last June due to substantially higher prices for canned salmon (up 14.3 percent) and canned California sardines (up 11.8 percent). As compared with June 1960, wholesale prices this June were slightly lower for canned tuna and unchanged for Maine sardines. Packing seasons for Maine sardines and Pacific salmon were under way in June. The early Maine sardine pack was very small, but that for Pacific salmon was encouraging.

The Bureau of Labor Statistics has made a routine revision of the weighting structure of the Wholesale Price Index, including the All Fish and Shellfish Group Index. The weights of the fish group and subgroups have been adjusted in accordance with the value of fishery products for the year 1958 as published by the U. S. Bureau of Commercial Fisheries. This revision is in accord with established policy that the weighting structure be revised periodically.

The revised weights for 1958 were first introduced in the index for January 1961. "Unofficial" indexes, however, were published for the months of January through May 1961 until the computations based on the new weights were completed. Beginning with the June 1961 index, the computations of the indexes were based on the new weights.

The weight adjustment does not result in a break in the series. The adjustments in indexes based on the new weights for all the months this year prior to June are only slight in all cases as far as fishery products are concerned, and only the groups and subgroups are affected. The individual commodity indexes (for example, the index for fresh shrimp at

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, June 1961 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1947-49=100)			
			June 1961	May 1961	June 1961	May 1961	Apr. 1961	June 1960
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					4/129.5	4/128.6	4/126.2	126.5
Fresh & Frozen Fishery Products:					2/	3/140.6	3/136.1	142.0
Drawn, Dressed, or Whole Finfish:					4/151.9	4/151.8	3/139.0	149.7
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.09	.08	86.9	78.1	55.8	88.3
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.37	.35	114.5	107.8	103.1	103.7
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.88	.88	196.6	197.7	191.0	189.3
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.61	.66	151.2	163.6	114.0	141.3
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.57	.72	132.5	167.7	119.6	155.9
Processed, Fresh (Fish & Shellfish):					4/145.4	4/142.1	3/143.4	144.8
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.29	.29	98.7	98.7	90.2	125.9
Shrimp, lge. (26-30 count), headless, fresh.	New York	lb.	.78	.77	122.4	120.9	124.0	128.8
Oysters, shucked, standards	Norfolk	gal.	7.50	7.25	135.6	179.4	179.4	170.1
Processed, Frozen (Fish & Shellfish):					4/113.2	4/112.2	3/113.7	118.4
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.39	.39	102.1	100.8	100.8	102.1
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.33	.32	102.0	100.5	100.5	78.5
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.29	.29	114.8	116.8	116.8	110.8
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.69	.69	106.5	105.7	107.2	123.8
Canned Fishery Products:					4/112.0	4/112.0	3/112.2	104.8
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	28.00	28.00	146.1	146.1	146.1	127.8
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.00	11.00	79.3	79.3	79.3	80.0
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	cs.	4.50	4.50	105.0	105.0	105.0	93.9
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	8.75	8.75	93.1	93.1	93.1	93.1

1/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.
2/Will not be available until computations are completed.
3/Old series indexes. Revision based on new weighting structure not available until later.
4/New series index based on new weights.

New York City) are not affected. It means that the new indexes based on the new weights can be regarded as continuous with and comparable to series for earlier years.

The present index reference base, 1947-49=100, will be continued throughout 1961. The new reference base (1957-59=100), which has been established by the Office of Statistical Standards of the Bureau of the Budget for use by all Government statistical agencies, will probably be introduced in January 1962.

One commodity has been dropped in the fishery products index as of January 1961--"whitefish, Lake Erie pound or gill net, round, fresh, New York City." The weight assigned to this specification has been assigned to "whitefish, Lake Superior, drawn, fresh, Chicago."