TRENDS AND DEVELOPMENTS

Fishing Vessels and Gear Developments

EQUIPMENT NOTE NO. 12--A NEW SCALLOP TRAWL FOR NORTH CAROLINA:

North Carolina fishermen recently developed a small lightweight trawl as an effective gear for calico scallop fishing. Advantages of the new trawl are: (1) It is more effective than a Georges Bank dredge on the hard sand bottoms of the North Carolina beds; (2) it is easily handled; (3) its initial and replacement costs are low; and (4) existing ves-

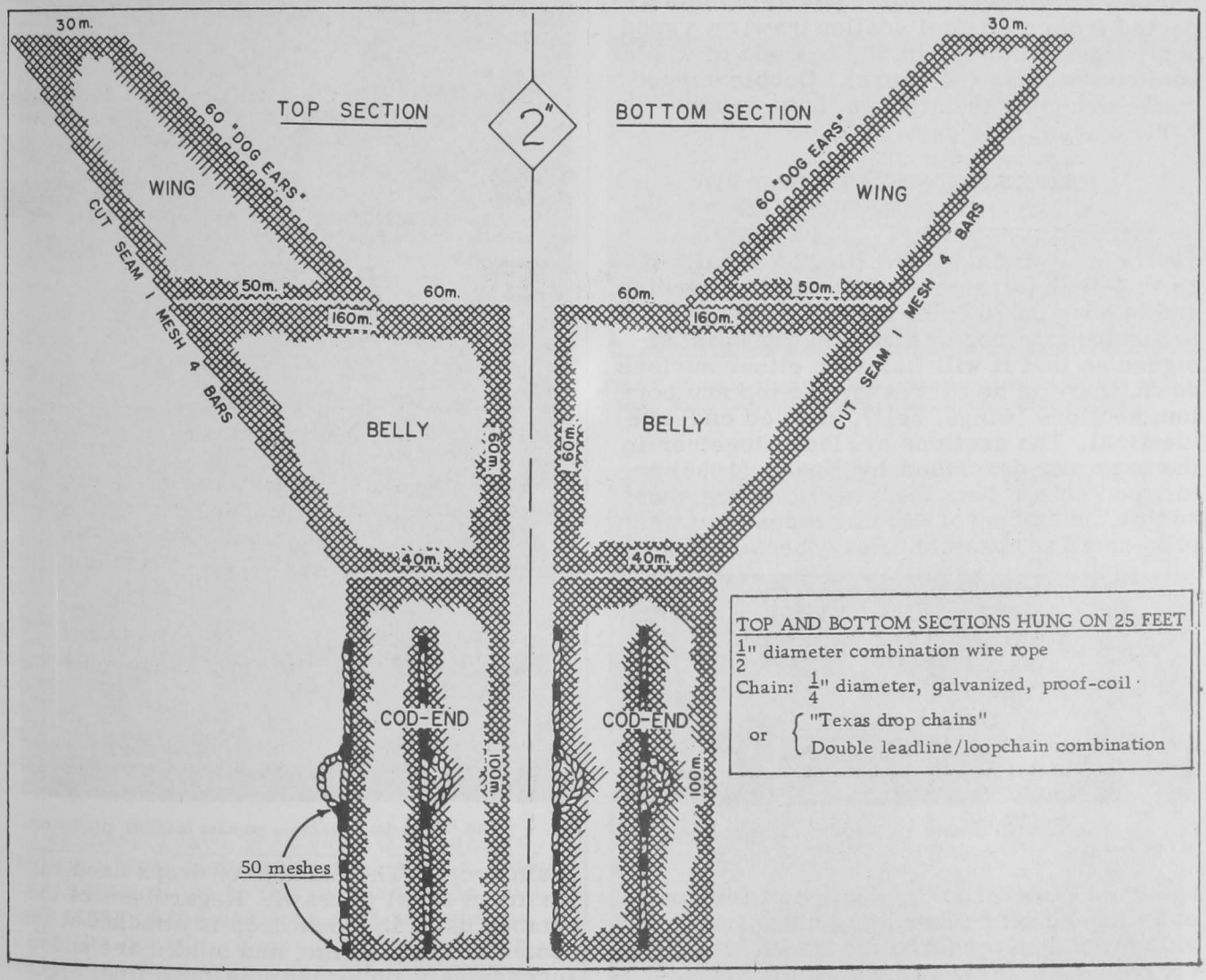

Fig. 1 - Cutting diagram for a 25-foot North Carolina calico scallop trawl.

U. S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
SEP. NO. 649

sels can be converted from other trawl or dredge fisheries to scallop trawling, quickly and cheaply. The disadvantage that the new trawl requires more maintenance and repair time than do other types of scallop gear is outweighed by the advantages. Most captains fishing North Carolina scallop beds are using trawls modeled after the new design.

A unique feature of the new trawl is that top and bottom sections are identical. When the original bottom sections become weakened, the trawl is simply turned over. Top and bottom trawl lines are switched, chafing gear and beckets are changed, and the original, relatively unworn top sections become the new bottom sections. The catch to be expected from a 25-foot scallop trawl on a good bed ranges from 400 to 500 bushels of whole scallops per day (24 hours). Double-rigged boats, dragging twin trawls, have caught 1,000 bushels in a day.

TRAWL SPECIFICATIONS AND CONSTRUCTION DETAILS

The new scallop trawl (fig. 1) is built of 2- to 4-inch (stretched mesh) cotton webbing and is hung on 25 to 28 feet of $\frac{1}{2}$-inch combination hanging rope. Since the trawl is designed so that it will fish with either surface down, there is no overhang, and top and bottom sections (wings, belly, and cod end) are identical. The sections are laced together in the manner described by Knake (1956) to form a 2-seam net. Belly sections are short so that the amount of webbing exposed to wear is as small as possible. Heavy beckets (fig. 2)

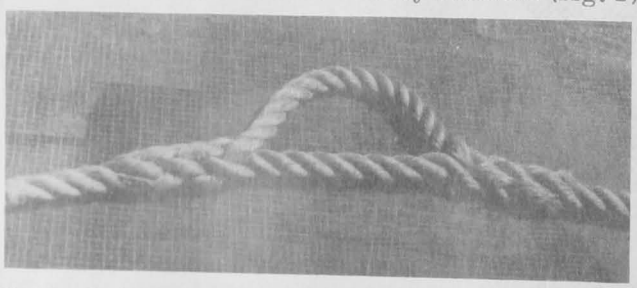

Fig. 2 - Beckets. Four beckets are seized the complete length of the cod end.

are used around the top section of the cod end, instead of the usual bag rings, to provide greater strength to the trawl. Manila or nylon rope is laced through the beckets to serve as a splitting strap.

TRAWL ACCESSORIES

Chafing Gear: Polyethylene rope yarns or automobile inner tube strips are used as chafing gear. For additional protection, a false belly of heavy webbing is often laced over the bottom belly of the trawl.

Texas Drop Chains, Tickler Chains, and Double Leadlines: The Texas drop chain (fig. 3) is used to increase the scraping and digging action of the trawl. It consists of a length of chain cut one foot shorter than the length of the leadline and fastened to the leadline at regular intervals by 2-, 4-, or 6-link

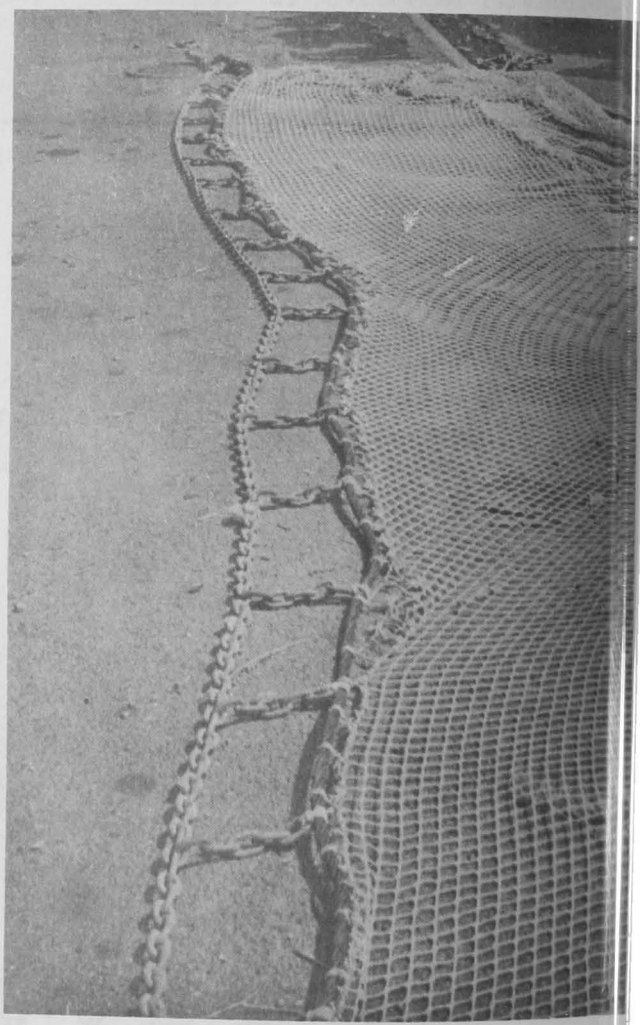

Fig. 3 - The Texas drop chain--a popular leadline attachment.

chain drops. The number of drops used varies from trawl to trawl. Regardless of the number used, the first drop is attached at the center of the leadline, and others are added successively, on either side, until final bights are formed at the ends of the chain. The chain will stretch with use and decrease the efficiency of the trawl unless the drops are examined and adjusted frequently. Adjustments are made to the end bights (fig. 4).

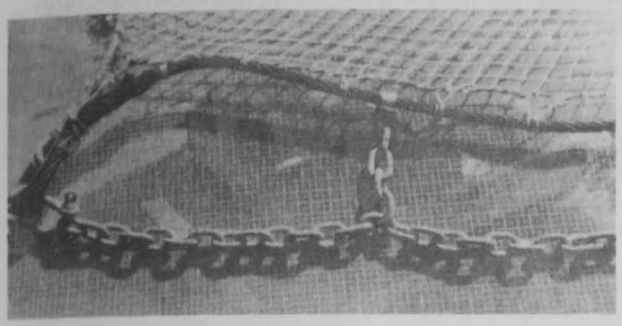

Fig. 4 - Adjustments to maintain the fishing efficiency of trawls equipped with Texas drop chains are made in the last bights of the chain.

Other devices used, singly or in combination, to increase the scraping action of the trawl and scare up the scallops in front of the trawl include tickler chains and double leadlines (fig. 5). One to three tickler chains are often used. These are stretched

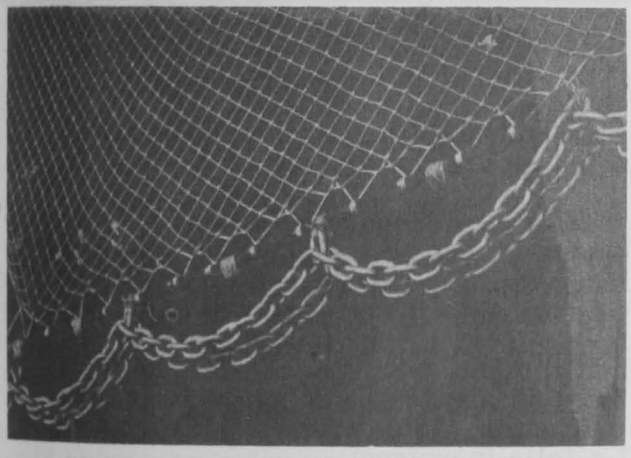

Fig. 5 - The double leadline. A device used to increase the weight of the forward bottom portion of the trawl and to increase its digging and scraping action.

across the mouth of the trawl from points of attachment near the trailing bottom corner of each door. Doubling the leadline, and attaching a loop chain, serves to increase the weight of the leading edge of the trawl and may serve to make the trawl tend bottom more effectively.

Leglines, Trawl Boards (Doors) and Bridles: Most fishermen feel that a trawl that fishes close to the trawl boards will catch many of the scallops that are scared up by the boards. Short leglines between net and boards are favored for this reason.

The size, weight, and type of boards used with the scallop trawl depend on the size and power of the vessel used and the personal preferences of the user. Bracket boards measuring 3 by $5\frac{1}{2}$ feet and weighing 250 pounds are used most commonly.

The complete rig (boards, trawl, and accessories) is fished from a single warp that is connected to the boards by a 10-fathom bridle of $\frac{3}{8}$-inch wire rope.

TRAWL OPERATION AND PERFORMANCE

The trawl is set and dragged in the usual manner. Most of the North Carolina vessels drag from outrigger booms in the familiar shrimp-boat fashion (figs. 6 and 7). Owing to its light weight and small size the trawl is easily handled. At the end of a drag, the splitting

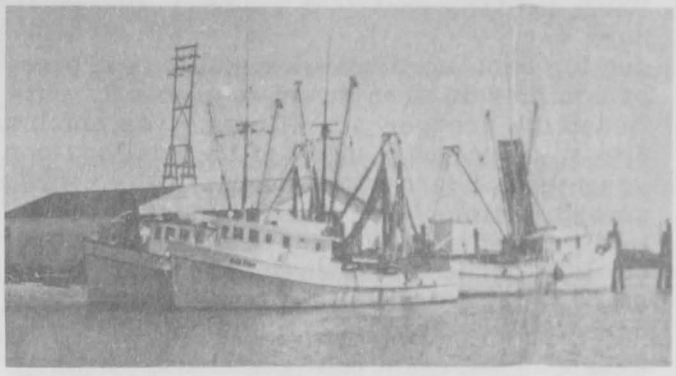

Fig. 6 - Double-rigged scallop trawlers tied to the dock in Beaufort, North Carolina, after having unloaded their catches.

Fig. 7 - A single-rigged scallop trawler on the grounds. The trawl is dragged from the starboard outrigger boom.

strap is brought to the rail of the boat and hooked to the hoisting tackle. The cod end is brought aboard, and the catch is dumped on deck. The trawl is then reset. Any scallops that might be in the webbing above the splitting-strap beckets are left in the net until the end of the next drag--or are allowed to spill back into the water. The time that would be consumed in making a second lift of the net to shake the scallops down into the cod end, and bring them aboard, is used more profitably in making an additional drag. By limiting drags to 15 minutes, the catches usually fit well within the cod end, and little loss is experienced.

In a series of trial drags lasting 36 hours, a 25-foot scallop trawl and an 8-foot George's Bank dredge were fished side by side on the hard sand bottom of the Core Bank calico scallop bed. Local crews handled both pieces of equipment. The trawl consistently outfished the dredge--sometimes by as much as 6 to 1. Apparently many of the scallops congregate in depressions in the otherwise smooth bottom. The rigid dredges, unable to dig into the hard sand, seem to slide over the tops of these depressions[1/]; whereas the more flexible trawls follow the bottom, dip down into the depression, and obtain the greater catch.

LITERATURE CITED

KNAKE, BORIS O.
1956. Assembly Methods for Otter-Trawl Nets, U. S. Fish and Wildlife Service, Fishery Leaflet 437, 29 p.

1/Similar trials on the Cape Canaveral, Fla., beds indicate that on softer bottoms the dredges generally outfish the trawls.

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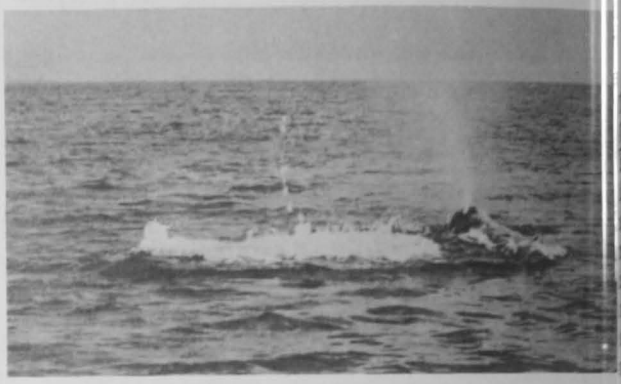
California

PELAGIC FISH POPULATION SURVEY CONTINUED:

Airplane Spotting Flight 62-1-Pelagic Fish: The inshore area from the United States-Mexican Border to the northern end of Monterey Bay was surveyed from the air (January 16-18, 1962) by the California Department of Fish and Game's Cessna "182" 9042T to determine the distribution and abundance of pelagic fish schools. Weather conditions were generally good throughout the area.

Pelagic fish schools were not abundant, but medium anchovy school groups were found off Port Hueneme, in the northern portion of Santa Monica Bay. Only one small sardine school (Santa Monica Bay) was observed during the flight.



Pair of gray whales traveling together. One just sinking with much white water due to speed, and other blowing, with blo holes open.

Southbound gray whales (76 in all) were noted throughout the survey area.

Two large groups of basking sharks were observed, one composed of approximately individuals was very close to shore in Mo Bay and the other, composed of about 45 a tively feeding individuals, was about one-half mile north of La Jolla Point. While these sharks are to be expected in Central California, their occurrence as far south La Jolla is unusual.

Note: See Commercial Fisheries Review, March 1962 pp.

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ROCKFISH TAGGING STUDIES CONTINUED:

M/V "N. B. Scofield" Cruise 62-S-1-Rockfish: The California Department of Fish and Game research vessel N. B. Scofield cruised (Jan. 23-Feb. 7, 1962) in the inshore area from Pt. Conception to Pt. Mo tara and the Farallon Islands to capture bl rockfish (Sebastodes mystinus) by hook a line for tagging, food studies, age, and oth life history information.

The cruise was shortened by stormy weather; excellent weather prevailed duri the remaining 13 days. A total of 1,738 bl rockfish was caught, of which 1,336 were

tagged, 74 were preserved for special studies on freezing shrinkage and for meristic counts, and 57 were preserved for stomach analysis. Of the tagged fish, 14 were delivered to aquaria at Monterey and Santa Cruz for observation. All tagged fish were deflated and 68 required stomach replacement; all were anesthetized in a special solution.

Note: See Commercial Fisheries Review, March 1962 p. 12.

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CENTRAL VALLEY KING SALMON SPAWNING RUN IS DOWN:

King salmon spawning stock which used California's Central Valley streams in 1961 numbered 256,000 fish, the California Department of Fish and Game reported on March 17, 1962. This was one of the smallest runs on record and about half the size of the excellent 1960 run when 482,000 kings spawned in the same area which has an estimated spawning capacity of 500,000 fish.

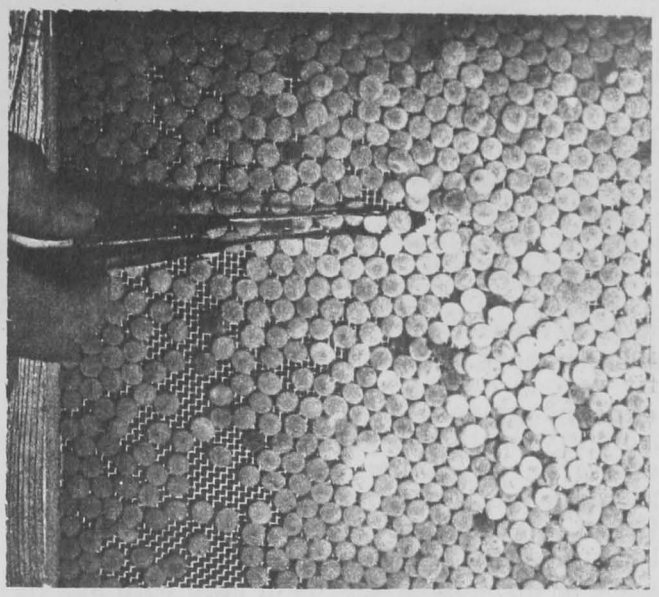
While wide annual variations in spawning runs such as this are not unusual, marine resources biologists uncovered no comprehensive reason for this decrease while making their 1961 salmon spawning survey.

"A drop like this one does not necessarily endanger future salmon fishing," declared the marine resources chief. "But we do feel it is a matter of concern. Although similar low years have occurred off and on in the past without vitally affecting the salmon fishery, the possibility of two low years in a row could bring a considerable drop in the salmon stock based on those spawning years."

The annual salmon spawning stock survey covers an area which extends from Redding south into the San Joaquin Valley, and most of the State's salmon are produced in that area. It includes aerial counts of individual spawning beds and concentrations of spawning fish. Ground observers keep a careful count of spawned-out salmon carcasses, destroying those counted to avoid duplication.

Once again the main Sacramento River accommodated a majority of all salmon spawners in the Central Valley. However, only one stream in the Sacramento Valley registered an increase. Mill Creek had 2,000 fish where 1,000 spawned in 1960.

The Nimbus Hatchery on the American River recorded an all-time high egg take from salmon, although the number of spawning salmon in the American River itself was below that of last year.



Picking dead salmon (white) eggs from tray.

San Joaquin Valley streams registered several record-low spawning stocks, including the Mokelumne, Consumnes, Merced, Tuolumne, Stanislaus, and main San Joaquin rivers. There was virtually no spawning run in those rivers, with the exception of the Tuolumne and Stanislaus.

Central Pacific Fisheries Investigations

SIZE AND SEX DISTRIBUTION OF TUNA BEING STUDIED:

One of the persistent features in the size distribution of tuna taken by long-line gear is the predominance of males among the larger fish. This has been especially noticable for yellowfin and big-eyed tuna. The hypothesis formulated was that the disproportionate sex ratio in large fish was the result of differential growth between sexes. This difference, if it exists, would be important in population studies for determining maximum yield. To test the hypothesis and to examine the sex composition of the catch, a sampling program was initiated in April 1960 to obtain size and sex data on yellowfin and big-eyed tuna from the Hawaiian long-line catch. The program is being conducted by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu.

A long-line vessel (sampan) of the Honolulu fleet.

Although sampling has not extended sufficiently in time to determine growth rates with great precision, the big-eyed data collected over the first 12 months of sampling (April 1960 through March 1961) were analyzed to test the hypothesis. The results show a difference in growth rate with sex, the males growing at a faster rate than the females.

The analyses included fitting normal curves to the monthly weight frequencies by the probability paper method. From the multimodal distribution the mean and standard deviation of 4 or 5 modal groups were calculated for each month. Evidence that these modal groups represented year-classes is their progression in time, which is such that the mean size of a modal group is approximated by the succeeding modal group one year later.

To estimate the ages of the year-classes and to mathematically describe the growth of big-eyed, a composite figure was constructed assuming similar growth rates among the year-classes. To estimate the age at initial recruitment, April was selected as the month of peak spawning. Several females with large ovaries were observed in the catch during early spring of 1961. By extrapolating the progression of modal sizes and assuming a rapid early growth, the 45-pound fish entering the long-line fishery as recruits in October were estimated to be 18 months old. It is possible that the rate of growth of the small fish may be overestimated.

The collection of size and sex data will be continued to confirm these preliminary findings and to follow serveral year-classes through the fishery. In addition, the gathering of data on small big-eyed which are occasionally captured by surface fishing methods will be intensified. Finally, a check will be maintained on the gonad condition of big-eyed to confirm the postulated spawning pea in April.

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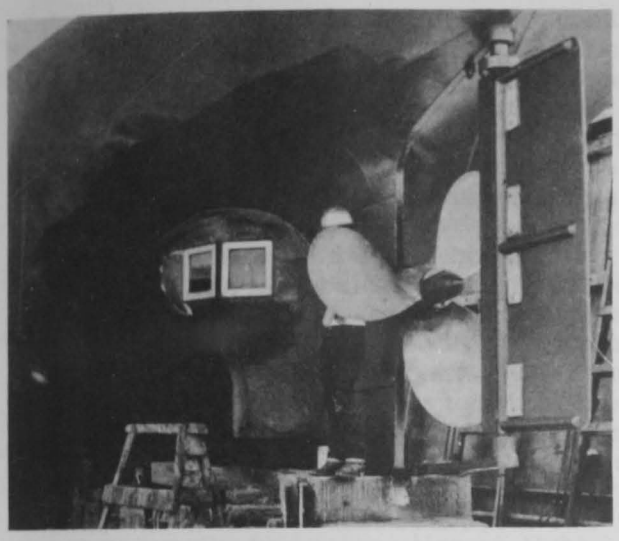
SENSORY SYSTEMS OF SKIPJACK TUNA BEING STUDIED:

The sensory systems of skipjack tuna ar being studied by the staff of the behavior program at the U. S. Bureau of Commercia Fisheries Biological Laboratory, Honolulu. In order to provide basic information for future studies on the sense of smell, the structure of the skipjack olfactory organ ha been examined and described.

The external openings of the olfactory system, the nares, fit into the general streamlining of the skipjack. The anterior naris is a very small circular opening, only 0.01 inch in diameter on a 20-pound fish, and is directed forward. The posterior naris is an elongated vertical slit 0.7 inches behind the anterior naris. This slit is directed posteriorly, with a thin flap of skin overlapping it anteriorly. Both of these nares open into the olfactory capsule. The actual sensing structure, the olfactory rosette, is located directly inside the anterior naris, and consists of 40 radially-oriented leaves. A longitudinal passage between two mounds of connective tissue leads to the posterior naris. Below this passage an accessory sac extends posteriorly along the jaw. This sac is compressed by the movement of the jaw while the mouth is being closed and is expanded when the mouth is opened, theoretically acting as a bellows-type pump.

Experiments were conducted to find out how water moved through the capsule and to see if the postulated pump was functional. Heads of fresh fish were placed in a current of water flowing at 3, 10, or 15 feet a second. These currents corresponded to slow, average, and fast swimming speeds observed in feeding skipjack at sea. (The speeds were calculated in the Laboratory from underwater movies taken of skipjack from the stern viewing chamber of the Bureau's research vessel, the Charles H. Gilbert.) Dye was introduced into the current to determine how the water entered the olfactory capsule. In a current of 10 feet per second the same amount of water entered the capsule whether the mouth was opened and closed or held



Stern viewing chamber of the Bureau's research vessel, the Charles H. Gilbert.

stationary. Yet, in still water more entered when the jaws were worked. Additional experiments demonstrated that the posterior naris acted as a one-way excurrent valve in flowing water, but allowed some water to enter in the absence of a current. In standing water, with the capsule filled with dye, little spurts of dye were ejected from the posterior naris when the jaws were closing, whereas almost no dye was ejected from the anterior naris.

We conclude that a continuous stream of water flows very slowly through the olfactory capsule of a swimming skipjack, and that an additional increment of water is drawn in via the anterior naris when the mouth is opened and is ejected via the posterior naris when the mouth is closed.

Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-FEBRUARY 1962:

Fresh and Frozen: For the use of the Armed Forces under the Department of Defense, substantially less fresh and frozen fishery products were purchased in February 1962 than in the same month of 1961 by the Defense Subsistence Supply Centers. The decline was 37.5 percent in quantity and 13.8 percent in value. Compared with the previous month, February 1962 purchases were down 37.8 percent in quantity and 20.3 percent in value.

Table 1 - Fresh and Frozen Fishery Products Purchased by Defense Subsistence Supply Centers, February 1962 with Comparisons

QUANTITY				VALUE			
February		Jan.-Feb.		February		Jan.-Feb.	
1962	1961	1962	1961	1962	1961	1962	1961
(1,000 Lbs.)				($1,000)			
1,089	1,743	2,840	3,599	794	921	1,790	1,846

During the first two months of 1962, purchases were also down 21.1 percent in quantity and 3.0 percent in value as compared with the same period in 1961. Because of higher prices for most types of frozen fishery products and purchases of higher-priced products, the value of the purchases did not drop as steeply as the quantity.

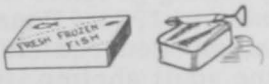
Prices paid for fresh and frozen fishery products by the Department of Defense in February 1962 averaged 72.9 cents a pound, about 16.0 cents less than paid in the previous month and 20.1 cents less than paid in February 1961.

Table 2 - Canned Fishery Products Purchased by Defense Subsistence Supply Centers, February 1962 with Comparisons

Product	QUANTITY				VALUE			
	February		Jan.-Feb.		February		Jan.-Feb.	
	1962	1961	1962	1961	1962	1961	1962	1961
	(1,000 Lbs.)				($1,000)			
Tuna	-	363	3,113	1,365	-	161	1,739	603
Salmon	-	-	-	-	-	-	-	-
Sardine	4	15	7	36	2	6	4	17

Canned: A small amount of canned sardines was the principal canned fishery product purchased for the use of the Armed Forces in February this year. For the first two months of this year purchases of canned fish were up substantially as compared with the same period of 1961 because of a large purchase of canned tuna in January.

Note: Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than indicated because local purchases are not obtainable.



Florida

FISHERIES RESEARCH, JULY-DECEMBER 1961:

Research with funds provided by various sources, including the Florida State Board of Conservation and the U. S. Fish and Wildlife Service is being carried on by the Marine Laboratory of the University of Miami. The research of interest to commercial fisheries which was reported in the Laboratory's

September 1961 and December 1961 Salt Water Fisheries Newsletter follows:

Larval Shrimp: The spawning grounds of the famed Tortugas pink shrimp are under observation by Marine Laboratory scientists. The shrimp spawn mainly during the summer months in water from 50 to 150 feet in depth, but 1961 was a poor spawning year. Young larvae collected in plankton nets for study were only about one-fortieth as abundant as in 1960.

Reasons for the spawning "failure" are being looked for in changes in the oceanographic climate of the area this year. In 1961 temperatures of the bottom layer of water were 5°-10° F. cooler than in 1960. Also, strong currents were present in the area which could carry larvae from the spawning grounds into the Straits of Florida, where they would be swept away from the shallow inshore nursery areas in which they grow for some months before migrating to the offshore spawning grounds.

Poor shrimp catches in many parts of the Gulf and South Atlantic regions in 1961 caused severe economic hardship in the fishing industry. These larval shrimp studies, sponsored by the U. S. Fish and Wildlife Service, are part of a concerted attempt by many government and university scientists to discover the reasons behind fluctuations in the catches of commercial shrimp.

Spawning seasons and grounds of the Tortugas pink shrimp continued to be mapped in the last quarter of 1961. Few shrimp larvae were found during the summer and fall of 1961 compared to previous years. In July and August 1961, pink shrimp larvae were only about one-fortieth as abundant in the center of the spawning grounds as in the corresponding months of 1960. Unusually cold water temperatures occurred close to the bottom where the adult shrimp live. Bottom water temperatures in the area of heavy spawning in 1960 were colder in 1961. Whether the lower temperatures caused the reduction in the numbers of larvae remains to be proven.

The scientists are making a careful check to determine whether this light spawning will affect the success of the fishery in 1962.

Ecology of Florida Bay: The hot, dry weather of the summer months of 1961 caused a severe reduction in the run-off into Everglades National Park. With this reduction of fresh-water, salinity increased rapidly both in Florida Bay and in the inner bay areas where the water is normally brackish. This increase in salinity has made it possible for marine fishes to invade the inner waters.

In addition to the increased catches of sport fish, in the third quarter of 1961 there were large numbers of young menhaden and anchovies in Coot Bay and eastern Whitewater Bay, where they had been absent for most of the previous four years because salinity values were very low. These are especially valuable as food for larger fishes.

The increased salt content of the inner bays has made it possible for marine algae to re-colonize these areas to such an extent that the bottom is becoming stabilized once more, allowing the water to become clear.

Pink shrimp catches from June-August 1961 were lower than those reported in the same period of 1960, but they were reasonably high. Unfortunately for the hungry fish, pink shrimp in the last quarter of 1961 were scarce in inshore waters.

Spotted Sea Trout: Over 180 sea trout tags were returned from the Pine Island area during the third quarter of 1961. A total of 1,529 tags (28 percent) had been returned by the third quarter.

The fish were tagged in January 1961 to determine the abundance and mortality rates of this fish population. Catch information returned with the tags supports earlier findings which indicated that this sea trout population is sedentary. The tags were collected monthly by a Marine Laboratory biologist during trips to obtain monthly landing reports from fish dealers.

Tags from spotted sea trout continued to be recovered in the last quarter of 1961 from the tagging experiments carried out as long ago as three years, but in reduced numbers. Over 30 percent recoveries have been made since the large-scale tagging experiment was carried out during January 1961 at Fort Myers.

Fish Behavior Studies: A scientist visiting from Japan in the third quarter of 1961 ended his project on the structure and function of the eyes of pelagic fishes and re-

turned to Japan. His investigations indicated that in open-sea fish, as in shallow-water species, it is possible to predict the feeding habits and habitat of a fish from a careful examination of its sense organs, including the eyes.

For example, surface swimmers such as the sailfish see most clearly those objects which are straight ahead of them, while fish that swim considerably beneath the surface but feed on fish swimming at the surface see most easily objects slightly above them.

Experiments on the effects of light on the behavior of the pink shrimp (Penaeus duorarum) and white shrimp (P. setiferus) were continued in the third quarter of 1961. Various wave lengths and intensities of light were used and the resultant behavior evaluated. Preliminary evidence indicates that the use of lights to capture shrimp may well be possible. More work is required before this method can be recommended with certainty, but the findings thus far indicate that it is possible certain wave lengths of light may attract these shrimp at certain times of day more effectively than the odor of fresh food fish.

Data is being accumulated on the ability of sharks to detect and respond to low-frequency sound. Much more work is needed on this project before meaningful and useful results can be expected, but in general it can be said that the sense of hearing in sharks is keener than had been anticipated.

Plans are in progress to build a facility for studying the behavior of marine animals at the Marine Laboratory. The building will be equipped with apparatus for controlling those aspects of the environment which seem most important. In this manner, ecologists will be able to study the effect of temperature, for example, on the settling rates of marine organisms.

The importance of such a facility to behavior studies lies in the fact that laboratory animals do not often exhibit the behavior patterns that are seen in nature. With it animals can be maintained under natural conditions, as measured in the field. These conditions can then be changed, and the effects of the change on behavior observed.

An interesting project on one aspect of communication between fishes was in the last quarter of 1961. Neon gobies "make their living" by removing parasites from the bodies and mouth cavities of larger fishes. Since they are "bite-size" and good to eat, why are they not, in fact, eaten by these large fishes? In a study of the interaction between groupers and neon gobies it was found that the gobies, in effect, ask permission to enter the mouth of the grouper by touching them on the flank. If, however, a grouper solicits the visit by holding very still near the goby, with its mouth open, the goby can enter with impunity without asking. In studying these relationships, facts and techniques are being learned which will be of use in studying the behavior of the larger, more difficult to keep, game and commercial fishes.

Note: See Commercial Fisheries Review, Dec. 1961 p. 28.

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OYSTER BOTTOM LEASES DOUBLED SINCE END OF 1960:

Oyster bottom leases in Florida have doubled since the close of the 1960 calendar year, the Director of the Florida State Board of Conservation announced on March 20, 1962. He said that as of December 31, 1960, there were 58 oyster leases with a total of 1,954.77 acres active. From January 1 through December 31, 1961, 33 leases were granted for a total of 1,298.80 acres. Beginning on January 1 to and including March 13, 1962, 21 leases were granted for 918.87 acres. As of March 1962, there were active 112 oyster leases for a total of 4,172.44 acres.

The Gulf coast of the State had shown the most activity and interest in the development of leased bottoms. The oyster production for the 1961/62 season would be the highest in the State's history. The marketing of Florida oysters has been maintained at a steady level this season and shipments to out-of-state destinations were running high as of March.

Frozen Fish

MICROWAVE THAWING STUDY STARTED:

Preliminary tests of thawing frozen fishery products have been started at the Gloucester Technological Laboratory of the U. S. Bureau of Commercial Fisheries. A 13½-pound block of whiting was thawed after 2 minutes

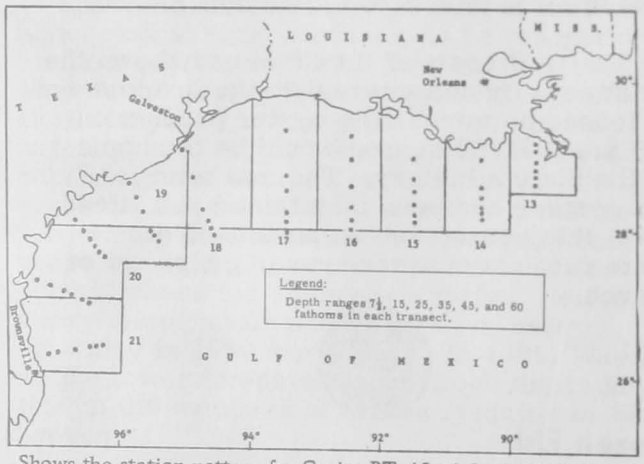
of exposure to microwave energy; this compares to about 2 hours in circulating water. The level of microwave energy to which the product was exposed was regulated so that it received the maximum energy until the internal temperature of the block reached 27 degrees F. Then to prevent cooking, the energy was reduced to about one-tenth of the initial value. The cost of such a commercial unit would be about $50,000.

Note: See Commercial Fisheries Review, March 1962 p. 17.

Gulf Fishery Investigations

SHRIMP DISTRIBUTION STUDIES:

M/V "Belle of Texas" Cruise BT-18 and "Miss Angela" Cruise MA-12: Good catches of 12-15 count heads-on brown shrimp were made in the 20-40 fathom range off Port Isabel and in the 40-60 fathom range off Terrebone Bay by the M/V Belle of Texas and the M/V Miss Angela between March 20 and 28, 1962. A good catch of 21-25 count brown shrimp was also made off Terrebone Bay in the 20-40 fathom range. In the same depth range (20-40 fathoms), a good catch of 15-20 count brown shrimp was made off Morgan City. Both research vessels are operated by the Galveston Biological Laboratory of the U. S. Bureau of Commercial Fisheries in studying the distribution of shrimp in the Gulf of Mexico.



Shows the station pattern for Cruise BT-18 of the M/V Belle of Texas and Cruise MA-12 of the M/V Miss Angela, March 20-28, 1962.

A total of 9 statistical areas were covered. In each area one 3-hour tow was made in each of 3 depth ranges. A 45-foot shrimp trawl was used. Most of the catches were brown shrimp, but there were some small catches of white shrimp. The largest catch was 54 pounds of 12-15 count heads-on shrimp in area 21 in 20-40 fathoms. The next largest catch was 48 pounds of 12-15 count shrimp in 40-60 fathoms in area 14, followed by a catch of 42 pounds of 15-20 count shrimp in 20-40 fathoms in area 15.

Note: See Commercial Fisheries Review, April 1962 p. 15.

Industrial Products

FISH MEAL, SOLUBLES, AND OIL:

United States Major Indicators, February 1962: For the first month of 1962,

Outside view of a Reedsville, Va., menhaden industrial products plant.

Major Indicators for U.S. Fish Meal, Solubles, and Oil, February 1962

Item and Period	1962	1961	1960	1959	1958
	(Short Tons)				
Fish Meal Production and Imports:					
Production 2/:					
April	1/	6,179	5,076	6,810	5,143
March	1/	2,751	2,955	2,122	2,601
February	2,700	2,071	1,923	2,128	1,842
January	2,732	2,713	2,433	3,095	2,075
Jan.-Dec. 3/	1/	289,039	257,969	275,396	226,299
Jan.-Dec. final tot.	1/	1/	290,137	306,551	248,140
Imports:					
April	1/	19,060	10,397	17,654	11,758
March	1/	20,458	18,652	16,719	7,238
February	1/	14,344	8,081	19,463	11,219
January	25,427	9,531	8,571	19,700	7,696
Jan.-Dec. totals	1/	217,845	131,561	132,955	100,352

(Table continued on following page)

Major Indicators for U.S. Fish Meal, Solubles, and Oil, February 1962 (Contd.)

Item and Period	1962	1961	1960	1959	1958
	(Short Tons)				
Fish Solubles Production and Imports:					
Production 4/:					
April	1/	2,539	2,870	6,987	3,619
March	1/	2,295	2,462	2,382	1,371
February	1,800	1,502	1,812	2,211	1,133
January	1,637	1,129	1,697	1,913	1,385
Jan.-Dec. totals	1/	109,780	98,929	165,359	130,177
Imports:					
April	1/	220	134	1,622	45
March	1/	135	87	410	84
February	1/	155	1,875	398	149
January	273	219	214	954	473
Jan.-Dec. totals	1/	6,739	3,174	26,630	14,567
	(1,000 Gallons)				
Fish Oil Production and Exports:					
Production:					
April	1/	439	248	436	200
March	1/	63	66	42	84
February	47	44	51	38	49
January	93	55	46	64	46
Jan.-Dec. 3/ 5/	1/	33,471	26,690	24,418	21,957
Jan.-Dec. totals	1/	1/	27,886	24,978	22,028
Exports:					
April	1/	980	761	1,116	254
March	1/	753	421	600	1,664
February	1/	2,327	3,177	999	1,038
January	679	1,793	276	898	825
Jan.-Dec. totals	1/	16,331	19,155	19,264	12,539

1/Not available.
2/Does not include crab, shrimp, and miscellaneous meals.
3/Preliminary data computed from monthly data.
4/Includes homogenized fish.
5/Represents over 95 percent of the total production.
Note: Data for 1962 and 1961 are preliminary.

United States production and imports of fish meal and solubles were up as compared to the same month in 1961. While production of fish oil was also up, exports were down substantially. February 1962 production of fish fish meal, oil, and solubles was greater than in the same month of 1961.

* * * * *

U. S. Production, February 1962: Preliminary data on U. S. production of fish meal, oil, and solubles for February 1962 as collected by the U. S. Bureau of Commercial Fisheries and submitted to the International Association of Fish Meal Manufacturers are shown in the table.

U. S. Production 1/ of Fish Meal, Oil, and Solubles, February 1962 (Preliminary) with Comparisons

Region	Meal	Oil	Solubles	Homogenized
	Short Tons	1,000 Gallons	(Short Tons)	
February 1962:				
East & Gulf Coasts	575	11	43	3/90
West Coast 2/	2,156	35	1,608	-
Total	2,731	46	1,651	90
Jan.-Feb. 1962 Total	5,402	120	3,220	110
Jan.-Feb. 1961 Total	4,263	98	2,486	145

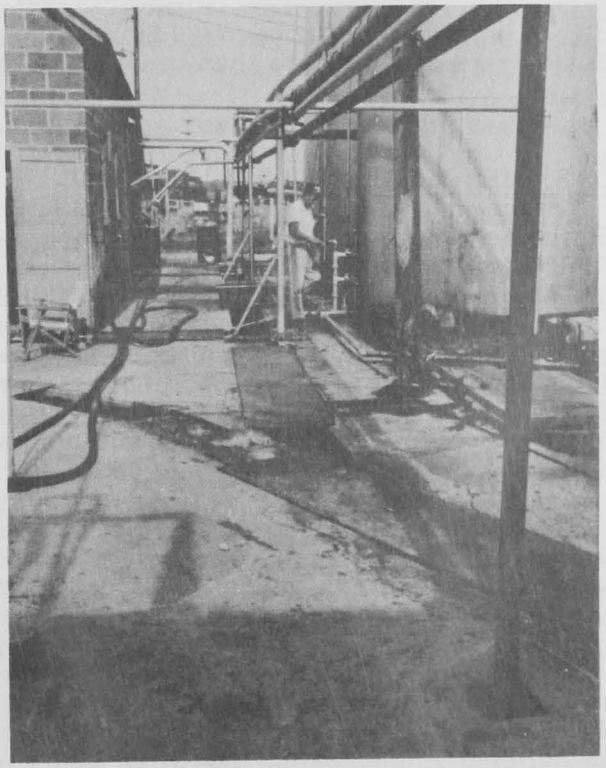
1/Does not include crab meal, shrimp meal, and liver oils.
2/Includes Hawaii, American Samoa, and Puerto Rico.
3/Includes condensed fish.

* * * *

U. S. Production, January 1962: In January 1962, 2,700 tons of fish meal and scrap and 92,900 gallons of marine animal oils were produced in the United States. Compared with January 1961, this was a slight decrease (less than 1 percent) in meal and scrap production, but an increase of 37,800 gallons (69 percent) in oil.

In January 1962, tuna and mackerel accounted for 1,600 tons or 60 percent of the meal total, and 37,800 gallons or 41 percent of the oil production. Pacific sardines contributed 455 tons (17 percent) to the production of meal and 14,000 gallons (15 percent) to the production of oil.

A total of 1,600 tons of fish solubles was produced in January 1962--180 tons more than in January 1961. The produc-



A portion of a menhaden industrial products plant in Reedsville, Va.

U.S. Production of Fish Meal, Oil, and Solubles, January 1962[1/]

Product	January		Total
	1962	1961	1961
	(Short Tons)		
Fish Meal and Scrap:			
Alewife	-	-	89
Herring:			
Alaska	-	-	3,810
Maine	-	-	1,239
Menhaden[2/]	-	-	246,990
Sardine, Pacific	455	-	2,744
Tuna and mackerel	1,641	1,567	21,432
Unclassified	636	1,171	12,735
Total	2,732	2,738	289,039
Shellfish and marine animal meal and scrap	3/	3/	10,000
Grand total meal and scrap	3/	3/	299,039
Fish solubles	1,597	1,418	98,003
Homogenized condensed fish	40	65	11,777
	(Gallons)		
Oil, body:			
Alewife	-	-	6,900
Herring, Alaska	-	-	727,517
Menhaden[2/]	-	-	30,814,537
Sardine, Pacific	3/14,200	-	83,010
Tuna and mackerel	3/37,816	27,853	751,590
Other (including whale)	40,920	27,250	1,087,610
Total oil	92,936	55,103	33,471,164

1/Preliminary data.
2/Includes a small quantity produced from thread herring.
3/Not available on a monthly basis.

tion of homogenized condensed fish amounted to 40 tons--25 tons less than in January 1961.

* * * * *

U. S. FISH MEAL AND SOLUBLES:

Production and Imports, January 1962: Based on domestic production and imports, the United States available supply of fish meal during January 1962 amounted to 28,200 tons--15,900 tons or 130 percent more than in January 1961. Domestic production was slightly less, but imports were 15,900 tons greater than in January 1961. Peru continued to lead other countries with shipments of 20,100 tons during January 1962.

The total United States supply of fish meal in 1961 (517,000 tons) exceeded the peak year 1959 when the quantity amounted to nearly 440,000 tons.

The United States supply of fish solubles (including homogenized fish) during January 1962 totaled 1,900 tons--208 tons more than in the same month of 1961. Solubles and homogenized fish manufactured

U. S. Supply of Fish Meal and Solubles, January 1962 and Comparative Data

Item	January		Total
	1962[1/]	1961	1961
	(Short Tons)		
Fish Meal and Scrap:			
Domestic production:			
Menhaden	-	-	246,9[illegible]
Tuna and mackerel	1,641	1,567	21,4[illegible]
Herring, Alaska	-	-	3,8[illegible]
Other	1,091	1,171	26,8[illegible]
Total production	2,732	2,738	299,0[illegible]
Imports:			
Canada	2,587	1,382	38,2[illegible]
Peru	20,082	6,969	151,4[illegible]
Chile	1,157	841	12,0[illegible]
Angola	-	-	1,5[illegible]
Republic of So. Africa	1,500	280	13,0[illegible]
Other countries	101	59	1,5[illegible]
Total imports	25,427	9,531	217,8[illegible]
Available fish meal supply	28,159	12,269	516,8[illegible]
Fish Solubles:			
Domestic production[2/]	1,637	1,483	109,7[illegible]
Imports:			
Canada	208	39	1,0[illegible]
Denmark	-	-	[illegible]
Other countries	65	180	5,7[illegible]
Total imports	273	219	6,7[illegible]
Available fish solubles supply	1,910	1,702	116,5[illegible]

1/ Preliminary.
2/ 50 percent solids. Includes production of homogenized condensed fish.

from domestically-caught fish made up 8[illegible] percent of the January 1962 supply.

Michigan

COMMERCIAL FISHERY LANDINGS FROM GREAT LAKES WATERS, 1961:

Michigan commercial fishermen caught nearly 24 million pounds of fish from Great Lakes waters in 1961, a drop of about one million pounds from 1960. The 1961 catch ex-vessel was valued at $2,900,000, approximately $97,000 less than in 1960 but only $10,000 shy of the annual 40-year average. The amount of the 1961 catch was down roughly 2 million pounds from the yearly average for 1920 through 1960.

Lake herring, chubs, carp, and yellow perch made up 77 percent of the total in 1961: Lake herring, 7,295,000 pounds; chubs, 6,321,000; carp, 2,718,000; and yellow perch, 2,183,800 pounds.

The Lake trout catch, once an important part of Michigan's Great Lakes total, slumped to a new low of 214,500 pounds with the bulk coming from Lake Superior. From 1920 through 1944, the State's commercial fishermen consistently took 5 to 6 million pounds of lake trout each year. Since then, their take has steadily waned with sea lamprey predation leaving but a small remanent of the Lake trout fishery.

Whitefish populations have suffered a similar fate in the Great Lakes as reflected by 1961 catches. Only 901,600 pounds of whitefish were taken by Michigan's commercial fishermen in 1961, the seventh lowest catch on record.

The 1961 commercial smelt catch was the lowest since 1950, nearly 1,400,000 pounds.

Michigan's 1961 catches by waters were: Lake Michigan, 4,328,000 pounds; Green Bay, 2,908,300; Lake Superior, 8,060,200; Lake Huron, 3,578,850; Saginaw Bay, 3,178,900; and Lake Erie, 1,921,340 pounds.

□□□□□□□

Nets

SYNTHETIC NET WEBBING OFFERS LESS RESISTANCE WHEN TOWED:

Various net materials with approximately equal wet-knot strengths were used for manufacturing net webbing of equal mesh size (110 mm. mesh opening) and towed in a tank for testing ship models. The webbings were stretched on a 1 m^2 frame. The thinner net materials made of synthetic fibers showed a lower resistance than Manila, and the frequently expressed opinion that plaited threads have a greater towing resistance than twisted ones was found incorrect. With greater towing speed, plaited Perlon showed a lower resistance than the twisted Perlon and a still lower one than Manila. (Deutsche Seiler-Zeitung, vol. 79, no. 3, 1960.)

North Atlantic Fisheries Exploration and Gear Research

TRAWL INSTRUMENTATION SYSTEM TESTED:

M/V "Delaware" Cruise 62-2 (February 28-March 9, 1962): Testing and evaluation trials of a trawl instrumentation system for taking various measurements on otter trawl and other nets while in operation were conducted aboard the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Delaware during this cruise.

The system is comprised of several experimental devices designed primarily to take measurements of the spread between otter boards, between trawl wing ends, between the headrope and footrope, to measure the depth of the trawl, the temperature of the water, and to tell whether or not the trawl is in contact with the bottom.

The spread distances are measured by means of lengths of wire stretched between the respective points and held under tension on spring-driven reels. Data on the amount of wire run off the reel is transmitted electronically back to the vessel where it is recorded as a line of dots on a moving tape. Data from a pressure-operated potentiometer indicating depth and from a temperature transducer are similarly transmitted to the vessel and recorded. A magnetically operated switch indicates bottom contact by

illumination of a light on the shipboard recorder panel. The various data are transmitted to the vessel through 9 electrical conductors contained in the core of the trawl warp.

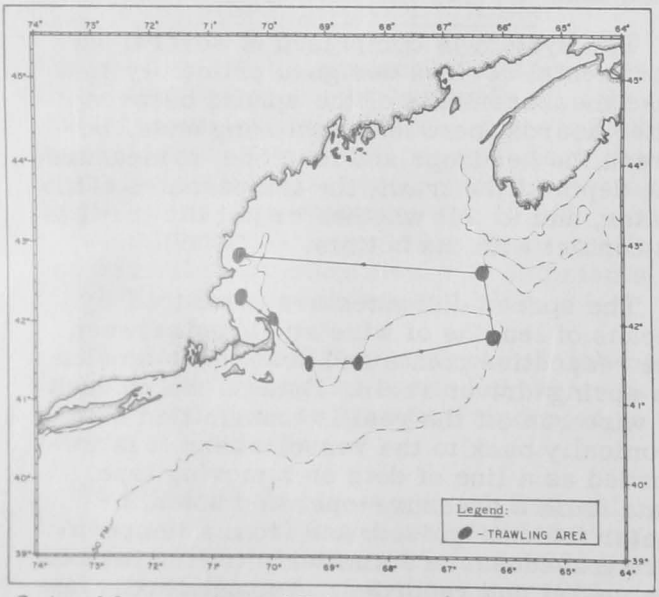
The distance measuring instruments and the bottom contact switch were found to function approximately as designed. The temperature and depth devices apparently have electronic "bugs" in either the transmission or recording system that have yet to be worked out. Some difficulty was also experienced with the conductor-cable trawl warp.

Work on the system will be continued aboard the 65-foot Rorqual to remedy the deficiencies in the devices before continuation of trials on the 148-foot Delaware.

North Atlantic Fisheries Investigations

BLOOD SAMPLES COLLECTED FROM GROUNDFISH:

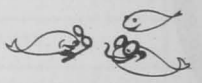
M/V "Delaware" Cruise 62-3 (March 15-22, 1962): A blood type or a serological survey of haddock and other groundfish at various geographically separate areas off the New England coast was the purpose of this cruise of the research vessel Delaware of the U. S. Bureau of Commercial Fisheries. The vessel, which sailed from Gloucester, Mass., on March 15 and returned on March 22, 1962, covered Massachusetts Bay, Nauset, Ipswich Bay, Georges Bank, and Browns Bank.



Cruise of the research vessel Delaware March 15-22, 1962, to collect samples of blood from groundfish off the New England coast.

At 7 stations, 21 drags were made for haddock and other groundfish. Samples of blood were taken from haddock, cod, red hake, white hake, cusk, wolffish, halibut, and other species of groundfish. Biological information collected included: frozen whole haddock for fecundity studies; cod otoliths, scales, and measurements; frozen miscellaneous species for aquarium models; and samples of cod blood for genetic studies. There were 27 bathythermograph records taken and 27 sets of sea bed drifters released throughout the cruise.

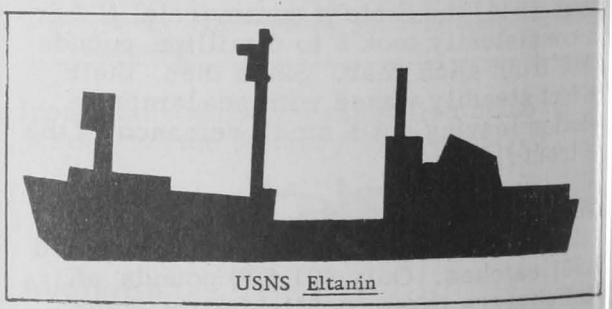
Serological sampling was possible aboard ship but extensive testing and evaluation remains to be completed.



Oceanography

NEWEST AND LARGEST UNITED STATES OCEANOGRAPHIC RESEARCH VESSEL:

The newest and largest (in tonnage) United States oceanographic research vessel, the Eltanin, made an official visit to Washington, D. C., the week of February 6, 1962. The vessel was open for inspection and scientists and representatives of government were able to see one of our Nation's best equipped and most versatile research vessels.



USNS Eltanin

The conversion of the Eltanin was completed late in 1961. She was formerly a cargo ship, with a raked icebreaker-form bow and a modified cruiser stern. With a length of 266 feet and full load displacement of 3,8 8 tons, the Eltanin will accommodate about 3 2 scientists and technicians and a 47-man civilian crew of the U. S. Navy's Military Sea Transportation Service (MSTS). The numerous laboratories aboard the vessel are spacious and well equipped, and quarters for the scientists and crew are very comfortable.

The Eltanin is really a full Antarctic research station, but afloat instead of land-based. She will be equipped not only for physical oceanography and marine biology studies, but also for atmospheric physics research, submarine geology, and meteorology. She will enable scientists to do research in areas of the world that have scarcely been explored, let alone studied scientifically.

After a short shake-down cruise, the Eltanin was expected to steam south to the Antarctic to make a series of traverses, crossing and recrossing the Antarctic convergence. Numerous universities and private corporations will conduct studies covering many fields. Included are: University of Southern California will study fundamental biological characteristics of the southern oceans; Columbia University will study plankton and nutritional factors of the area; Lamont Geological Observatory will study the ocean currents; Texas Instruments Inc. will operate the deep-sea winch, run the electronics and machine shops, and make routine oceanographic observations. (National Oceanographic Data Center Newsletter, February 28, 1962.)

Oregon

FISH COMMISSION ANNOUNCES RESEARCH AGREEMENT WITH ATOMIC ENERGY COMMISSION:

The Oregon Fish Commission has entered into a contract agreement with the U. S. Atomic Energy Commission (AEC) to study the offshore-inshore exchange of bottom fish stocks off northern Oregon and southern Washington, the Commission's Director of Research announced on March 13, 1962.

A total of $11,000 has been given the Commission to initiate the first year of study. Objectives for the first year's operation are an intensive tagging and tag-recovery program. The Principal Investigator will be the Senior Biologist at the Commission's Astoria Laboratory.

Bottom fish taken by the U. S. Bureau of Commercial Fisheries research vessels during marine ecological studies under a similar AEC contract will be tagged and released in the study area off the Columbia River at depths of 100 to 1,000 fathoms. The Oregon commercial trawl landings at Astoria, Newport, Coos Bay, and other ports to the north and south are to be closely monitored for tagged fish. Based on past experience, the bulk of recovered fish, if any, will appear in catches of Oregon trawlers since these vessels predominate in the area.

The principal species expected to be tagged are Dover sole and black cod or sablefish. Only species found in abundance will be tagged to enhance the likelihood of a maximum number of recoveries for analysis.

"Possible duration of this study will be six years," stated the Director of Research. He pointed out that sufficient time is necessary to obtain adequate recoveries and other information from tagging, and the study could cover a ten-year period if conditions warrant the additional time. Dover sole and sablefish are both long-lived animals and appreciable numbers of tag recoveries can be expected for at least five years after tagging.

* * * * *

NEW CRAB-TAGGING METHOD USED:

A new technique in Dungeness crab tagging has been introduced by Oregon Fish Commission biologists and early this year was being tested at the Commission's Newport Laboratory on Yaquina Bay. The head of shellfish investigations expects the new method to far surpass previous tagging attempts. Successful tests were made under aquarium conditions before beginning tagging operations.

Tagging and measuring crabs.

Crabs are a particularly difficult animal to study with respect to age determination and growth rate. Crabs shed their shells one or more times annually and carry no age-determination structure within their body, thereby making tagging the only method available for growth determination and migrational habits.

Previously, crabs have been marked by several different methods, including fingernail polish and metal tags attached to the shell, but success was poor because of the shedded shells.

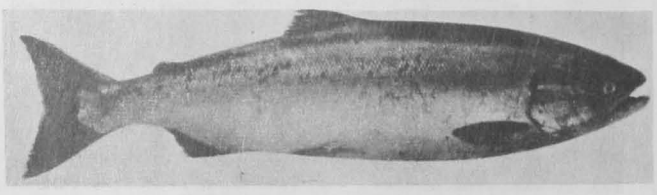
A splitting-line method using nylon dart and spaghetti tags is now being used. An insertion point on the crab's body has been found that will keep the tag with the crab through several successive sheddings, thus making it possible to study growth, migration, and distribution with a far greater degree of accuracy.

If fishermen return the tagged crabs back into the sea, it would aid the biologists greatly with the study. "We know the crabs are well distributed and surviving from tags we have received," said the head of the Commission's shellfish investigations, "and the public could do us a great favor if they would release these tagged specimens unharmed when captured." By doing this, greater numbers of samples will be available when the study begins in June 1962, and through these studies the best possible management of the resource can be obtained.

* * * * *

POND-REARED SILVER SALMON RELEASED:

"We have just completed our most successful year in pond-rearing silver salmon," observed Oregon's Fish Commission Assistant Director of Hatcheries on March 14, 1962. Over 420,000 yearling silvers were released from the Fish Commission-Weyerhaeuser Company's cooperative Millicoma Pond, an eight-acre impoundment on the East Fork of the Millicoma River, 25 miles east of Coos Bay.



Silver Salmon (Oncorhynchus kisutch)

The young fish were put into the pond in May 1961, and were fed the Oregon moist pellet diet for the following ten months. An original plant of 588,000 fingerlings was made, and the release figures show a 72 per cent survival for the yearlings, now 5 to 6 inches in length. The release last year of 82,000 silvers, and 78,000 in 1960 were from smaller plants into the pond.

The Assistant Director also pointed out that 75,000 of those fish were hauled from the pond by liberation truck to the upper South Coos River tributaries, namely Williams and Tioga Creeks, and released there. Since removal of splash dams on that river, the Fish Commission has annually released salmon there so they can return as adults and spawn naturally. "This," said the Assistant Director, "is one more step forward in our program to help restore the once abundant silver salmon."

The remaining fish were released directly into the East Fork of the Millicoma River from the pond. The fish were in excellent condition. Some of the young fish will spend only 7 to 8 months in the ocean and return as jacks this fall, while those that survive another year will return as adults in the fall of 1963.

Eggs to perpetuate this pond-rearing project are taken at a fish rack located on the East Fork of the Millicoma, downstream from the pond. A limited number of adults are trapped and the rest allowed to move upstream to spawn naturally. There are 500,000 fingerlings available for planting into the pond to begin the fourth year of operation.

It is anticipated that this large release of yearling silvers could make a substantial contribution to the salmon fishery in the Coos Bay area in 1963.

* * * * *

THREE MILLION SPRING CHINOOK SALMON RELEASED:

The season's release of over three million yearling spring chinook salmon into Oregon's waters, mostly into streams of the Willamette drainage system, was completed in early March 1962, the Oregon Fish Commission's Director of Fish Culture reported on March 12. Spring chinook liberations began in late November 1961 and were completed for the season with a final release by

the Fish Commission of 193,000 yearlings into the North Santiam River during the week of March 4-10, 1962.

In commenting on the excellent physical condition of the fish liberated, the Director gave much credit to the Commission's program of feeding pasteurized "starter" diet and the Oregon moist pellet, a nutritionally complete fish ration developed cooperatively by the Fish Commission and Oregon State University specialists.

* * * * *

SPLASH DAM REMOVAL OPENS NEW SALMON SPAWNING AREA:

The blasting of a 20-foot high, 150-foot long, and 50-foot wide splash dam by Oregon Fish Commission personnel opened up 10 miles of new spawning area for silver salmon and steelhead on the Luckiamute River near Valsetz, the Director of Engineering announced on March 13, 1962.

The dam, built in 1903 to provide log storage, had not been used for that purpose in nearly 40 years. Debris had backed up behind the timbered structure for over 300 feet and was 20 feet deep in some places.

Two 10-case charges of dynamite were required to loosen debris and create a channel through the dam face so clearance work could begin. The Director stated that nature would provide some of the stream cleaning with the advent of spring rains and high waters, but that it was first necessary to break up several jams behind the dam so they could be hauled or flushed out. Chain saws and dynamite were employed to loosen and remove much of the accumulated material, with most of the large logs and a major portion of the jam taken out.

The three wooden structural abutments have now been completely removed, and for the first time in 60 years the stream is flowing in its normal channel. This is just one of the many stream clearance projects the Fish Commission is engaged in to provide new spawning areas for the anadromous fish of the State. "Stream clearance is not the only solution to maintaining runs of fish," said the Director, "but by cleaning up and restoring these streams to their natural state, we can establish new runs and enhance existing productivity."

Shrimp

UNITED STATES SHRIMP SUPPLY INDICATORS, FEBRUARY 1962:

Item and Period	1962	1961	1960	1959	1958
	. . . . (1,000 Lbs., all heads-off)				
Total Landings, So. Atl. and Gulf States:					
April	-	3,169	4,729	3,595	5,300
March	-	4,814	4,098	2,950	4,774
February	3,800	3,911	3,785	3,227	4,007
January	3,920	5,677	5,401	4,310	5,254
Jan.-Dec.	-	91,000	141,035	130,659	116,552
Quantity canned, Gulf States 1/:					
April	-	10	72	81	306
March	-	38	128	93	36
February	236	98	223	135	52
January	470	199	289	308	146
Jan.-Dec.	-	15,760	28,594	24,679	26,404
Frozen inventories (as of end of each mo.) 2/:					
April 30	-	27,492	20,502	23,331	12,211
March 31	-	31,345	23,232	24,893	14,501
February 28 . . .	18,874	37,612	29,063	27,555	16,359
January 31	21,328	37,842	34,332	30,858	17,963
Imports 3/:					
April	-	9,208	7,733	9,051	5,446
March	-	10,347	8,545	8,492	4,986
February	4/	8,932	7,657	7,481	4,466
January	12,907	12,338	8,596	8,238	5,696
Jan.-Dec.	-	126,282	113,418	106,555	85,393

1/Pounds of headless shrimp determined by multiplying the number of standard cases by 33.
2/Raw headless only; excludes breaded, peeled and deveined, etc.
3/Includes fresh, frozen, canned, dried, and other shrimp products as reported by the Bureau of the Census.
4/Not available.

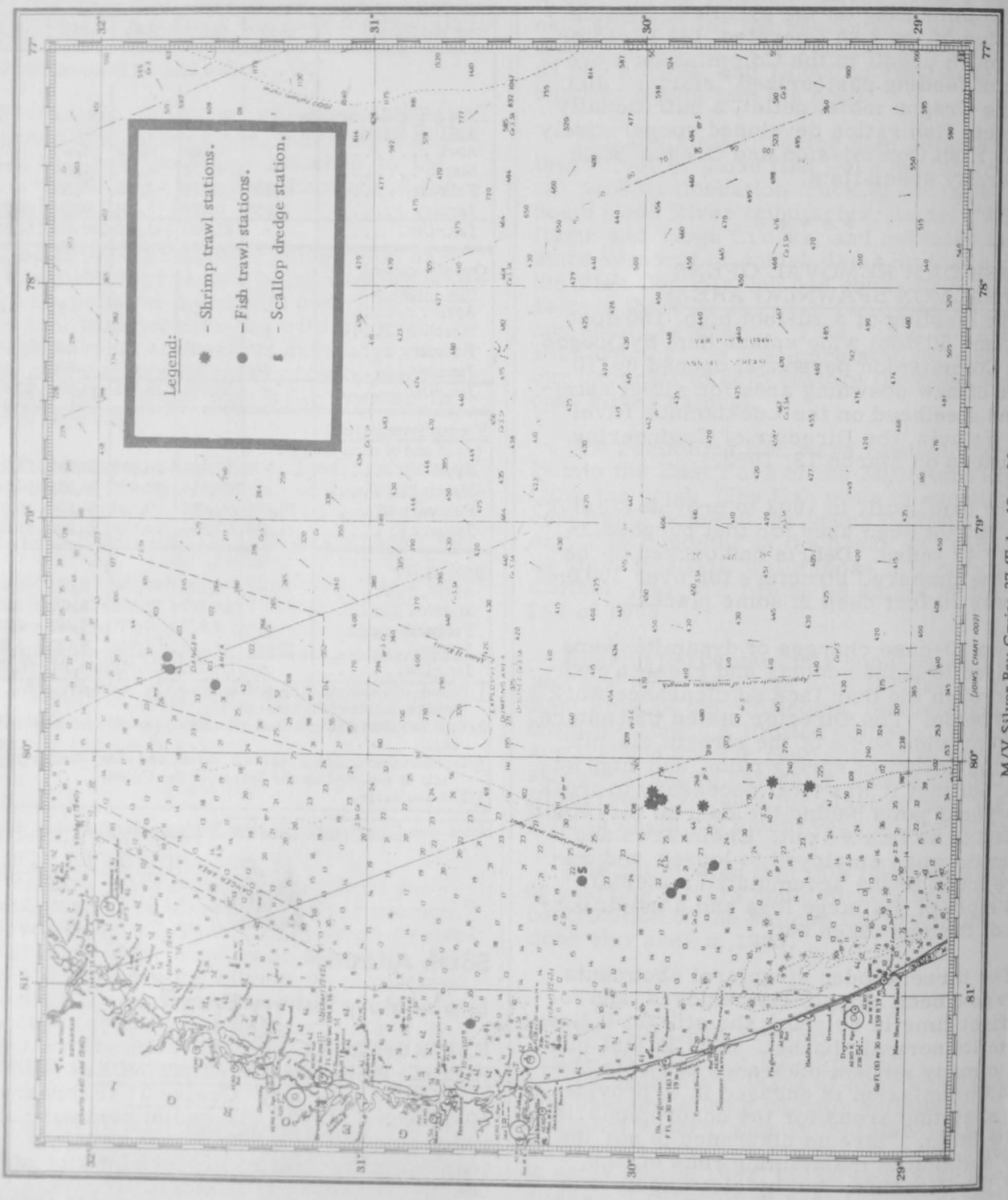
Note: See Commercial Fisheries Review, March 1962 p. 38.

South Atlantic

Exploratory Fishery Program

EXPLORATORY FISHING FOR ROYAL-RED SHRIMP CONTINUED:

M/V "Silver Bay" Cruise 37 (February 19-March 6, 1962): To assist commercial fishermen initiating deep-water shrimp trawling and to assess the availability of deep-water royal-red shrimp (Hymenopenaeus robustus) between St. Augustine and Savannah were the principal objectives of the 16-day cruise of the exploratory fishing ves-



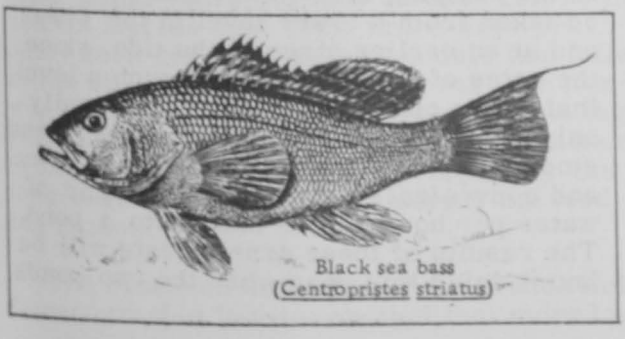
M/V Silver Bay Cruise 37 (Feb. 19 to Mar. 6, 1962).

sel Silver Bay of the U. S. Bureau of Commercial Fisheries. The vessel returned to Brunswick, Ga., on March 6, 1962.

Trawling for royal-red shrimp was conducted off St. Augustine in conjunction with 7 area shrimp trawler. Catch rates of all vessels, including the Silver Bay, were generally comparable. Conventionally-rigged 70-foot 4-seam flat trawls with tickler chains and 8 ft. x 40 in. chain doors were used aboard the Silver Bay and produced catches ranging up to 200 pounds of heads-off shrimp per 2-hour drag, averaging about 100 pounds.

Snapper trawling explorations were conducted in the 19-21 fathom depth range between Jacksonville Beach and Matanzas Inlet, and in the 30-40 fathom depth range east southeast of the Savannah Lightship. An 80-100 foot roller-rigged 2-seam $4\frac{1}{2}$ inch mesh nylon fish trawl with funnel flapper and 10-foot bracket doors was fished in conjunction with "white line" depth recorder tracings. Gear damage was negligible.

Catches of mixed fish were found off Florida with vermilion snapper (Rhomboplites aurorubens), red snapper (Lutjanus blackfordi), grey snapper (Lutjanus griseus), yellowtail snapper (Ocyurus chrysurus), grouper (Mycteroperca and Epinephelus), red and white porgy (Pagrus and Calamus), black sea bass (Centropristes striatus), grey triggerfish (Balistes capriscus), and grunt (Haemulon aurolineatum) predominating. Large red snapper were present at stations in amounts ranging from 40-200 pounds per drag. Small to large (5-16 inches) vermilion snapper were also taken at all stations and ranged up to 1,400 pounds per drag. Maximum catches of other species on a per drag basis were as follows: grey snapper, 200 lbs.; yellowtail snapper, 80 lbs.; grouper, 110 lbs.; red porgy, 840 lbs.; white porgy, 240 lbs.; black sea bass, 174 lbs.; grey triggerfish, 408 lbs.; and grunt 315 lbs.



Black sea bass
(Centropristes striatus)

Three drags off Georgia produced similar catches with maximum amounts on a per drag basis as follows: red snapper, 47 lbs.; vermilion snapper, 220 lbs.; grouper, 165 lbs.; black sea bass, 140 lbs.; and red porgy, 450 lbs.

Bottom topography in this area varied from smooth to slightly broken.

Note: See Commercial Fisheries Review, April 1962 p. 26.

South Carolina

FISHERIES BIOLOGICAL RESEARCH PROGRESS, JANUARY-MARCH 1962:

The following is a report on the progress of biological research by the Bears Bluff Laboratories, Wadmalaw Island, S. C., for January-March 1962.

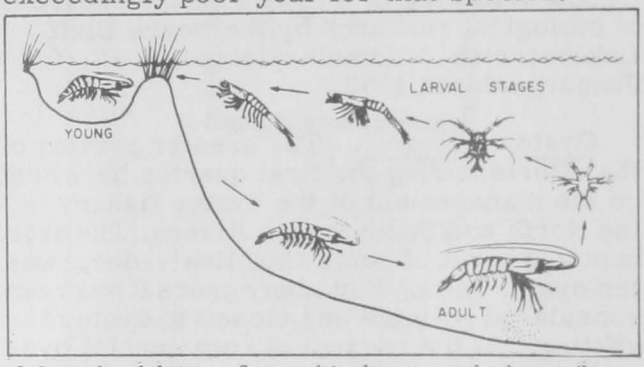
Oyster Research: The greater portion of the efforts during the first quarter have been on the management of the oyster fishery in the North and South Santee Rivers. The area contains most of South Carolina's deep-water oyster beds. For many years it has been considered polluted and closed to oyster harvesting. At the request of commercial oystermen, the State Health Department re-examined the area, and after a hearing in February the area was declared open for oyster harvesting.

Under State law these deep-water oyster beds are not subject to lease, but the harvesting of oysters therefrom could be controlled by the Division of Commercial Fisheries. The Division decided that for conservation some sort of quota system would be necessary. Consequently, Bears Bluff personnel made a survey of the area, mapping and sampling it to determine the quantity and quality of oysters available. The surveys showed that there were approximately 389 acres of actual oyster beds with a harvestable population of large (more than 3-inch in length) oysters of about 90,000 bushels (South Carolina measure) or 170,000 U. S. standard bushels.

The State's Division of Commercial Fisheries then issued permits to recognized oystermen with quotas fixed so as not to deplete the oysters. Two fairly extensive surveys and additional spot checks have been made in the Santee area to determine the extent of

harvesting. Towards the end of March it appeared that three areas of approximately 7½ acres are reaching depletion of marketable oysters, and Bears Bluff Laboratories will recommend to the Division that these areas be closed until next year. The remaining oyster grounds still can be harvested.

Shrimp Research: Postlarval brown shrimp began to appear in experimental plankton tows during the first week of February. The postlarvae reached peak numbers during February 23 to March 9, and were continuing to enter inside waters in some numbers as late as March 30. Although no great abundance was evident this year, brown shrimp have been approximately three times as plentiful as in 1961, which was an exceedingly poor year for that species.



Life cycle of shrimp. Spawned in the ocean, the larvae (here greatly magnified) migrate to inshore nursery areas. As the shrimp grow, they return to sea where they support the most valuable of our commercial fisheries.

Although the abundance of brown shrimp larvae this year did not approach that of 1960, it should be pointed out that during that year a cold spell, which occurred when postlarvae were at maximum numbers, probably resulted in a high mortality. For this reason no comparison of the commercial prospects for brown shrimp, based on abundance of postlarvae during these two years, should be made. It can be said, however, that the outlook for the commercial catch of brown shrimp this coming June and July is considerably better than at this time in 1961, even though the catch may still be below average.

Fish Research: Postlarval spot were quite plentiful in plankton tows during this quarter, being only slightly less numerous than in 1961. This would indicate another successful spawning and continued abundance for this species. Flounders also appear to have had a successful spawning this winter, as flounder larvae were about twice as plentiful in plankton tows as in 1961.

Experimental otter-trawling at regular stations continued on schedule throughout this quarter. Survey stations now extend from Price Creek, which is north of Charleston, to Calibogue Sound near the Georgia line. Both croaker and spot showed considerable increases in abundance in the first quarter of this year as compared with 1961. Croaker were almost nine times as numerous and spot were about twice as plentiful as last year. White shrimp were also more abundant during the quarter than in the same period of 1961, being about 1.8 times as numerous at regular stations.

Pond Cultivation: Experimental work to determine the possibility of stocking shrimp ponds with large volume irrigation pumps was continued during the quarter. A six-inch irrigation pump was used to pump approximately 3.5 million gallons of water from a nearby tidal creek into a one-acre experimental pond during February 12 to March 30. The pond had been drained and closed off completely on February 9, and pumping was begun as soon as postlarval brown shrimp began to appear in sufficient numbers. Surface water was allowed to flow off through the pond's overflow pipes during pumping operations.

During the same period a pond of equal size was opened and allowed to take in water naturally on the flood tides, for comparison of results of the two methods of stocking postlarval shrimp. It was estimated that about ten million gallons of water entered the pond during the stocking period.

These experiments were set up to determine whether or not stocking postlarval shrimp by pumping is as practical as the natural flooding method. The advantages of the pumping method are that water can be taken from a lower level in the creek and at an earlier stage of the tide, since the gates of the ponds are at such a level that water can enter the ponds naturally only on high flood tide. On the other hand, stocking by natural flooding is economical and convenient, and a greater volume of water per hour can be taken into a pond. The results of these experiments will be known later this year when the two ponds

are drained and harvested, and a comparison of results is made.

Note: See Commercial Fisheries Review, February 1962 p. 40.

Tuna

ANOTHER TAGGED BLUEFIN SWIMS ACROSS NORTH ATLANTIC OCEAN:

A second four-months crossing of the North Atlantic Ocean by a tagged giant bluefin tuna has been reported to the research associate in charge of the tagging program at the Woods Hole Oceanographic Institution, according to a December 11, 1961, news release from the Institution.

As in the first crossing, reported about a month earlier, the fish was tagged near Cat Cay in the Bahamas and was recovered near Bergen, Norway--more than 4,500 miles away. The elapsed times for the crossings were almost identical: the first fish was tagged on June 10 and the tag was recovered on October 6, 1961--118 days later; the second was tagged June 1 and recovered September 28, 1961--a period of 119 days.

Both fish were tagged by two sport fishermen participating in the tagging program: the owner, from Wilmington, Del., and the skipper, from Fort Lauderdale, Fla., of the sportfishing boat Caliban II. Both tagged fish were caught by Norwegian commercial seiners. However, in the first case the tag was found loose on the dock; in the second case the tag was still in the fish, which weighed 484 pounds. Its weight when tagged was estimated at 500 pounds.

The scientist of the Norwegian Institute of Marine Research in Bergen, who reported both recoveries, wrote that the tagged fish was of a variety known to fishermen as "long-tailed" bluefin because it is thinner than normal. Some years the tuna catches late in the season include such fish, which have previously been regarded as individuals that failed in the struggle for food. However, the Norwegian Institute scientist suggested, the tag recovery might mean that the lean condition of the fish was a result of having made the long transatlantic crossing during the feeding season.

The research associate of the Woods Hole Oceanographic Institution said that more tagging of giant tuna may lead to new recoveries which will help evaluate the theory of the Norwegian scientist. Of more than 1,000 tagged bluefin tuna, fewer than 100 have been giants, weighing over 300 pounds. Of those, 89 were tagged by the sportfishing boat Caliban II.

Note: See Commercial Fisheries Review, February 1962 p. 42.

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CALIFORNIA EX-VESSEL PRICES INCREASED:

Ex-vessel prices paid for domestic-caught tuna landed at San Diego and San Pedro, Calif., were increased by $10 per ton for bluefin, skipjack, and yellowfin tuna. Effective March 22, 1962, the new prices per ton are: bluefin, $300, skipjack $270, and yellowfin $310, round weight basis, at canners' docks. The new prices were established as a result of negotiations between tuna canners and vessel owners in California.

This marks the sixth round of increases, each by $10 per ton, since July 1, 1961. The most recent previous increase was on January 2, 1962, for skipjack and yellowfin tuna, and on March 9, for bluefin. Ex-vessel prices a year earlier per ton were: bluefin $240, skipjack $210, and yellowfin $250.

U. S. Fishing Vessels

FIRST CONSTRUCTION SUBSIDY APPROVED:

Approval of the first construction differential subsidy contract for building a United States fishing vessel, as authorized by a Federal law passed in 1960 (P.L. 86-516), was announced on March 21, 1962, by the Assistant Secretary of the Interior for Fish and Wildlife.

Under the contract, the U. S. Bureau of Commercial Fisheries will pay $37,233, or one-third the cost of a new $117,700 otter trawler to be built by Harvey F. Gamage of South Bristol, Me., for Thomas E. Larsen of New Bedford, Mass.

To be eligible for a subsidy, a vessel must be designed to operate in a fishery which has received a finding of injury because of increased imports. At present, the New England groundfish fishery is the

only one meeting this requirement. The amount of subsidy that can be granted is that equal to the difference between the cost of construction in a domestic shipyard and in a foreign shipyard, with a maximum limitation of 33⅓ percent of the domestic construction cost.

Note: See Commercial Fisheries Review, June 1961 p. 22, November 1960 p. 91.

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FISHERIES LOAN FUND LOANS AND OTHER FINANCIAL AID FOR VESSELS, JAN. 1-MAR. 31, 1962:

From the beginning of the program in 1956 through March 31, 1962, a total of 1,133 applications for $32,337,147 have been received by the U. S. Bureau of Commercial Fisheries, the agency administering the Federal Fisheries Loan Fund. Of the total 595 applications ($14,120,911) have been approved, 389 ($10,020,504) have been declined or found ineligible, 113 ($5,546,262) have been withdrawn by applicants before being processed, and 36 ($1,054,756) are pending. Of the applications approved, 235 ($1,594,714) were approved for amounts less than applied for.

The following loans were approved from January 1, 1962, through March 31, 1962:

New England Area: Frank H. Thompson, Addison, Maine, $2,250; Alger F. Burgess, Chebeaque Island, Maine, $3,500; Ora M. Hunt, Plymouth, Mass., $5,000.

South Atlantic and Gulf Area: Herbert M. Storter, Naples, Fla., $27,700; Kyle Collins & G. Cecil Hartley, Tampa, Fla., $23,000; Cleveland D. Scarborough, Mt. Pleasant, S. C., $7,970; Louis E. Williams, Mt. Pleasant, S. C., $8,500; Eugene M. Webster and W. H. Rayburn, Aransas Pass, Tex., $17,650; Orris A. Smith, Brownsville, Tex., $19,000; Hollis M. Forrester, Lake Jackson, Tex., $40,000; Jaquin Cheramie & Hubert Lafont Shrimp Co., Golden Meadow, La., $14,510; Ellis Plaisance, Jr. & Hubert Lafont Shrimp Co., Golden Meadow, La., $15,220; Harold J. Callais, Cut Off, La., $13,225; Clinton P. Guidry, Lafitte, La., $15,780; G. A. Rogers & M. H. Plaisance, Westwego, La., $18,750; Norman C. Ronquille, Westwego, La., $17,220.

California: James N. Blum, Eureka, $7,377; J. V. Shaw, Salinas, $9,000; Terence S. Harnidge, San Diego, $3,870; Mitchell M. Tyler, San Diego, $9,990; Russel E. Moody, Vallejo, $3,000.

Pacific Northwest Area: Norman Fuller, Forks, Wash., $3,500; Francis E. Caldwell, Port Orchard, Wash., $4,800; Ray G. Knowles, Tacoma, Wash., $2,200; Robert M. Edenso, Seattle, Wash., $5,360; George M. Jensen, Seattle, Wash., $7,000; Richard E. Rydman, Westport, Wash., $20,000; Ronald W. Stedman, Westport, Wash., $11,000.

Alaska: Clancy V. Henkins, Douglas, $13,300; Everett J. Buchanon, Juneau, $3,000; Jack E. Crowley, Juneau, $11,500; Philip C. Hoffman, Ketchikan, $2,800; George H. Johnson, Seldovia, $12,000; Trawlers, Inc., Seward, $34,000; Winston E. Davies, Wrangell, $2,500.

In the Fishing Vessel Mortgage Insurance Program, also administered by the Bureau, approval has been granted for the insurance of mortgages for the following fishing vessels during the last quarter of 1961 and the first quarter of 1962: Big Baby, Inc., Tampa, Fla., $38,560; Thomas B. Larsen, New Bedford, Mass., $40,000; Victoria Fishing Co., New Bedford, Mass., $71,250. The first fishing vessel mortgage was insured in January 1961. Under the mortgage insurance program, the Department of the Interior guarantees the lender or mortgage holder the insured amount. Should the borrower fail to pay, the Department pays but has legal recourse to the borrower's assets.

In the Construction Differential Subsidy Program, the following construction differential subsidy was approved in March 1961: Thomas B. Larsen, New Bedford, Mass., $34,667. This was the first approval in this program. The amount approved for subsidy represents one-third the cost of a new vessel.

Note: See Commercial Fisheries Review, February 1962 pp. 20, 46.

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CONTRACT TO DESIGN AND BUILD SEMIAUTOMATED STERN TRAWLER-PURSE SEINER:

The first United States effort to adopt the stern trawling technique was announced early this year by a group of Rhode Islanders. A contract was awarded late in January 1962 to a firm of naval architects and builders of steel vessels of Warren, R.I., to design and build a 76-foot semiautomated dragger capable of being easily converted to purse seining.

Fig. 1 - New 76-foot semiautomated stern trawler-purse seiner rigged for stern trawling.

The vessel will be built for a new Rhode Island company to be associated with the Warren, R.I., firm. The new firm is headed by a group of business and civic leaders who have taken the challenge to develop a more productive fishing vessel in an effort to surpass that of foreign countries now fishing off the New England coast. The vessel is scheduled to be launched in late summer 1962.

Prime feature of the new design will be an advanced "over the stern" net-handling system which will speed net hauling and reduce hazards to the crew. Use of the European stern ramp will make fishing easier in bad weather, allowing more consistent catches and a shorter work week for fishermen.

"Stern trawlers of larger size, but not as advanced in automation, are now being operated by the Russians off our coasts. These trawlers, most of them built in Poland, are able to haul their nets in half the time required by United States side trawlers which have to circle an area to haul their nets and then undergo a complicated method of disconnecting fishing gear in order to get the loaded net aboard," stated the President of the group designing and building the new vessel.

The new European stern trawlers haul their nets through a stern ramp. Though faster than existing United States

PRINCIPAL CHARACTERISTICS OF
SEMIAUTOMATED STERN DRAGGER-PURSE SEINER

DIMENSIONS: Length over-all 76'0"; molded beam 21'6"; light draft 8'0".

RIG: Stern trawler, pilothouse control of trawling cable positioning and net hauling over stern; fitted with conventional European-type ramp.

PROPULSION (Main): Stern drive 340 horsepower Diesel, driving 60-inch 3-blade controllable pitch propeller developing 10,400-pound thrust. Propeller driven through 12-inch gear belt, 5:1 reduction, engine tandem mounted in after peak. Engine power take-off connected by gear belt to deck winch and also to auxiliary water jet propulsion unit, controlled from pilot house.

AUXILIARY POWER: 160 horsepower deck mounted Diesel driving deck winch through torque converter. Also connected to water jet propulsion unit, pilot house controlled.

RANGE: 5,000 miles; will be capable of fishing from Grand Banks to Central American Pacific areas.

WINCH: 30" drum capacity of 1,000 fathoms of 5/8" wire, with pneumatic controls, semiautomatic level winder and hydraulic brake to be installed on the winch by Blount. Control will be from cab located at after end of pilot house overlooking entire working deck.

FISH HOLD: Total 3,500 cu. ft., 220,000 pounds of fish and ice. Vultafoam insulated, sheathed in fibreglass, metal bottom.

FISH COOLING: Optional ice or mechanically-refrigerated salt-water mist spray.

QUARTERS: Four staterooms, each containing 2 bunks, master stateroom, and centralized modern galley, built in modern domestic style.

vessels, they use the standard net-strapping method. The new automated dragger will eliminate strapping and will automatically bring in the catch clear of the stern and onto the deck.

The new vessel will be a combination stern trawler and purse-seiner in order for it to take advantage of whichever type of fishing is most profitable, thus assuring peak production throughout the whole year. It will be convertible to either method of fishing in less than a day.

Development of the new dragger continues the program of the Warren, R.I., firm of naval architects and shipbuilders to construct a series of experimental fishing vessels, including the highly successful 65-foot Atlantic tuna clipper built for a Cape Cod firm in 1961.

Only since the successful adaptation of the Warren, R.I., firm's stern drive, as on the tuna clipper, has it been possible to design a vessel combining needs of both dragger and purse-seiner: large fish hold clear of shafting, with the ability to take heavy loads in good trim and handle a mile of cable.

As a dragger the new vessel will handle 1,000 fathoms of trawl cable and be capable of trawling in water as deep as 1,200 feet on the outer edge of the Continental Shelf. It will fish initially for deep-sea lobsters. Its stern-hauled net-handling rig will land the net with greater safety to the lobsters, increasing their life in captivity and allowing them to be brought to market in fresher condition. It will also have the latest equipment for holding the lobsters.

In late spring and summer, when the offshore lobsters are shedding, the vessel will be used as a purse seiner and fish for menhaden and tuna. Because of its refrigeration system, it will be able to range for tuna up to 150 miles off the coast.

Among its features is a 60-inch controllable pitch propeller developing a thrust in excess of 10,000 pounds and a water jet auxiliary propulsion system designed to be an aid in regulating position while pursing the net. The main engine, as well as the auxiliary engine, at the option of the skipper, will be capable of driving a water jet propulsion unit located in the stern. Either engine can thus propel the boat in any direction.

Fig. 2 - New stern trawler-purse seiner rigged for seining.

There will be individual staterooms for the crew, one of the first United States-rigged vessels to be so equipped.

The vessel will carry a standard size crew and if a contemplated processing plant is located in the Rhode Island area, there will be an increase of 5 to 10 additional shore jobs. The decision to build and operate a processing plant in Rhode Island to fit fishing operations will be considered when the boat has successfully met her designer's requirements.

One of the great hopes of the designer is that its bad weather fishing ability may lead to a five-day work week for the fishermen. More efficient deck gear plus more speed to and from the fishing grounds may allow this.

"At stake also is the ability of American private enterprise to face up to a harsh competition right under our noses," the President of the Warren, R.I., firm said. "We will never outdistance the foreign fleets on our fishing grounds, without new designs and developments."

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DOCUMENTATIONS ISSUED AND CANCELLED, FEBRUARY 1962:

During February 1962, a total of 15 vessels of 5 net tons and over were issued first documents as fishing craft in the United States as compared with 21 in February 1961. Also, there were 4 more documents cancelled for fishing vessels in February 1962 than in the same month in 1961.

Table 1 - U. S. Fishing Vessels 1/--Documentations Issued and Cancelled, by Areas, February 1962 with Comparisons

Area (Home Port)	Feb. 1962	Feb. 1961	Jan.-Feb. 1962	Jan.-Feb. 1961	Total 1961
	(Number)				
Issued first documents 2/:					
New England	-	4	2	7	33
Middle Atlantic	-	-	-	-	12
Chesapeake	2	1	6	4	75
South Atlantic	2	2	4	3	44
Gulf	5	7	15	18	103
Pacific	6	4	12	9	149
Great Lakes	-	1	-	1	12
Puerto Rico	-	2	-	2	2
Total	15	21	39	44	430
Removed from documentation 3/:					
New England	3	2	5	3	20
Middle Atlantic	1	-	9	2	32
Chesapeake	1	2	3	8	28
South Atlantic	4	-	7	5	29
Gulf	6	11	19	17	104
Pacific	11	8	27	17	111
Great Lakes	1	-	6	2	17
Hawaii	-	-	1	-	-
Total	27	23	77	54	341

Note: See table 2.

Table 2 - U. S. Fishing Vessels 1/--Documents Issued and Cancelled, by Tonnage Groups, February 1962

Gross Tonnage	Issued 2/	Cancelled 3/
	(Number)	
5-9	2	3
10-19	6	13
20-29	1	1
30-39	-	4
40-49	1	-
50-59	-	2
60-69	1	1
70-79	4	-
100-109	-	1
120-129	-	1
310-319	-	1
Total	15	27

1/Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.
2/Includes redocumented vessels previously removed from records. Vessels issued first documents as fishing craft were built: 10 in 1962, 2 in 1961, and 3 prior to 1951. Assigned to areas on the basis of their home ports.
3/Includes vessels reported lost, abandoned, forfeited, sold alien, etc.
Source: Monthly Supplement to Merchant Vessels of the United States, Bureau of Customs, U. S. Treasury Department.

U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, JANUARY 1962:

Imports of fresh, frozen, and processed edible fish and shellfish into the United States in January 1962 were up 1.8 percent in quantity and 2.9 percent in value as compared with December 1961. The increase was due primarily to more imports of frozen fillets (groundfish and other types), canned sardines in oil, canned salmon, and fresh and frozen sea scallops. The increases were almost offset by a drop in the imports of all types of canned and frozen tuna, frozen salmon, canned sardines not in oil, frozen frog legs, and frozen shrimp.

Compared with the same month in 1961, imports in January 1962 were up 4.6 percent in quantity and 22.0 percent in value. The increase in value was due to the higher prices for nearly all imported fishery products. The general increase came about because of more imports of fillets other than groundfish (including swordfish, halibut, and salmon), frozen tuna other than albacore, tuna loins and discs, canned tuna in brine, canned sardines in oil, canned crab meat, frozen spiny lobsters, live lobsters from Canada, and frozen sea scallops (from Canada). The increases were offset somewhat by declines in the imports of groundfish fillets (especially blocks and slabs), frozen albacore, frozen salmon from Canada, canned sardines not in oil, and frozen frog legs.

In 1961 the imports of fresh, frozen, and processed edible fish and shellfish were up 1.6 percent from the 1,010.4 million pounds reported in the previous year. The value of the imports was up 9.4 percent from the $304.8 reported in 1960. Higher prices for many imported fishery products in 1961 accounted for most of the increase in value. Imports in 1961 were greater for all types of frozen fillets (including halibut, salmon, and swordfish), frozen albacore tuna, tuna loins and discs, canned tuna in brine, canned sardines in oil and not in oil, frozen shrimp, and fresh and frozen scallops from Canada. The failure of the sardine fisheries in California and Maine was responsible for the increase in canned sardine imports. Offsetting the increases, were less imports of frozen tuna other than albacore (principally yellowfin), frozen salmon from Canada, canned salmon from Japan, and frog legs from Cuba.

U.S. Imports and Exports of Edible Fishery Products, January 1962 with Comparisons

Item	Quantity Jan. 1962	Quantity Jan. 1961	Quantity Year 1961	Value Jan. 1962	Value Jan. 1961	Value Year 1961
	(Millions of Lbs.)			(Millions of $)		
Imports:						
Fish & Shellfish:						
Fresh, frozen, & processed 1/	89.0	85.1	1,026.3	32.2	26.4	333.6
Exports:						
Fish & Shellfish: processed only 1/ (excluding fresh & frozen)	3.5	2.5	28.6	1.4	1.1	13.2

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

United States exports of processed fish and shellfish in January 1962 were up 40.0 percent in quantity and 27.3 percent in value as compared with January 1961. The January 1962 exports were greater than in the same month of 1961 because of higher exports of canned mackerel, canned salmon, canned sardines not in oil, frozen shrimp, and canned squid.

Compared with the previous month, the exports in January 1962 were down 23.9 percent in quantity, but were up 7.7 percent in value.

Processed fish and shellfish exports for 1961 were down 41.3 percent in quantity and 31.2 percent in value as

compared with 1960. The following leading products were exported in substantially lesser quantities in 1961 as compared to 1960: fresh and frozen salmon (1,095,000 pounds in 1961 and 2,849,000 pounds in 1960), canned salmon (7,186,000 pounds in 1961 and 11,924,000 pounds in 1960), canned sardines not in oil (7,475,000 pounds in 1961 and 20,955,000 pounds in 1960), canned shrimp (2,502,000 pounds in 1961 and 3,482,000 pounds in 1960), and canned squid (3,433,000 pounds in 1961 and 7,530,000 pounds in 1960). There were increases in the exports of canned mackerel (from 1,305,000 pounds in 1960 to 3,908,000 pounds in 1961) and frozen shrimp (from 2,989,000 pounds in 1960 to 4,771,000 pounds in 1961 1/).

1/Does not include re-exports which were substantial in 1961.

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IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

The quantity of tuna canned in brine which could be imported into the United States during the calendar year 1962 at the 12½-percent rate of duty had not been announced as of early March.

Imports from January 1-March 3, 1962, amounted to 8,050,911 pounds (about 383,400 std. cases), according to data compiled by the Bureau of Customs. During the same period in 1961 a total of 7,475,964 pounds (356,000 std. cases) had been imported.

Note: See p. 77 of this issue.

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IMPORTS AND EXPORTS OF FISHERY PRODUCTS, 1961:

The trend toward obtaining a larger part of United States requirements for fishery products from imports continued in 1961. U. S. imports of several major fishery products reached record levels. Among these were groundfish and ocean perch fillets, scallops, spiny lobsters, shrimp, canned tuna in brine, canned oysters, and fish meal.

In 1961, over 44 percent of the United States supply of fishery products was obtained from foreign countries. Imports supplied the major share of many fishery commodities consumed in the United States. For the first time, imports of shrimp (round-weight basis) were greater than domestic production.

Compared with 1960 receipts, substantial increases were reported in imports of tuna loins and discs, canned sardines, and swordfish. Principal items showing decreases from 1960 were fresh, frozen, and canned salmon, fresh or frozen tuna, and fresh-water fillets.

United States exports of the leading edible fishery products of domestic origin were down one-third from 1960. Fish oil exports declined by 15 percent. Among the other products exported in substantially lesser quantities during 1961 were canned sardines, salmon, shrimp, and squid. Canned mackerel and frozen shrimp were exported in greater quantities.

Review of Imports (1961 compared with 1960): In 1961, imports of groundfish and ocean perch fillets and blocks increased 26 percent. This included an increase of 32 percent in the quantity of blocks or slabs. Canadian shipments of blocks and slabs increased by 24 percent, Icelandic by 49 percent, and Danish by 40 percent. Imports of fillets other than groundfish increased slightly; fresh-water fillets declined by 17 percent.

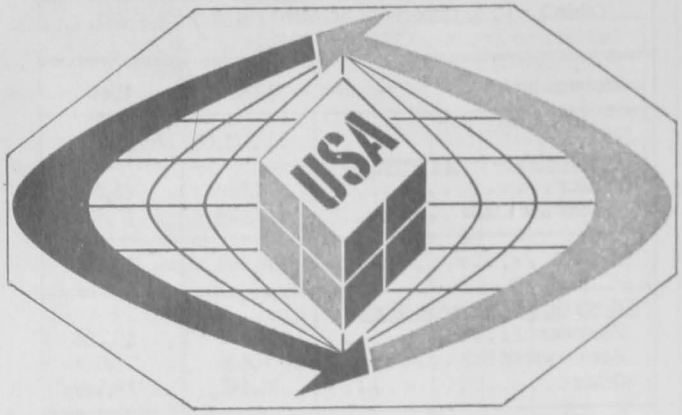
Table 1 - U. S. Imports of Selected Fishery Products, 1960 and 1961

Commodity	1961	1960
	... (1,000 Lbs.) ...	
Groundfish and ocean perch:		
Fillets	76,589	65,878
Blocks and slabs	118,675	89,672
Total	195,264	155,550
Fillets other than groundfish:		
Flounder	18,420	18,724
Fresh-water fish	9,839	11,805
Other	21,447	18,125
Swordfish (incl. steaks, fillets, & chunks)	22,228	20,315
Tuna, fresh or frozen:		
Albacore	71,946	69,801
Other than albacore	128,804	164,847
Total	200,750	234,648
Tuna loins and discs	8,348	6,711
Tuna, canned in brine:		
Albacore	29,116	15,775
Other than albacore	29,117	35,384
Total	58,233	51,159
Tuna, canned in oil	430	596
Bonito and yellowtail, canned	10,354	9,904
Crab meat, canned	4,238	4,507
Lobster, fresh or frozen:		
Northern	21,299	21,403
Spiny	32,590	32,346
Lobster and spiny lobster, canned	2,828	2,939
Oysters, mostly canned	7,702	7,025
Salmon:		
Fresh or frozen	12,310	13,472
Canned	7,381	19,113
Sardines:		
Canned in oil	27,877	21,236
Canned not in oil	14,611	6,141
Sea scallops	8,653	6,873
Shrimp, mostly frozen, some canned and dried	126,282	113,418
Fish meal	435,690	263,122
Fish solubles	13,478	6,348

Imports of frozen albacore tuna showed a small rise, whereas frozen tuna other than albacore decreased 22 percent. In total, this amounted to a 14-percent decrease in imports of fresh and frozen tuna. Imports of tuna loins and discs rose by 24 percent, but the quantity was much less than the other types of tuna imported.

Imports of canned tuna in brine increased by 18 percent. Japan accounted for 73 percent of the total quantity. Canned bonito and yellowtail imports increased 5 percent; Peru was the principal supplier of those products.

A new high was reached in imports of frozen spiny lobster. Principal gains were from Brazil, Mexico, South Africa, and the Bahamas. Imports of northern lobster were slightly less than during 1960.



Canned salmon imports decreased 61 percent. Imports from Japan, the principal supplier, declined from 18 million pounds in 1960 to 5.5 million pounds in 1961. Fresh or frozen salmon from Canada, the main supplier, dropped slightly.

Norway and Portugal supplied the major share of the imported canned sardines in oil. Most of the canned sardines not in oil were imported from the Union of South Africa. Both showed important increases.

Imports of sea scallops--nearly all from Canada--increased 26 percent from 1960 to 1961.

Shrimp, mostly frozen, increased 11 percent. For the first time in the history of the shrimp fishery, the quantity of imports exceeded that of the domestic catch. Mexico accounted for 63 percent of total imports.

In 1961 fish meal imports reached an all-time high of 435.7 million pounds (217,845 short tons) for a 66-percent increase over the preceding year. Over half of the imports were from Peru. Imports of fish solubles were also 12 percent greater.

Review of Exports (1961 compared with 1960): During 1961, exports of sardines not in oil amounted to 7.5 million pounds, compared with 20.9 million pounds in 1960, or a decrease of 64 percent. Shipments to the Philippines, Ecuador, and New Zealand declined.

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

Commodity	1961	1960
	...(1,000 Lbs.)...	
Fish oils	122,486	143,659
Misc. fish, mostly fresh-water, fresh or frozen	3,608	4,928
Oysters, shucked	580	604
Salmon:		
Fresh or frozen	1,095	2,849
Canned	7,186	11,924
Mackerel, canned	3,900	1,305
Misc. canned fish, mostly Calif. anchovies	453	483
Sardines:		
Canned not in oil	7,475	20,955
Canned in oil	185	264
Shrimp 1/:		
Fresh or frozen	4,771	2,989
Canned	2,502	3,482
Squid, canned	3,433	7,530

1/Does not include a substantial amount of re-exports of Mexican shrimp, principally to Japan.

Fish oil exports dropped 15 percent owing to reduction in shipments to Sweden, the Netherlands, and West Germany. A large gain was noted in exports to Canada and Norway. United States exporters of fish oil met strong competition from Peruvian fish oil in markets of Western Europe.

A decline in shipments of canned salmon to the United Kingdom accounted for most of the 40-percent drop in canned salmon exports.

Squid exports were about half those of 1960. Exports to the Philippines dropped from 4.4 million pounds in 1960 to 309,000 pounds in 1961.

Exports of canned mackerel tripled in 1961 to 3.9 million pounds. El Salvador received 802,000 pounds; the remainder went to various countries in smaller amounts.

Exports of domestic fresh or frozen shrimp increased 60 percent; Japan and Canada each received about 2 million pounds. Canned shrimp exports declined 28 percent. (Does not include a substantial amount of re-exports, principally to Japan.)

Virginia

MARINE SCIENTISTS CONTINUE STUDIES OF RADIOACTIVE WASTES:

The Atomic Energy Commission renewed its grant to the Virginia Institute of Marine Science by awarding an additional $20,000 for a continued study of the role of filter-feeding marine organisms in removing radioactive wastes from river and bay waters, according to the Director of the Institute. The studies were begun in 1961 with an initial $20,000 grant.

"Our scientists are among the first to consider the role of living organisms in removing radioactive particles suspended in the water," the Institute's Director reported. "Since the Hampton Roads-York River area is now a center for atomic-powered Navy and commercial vessels, and since the use of this source of energy will grow rapidly in the next decade, it is most appropriate that these studies be carried out by Virginia's marine laboratory."

One of the Institute's researchers in recent years has conducted experiments which indicate that oysters deposit enormous quantities of organic and inorganic material on the bottom. Through field and laboratory experiments he is learning the stability of these deposits, of what they consist, and the size of the particles. The other researcher on the project is determining the amount of radioactive material which may be tied up in these deposits.

Commercial growers frequently plant 300,000 oysters of the size being used in experimental work by the Institute's researchers on each acre of their oyster beds. Calculations arrived at by the researchers indicate that these oysters may deposit over a ton of material per acre each week during growing seasons.

During the first months of work, the two researchers set up equipment and conducted many preliminary experiments to test the reliability of the equipment.

"'Red tide' organisms which have appeared in great quantities in the York River during July and early August 1961 so disrupted the feeding of oysters that it took them from 7 to 10 days to resume normal feeding activities," one of the researchers reports. "During the time of 'red tides' the deposition rate by oysters and other plankton feeders might be greatly reduced," he concluded.

During the coming year, one-celled plants will be cultivated in sea water fertilized with radioactive chemicals in the laboratory. The scientists will feed these plants to experimental oysters and later measure the amount of radioactive material incorporated into their bodies.

Another laboratory project involves feeding oysters mixtures of radioactive plants and suspended silt and clay on which radionuclides are attached in amounts commonly encountered in the marine environment. The permanence of radionuclides in the deposits will then be determined.

Other experiments are being set up to measure the effect of turbidity and temperature on the rate at which the deposits are made. A controlled temperature system will be installed to raise the temperature from 0° C. to 30° C. (32° F. to 86° F.), temperatures to which oysters are subjected in the river, during which time varying amounts of food and suspended clays and silts can be introduced.

The results of these studies financed by the Atomic Energy Commission will help scientists predict the outcome of dumping nuclear wastes or the accidental release of radioactive material into tidal waters of the state by a nuclear reactor. If they remain suspended in the water rather than tied up in bottom deposits, tidal action may rapidly dilute and disperse them. If, on the other hand, they are concentrated by filter-feeding organisms and tied up in bottom deposits, they may remain in the immediate vicinity for long periods of time.

Wholesale Prices, March 1962

Although fishery landings in New England and other parts of the country were seasonally heavier this March, they were lighter than a year earlier. The March wholesale price index for edible fishery products at 120.3 percent (using the new base of 1957-59=100) was 0.5 percent higher than in the previous month and 13.2 percent higher than in March 1961.

A spurt of fresh shrimp at New York City shipped from the South Atlantic States in mid-March caused a 4.8-percent drop in prices for that product. This decline was responsible for the drop of 1.8 percent from February to March in the index for processed fresh fish and shellfish. Not quite offsetting the drop in shrimp prices was an increase of 11.1 percent in fresh haddock fillet prices at Boston because of insufficient landings to meet the demand. Compared with March 1961, the subgroup index was up 14.7 percent with prices this March for all items substantially higher. Prices were up for fresh haddock fillets by 14.7 percent, for fresh shrimp at New York City by 17.7 percent, and for shucked oysters by 10.8 percent.

Wholesale prices of the items under the drawn, dressed, or whole finfish subgroup were mixed and the subgroup index from February to March rose 2.7 percent. Prices of large haddock at ex-vessel at Boston this March were up 15.5 percent as compared with the previous month. This increase was offset somewhat by lower prices for whitefish (down 3.3 percent) at Chicago and frozen western halibut (down 0.4 percent) at New York City. More Canadian whitefish accounted for the lower prices on that product. Compared to a year earlier, March 1962 prices for the subgroup were 7.8 percent higher with nearly all items significantly higher priced. Although this March haddock landings at Boston were seasonally higher, they were substantially below a year earlier. This accounted for the 31.5 percent higher ex-vessel prices for fresh haddock this March. Signifi-

Raw breaded shrimp on conveyor belt moving to weighing and packaging line.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, March 1962 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes 2/ (1957-59=100)			
			Mar. 1962	Feb. 1962	Mar. 1962	Feb. 1962	Jan. 1962	Mar. 1961 3/
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					120.3	119.7	115.2	106.3
Fresh & Frozen Fishery Products:					119.4	118.5	112.4	104.6
Drawn, Dressed, or Whole Finfish:					121.8	118.6	109.7	113.0
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.16	.14	124.0	107.4	78.1	94.3
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.40	.40	116.8	117.3	110.4	96.6
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.86	.86	120.5	120.5	120.5	122.2
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.75	.78	111.9	115.7	110.5	104.5
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.74	.74	120.4	120.4	92.5	114.7
Processed, Fresh (Fish & Shellfish):					123.2	125.4	117.9	107.4
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.50	.45	121.4	109.3	87.4	100.8
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	1.00	1.05	117.2	123.1	110.2	99.6
Oysters, shucked, standards	Norfolk	gal.	7.75	7.75	130.7	130.7	132.8	118.0
Processed, Frozen (Fish & Shellfish):					109.0	107.7	105.5	90.2
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.40	.40	100.1	100.1	100.1	97.6
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.35	.33	101.1	96.7	96.7	98.2
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.34	.34	119.2	119.2	115.7	106.9
Shrimp, lge. (26-30 count), brown, 5-lb. pk.	Chicago	lb.	.95	.95	112.1	112.1	108.5	82.4
Canned Fishery Products:					122.1	122.1	120.4	109.6
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	28.50	28.50	124.2	124.2	122.0	122.0
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	12.15	12.15	107.9	107.9	107.9	97.7
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 24 cans/cs.	Los Angeles	cs.	5.25	5.25	118.5	118.5	116.2	88.0
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	12.81	12.81	164.3	164.3	157.9	112.2

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/ Beginning with January 1962 indexes, the reference base of 1947-49=100 was superseded by the new reference base of 1957-59=100.

3/ Recomputed to be comparable to 1957-59=100 base indexes.

cantly smaller frozen stocks in cold storage were responsible for the higher prices (up 20.9 percent) at New York City for western halibut. Fresh whitefish at Chicago was priced 7.1 percent higher this March than a year earlier. But with slightly more frozen salmon on hand this year, March prices at New York City for that product were down 1.4 percent as compared to a year earlier.

Prices for processed frozen fish and shellfish in March 1962 were 1.2 percent higher than the previous month principally because of higher prices for frozen haddock fillets (up 4.6 percent). Compared to the same month last year, March 1962 prices were up a substantial 20.8 percent. The continued scarcity was responsible for the 36.1-percent increase in the Chicago price for frozen shrimp. Lighter supplies caused the frozen fillet prices at Boston to go up for ocean perch by 11.5 percent, for haddock by 3.0 percent, and for flounder by 2.6 percent.

The index for the canned fishery products subgroup remained steady at the February 1962 level. The 1961/62 season for California sardines ended on February 28 with the pack even smaller than that in 1960. Maine sardine stocks continued to dwindle and demand exceeded the available supplies. Canned pink salmon stocks also were at a low level. Canned tuna stocks were moderate and demand was good, but there was no significant change in prices except that some trade discounts were reported in advertised brands. However, the canned tuna pack in California for the first quarter this year was 11 percent less than in the first quarter of 1961. March 1962 prices for canned fishery products were up a substantial 11.4 percent from a year earlier. All products in the subgroup were priced substantially higher this March: canned Maine sardine prices were up 46.4 percent, canned California sardine prices were up 34.7 percent, canned tuna prices were 10.4 percent higher, and canned pink salmon prices were up 1.8 percent.