

TRENDS AND DEVELOPMENTS

Fishing Vessel and Gear

Developments

EQUIPMENT NOTE NO. 3-- NEW DIVING SLED FOR UNDERWATER PHOTOGRAPHY:

To improve the effectiveness of commercial fishing gear, research units of the U. S. Bureau of Commercial Fisheries recently began an extensive series of underwater studies of gear action. Unique problems and technical difficulties have been created by the necessity for observing and recording the action of the gear under operational conditions. One of these was the lack of a suitable vehicle from which direct visual and motion picture observations could be made.

Early efforts to develop a suitable vehicle resulted in a strong lightweight diving sled of high maneuverability (Sand 1956). This sled fulfilled requirements for a vehicle from which direct observations of the gear could be made by SCUBA divers; but it was not considered fully satisfactory as a vehicle for underwater photography, because serious strains were imposed on the camera operator when making steady high-quality pictures.

To overcome that weakness, personnel assigned to the Bureau's gear research vessel George M. Bowers, at Pascagoula, Miss., recently developed and constructed a new sled specifically designed for motion picture work. Over 10,000 feet of motion picture film have been taken from the new sled since it was first put into operation, and its performance has been excellent at towing speeds of $1\frac{1}{2}$ to 3 knots.

Construction: The frame of the new sled (fig. 1) is welded throughout for safety and ruggedness. Control surfaces

have been placed at the extreme leading edge of the sled frame, and handles for regulating those surfaces are placed on the port side for operation by one diver. All control linkage is run through rubber bushings rather than metal because rubber needs no lubrication and does not "freeze." The towpoint, on the forward edge of the frame, has been set back behind the effective center of action of the control surfaces (fig. 2) to provide greater maneuverability.

A rod attachment on the camera housing can be secured in one of two camera mounts on the leading and trailing edges of the starboard runner (fig. 3). The mounts permit movement of the camera through an extensive arc, thereby permitting pictures to be taken over a wide field while relieving the cameraman of considerable strain and providing steady support.

Foam-rubber net floats laced to the upper portion of the frame and air tanks spot-welded to the runners and under the central portion of the upper frame provide buoyancy. Canvas stretched between the lower frame members supports the divers and adds to the stability of the sled (figs. 2 and 3).

Accessories and Modifications: Development of research tools is a continuous task, and the tools developed must be subjected to constant revision as new needs arise. The foregoing account described the basic structure of the sled as it was used during the operations conducted in 1959. To that basic sled several accessory structures and features have been added, for example: a rudder (figs. 1-3) was found to increase the stability of the sled in strong currents; boxes lined with foam rubber (fig. 3) were placed on the frames near the camera mounts to hold light meters; a depth gauge was

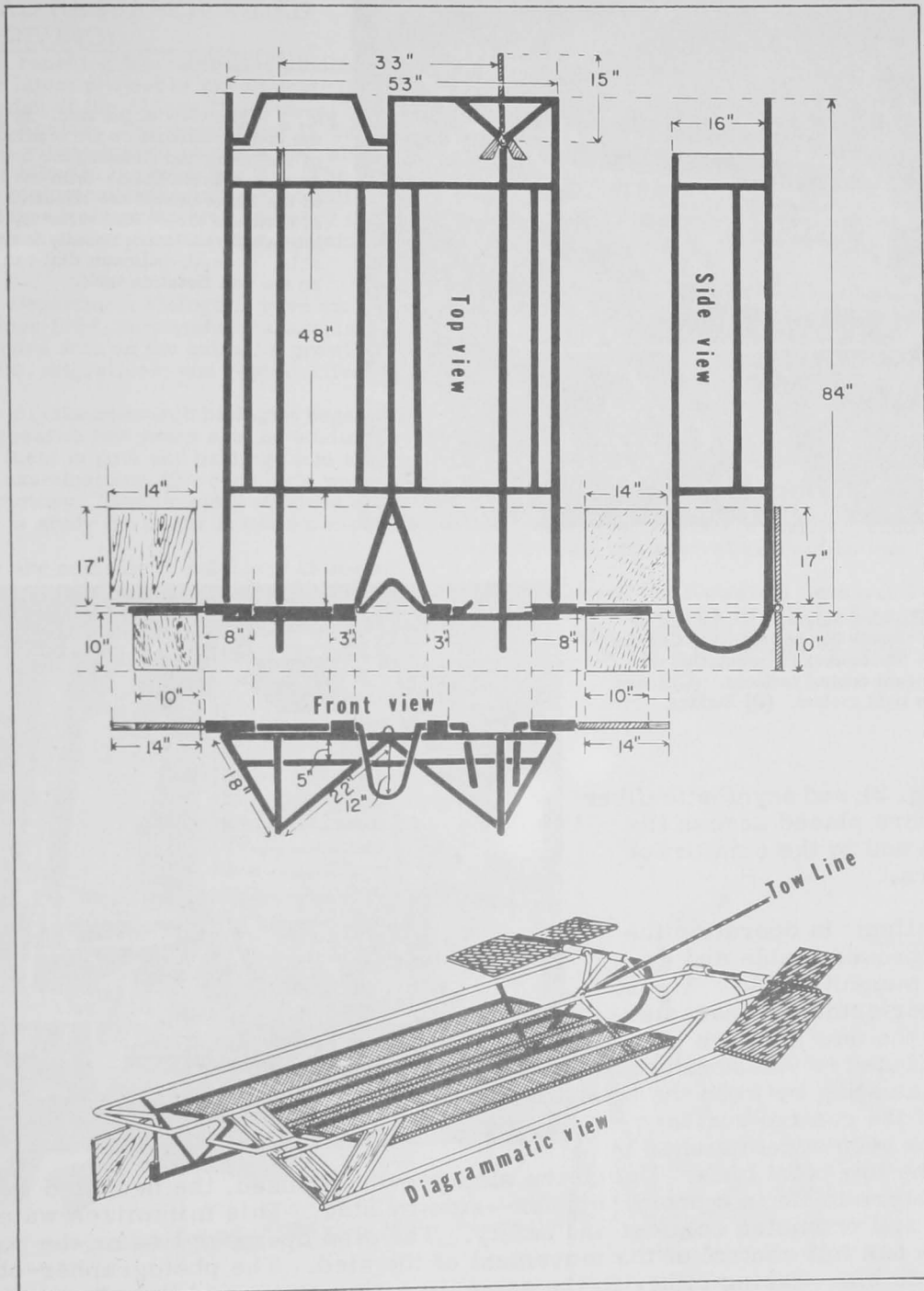


Fig. 1 - Diagrammatic views of the new sled. For clarity, only the frame members are made of $\frac{3}{4}$ -inch electrical conduit. Rudder, stabilizer, and control surfaces are $\frac{3}{4}$ -inch plywood.

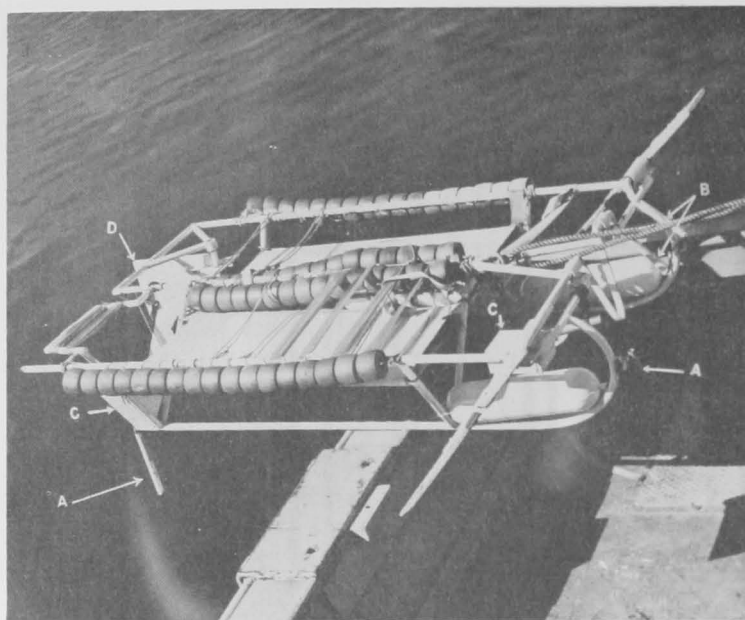


Fig. 2 - Top view of the sled. By placing the control surfaces on the leading edge of the frame and situating the tow point from one-fourth to one-third the length of the frame behind the effective center of action of the control surfaces, the sled has been made exceptionally maneuverable. A depth-indicator dial can be seen on the port flotation tank.

Fig. 3 - The sled balanced on the rail of the M/V *George M. Bowers*. (A) Camera mounts. (B) Handles for regulating port and starboard control surfaces. (C) Lined boxes for light meters. (D) Rudder.

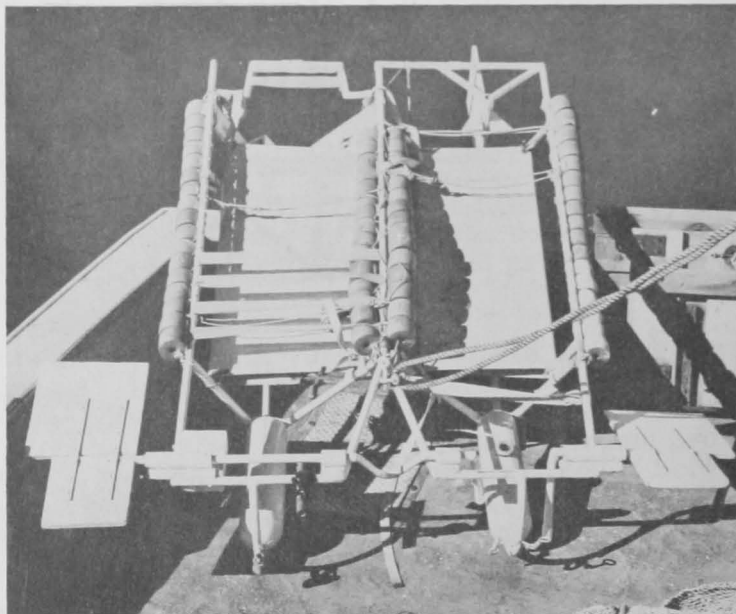
added (fig. 2); and synthetic-fiber straps were placed across the frame to add to the comfort of the divers.

Operation: In operation the sled has proved stable and extremely maneuverable. The excellent performance characteristics of the new sled are primarily attributed to the functional relation existing between the tow point and the control surfaces, which has been accomplished by setting the tow point back. Unlike the sled previously used, the new sled permits the operators to lie in a prone position--side by side. This minimizes water resistance and promotes comfort and safety. The sled operator lies on the port side where he has full control of the movement of the sled. The photographer-observer lies beside him--facing either in the same direction or toward the after end of the sled depending on the operation and the camera mount in use.

LITERATURE CITED

- SAND, R. F.
1956. New Diving Sled. *Commercial Fisheries Review*, vol. 18, no. 10 (October), pp. 6-7.
(Also Separate No. 452.)

--By John Hold, formerly Fishery Methods and Equipment Specialist, Branch of Exploratory Fishing & Gear Research, Division of Industrial Research & Services, Pascagoula, Miss.



Alaska

KING CRAB RESEARCH AIDED BY SKIN DIVING:

Undersea ranching for controlled studies of king crabs is the latest project of the Biological Research Division of the Alaska Department of Fish and Game at Kodiak. The ocean floor is the ranch, steel framed wire-covered pens the corrals, and a skin-diving biologist the crab herder. The purpose is to gather biological information that will keep the new dollar-earning king crab industry in the Kodiak-Afognak area operating on a sustained-yield basis.

Although Department biologists have studied the king crab since 1954, successful management requires far more data on the animal's growth rates, feeding habits, migrations, and reproductive biology.

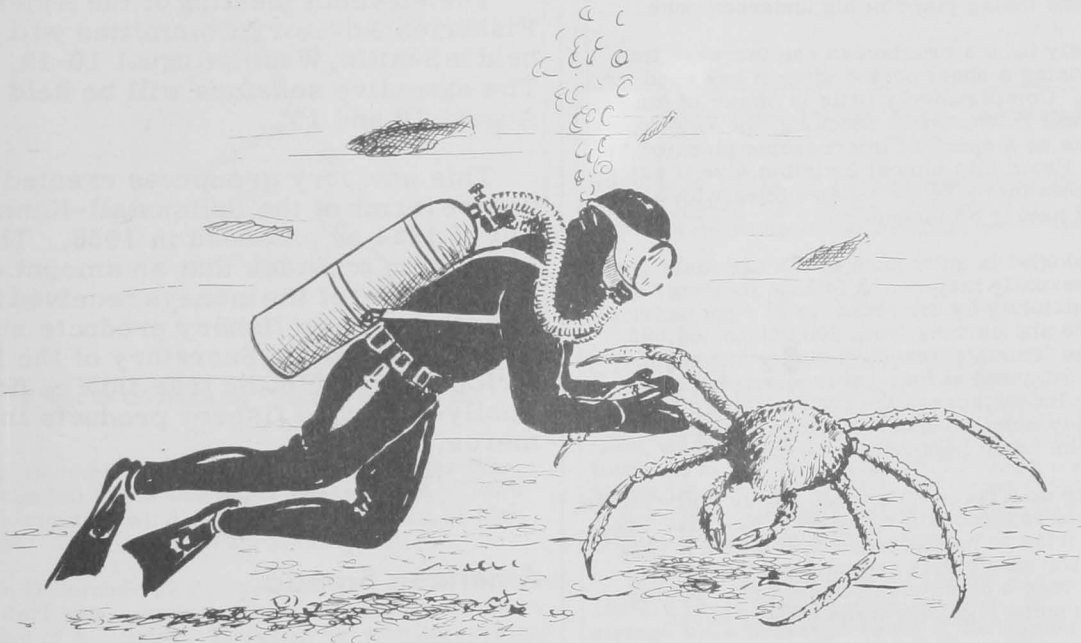
When the Alaska research biologist began his king crab research two years ago, he studied crabs by trapping them in pots and hauling them to the surface for examination. However, this was not entirely satisfactory. The biologist obtained a skin diver's suit to study the crabs in their own habitat.

As crabs are nomadic in habit, the biologist found it necessary to build pens to confine his crabs to a certain area to insure continuity to his studies. He can now observe the crabs living in their natural environment on the ocean floor. About 300 king

The suit is made of neoprene. It is known to divers as a wet suit. Although the suit fits skin tight, water seeps into the suit under the wrist and leg bands. This is gradually warmed by body heat until the diver is actually encased by a thin film of tepid water. The suit, including pants, shirt, gloves, boots, and head cap covers the body. Goggles fit over the eyes. Only the area around the mouth is exposed. It takes awhile for the exposed part of the face to grow accustomed to the cold water, although at times in the winter the water is often warmer than air. For breathing under water a 75-pound tank of compressed air is carried on the diver's back. Air is breathed through a mouthpiece attached to a hose from the tank. This will provide underwater breathing for about an hour. The tank appears heavy, but it is of course hollow and will rise buoyantly to the surface if released from the diver.

The biologist descends to tend and study his crabs at least once weekly. As the crabs cannot move out of the pens for food he must feed them. He gathers some of the food himself on the harbor floor; the rest he buys from fishermen. Sometimes 1,000 pounds is contracted for and frozen for future use. Food consists of starfish, sand dollars, sea urchins, and several kinds of bottom fish.

The Chief of the Biological Research Division for the Department who directs the king crab project along with other studies maintains that data on the entire life cycle of the king crab can be obtain-



crabs are confined in six pens that have a combined area of 600 square feet. A two-inch stainless steel wire mesh keeps the smallest crabs from crawling out and prevents outside crabs from crawling in and eating the food placed there by the diver. The pens have no bottoms so the crabs can burrow in the mud or sand just as they might in their natural state. The temperature of the water is about 38 degrees in a 20-foot depth of water at low tide. The water is colder at 50 feet, but the biologist can work quite comfortably for an hour at that depth.

ed by skin diving. He believes that skin diving should be encouraged and developed as a tool in fishery investigations.

The only time unpenned crabs can't be studied is when they go into deeper water offshore where they cannot be followed. But it is quite common, the biologist states, to observe king crabs reproducing in depths of 50 feet or less. At that time an estimate of sex ratios, vital to population counts, can be made.

Schools of herring and salmon have been observed on the sea dives. Halibut are quite wary. Squid swim away quickly, sometimes emitting an inky smoke screen in their wake.

As for king crabs, it is possible to observe any stage of their growth or activities. They don't seem to mind being watched. They can run quite fast, however, but none have been seen swimming free of the bottom. They walk "tip toe" on the ocean floor as fast or faster than a skin diver can swim.

The extent of a skin diver's observations depends upon his underwater visibility. This is determined by when and where he is diving. Sometimes visibility is good for a distance of 100 feet or poor at 20 feet. The use of an underwater compass is the only way the diver can keep his horizontal directions straight under water. He generally knows which way is up.

The biologist seldom goes down without a companion-diver as he says almost anything can happen in diving. Bleeding from the ears and nose can occur from ascending too rapidly. If the sinuses are clogged or the diver has a cold, a too rapid ascent may rupture blood vessels and cause a hemorrhage.

The biologist has made films of a king crab moulting and discarding its old shell. This was possible because he was able to observe the moulting process taking place in his undersea pens.

The only time a crustacean can increase its size is during a short period after it has shed its old shell. Comparatively little is known of king crab growth rates. After hatching, the king crab's life begins as a speck of microscopic plankton in the sea. From this almost invisible size it sometimes grows into a 24-pound specimen with a leg spread of nearly 58 inches.

No biologist is quite sure of the age male crabs become sexually mature. A female indicates arrival at maturity by the presence of eggs under her tail. Here she carries from 200,000 to 400,000 eggs. The female's sexual maturity has been roughly estimated at four years when she measures four inches across the body. A male king crab's body must measure 6½ inches before the animal can be taken legally by a fisherman.

Picking up a large king crab, the biologist states, can be real hazardous for a diver. For that reason he never tries to handle more than one at a time under water where they are particularly active. They can tear a diver's suit apart while waving their enormous legs and claws blindly about.

Another menace to divers are killer whales. These have been captured in the vicinity of Kodiak with as many as 13 seals in their stomachs.

The biological evidence being gathered will be used for management purposes wherever king crabs are found and harvested. There is reason to believe that king crab fishing areas will be greatly extended. This year a new fishing area will be investigated in the vicinity of Pelican in Southeastern Alaska. Much of the success of managing this valuable resource by the Alaska Department of Fish and Game will be based on the type of data.

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ALITAK BAY DECLARED A HISTORIC BAY:

A positive intention to maintain full jurisdiction and control over the waters of Alitak Bay (located on the southwest end of Kodiak Island) was announced on February 19, 1960, by the Alaska Department of Fish and Game. The boundary of State jurisdiction is defined as within the area encompassed by a line drawn from the southern tip of Tugidak Island to Low Cape on Kodiak Island and for three miles seaward of such a line.

The Alaska Department of Law has advised the Department of Fish and Game that there is precedent for this claim and that the State jurisdiction can be upheld.



American Fisheries Advisory Committee

NEXT MEETING TO BE HELD IN AUGUST:

The eleventh meeting of the American Fisheries Advisory Committee will be held in Seattle, Wash., August 10-12, 1960. The executive sessions will be held on August 10 and 11.

This advisory group was created under the terms of the Saltonstall-Kennedy Act of 1954 as amended in 1956. This legislation provides that an amount equal to 30 percent of the moneys received from import duties on fishery products shall be available to the Secretary of the Interior to promote the free flow of domestically-produced fishery products in commerce.



American Samoa

Species	January		February		Jan.-Feb.	
	1960	1959	1960	1959	1960	1959
	(1,000 Lbs.)					
Albacore	2,550	1,989	2,254	1,138	4,804	3,127
Yellowfin	222	411	400	396	622	807
Big-eyed	63	71	88	45	151	116
Skipjack	3	-	1	1/	4	1/
Total	2,838	2,471	2,743	1,579	5,581	4,050

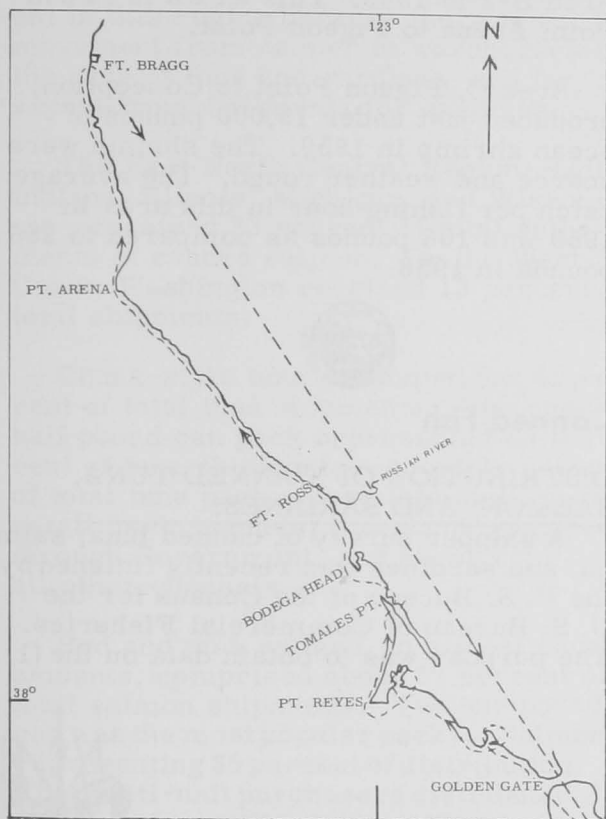
1/ Less than 500 pounds.
 Note: Most of the tuna landed by Japanese long-line vessels; a small amount by South Korean and Samoan long-line vessels.



California

AERIAL CENSUS OF COMMERCIAL AND SPORT FISHING CONTINUED:

Airplane Spotting Flight 59-25, Abalone-Clam:
The shoreline from San Francisco to Ft. Bragg and from Pt. Buchon to Pillar Pt. was surveyed from the air on December 26-27, 1959, by the California Department of Fish and Game Cessna 182 to determine the number of abalone sport fishermen, clam diggers, and shoreside sport anglers present in the area.

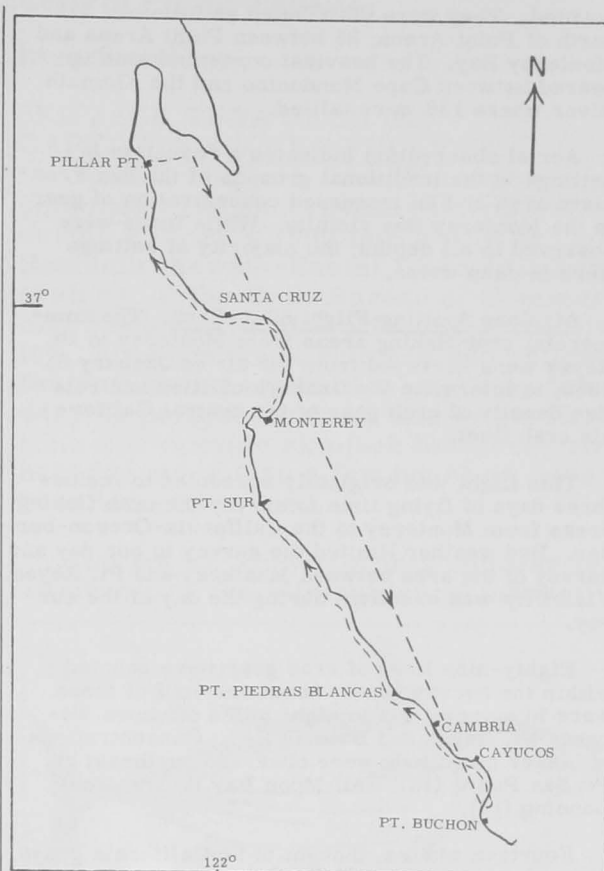


Flight 59-25 Abalone, Clam, December 26.

On December 26 the weather was better than average but there was a very heavy surf. There was almost no wind and only a scattering of high clouds. The tide was -0.5 ft. at 3 p.m.

On December 27 the weather was nearly perfect. The surf was very low, especially on the southern portion of the coast. The contrast with the previous day was remarkable. The observations were concluded at Pillar Point as a strong wind, an incoming tide, and darkness made further scouting pointless.

A skin-diving meet was in progress at Ano Nuevo and probably biases the count by adding spear fishermen to the abalone pickers in that area. Two commercial abalone diving boats were working three miles north of Pt. Piedras Blancas. On December 26 in the Golden Gate to Ft. Bragg area, 293 abalone pickers, 254 clam diggers, and 45 surf anglers were observed. In the area from Pt.



Flight 59-25 Abalone, Clam, December 27.

Buchon to Pillar Point, 605 abalone pickers, 636 clam diggers, and 74 surf anglers were observed. Note: Also see Commercial Fisheries Review, February 1960, p. 29.

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CRAB DISTRIBUTION AND ABUNDANCE STUDIES CONTINUED:

Airplane Spotting Flight 59-20-Crab: The area from Moss Landing to Fort Ross was surveyed from the air on November 16, 1959, by the California Department of Fish and Game Cessna 182 to determine fishing localities of the central California commercial crab fishery.

Although fog and haze hampered observations, 198 crab trap strings were counted. No trap strings were observed south of Half Moon Bay or north of the Russian River. The greatest concentration of set gear was off Drakes Bay, south of Pt. Reyes. Lesser concentrations were off the Russian River and Sharp's Park.

Airplane Spotting Flight 59-24-Crab: The coastal waters from Monterey to Oregon were surveyed from the air (December 20-22, 1959) to determine the fishing locations and relative density of the northern California crab fleet.

Sea and weather conditions were good between Monterey and Oregon, 261 lines of traps were

counted. They were distributed as follows: 176 north of Point Arena; 85 between Point Arena and Monterey Bay. The heaviest concentrations appeared between Cape Mendocino and the Klamath River where 136 were tallied.

Aerial observation indicates a reduction in settings in the traditional grounds of the San Francisco area and an increased concentration of gear in the Monterey Bay vicinity. While traps were observed in all depths, the majority of settings were in deep water.

Airplane Spotting Flight 60-1-Crab: The commercial crab fishing areas from Monterey to Pt. Reyes were surveyed from the air on January 6, 1960, to determine the fishing localities and relative density of crab gear of the central California crab fleet.

This flight was originally scheduled to include three days of flying time to survey the crab fishing areas from Monterey to the California-Oregon border. Bad weather limited the survey to one day and survey of the area between Monterey and Pt. Reyes. Visibility was excellent during the day of the survey.

Eighty-nine lines of crab gear were counted within the survey area. About one-half of these were in an area five to eight miles offshore, between Pt. Reyes and Bolinas Bay. Concentrations of lesser magnitude were observed northeast of Pt. San Pedro (16), Half Moon Bay (6) and Moss Landing (14).

Fourteen whales, thought to be California grays, were observed: two off Pt. Reyes, one south of Drakes Bay, seven near the South Farallons, two near Half Moon Bay, and two off the Monterey peninsula.

Note: Also see Commercial Fisheries Review, April 1960, p. 18.

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SHRIMP LANDINGS BREAK RECORD IN 1959:

Landings in California of ocean shrimp set another record in 1959, according to the Director of the Department of Fish and Game. The ocean shrimp catch for 1959 totaled 1,777,874 pounds, an increase of 47,652 pounds over 1958, which was itself a record year.

The higher landings in 1959 were made possible when the Fish and Game Commission accepted Departmental recommendations to increase quotas in two areas. The quota was raised 250,000 pounds in Area A--Oregon line to Cape Mendocino--and by 200,000 pounds for Area B-1, off Fort Bragg.

The catch was largest in Area A, with California landings of 1,317,972 pounds, plus about 400,000 pounds landed in Oregon.

The Area A California shrimp fleet, which ranged from three vessels in May to 10 in July 1959, made over 1,000 tows, totaling more than 2,000 fishing hours. The average catch per fishing hour for the entire season was 638 pounds last year, which compares favorably with shrimp fishing anywhere in the world. The 1958 average was 501 pounds.

Virtually no shrimp catch came from Area B-2 in 1959. This area is from Point Arena to Pigeon Point.

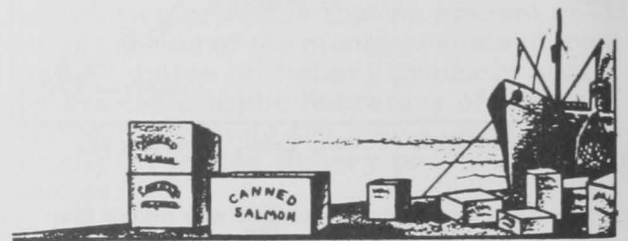
Area C, Pigeon Point to Conception, produced just under 15,000 pounds of ocean shrimp in 1959. The shrimp were scarce and weather rough. The average catch per fishing hour in this area in 1959 was 106 pounds as compared to 256 pounds in 1958.



Canned Fish

DISTRIBUTION OF CANNED TUNA, SALMON, AND SARDINES:

A shipper survey of canned tuna, salmon, and sardines was recently finished by the U. S. Bureau of the Census for the U. S. Bureau of Commercial Fisheries. The purpose was to obtain data on the (1)



geographic location of the market; (2) the commodities that are moving, including number of cases by can size and type, and the class of customer; (3) how much of the pack moves into the multi-unit retail food channel, how much into Government, and how much into all other channels. The data are based on shipments in the 12 months ended June 30, 1959.

The study shows that about 23 million standard cases of canned fish were shipped during the twelve months. Canned tuna comprised more than half of the

total--about 13 million cases. Shipments of canned salmon and sardines accounted for 5 million cases each.

Distribution of canned tuna and sardines was largest in the Pacific region, accounting for 27 percent and 16 percent of total shipments, respectively. California received the largest proportion of both canned tuna and canned sardine shipments, which eventually are further distributed. Distribution appeared largest in this region because there is a movement from canner to warehouses in the case of tuna and sardines, and for export from California for sardines.

The East North Central Region--Ohio, Indiana, Illinois, Michigan, and Wisconsin--received 23 percent of total shipments of canned salmon. On the West Coast, Washington received 13 percent of total shipments.

Chunk-style tuna accounted for 61 percent of total tuna shipments. The one-half pound can pack represented 85 percent of tuna shipments. About 39 percent of total tuna pack moved into multi-unit retail food channels, 3 percent channeled through Government, and 58 percent into all other channels.

Red and pink salmon, in almost equal amounts, comprised about 67 percent of total salmon shipments. The one pound can was the most popular pack for salmon, representing 65 percent of distribution. The multi-unit purchasers distributed 23 percent of canned salmon, with only 1 percent channeled through Government and 76 percent into all other channels.

The distribution of sardines by style of pack was 38 percent oil pack, 24 percent tomato sauce, 6 percent mustard, and the remainder unidentified. Keyless sardines accounted for 93 percent of all sardine shipments; 56 percent packed in one pound cans. All sardines packed with key were distributed in the $\frac{1}{4}$ -pound can sizes, with oil pack accounting for two-thirds. About 17 percent of all canned sardines were distributed through multi-unit retail outlets, 1 percent through Government, and the remainder through other channels.

Note: Also see Commercial Fisheries Review, January 1960,

p. 40



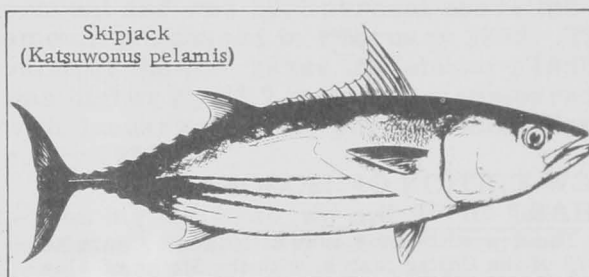
Central Pacific Fisheries

Investigations

SKIPJACK TUNA HELD IN CAPTIVITY SUCCESSFULLY:

Oceanic skipjack tuna (*Katsuwonus pelamis*) were successfully introduced during February 1960 into a pool at the Honolulu (Kewalo-Basin) Biological Laboratory, of the U. S. Bureau of Commercial Fisheries, and are feeding in captivity. Although black skipjack and yellowfin-tuna have been held in captivity for varying periods of time, this is the first time that oceanic skipjack have been so held for more than a few hours or have been induced to feed.

The major portion of this success is attributed to the elimination of manual



Skipjack
(*Katsuwonus pelamis*)

handling of the fish. Transportation of the fish from the ocean to the pool was accomplished in such a way that the skipjack were only out of water momentarily and were touched only by a barbless hook. A portable steel, oval tank, 8 by 6 feet and approximately 2 feet deep, was secured to the deck of a chartered commercial live-bait vessel. When the skipjack were hooked, the fishermen lowered the fish into the tank with enough slack in the line to allow the fish to shake off the hook. During transport, water was continually circulated within the tank. When the vessel reached shore, the tank was lifted from the ship and immersed in the pool. A hatch in the side of the tank was opened and the skipjack were allowed to swim out of the tank into the pool.

The pool is circular, 23 feet in diameter and 4 feet deep. Pumps are arranged so that sea water from an adjacent channel or saline water from a well can be pumped into the pool. As water from the well is devoid of oxygen, it is allowed to cascade down a special aerator before flowing into the pool.

The only food that has been fed to the skipjack thus far has been chunks of shrimp, which have been purchased frozen from commercial sources.

With this significant advance in the Bureau's skipjack tuna behavior studies, plans are being made for the construction of more suitable tanks and associated instrumentation in which skipjack behavior may be observed. It is planned that conditioned response studies will be undertaken. These studies will involve variables which cannot readily be controlled at sea such as sound, light, and various extracts including fish blood, visceral extracts, etc., and will supplement those made at sea from the underwater observation chambers on the Bureau's research vessel Charles H. Gilbert.



Charts

NEW EDITION OF ISOGONIC CHART OF U. S.:

The new edition for 1960 of Isogonic Chart No. 3077 of the United States, with the States of Alaska and Hawaii included for the first time, has just been published, the Director of the Coast and Geodetic Survey announced on March 10, 1960.

The chart is issued in a new format with the 48 states shown on one side of a single sheet, printed back-to-back with the new States of Alaska and Hawaii. These charts show the distribution of magnetic declination or variation of the compass (the angle between true north and magnetic north) and rates of annual change for the entire Nation. The iso-lines connect points of equal magnetic declination and of equal annual-change rates. The 1960 edition of Chart No. 3077 supersedes the preceding edition published in 1955. Chart 3069b, Isogonic Chart of Alaska for 1955, is obsolete and will not be reissued, for Alaska is now shown on the United States chart.

The chart of Alaska includes western Canada, northwestern United States, and the eastern tip of Siberia. It is at the scale of 1:5,000,000 on the Lambert conformal conic projection, corresponding to the projection and scale of the reverse side showing the 48 states. The State of Hawaii is shown on the Alaska side of the chart at the scale of 1:7,500,000. The lines of equal declination and equal annual change have been completely redrawn for the new charts from the latest available information.

The isogonic lines are derived from the Coast and Geodetic Survey's extensive file of world-wide geomagnetic data. These same data were used earlier by the Bureau in compiling the U.S. Navy Hydrographic Office World charts showing the world-

wide magnetic variation for the 1960 epoch. The charts for the United States show the general pattern indicated on the series of world charts, but in greater detail made possible by the greater density of magnetic observations in continental areas. Isogonic lines in Canadian areas were furnished by the Dominion Observatory, Department of Mines and Technical Surveys, Ottawa.

These charts are the latest of a long series of magnetic charts published by the Coast and Geodetic Survey as a navigational aid and for other scientific and engineering purposes. The isogonic charts are of particular interest to the navigator, surveyor, prospector, and scientist. Magnetic information in the form of compass roses and isogonic lines appearing on nautical and aeronautical charts of the United States published by the Coast and Geodetic Survey is based on the isogonic charts. The charts may be used for quick and accurate determination of declination by simple inspection without measurement of any kind.



Chesapeake Bay States

MONTHLY FISH LANDING BULLETINS FOR MARYLAND AND VIRGINIA:

Two new monthly bulletins showing the landings of fish and shellfish in Maryland and Virginia ports will henceforth be issued by the U. S. Bureau of

MARYLAND LANDINGS

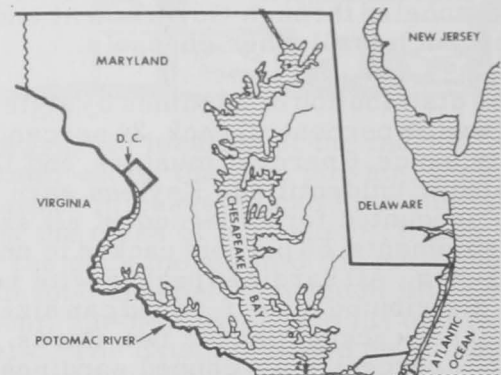
U. S. Department of the Interior
Fish and Wildlife Service
Bureau of Commercial Fisheries
Washington 25, D. C.

in cooperation with
Maryland Department of Tidewater Fisheries and Department of Research and Education
Annapolis, Md.

C. F. S. NO. 2242

JANUARY 1960

MARYLAND FISHING AREAS



Commercial Fisheries in cooperation with the fishery agencies of the two States. The first issue of each report has been issued and each covers the landings in each of those States during January.

Virginia data are obtained in cooperation with the Virginia Commissioner of Fisheries and the Virginia Fisheries Laboratory. The Maryland information is obtained through the Maryland Department of Tidewater Fisheries and the Department of Research and Education.

The addition of these two bulletins brings to 17 the number of monthly landings bulletins issued by the Bureau in cooperation with the respective States.

Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-FEBRUARY 1960:

Fresh and Frozen Fishery Products:
For the use of the Armed Forces under the Department of Defense, 1.8 million pounds (value \$912,000) of fresh and fro-

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Supply Agency, February 1960 with Comparisons

QUANTITY				VALUE			
February		Jan. -Feb.		February		Jan. -Feb.	
1960	1959	1960	1959	1960	1959	1960	1959
. (1,000 Lbs.) (\$1,000)			
1,817	1,437	3,314	2,296	912	777	1,649	1,621

zen fishery products, were purchased in February 1960 by the Military Subsistence Supply Agency. This exceeded the quantity purchased in January by 21.4 percent and was 26.4 percent above the amount purchased in February 1959. The value of the purchases in February 1960 was higher by 23.7 percent as compared with January and 17.4 percent above February 1959.

During the first two months of 1960 purchases totaled 3.3 million pounds (valued at \$1,649,000)--an increase of 13.3 percent in quantity and 1.7 percent in value as compared with the similar period in 1959.

Prices paid for fresh and frozen fishery products by the Department of Defense in February 1960 averaged 50.2 cents a pound, 1.0 cent higher than the 49.2 cents paid in January, but 3.4 cents less than the 53.6 cents paid during February 1959.

Canned Fishery Products: Tuna was the principal canned fishery product pur-

Table 2 - Canned Fishery Products Purchased by Military Subsistence Supply Agency, February 1960 with Comparisons

Product	QUANTITY				VALUE			
	February		Jan. -Feb.		February		Jan. -Feb.	
	1960	1959	1960	1959	1960	1959	1960	1959
	. . . (1,000 Lbs.) (\$1,000)			
Tuna	566	368	1,017	753	260	189	451	381
Salmon	-	-	-	-	-	-	-	-
Sardine	25	25	31	37	10	9	14	13

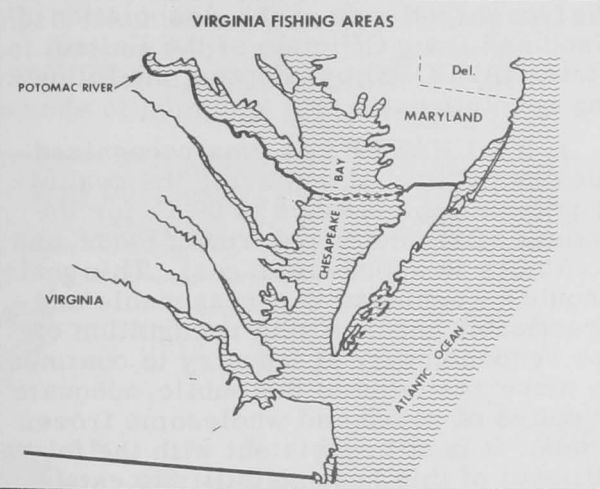
chased for the use of the Armed Forces during February this year. In the first two months of 1960, purchases of canned tuna were up 35.1 percent, but for canned sardines were down by 16.2 percent as compared with the same period in 1959.

VIRGINIA LANDINGS

U. S. Department of the Interior
Fish and Wildlife Service
Bureau of Commercial Fisheries
Washington 25, D. C.

in cooperation with
Virginia Commission of Fisheries
Newport News, and
Virginia Fisheries Laboratory
Gloucester Point

C. F. S. NO. 2241 JANUARY 1960



All of these are for coastal states except for the Ohio bulletin which covers the landings of that State from Lake Erie.

The other states for which monthly landings publications are available are Maine, Massachusetts, Rhode Island, New York, New Jersey, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, California, and Ohio.

Over half of the Atlantic Ocean-Gulf of Mexico harvest of blue crabs and nearly 70 percent of the eastern oysters are landed in the Chesapeake Bay States of Maryland and Virginia.



No canned salmon was purchased during January-February 1960 and 1959.

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



Fisheries Loan Fund

LOANS APPROVED, JANUARY 1-FEBRUARY 29, 1960:

As of February 29, 1960, a total of 707 applications for fisheries loans totaling \$21,959,268 had been received since the program was started in December 1956. Of these, 372 (\$8,663,534) have been approved, 239 (\$6,860,774) have been declined or found ineligible, 56 (\$2,499,156) have been withdrawn by applicants before being processed, and 40 (\$2,902,729) are pending. Several of the pending cases have been deferred indefinitely at the request of the applicants. Sufficient funds are available to process new applications when received.

The following loans had been approved between January 1 and February 29, 1960:

New England Area: Sofus Martensen, New Bedford, Mass., \$71,600.

South Atlantic and Gulf Area: Edly B. Shipman, New Smyrna Beach, Fla., \$6,500; Elroy Leonard, Charlotte, N. C., \$19,500; Albin W. Gerds, Brownsville, Tex., \$7,400; and Ralph J. White, Brownsville, Tex., \$40,500.

California: Earl E. Harvey, Eureka, \$9,500; Frank P. LaGamma, Lemon Grove, \$17,000; Donald L. Sawyer, San Diego, \$7,645; and John Sima and Tony Zangaro, San Pedro, \$28,900.

Pacific Northwest Area: Arthur H. Paquet, Astoria, Ore., \$20,548; Louis S. Mattocks, Seaside, Ore., \$10,000; Humphrey L. Tyron, Marysville, Wash., \$6,550; Michael Nicpon, Port Angeles, Wash., \$4,500; Boat Sea Star, Seattle, Wash., \$39,296; and Reuben Troberg, Seattle, Wash., \$2,000.

Alaska: William A. Eklof, Homer, \$8,000; and Gerald G. Bennett, Ketchikan, \$8,000.



Frozen Foods

PACKERS CLARIFY THEIR POSITION ON FROZEN FOOD CODE:

At its annual meeting in mid-March 1960 the Board of Directors of the National Association of Frozen Food Packers (NAFFP), whose membership includes nearly 85 percent of the industry



producers, acted to clarify its position on the frozen food code of the Association of Food and Drug Officials of the United States (AFDOUS) by adopting the following resolutions:

1. That NAFFP has long recognized the desirability of achieving the goal of a uniform temperature of 0° F. for the commercial handling of frozen foods, and continues to approve that goal. This goal should be achieved in a reasonable and practicable manner with recognition of the responsibility of industry to continue to make available to the public, adequate supplies of sound and wholesome frozen foods. It is not consistent with the fulfillment of this responsibility to establish an absolute product temperature of 0° F., since, within reasonable limits, temporary deviations from the zero level will not affect the soundness of wholesomeness of such foods;

2. That the membership be invited to channel matters of compliance with bacterial and temperature specifications in the State of Massachusetts, or in other states or municipalities, through the headquarters office so that such matters can be dealt with on a unified basis. Assistance on such matters may be offered to nonmembers if it appears that to do so would be in the interest of the industry.

3. That it is the view of NAFFP that the AFDOUS Code should be considered as a manual of operating practices and objectives; that it should not be proposed for adoption as statute or regulation. Its provisions do not lend themselves to en-

forcement as statutory enactments of regulations with criminal penalties for their violation. They may provide, however, the basis for obtaining the common objectives of both industry and the Association of Food and Drug Officials of the United States, which are stated in this resolution.



Gulf Exploratory Fishery Program

MIDWATER TRAWLING FOR SCHOOL FISH IN THE GULF OF MEXICO CONTINUED:

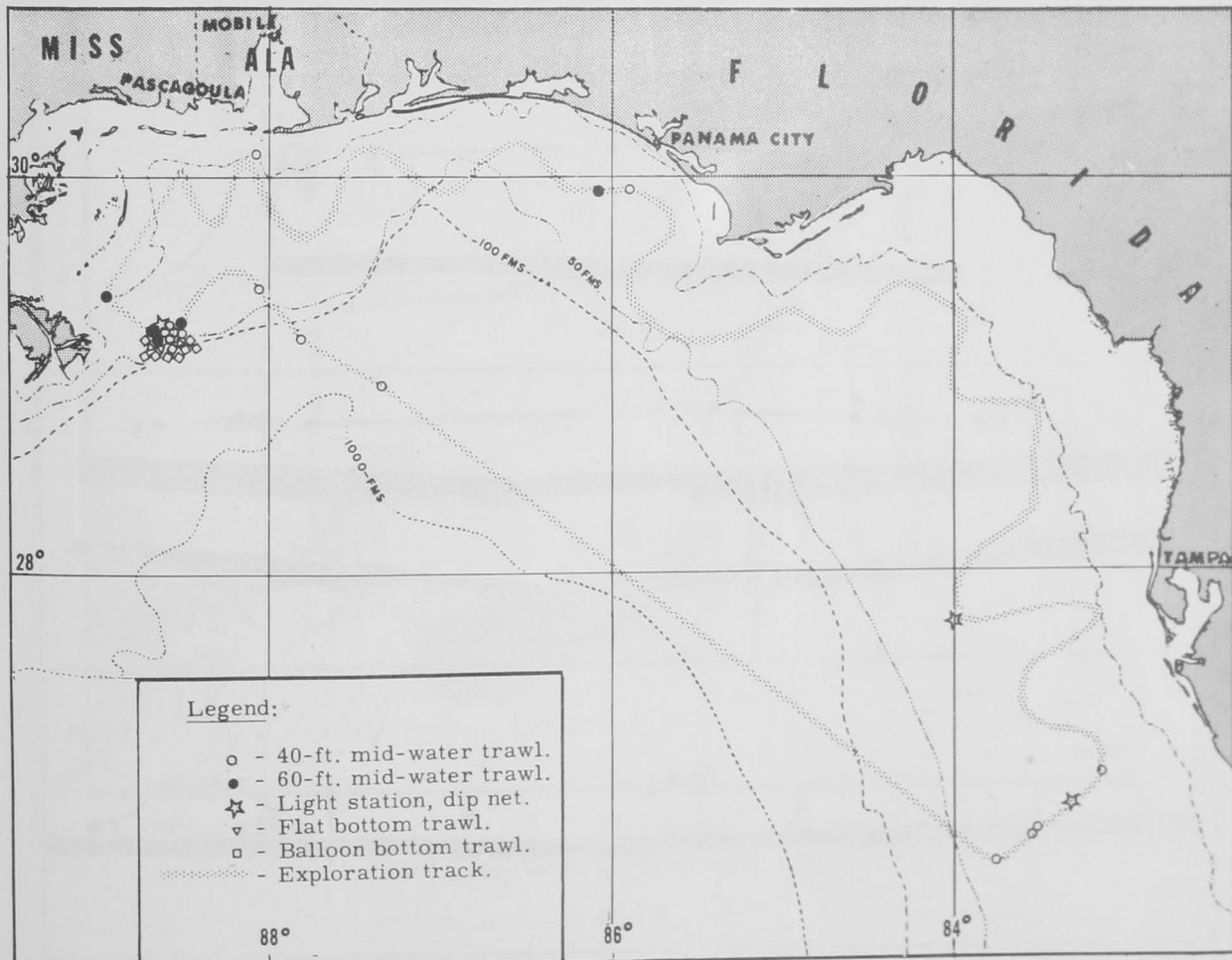
M/V "Oregon" Cruise 63: First successful commercial-scale mid-water trawling in the Gulf area was accomplished by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Oregon (November 18-December 16, 1959) when catches of 3,000 to 5,000 pounds of bumpers (*Chloroscombrus*)

were made from mid-water depth recorder indications of fish schools.

Underwater observations and motion pictures were made of the 40- and 65-foot square midwater trawls that have been previously used in the Gulf project. Several defective performance features were noted, which summarily resulted in poor horizontal spread of the net. Unequal stresses on the hangings along the wings and body and insufficient door spread appeared to be the principal malfunctions. Vertical opening was satisfactory.

The trawls were rehung and 5-foot by 10-foot rectangular doors were constructed. After some modifications to the door bridles, a notable increase in horizontal spread was observed.

Scouting transects were made. Concentrations of midwater fish were not



M/V Oregon Cruise 63 (November 18 to December 16, 1959).

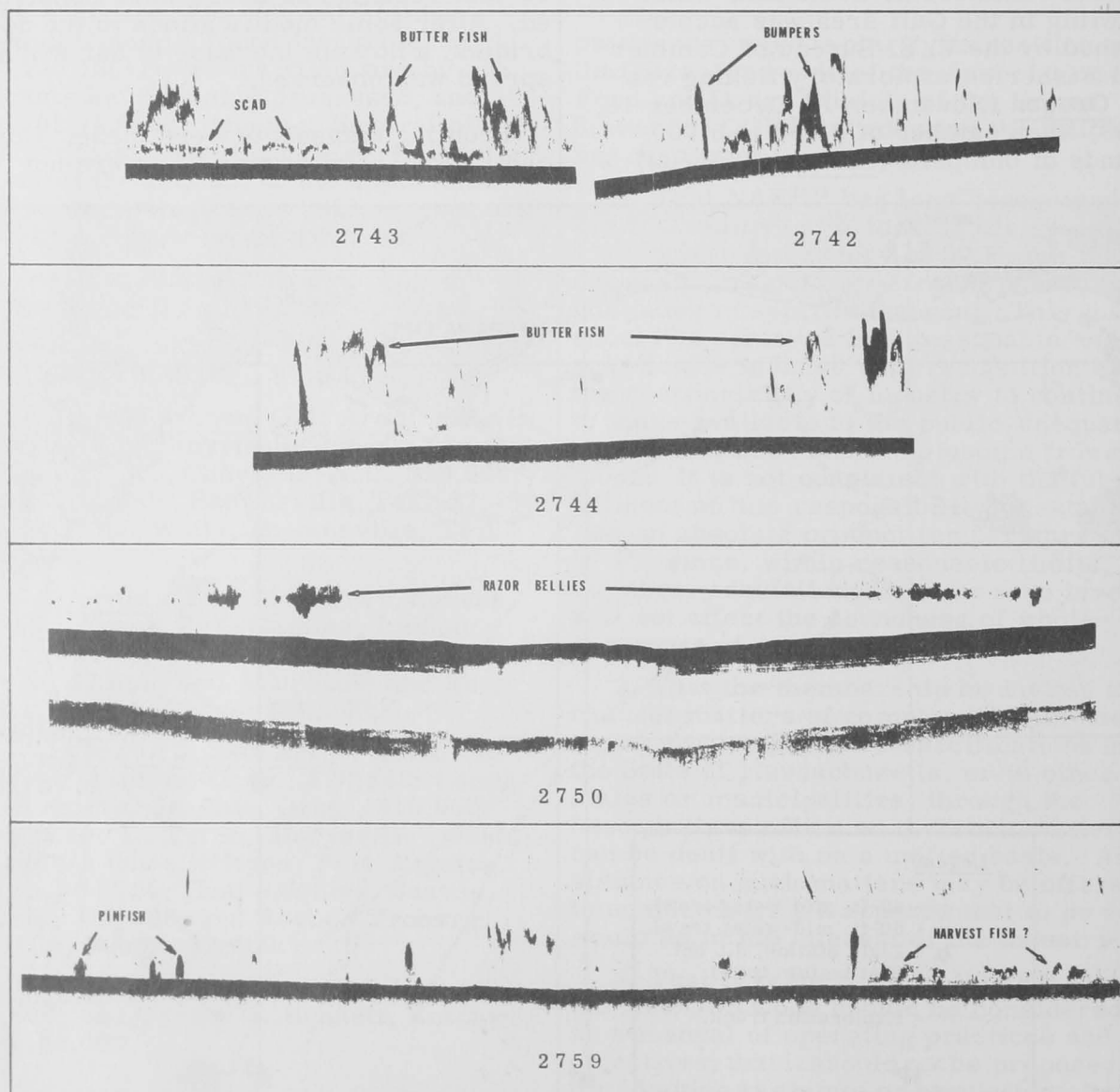
found until the vessel traversed the 40-fathom curve, east of the Mississippi Delta, where test fishing in rough seas yielded clean catches of 4" to 8" bumpers of 3,000 to 5,000 pounds per hour tow, using the 65-foot midwater trawl. A few menhaden were mixed in the catches. The sets were made on heavy recorder tracings in depths of 30 to 35 fathoms where bottom depths varied between 39 and 41 fathoms. Malfunctioning of the trawl-depth telemeter at this time allowed only approximate positioning of the trawl in the schools.

Bottom trawling with shrimp trawls was conducted in the same area "under"

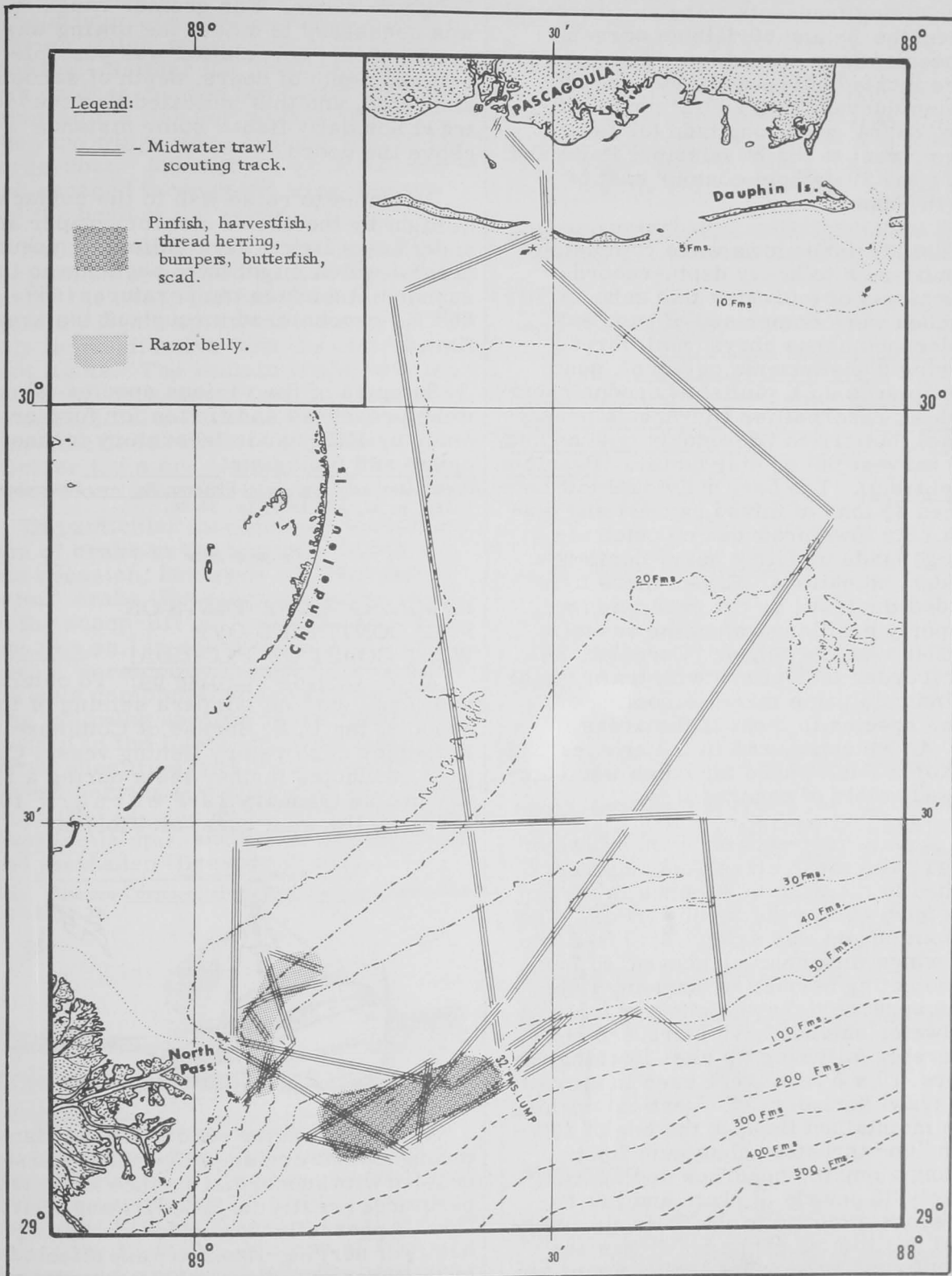
the recorder indications and the catches were devoid of bumpers and menhaden.

Nightlight dip-netting in the area yielded several 6" to 8" menhaden. Numerous small scattered schools of mullet were observed around the vessel during the night.

M/V "Oregon" Cruise 65: During March 3-10, the M/V Oregon continued midwater trawling operations for industrial and food fishes in the north central Gulf of Mexico to obtain additional information on seasonal occurrence and availability of fish stocks to midwater trawling gear.



Echo-grams made during M/V Oregon Cruise 65.



M/V Oregon Cruise 65 (March 3-10, 1960).

Scouting transects were made between the 5- and 60-fathom curves. Concentrations of midwater fish schools were located between the 40- and 50-fathom curves from 29°12' north latitude, 88°34' west longitude (32-fathom lump), west to the Mississippi Delta and along the 20-fathom contour east of North Pass.

Twenty-three tows were completed on moderate to heavy depth-recorder indications of midwater fish schools. Catches were comprised of bumpers (*Chloroscombrus chrysurus*), thread herring (*Opisthonema oglinum*), scad (*Decapterus* sp.), pinfish (*Lagodon rhomboides*), razorbellies (*Harengula pensacola*), butterfish (*Poronotus triacanthus*), and harvestfish or star butters (*Peprilus alepidotus*). The best individual tow contained 3½ tons of mixed harvest and pinfish. Six tows produced no catch although made on fairly heavy depth-recorder indications. Either these fish evaded the trawl or the gear was improperly positioned when the vessel passed over the school. Correlations of recorder indications with trawl catches indicate some mixed schooling of these species in most of the areas fished. An exception was in the area east of North Pass where the catch was comprised solely of razorbellies.

A sixty-foot-square nylon midwater trawl, with mesh sizes tapering from 5 inches in the wing to 2 inches in the bag, was used during the fishing trials. The bottom bosom was extended 20 feet into the wings (inverted top square) to form a projecting barrier to sounding fish. This appears to have some merit as midwater catches have increased considerably following its use. Rectangular doors, 10 x 5 feet, were used to spread the trawl horizontally. Vertical opening was maintained through the use of 23 7-inch "up-thruster" aluminum floats strung along the headrope and approximately 35 pounds of chain and two depressors attached to the footrope. Vertical positioning of the trawl was accomplished by varying engine r.p.m.'s and the scope of the towing warps. A direct-reading telemeter provided accurate readings of the depth level of the doors. Varying the engine r.p.m.'s provided satisfactory positioning within a

5-fathom range. For greater range it was necessary to adjust the towing warp scope. Some correlation was possible between depth of doors, depth of schools, and catch, and this indicated that the trawl normally fished some distance above the doors.

Attempts to raise fish to the surface at night by the use of mercury-vapor and underwater lights were uniformly unsuccessful which might have been due to the subnormal surface temperatures (45°-50° F.) encountered throughout the areas fished.

Samples of the various species taken were preserved and frozen for further study by Pascagoula laboratory technologists and biologists.

Note: Also see *Commercial Fisheries Review*, November 1959, p. 38, July 1959, pp. 34-36.

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LAMPARA SEINE TESTS ON FISH CONTINUED OFF WEST COAST OF FLORIDA:

M/V "Oregon" Cruise 64: To obtain additional data on lampara seining of fish schools, the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Oregon conducted further tests during a 26-day cruise (January 19-February 16, 1960) off the west coast of Florida.



Adverse weather conditions persisted throughout the cruise. High winds and seas coupled with subnormal surface water temperatures greatly curtailed fishing activities. Apparently the surface schooling habits of herring-like fish were affected by the thermogradient as bottom temperatures were found to be consistently warmer than surface temperatures throughout the areas fished. This condition may account for the fact that no surface schools were sighted during the cruise.

Two lampara seine sets were attempted on subsurface concentration of thread herring which were located by aerial spotting. Neither set produced significant catches though the aerial spotter reported the fish completely entrapped when the wings were brought aboard the purse boat. Indications were that the fish escaped through the wing meshes and the head of the seine.

Both mercury-vapor and incandescent lamps were used as fish attractors during the scoop-lift net trials. The mercury lights appeared to be considerably more effective than the incandescent lights. The limited trials with the scoop-lift net suggest that this gear may be a practical tool for the capture of sardine-like fishes in the Gulf of Mexico. Further tests are planned for this gear under more favorable operating conditions.

Of particular interest was the attraction of crabs to the mercury lights. On one occasion, hundreds of "Jack Rochester" crabs (*Portunus sp.*) were taken in the scoop-lift net. Blue crabs (*Callinectes sp.*) in amounts up to one-half bushel were common in most scoop-lift net sets completed in shallow water. The following species of fish were attracted to the lights and were taken in small quantities with the scoop-lift net: thread herring (*Opisthonema sp.*), razor-belly (*Harengulae sp.*), Spanish sardine (*Sardinella sp.*), anchovies (*Anchoa sp.*), and menhaden (*Brevoortia sp.*).

Note: Also see *Commercial Fisheries Review*, November 1959, p. 39.



Hawaii

COMMERCIAL FISHERIES LANDINGS, 1959:

The commercial fisheries landings of sea and pond fish and shellfish in the State of Hawaii during the calendar year 1959 amounted to 16.6 million pounds, valued at \$3.2 million ex-vessel, according to the Hawaiian Division of Fish and Game. As compared with the previous calendar year, the catch showed an increase of 5.2 million pounds, or 45.9 percent in volume, and \$546,881, or 20.8 percent, in value. The increase is largely due to the skipjack tuna (*Katsuwonus*

pelamis) catch which increased 5.6 million pounds, or 81.6 percent in volume, and \$575,833, or 64 percent in value. In addition to skipjack tuna, landings of other important species which increased substantially were yellowfin tuna (*Neothunnus macropterus*) by 160,636 pounds, or 39.4 percent, and black marlin (*Makaira ampla*) by 131,118 pounds, or 43.1 per-

Table 1 - Hawaiian Commercial Fishery Landings and Ex-Vessel Values, 1958-59

Species	English Name	Hawaiian Name	1959		1958	
			Quantity 1,000 Lbs.	Value US\$ 1,000	Quantity 1,000 Lbs.	Value US\$ 1,000
Ocean Catch:						
Amberjack		Kahala	79	23	89	23
Big-eyed scad		Akule	156	125	179	123
Dolphin		Mahimahi	119	53	149	58
Goatfish		Weke-ula				
		Weke	127	78	141	82
		Moana				
		Kumu				
Crevalles		Ulua	63	29	98	39
Mackerel		Opelu	192	76	188	78
Snappers:						
Gray		Uku	46	22	74	31
Pink		Opakapaka	110	56	141	67
		Kalekale				
Red		Ulaulu koae	73	65	89	68
		Ulaulu (ehu)				
Swordfishes, sailfishes, spearfishes, & marlins		A'u & A'u lepe	797	200	725	184
Tuna & tunalike fish:						
Albacore		Ahipalaha	11	2	16	4
Big-eyed & bluefin		Ahi	1,322	574	1,596	622
Yellowfin		Ahi	569	178	408	117
Skipjack		Aku	12,413	1,475	6,835	899
Bonito		Kawakawa	19	4	42	7
Shellfish:						
Crabs		Kona, Kauakonu	8	4	8	3
Limpet		Opihi	13	5	10	4
Lobster, spiny		Ula	12	8	9	6
Octopus		Hee	4	3	7	4
Shrimp		Opae	-	-	1	1
Squid		Muhee	5	2	25	6
Other fish & shellfish			346	139	436	182
Total Ocean Catch			16,484	3,121	11,268	2,589
Pond Catch:						
Clams		Olepe	3	1	4	1
Crabs		Kuakonu, Papai	2	1	2	1
Milkfish		Awa	32	13	16	8
Mullet		Amama	45	37	57	47
Tilapia		-	2	1	5	1
Other species		-	12	5	11	5
Total Pond Catch			96	58	95	63
Grand Total			16,580	3,179	11,363	2,652

cent. Landings dropped for big-eyed tuna (*Parathunnus sibi*) by 274,155 pounds, or 17.2 percent, striped marlin (*Makaira audax*) by 55,280 pounds, or 15.9 percent, pink snappers (*Pristipomoides microlepis*) by 33,345 pounds, or 27.4 percent, and big-eyed scad (*Trachurops crumenophthalmus*) by 23,008 pounds, or 12.9 percent.

Note: See *Commercial Fisheries Review*, June 1959, p. 37.



Michigan

REGULATION OF COMMERCIAL FISHERIES NOW RESPONSIBILITY OF CONSERVATION COMMISSION:

Beginning March 19, 1960, regulation of Michigan's commercial fishing industry becomes a responsibility of that State's Conservation Commission. This involves about 1,000 licensed operators

and some 39,000 square miles of Great Lakes waters--nearly twice the combined area of the seven other Great Lakes States. Under its new authority, the Commission will be empowered to adjust regulations with the exception of license fees and penalties.

Department of Conservation officials will study suggested changes concerning mesh sizes, seasons, size limits, and other matters. No quick or marked changes in present regulations are foreseen, however.

The shift in control from the State Legislature to the Commission is designed to create closer contact between the industry and its governing body. Previously, the Commission's power was piecemeal. It was charged with enforcing regulations, licensing fishermen, collecting spawn, and compiling statistics, including daily catch records of licensed fishermen.

Department leaders view the new arrangement as particularly important in setting uniform regulations with other states and Ontario. Control of sea lamprey and rehabilitation of lake trout in the Great Lakes will be important concerns.

During 1959, Michigan's commercial fishery operators netted approximately 21 million pounds of fish for a vessel value of almost \$3 million. The lake trout catch totaled 658,000 pounds, all of which was taken in Lake Superior. Because of the lamprey's predation, lake trout production in the other lakes is nil and even in Lake Superior spawning stock has been all but eliminated by the predator.



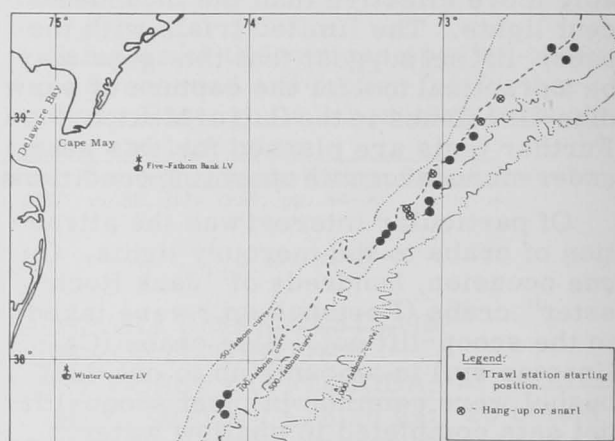
North Atlantic Fisheries

Exploration and Gear Research

DEEP-WATER RED CRAB TRAWLING EXPLORATIONS CONTINUED:

M/V "Delaware" Cruise 60-2 (February 11-28, 1960): This cruise was made by the U. S. Bureau of Commercial Fisheries research and exploratory

fishing vessel Delaware in cooperation with the Bureau's Fisheries Biological Laboratory, Woods Hole, Mass. The purpose of the cruise was threefold: (1) to complete hydrographic transects from the continental shelf to the Gulf Stream in the area between Georges Bank and Cape Hatteras, (2) to further investigate the distribution and availability to trawling gear of red crabs along the edge of the continental shelf bordering the mid-Atlantic area (February 21-25), and (3) to conduct trawling operations along a series of transects between Cape Hatteras and Martha's Vineyard.



M/V Delaware Cruise 60-2 (February 11-28, 1960).

Deep-water trawl explorations east of Ocean City, Md., indicated concentrations of red crabs (Geryon quinquegens) were reduced at this season of the year, when compared with fishing results obtained at the same location during the summer season.

The largest individual catch taken on the cruise was 89 crabs, weighing approximately 125 pounds, during a 30-minute tow in 250-fathom depth with a standard No. 36 net. No red crabs were found to occur in depths of less than 100 fathoms. The result of tows made at intermediate depths between 90-250 fathoms indicated that except for an occasional stray, the inshore limit of the red crab depth-range at this season is approximately 130 fathoms in the area studied.

The cruise was harassed by bad weather which hampered operations during all phases. However, the coverage of red crab explorations was extended northward from Cape May (northern limit of

previous work) to the Hudson Canyon. The continental slope in the area worked is extremely broken and precipitous, and depth contours were difficult to follow with trawl gear.

A standard No. 36 otter trawl (60' foot rope, 80' head rope) was used on all exploratory tows. Conclusive work in depths exceeding 250 fathoms was impractical due to inadequacy of the electronic equipment.

Note: Also see Commercial Fisheries Review, September 1959, p. 37.

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NEW ENGLAND COMMERCIAL BLUEFIN TUNA PURSE-SEINING, 1959 SEASON:

Commercial-scale purse-seining for bluefin tuna in the waters of the Gulf of Maine in the North Atlantic was continued in 1959 by the converted commercial trawler Silver Mink with limited assistance from the U. S. Bureau of Commercial Fisheries exploratory fishing staff at Gloucester, Mass.

Catch of the Tuna Seiner <u>Silver Mink</u> , 1959		
1959	Number of Fish	Weight Lbs.
Aug. 3	722	102,420
9	461	64,730
12	225	30,880
15	696	92,770
20	1,943	261,459
21	342	45,220
23	930	124,551
24	509	65,395
26	631	83,952
27	951	117,116
31	367	46,614
Sept. 3	600	76,350
4	515	62,800
5	568	68,880
7	286	37,670
8	206	27,450
10	356	44,575
11	672	85,900
12	150	20,220
15	158	21,900
24	289	33,980
Totals . .	11,577	1,514,832

Note: Average weight of individual fish, 130.8 lbs.

Over 750 tons of bluefin were seined during the 1959 season which extended from August 3 to September 24, and in-

cluded 21 fishing (operational) days. The catch of tuna landed by the Silver Mink during this period surpassed the 1958 catch by 570 tons. The majority of the seining operations which produced this catch were carried on within a radius of less than 25 miles from Provincetown, Mass.--the home port of the Silver Mink.

Note: Also see Commercial Fisheries Review, February 1959, p. 1.



North Atlantic Fishery Investigations

GULF STREAM INFLUENCE ON FISH DISTRIBUTION AND ABUNDANCE ALONG CONTINENTAL SHELF:

M/V "Delaware" Cruise 60-2 (February 10-26, 1960): A cruise was made by the U. S. Bureau of Commercial Fisheries research vessel Delaware to investigate the influence of the Gulf Stream (slope water and shelf water) on the distribution and abundance of marine fish and invertebrates along the continental shelf and from Cape Hatteras to Martha's Vineyard.



The Service's research vessel, Delaware.

A partial hydrographic transect was made from Cape Ann, Mass., to the Gulf Stream by biologists from the Bureau's Woods Hole Biological Laboratory. Fishing operations were conducted at various depths from 40 to 250 fathoms from the Winter Quarter Lightship, Five Fathom Lightship, and Barnegat Lightship.

Inclement weather throughout most of the cruise hampered the completion of all objectives. A total of 32 species was caught and several species brought back to the Laboratory for further identification. The data collected showed that the hakes (silver hake, American hake, white hake, red hake, and long-finned hake) were the most abundant species caught.

This cruise was executed in three phases. The first and third were on biological objectives, and the second phase was devoted to exploratory fishing for red crab (see p. 26 of this issue).

* * * * *

FISHING SURVEY OF CONTINENTAL SHELF ALONG GEORGES BANK:

M/V "Delaware" Cruise 60-3: A fishing survey of the continental shelf was conducted (March 9-17, 1960) by the U. S. Bureau of Commercial Fisheries research vessel Delaware along the eastern side of Georges Bank. The secondary purpose of the trip was to determine the vertical movements of the whiting or silver hake and American or white hake.

Three transects of six stations, each commencing 5 miles north of Corsair Canyon to Channel, and one transect approximately 13 miles south of Hudson Canyon were the areas of investigation. Trawling was concentrated at 150 fathoms.

Trawling operations with a No. 36 trawl were carried out at only one transect on Georges Bank. Further operations were prevented by foul weather and icing conditions. Trawling operations with a No. 36 and a midwater trawl were carried out through 2 of 3 time periods. The third period was not completed due to adverse weather.

On Georges Bank, 20 species of fish were recorded with numbers of each varying according to depth. At Hudson Canyon 16 species were recorded. Whiting and white hake were most plentiful at 150 fathoms. No fish were taken in the midwater trawl.

North Pacific Exploratory Fishery Program

FISHING GEAR RESEARCH AND EVALUATION STUDIES CONTINUED:

M/V "John N. Cobb" Cruise 45: Fishing gear research and evaluation studies were scheduled by the U. S. Bureau of Commercial Fisheries' exploratory fishing and gear research vessel John N. Cobb in the Straits of Juan de Fuca and along the Pacific Coast of Washington from February 25-April 15, 1960.



SCUBA divers boarding diving sled preparatory to observing bottom trawls in action. Float in background is attached to door of trawl.

Preliminary tests and observations were to be made in the vicinity of Dungeness Spit at the eastern end of the Straits of Juan de Fuca. Comparative fishing tests of the modified trawls were to be made on the trawling grounds between Destruction Island and Cape Flattery off the Washington Coast.

Objectives of the cruise were to complete final modifications on the "free-wing trawl and the "blanket" trawl, which were originally designed and tested in 1959, and to systematically compare the fishing ability of the new nets with that of standard gear.

Nets modified to conform to characteristics suggested by last year's experiments were to be operated and observed in action by SCUBA divers riding a "diving sled." After final adjustments, test fishing was to be conducted on commercial bottomfish grounds. The new nets were to be compared as to efficiency with

a standard 400-mesh eastern-type otter trawl.

Note: Also see Commercial Fisheries Review, June 1959, p. 44 and May 1959, p. 30.



Radiation Preservation

GOVERNMENT INCREASES RESEARCH ON RADIATION PROCESSING OF FOODS:

Through the stimulus of the Interdepartmental Committee on Radiation Preservation of Foods, definite steps are now being taken to carry forward a national program of research and development on radiation processing of food. This important phase of the President's Atoms for Peace Program was announced on March 28 by Deputy Administrator of the Business and Defense Services Administration, U. S. Department of Commerce. He is Chairman of the nine-agency Committee.

The Atomic Energy Commission has established a program of research and development on low-dose radiation processing of perishable foods to extend shelf life. During the next five years the Atomic Energy Commission expects to spend approximately \$5 million on this project. During fiscal years 1960 and 1961, \$115,000 and \$500,000, respectively are being devoted to the program. Under the Atomic Energy Commission program, emphasis will be placed on basic studies in food chemistry, microbiology, wholesomeness testing, preservation factors of shelf life extension and radiation processing technology.

The Department of the Army has approved a revised Army food irradiation program. Over a six-year period, the Army Research program will cost an estimated \$5 million. It also proposes to construct a radiation food research facility to cost about \$1.8 million. This facility will consist of a megacurie cobalt 60 gamma irradiator, variable voltage linear electron accelerator, and associated facilities with emphasis on high-dose treatment of foods.

The Departments of Agriculture, Interior, and Commerce have conducted research and development in their re-

spective areas and indicate they plan to continue their individual programs in cooperation with the Army and the Atomic Energy Commission. Interior's work is on fishery products.

Research on the use of radiation for processing food must take into account the provisions of the several food regulatory acts, such as those administered by the Department of Health, Education and Welfare, and the Department of Agriculture. The wholesomeness and safety of radiation-processed food must therefore be established to the satisfaction of those agencies.

Agencies represented on the Committee are: Departments of State, Interior, Agriculture, Commerce, Health, Education and Welfare, Army, Atomic Energy Commission, Small Business Administration, and International Cooperation Administration.

As the national research and development program on radiation processing of food progresses, the Interdepartmental Committee through its member agencies will encourage commercial adoption of this technology.

Note: Also see Commercial Fisheries Review, October 1959, p. 16.



South Atlantic Exploratory Fishery Program

EXPLORATORY TRAWLING OPERATIONS OFF SOUTH ATLANTIC COAST:

M/V "Silver Bay" Cruise 22: An exploratory fishing survey was conducted along the South Atlantic Coast between Cape Hatteras, N. C., and Brunswick, Ga., during a 32-day cruise of the U. S. Bureau of Commercial Fisheries chartered fishing vessel Silver Bay, which ended on March 18, 1960. During the survey, 186 stations were made in depths ranging from 5-150 fathoms.

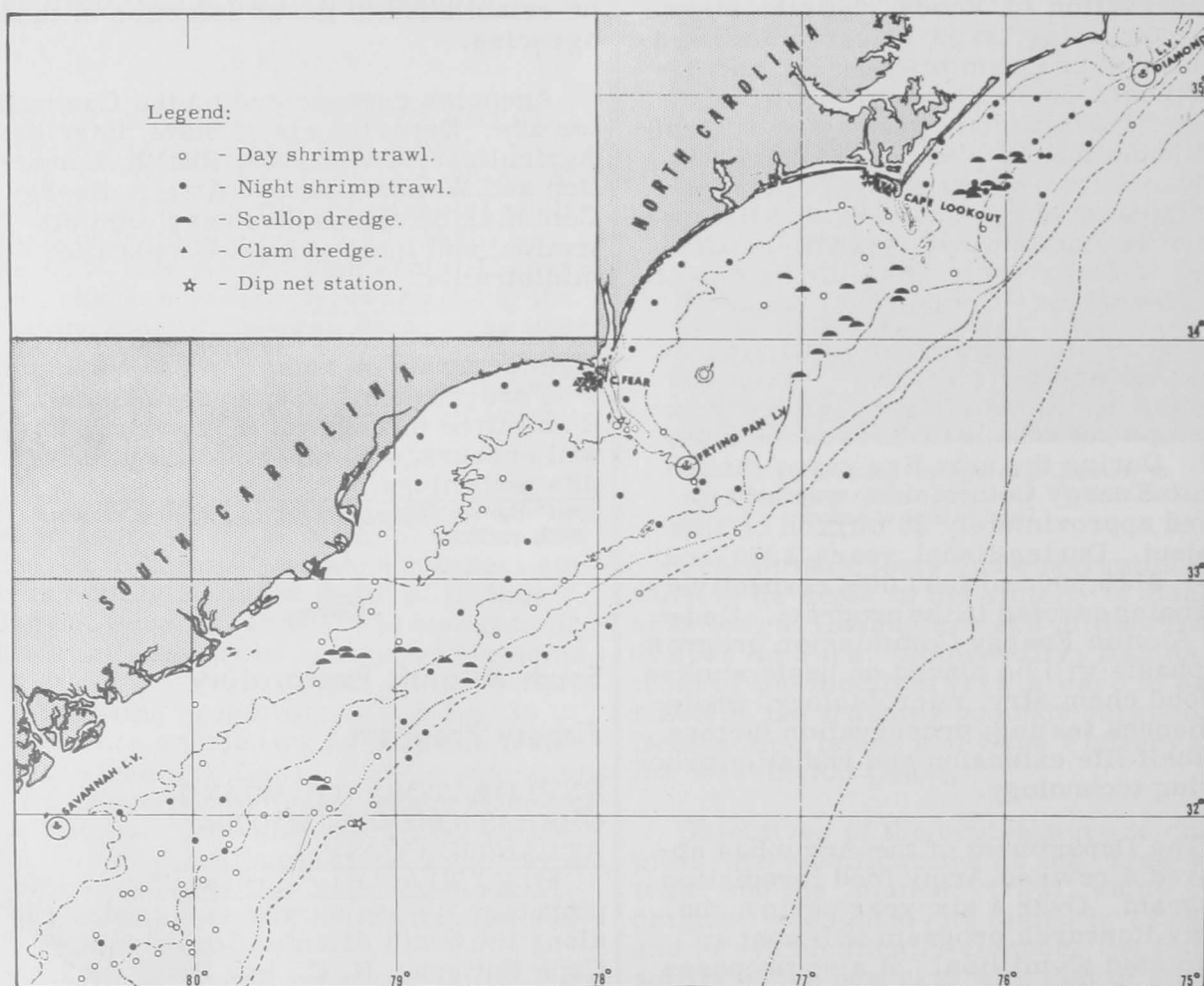
FISH: Exploratory trawling produced maximum catches of 1,000 pounds of mixed fish per one-hour drag. The best catches were made outside the 15-fathom curve

and consisted mostly of porgies (Stenotomus), lizardfish (Synodus), sea robins (Prionotus), ling (Urophycis), small spots (Leiostomus), and croakers (Micropogon). Catches of flounders (Paralichthys), weakfish or gray sea trout (Cynoscion), and kingfish or king whiting (Menticirrhus) ranged from 0 to 75 pounds per tow. No appreciable difference was noted between the catch rates for the 45 daytime and 55 nighttime tows.

SHRIMP: Rock shrimp (Sicyonia) were present in small amounts in most drags

$\frac{1}{2}$ -hour drag were made in 16-19 fathoms off Core Banks, N. C. These catches were exceptionally free of trash. One 80-pound bushel yielded $3\frac{1}{2}$ pints of meats. Subsequent catches with a balloon trawl in 21 fathoms yielded approximately 4 pints of meats per bushel. From Cape Lookout, N. C., to Doby Sound, Ga., individual scallops were taken in depths ranging from 10 to 100 fathoms. A total of 57 tows were made.

CLAMS: Fourteen clam drags off Cape Lookout produced hard clams (Venus mer-



M/V Silver Bay Cruise 22 (February 16-March 18, 1960).

from Cape Lookout to Savannah in the 15-70 fathom depth range. Individual pink shrimp (Penaeus duorarum) and white shrimp (P. setiferus) were found in the 10-20 fathom depth range. No concentrations were observed.

SCALLOPS: Catches as high as 15 bushels of scallops (Pecten gibbus) per

cenaria sp.) at the rate of 1 to 5 bushels per hour. Limited explorations off the mouth of the Cape Fear River produced from zero to 24 clams per 15-minute tow in the 6 to $6\frac{1}{2}$ -fathom depth range. The clams ranged from 4- $5\frac{1}{2}$ inches in length and were equal in taste and texture to those previously located off Beaufort Inlet, N. C. A total of 28 drags were made.

GEAR: More than half the drags were made with 41'/47', $\frac{1}{2}$ -inch mesh cotton balloon trawl fished with 44' tickler chain 6' chain doors, and 6' legs on a 25-fathom bridle. One tow was with a 70'/90', $2\frac{1}{2}$ -inch mesh nylon fish trawl on 8' bracket doors. For clams, a 14-tooth Fall River-type clam dredge was used. For scallops, a modified 8' Georges Bank-type scallop dredge with 2" rings and $1\frac{1}{2}$ " mesh liner was used.

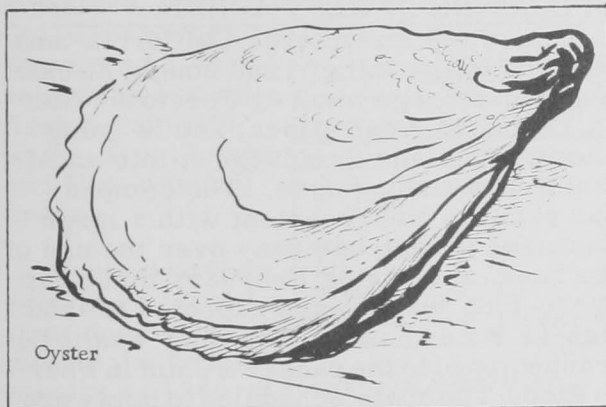
Note: Also see Commercial Fisheries Review, March 1960, p. 26 and February 1960, p. 42.



South Carolina

FISHERIES BIOLOGICAL RESEARCH PROGRESS, JANUARY-MARCH 1960:

Oyster Research: To determine with reasonable accuracy progress of seed planted on a subtidal oyster bed in the Ashepoo River, individual oysters from

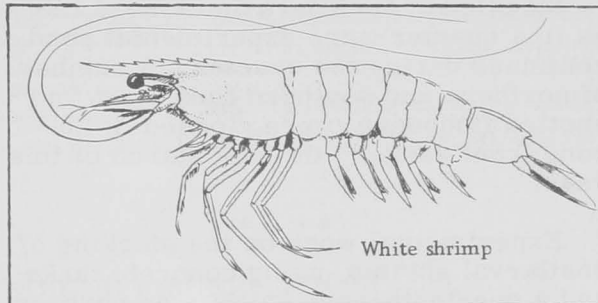


three plantings and native oysters dredged from the area prior to planting were measured, numbered, and placed in covered wire baskets. These baskets were attached to a wire cable which was then anchored on the bed, so that the baskets could be recovered easily. These oysters will be measured at intervals and records kept as to growth and mortality, according to Progress Report No. 43, Bears Bluff Laboratories, Wadmalaw Island, S. C.

Salinities in the area of experimental planting have varied widely during January-March--from 24.5 parts per thousand recorded January 12, to 11.6 parts per thousand on March 18, both from bottom samples.

Shrimp Research: The shrimp research continued on schedule throughout the quarter with experimental drags in inshore waters. Small white shrimp and croakers were particularly abundant, showing considerable increases over the same periods for 1958 and 1959. The abundance of white shrimp during the past winter should indicate a good catch for this species in the coming year, provided no great damage was caused by the cold snap experienced in March.

White shrimp were 88 percent more abundant in experimental drags at eight regular stations during January-March 1960 than for the same period of 1959, and were over 97 percent more abundant than during the same quarter in 1958.



Croakers were up 65 percent over last year and 82 percent greater than in 1958. Although spot showed no large increase, the average catch per unit of effort for this species was somewhat greater for the 1960 quarter than for the corresponding periods of 1958 and 1959.

A new program for the study of commercial shrimp postlarvae was initiated at Bears Bluff in January of this year. As a part of this study, 73 standard plankton tows were made during the quarter at regular stations throughout the shrimp survey area. A primary objective of this study is to determine the feasibility of obtaining postlarval shrimp as seed stock for commercial ponds. It is also felt that research on postlarval shrimp will prove of great value in the future with regards to such matters as predicting yearly abundance and distribution of commercial shrimps.

Considerable numbers of Penaeus aztecus postlarvae were taken in plankton tows during late February and early March, particularly in the Calibogue Sound and North Edisto River areas.

Shortly after the beginning of the cold spell in March, however, the numbers of these postlarvae declined suddenly at all stations. The extent of damage caused by the 6-10° F. drop in water temperatures cannot at present be ascertained.

Pond Cultivation: During the quarter, the Laboratoris' oyster pond was drained and a considerable amount of silt was washed out by means of a pressure hose. Silting poses a great problem to oyster cultivation generally, and is particularly troublesome in pond cultivation. Experiments with transplanted seed oysters were expected to be resumed in the oyster pond during the second quarter.

Stocking of flounders and forage fishes in a quarter-acre experimental pond continued during the quarter. A number of northern and southern fluke, and four-spotted flounders, were stocked in the pond from January through March of this year.

Experimental work on the stocking of postlarval shrimp, using concrete tanks and a one-tenth-acre salt-water pond, is also in progress.



Transportation

RAILROADS ATTEMPTING TO MEET MOTOR CARRIER RATES FOR SHRIMP:

The Southwestern Freight Bureau, Inc., has proposed trailer-on-flatcar service (TOFC) rates on frozen shrimp from Texas and Louisiana points to compete with charges of exempt motor carriers. Following is a list and a comparison of rates:

Origin	Destination	Competitive Exempt Truck Rates	TOFC Rates
(Rate Per 100 Lbs.)			
New Orleans, La.	Memphis, Tenn.	\$ 1.25	\$ 1.25
New Orleans, La.	Chicago, Ill.	1.75	1.75
New Orleans, La.	Des Moines, Iowa	2.00	1.75
New Orleans, La.	Minneapolis, Minn.	2.25	2.25
Galveston, Tex.	Memphis, Tenn.	1.50	1.50
Galveston, Tex.	Des Moines, Iowa	2.00	1.75
Galveston, Tex.	Chicago, Ill.	2.00	2.00
Galveston, Tex.	Minneapolis, Minn.	2.25	2.25
Brownsville, Tex.	Memphis, Tenn.	1.75	1.75
Brownsville, Tex.	Des Moines, Iowa	2.25	2.25
Brownsville, Tex.	Chicago, Ill.	2.25	2.25
Brownsville, Tex.	Minneapolis, Minn.	2.50	2.25

The Texas and New Orleans Railroad, which serves Aransas Pass, Palacios, Port Lavaca, and Rockport, Tex., as well as Berwick, Houma, Lafayette, and Morgan City, La.,

will not be covered by this arrangement. This originating railroad for these places cannot count on sufficient volume of frozen shrimp or other commodities to construct facilities for profitable operation of this kind of service.

The proposed rail rates apply on frozen shrimp in packages subject to a minimum weight of 22,000 pounds based on the net weight of the shrimp. The weight of ice and packages is transported free subject to a limitation that the weight thereof shall not exceed 30 percent of the weight of the frozen shrimp. Shipments in trailers are accepted only when the carrier has suitable equipment.

The proposed rates are subject to diversion and reconsignment rules which provide that where instructions are received in sufficient time to be effected before the trailer is unloaded, the first diversion or reconsignment is without charge, the second is \$5, and the third and fourth are made at \$10 each.

The railroads earlier established favorable rates into the northeast for shrimp in regular carload lots but have yet failed to attract any significant volume of shipments.

This is another endeavor by railroads to meet exempt motor carrier competition. It is unusual for the railroads to charge on a net-weight basis. This points up the interest of railroads to attract shrimp traffic.



Tuna

TWO LARGE CALIFORNIA PACKERS OPERATING IN WEST AFRICA:

One of the three large California tuna packers in the fall of 1959 bought an existing cold-storage plant at Freetown, Sierra Leone, in West Africa, and is going ahead with plans to enlarge it into an Atlantic tuna fishing base. The company has come to an agreement with a large Japanese fishing company over the use of the base, and during February three Japanese tuna boats were expected to land fish at Freetown. The fish was to be transhipped to the packer's plant in Puerto Rico. The boats scheduled to land were No. 18 Azuma Maru (100 tons of albacore), the No. 1 Koyo Maru (280 tons of albacore), and the No. 2 Banshu Maru (770 tons of albacore), or a total of 1,150 tons. The cold-storage plant at Freetown was a small plant with only 150-ton capacity when purchased, but it has now been enlarged to an estimated 500-ton capacity. It is said that plans call for enlargement to 3,000-ton capacity soon.

Another of the three large California packers is also going ahead with plans for a cold-storage plant at the new port of Eima outside of Accra, in Ghana.

Japanese trading companies are also surveying West Africa areas at present with similar plans.



United States Fishing Fleet ^{1/}Additions

FEBRUARY 1960:

A total of 26 vessels of 5 net tons and over was issued first documents as fishing craft during February 1960--a decrease of one vessel compared with the

Table 1 - U. S. Vessels Issued First Documents as Fishing Craft by Areas, February 1960

Area	February		Jan.-Feb.		Total
	1960	1959	1960	1959	
	(Number)				
New England . .	1	-	2	2	15
Middle Atlantic .	3	-	4	-	12
Chesapeake . . .	4	4	9	13	106
South Atlantic .	7	4	10	12	76
Gulf	3	10	7	16	135
Pacific	7	5	9	8	97
Great Lakes . . .	1	2	1	3	6
Alaska	-	2	-	2	32
Total	26	27	42	56	479

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

same month in 1959. The South Atlantic and Pacific areas led with 7 vessels each. The Chesapeake area followed with 4 vessels, while the Middle Atlantic and Gulf areas were next with 3 each. The remaining 2 vessels were issued first documents in the Great Lakes and New England areas.

Forty-two vessels were issued first documents during the first 2 months of 1960--14 vessels less than were reported during the same period of last year. Most of the decline was in the Gulf area which represented a decrease of 9 vessels as compared with the same period in 1959.

^{1/}Includes both commercial and sport fishing craft.

Table 2 - Vessels Issued First Documents as Fishing Craft by Tonnage, February 1960

Net Tons	Number
5 to 9	14
10 to 19	2
20 to 29	3
30 to 39	3
40 to 49	2
60 to 69	1
330 to 339	1
Total	26



U. S. Foreign Trade

CANNED FISH AND SHELLFISH EXPORTS, 1959:

United States exports of canned fish and shellfish have steadily declined in both value and quantity from 1955 through 1958. In 1959 there was a change and an increase took place in both quantity and value.

Table 1 - United States Exports of Fish and Shellfish, 1955-59

Item	1959	1958	1957	1956	1955
	(Millions of Lbs.)				
Quantity:					
Fish	54	32	51	63	71
Shellfish	13	8	17	19	18
Total	67	40	68	82	89
(Millions of \$)					
Value:					
Fish	17	11	12	13	17
Shellfish	4	3	4	5	4
Total	21	14	16	18	21

Table 2 - United States Exports of Fish and Shellfish by Principal Products, 1958-59

Product	1959		1958	
	Lbs.	\$	Lbs.	\$
Canned fish:				
Salmon	13,825,940	10,638,661	9,226,711	6,668,900
Sardines in oil . .	1,271,215	292,713	645,419	164,428
Sardines not in oil	37,453,480	5,843,435	17,816,275	3,231,400
Tuna	232,919	138,856	335,536	216,073
Mackerel	743,046	134,988	2,307,753	332,835
Fish, not else-where covered .	371,847	326,474	1,199,115	495,844
Total canned fish .	53,898,447	17,375,127	31,530,809	11,109,480
Canned shellfish:				
Shrimp	2,876,493	2,898,453	2,161,451	2,548,019
Squid	9,156,111	905,516	5,583,257	500,711
Shellfish, not else-where covered .	598,769	466,587	595,664	372,123
Total canned shellfish	12,631,373	4,270,556	8,340,372	3,420,853

* * * * *

EDIBLE FISHERY PRODUCTS, JANUARY 1960:

Imports of edible fresh, frozen, and processed fish and shellfish into the United States during January 1960 decreased by 16.4 percent in quantity and 12.1 percent in value as compared with December 1959. The decrease was due primarily to lower imports of groundfish and other fillets (down 7.6 million pounds) and frozen albacore and other tuna (down 8.6 million pounds), and to a lesser degree, a decrease in the imports of fresh and frozen salmon and shrimp. The decrease was partly offset by a 3.7-million-pound increase in the imports of canned salmon.

United States Foreign Trade in Edible Fishery Products, January 1960 with Comparisons

Item	Quantity			Value		
	January 1960	1959	Year 1959	January 1960	1959	Year 1959
	(Millions of Lbs.)			(Millions of \$)		
Imports:						
Fish & shellfish: Fresh, frozen, & processed ^{1/} . . .	81.7	88.2	1,070.5	24.8	24.8	309.8
Exports:						
Fish and shellfish: Processed only ^{1/} (excluding fresh & frozen) . . .	6.6	2.4	68.0	1.8	0.8	22.8

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

Compared with January 1959, the imports in January this year were lower by 7.3 percent in quantity, but the value was unchanged. Lower imports of groundfish and other fillets (down 10.4 million pounds) and tuna other than albacore (down 2.7 million pounds) were primarily responsible for the decrease. Compensating, in part, for the decreases were increases of 3.8 million pounds in the imports of frozen albacore tuna, canned salmon (up 3.9 million pounds), and lobster and spiny lobster (up 1.8 million pounds).

United States exports of processed fish and shellfish in January 1960 were up by 20.6 percent in quantity and 20.0 percent in value as compared with December 1959. Compared with the same month in 1959, the exports this January were higher by 173.8 percent in quantity and 125.0 percent in value.

Total exports of processed fish and shellfish for calendar year 1959 were up about 65.0 percent in quantity and 41.2 percent in value as compared with 1958.



Wage-Hour Fishery Exemption

BREADED SHRIMP PROCESSING COMES UNDER EXEMPTION:

With reference to Secretary of Labor Mitchell's order requiring shrimp bread-planting to pay Federal minimum wages under the Wage-Hour Law, Federal Judge Frank Scarlett recently rejected the Labor Secretary's order. The Wage-Hour Law includes the fishery exemption, which the Wage-Hour Administrator and the Secretary of Labor, through an interpretation, have tried to upset. The fishing industry has won a number of legal cases on the fishery exemption, but the Wage-Hour Administrator continues to bring court action in other jurisdictions.

The Federal Judge's ruling applies not only to the firm in Thunderbolt, Ga., which was involved in the case, but also to other firms engaged in shrimp processing. A St. Simons Island, Ga., shrimp firm intervened in the case on the side of the Thunderbolt, Ga., firm.

In his finding, the Federal Judge cited an exception allowed by Congress to the seafood industry and said if he found otherwise many packers might be put out of business since under the Wage-Hour Law employees may demand additional wages for the past two years.

The Labor Secretary last year said that adding as much as 20 percent of bread to a seafood ended its exemption as intended by Congress. The plants add varying amounts of bread, often running to about 50 percent.

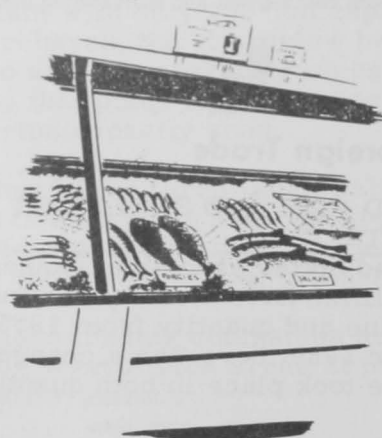


Wholesale Prices, March 1960

The March 1960 wholesale price index for edible fishery products (fresh, frozen, and canned) at 123.4 percent of the 1947-49 average was up 1.3 percent from the preceding month. Supplies of many fresh fish and shellfish items were curtailed sharply in March due to extremely stormy weather and resulted in higher wholesale prices for many fresh fishery products. From March a year ago to this March the wholesale fishery products price index was down by 3.7 percent due primarily to lower fresh and frozen shrimp prices and frozen haddock fillet prices.

The market for fresh haddock at Boston in March this year continued to be weak due to seasonally better landings and large inventories of frozen fillets. All other items in the drawn, dressed, and whole finfish subgroup were higher in March this year as compared with the preceding month with the exception of frozen dressed halibut, which was unchanged. The net result was an increase of one percent for the subgroup as a whole from February to March this year. Compared with March 1959 the subgroup wholesale price index was lower by 3.3 percent due chiefly to 12.4 percent lower drawn haddock prices at Boston and a drop of 12.4 percent in frozen dressed halibut prices. Lower prices for these items more than offset increases in the wholesale prices for frozen king salmon, fresh-water drawn whitefish and round yellow pike.

Fresh processed fish and shellfish prices in March this year were up by 5.7 percent from the preceding month due to a sharp rise (13.4 percent) in the wholesale price for fresh shrimp at New York and a lesser increase of about 1.9 percent in the price for fresh shucked oysters. These increases in March more than offset a 15.8-percent drop in the fresh small haddock fillet price. From March last year to March this year the subgroup wholesale price index dropped



2.5 percent. Fresh haddock fillets were lower by 27.4 percent and fresh shrimp down by 11.5 percent in March this year as compared with March 1959. During the same period shucked oyster prices rose 14.9 percent.

The wholesale price index for frozen processed fish and shellfish in March 1960 was down 1.0 percent from February. Frozen shrimp prices increased slightly (less than 1/2 cent a pound) and frozen ocean perch fillets rose by 3.6 percent in March from the preceding month. These increases in March this year over the preceding month were more than offset by an 8.0-percent drop in frozen haddock fillet prices. In March 1960 the subgroup wholesale price index was down by 18.5 percent from March a year ago. Lower frozen fillet

prices (particularly haddock which was down by 27.8 percent) plus a 21.0-percent drop in frozen shrimp prices were responsible for the decline.

Primary wholesale prices for canned fishery products remained unchanged in March 1960 for the fourth straight month. Supplies of California sardines and domestic canned salmon at the primary distributor level were about exhausted at the end of March. In addition stocks of Maine sardines were only fair and the only canned fish item in good supply was canned tuna. Compared with March 1959, primary canned fish prices were up about 5.1 percent this March due to higher prices for canned salmon and both California and Maine sardines. However, canned tuna prices were lower by 1.8 percent this March as compared with March 1959.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, March 1960 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices ^{1/} (\$)		Indexes (1947-49=100)						
			Mar. 1960	Feb. 1960	Mar. 1960	Feb. 1960	Jan. 1960	Mar. 1959			
			ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)								123.4
<u>Fresh & Frozen Fishery Products:</u>					137.6	134.9	135.1	148.8			
<u>Drawn, Dressed, or Whole Finfish:</u>					148.5	147.2	148.7	153.6			
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.12	.12	116.9	120.9	127.4	149.2			
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.29	.29	90.3	90.3	93.8	103.1			
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.78	.77	174.7	172.5	171.9	168.5			
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.79	.75	195.8	185.9	159.9	166.1			
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.72	.68	144.7	136.6	161.9	161.8			
Yellow pike, L. Michigan & Huron, rnd., fresh .	New York	lb.	.78	.73	181.8	170.0	166.5	170.0			
<u>Processed, Fresh (Fish & Shellfish):</u>					142.2	134.5	135.8	145.8			
Fillets, haddock, sml., skins on, 20-lb. tins . .	Boston	lb.	.35	.41	117.4	139.5	148.0	161.6			
Shrimp, lge. (26-30 count), headless, fresh . .	New York	lb.	.81	.71	127.2	112.2	106.6	143.8			
Oysters, shucked, standards	Norfolk	gal.	6.75	6.63	167.0	163.9	173.2	145.4			
<u>Processed, Frozen, (Fish & Shellfish):</u>					109.1	110.2	107.9	133.9			
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.38	.38	98.1	98.1	98.1	106.0			
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.29	.31	89.5	97.3	97.3	124.0			
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.29	.28	114.8	110.8	108.8	118.8			
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.68	.68	104.5	104.1	100.3	132.3			
<u>Canned Fishery Products:</u>					103.8	103.8	103.8	98.8			
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs. . .	Seattle	cs.	24.50	24.50	127.8	127.8	127.8	116.1			
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	10.80	10.80	77.9	77.9	77.9	79.3			
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	cs.	8.00	8.00	93.9	93.9	93.9	86.9			
Sardines, Maine, keyless oil, No. 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	8.75	8.75	93.1	93.1	93.1	87.5			

^{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.

