

# TRENDS AND DEVELOPMENTS

## Alaska

### FOREIGN FISHING ACTIVITIES IN BERING SEA:

Early May 1964: U.S.S.R.: During the second week in May 1964, the Soviet trawling fleet concentrated west of Yakutat began dispersing and moving to other regions nearer Kodiak Island. The main concentration, which assembled on the Portlock Bank (much as in past years), was estimated to include 86 trawlers, 16 freezerships, 2 factoryships, and a few support vessels. A smaller segment of the Soviet trawl fleet was operating west of Icy Bay in May 1964, and included approximately 30 trawlers, 3 freezerships, and 1 factoryship. The region south and west of Kodiak in the vicinity of Chirikof Island was exploited in May 1964 by a smaller Soviet trawling fleet composed of less than 5 trawlers and 1 freezership. Observations indicated that the Soviet fleets in the Gulf of Alaska were concentrating on Pacific ocean perch.



Fig. 1 - One type of Soviet factoryship operating in the North Pacific and Bering Sea. Length over-all about 150 feet with a speed of 10-12 knots.

The Soviet fleet fishing tangle nets for king crab continued to operate in the eastern Bering Sea in May 1964. That fleet consisted of 3 factoryships, each accompanied by twelve 40-foot picker boats and 2 SRT net-setting trawlers. The three Soviet king crab factory-

ships in the area were the Pavel Chebotnyagin operating north of Unimak Pass, and the Konstantin Sukhanov and the Vasiliy Blyukher, operating south of Hagemeister Island in outer Bristol Bay.

It is believed that two Soviet trawlers were still operating in May 1964 on the shrimp fishing grounds north of the Pribilof Islands and had been fishing in the area for over a month.

JAPAN: In May 1964, the shrimp factoryships Chichibu Maru and Einin Maru, each accompanied by 12 trawlers, continued to operate on shrimp grounds north of the Pribilof Islands.

During May, the Japanese tangle-net king crab fleet was reported to have been centered in outer Bristol Bay, north of Port Moller. That fleet consisted of 2 factoryships, the Tokei Maru and Tainichi Maru, each accompanied by 6 catcher vessels.

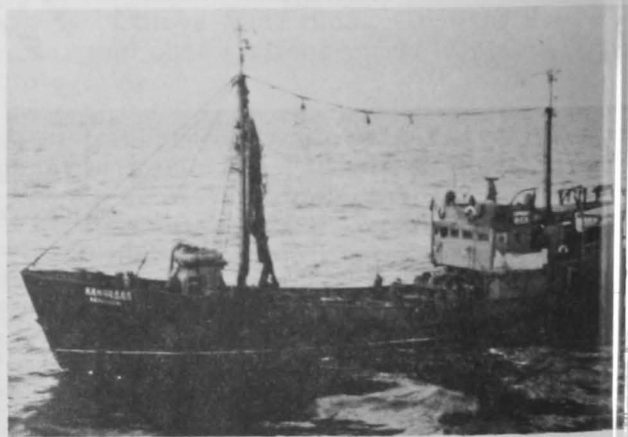


Fig. 2 - One type of Soviet trawler fishing in the North Pacific Bering Sea.

The Fuji Maru No. 3, accompanied by 5 long-line fishing vessels, was believed to have been fishing in the region of the 100-fathom curve, southeast of the Pribilof Islands. The Kotoshiro Maru No. 25, with one accompanying long-line fishing vessel, presumably was

operating in the same area as the Fuji Maru No. 3 fleet.

The fish-meal factoryships Hoyo Maru and Yokoei Maru, each accompanied by 30 trawlers, were operating in the eastern Bering Sea about 60 miles west of Amak Island.

Late May - Early June 1964: U.S.S.R.: During late May 1964, the large Soviet trawling fleet that built up off Yakutat had been shifting efforts between that area and the Portlock Bank region. As of early June, that fleet, estimated at 116 trawlers, 19 freezer-ships, 3 factoryships, 1 salvage tug, 1 tanker,

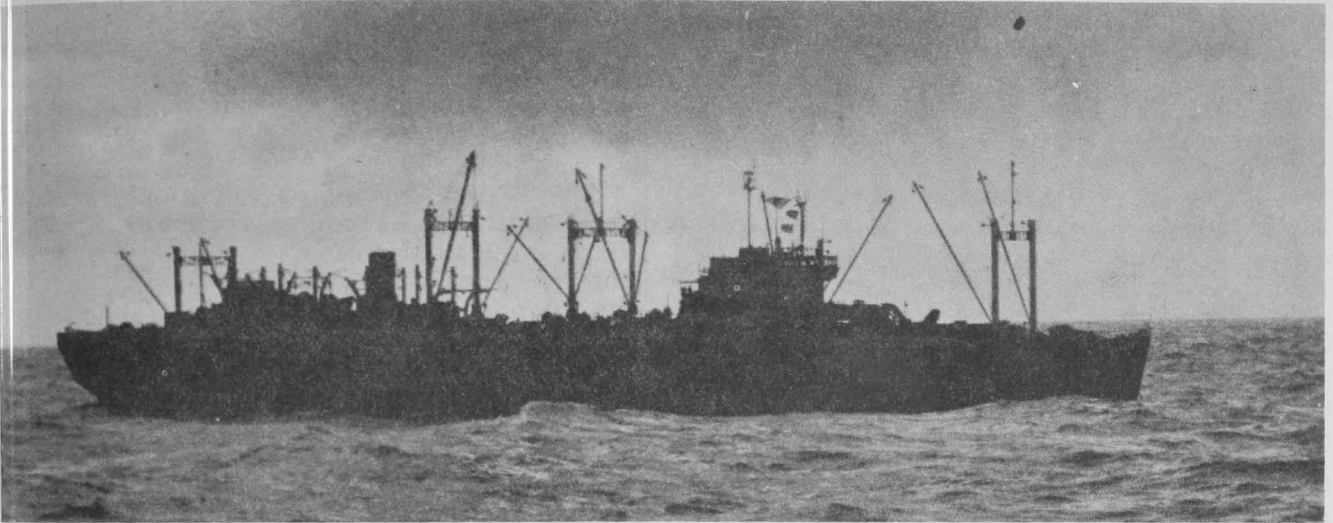


Fig. 3 - Japanese factoryship Tenyo Maru fishing in area west of St. Paul Island accompanied by 28 trawlers.



Fig. 4 - Washing silt and dirt from net loads of trawl-caught fish on the main deck of a typical Japanese factoryship.

The Tenyo Maru, accompanied by 28 trawlers, was reported fishing in the area west of St. Paul Island. The Tenyru Maru was reportedly fishing in the vicinity east of the Pribilof Islands. The stern-trawler Taiyo Maru No. 81 was located about 35 miles east of Cape Sitkinak, Trinity Islands.

Soviet and Japanese fishing activities in the Bering Sea continued into early June as follows:

and 2 cargo vessels, was again centered on Portlock Bank east of Kodiak. Observations and reports continued to indicate they were catching Pacific ocean perch with very small catches of other incidental species.

Soviet trawling effort appeared to be minimal in the area southwest of Kodiak, generally from Albatross Bank to Chirikof Island. A small fleet of about 4 trawlers and 1 reefer was fishing in that region.

The Soviet factoryship Konstantin Sukhanov and sisterships Pavel Chebotnyagin and Vasily Blyukher, each with at least two accompanying tangle-net setting trawlers, are continuing their operations on king crab in the Bering Sea north and east of Unimak Pass.

As of early June there was no confirmation that the two Soviet trawlers were still engaged in a shrimp fishery north of the Pribilof Islands. It was presumed that fishery might have been terminated.

**JAPAN: Shrimp Fishery:** The shrimp factoryships Chichibu Maru and Einin Maru, each accompanied by 12 trawlers, continued to operate on the shrimp grounds north of the Pribilof Islands. As of mid-June the side

trawler Tenryu Maru was believed to be still fishing for shrimp west of the Trinity Islands, southwest of Kodiak.

**King Crab Fishery:** The Japanese tangle-net fishery for king crab was reported to be centered in outer Bristol Bay, north of Port Moller. That fleet consisted of 2 factoryships, the Tokei Maru and Tainichi Maru, each accompanied by 6 catcher boats.



Fig. 5 - Sorting and weighing king crab meat prior to freezing aboard a Japanese crab factoryship.

**Long-Line Fishery:** Japanese press translations reported, the factoryship Fuji Maru No. 3, specially chartered to fish for halibut in the Area 3B North Triangle, was to return to Japan in late May and her five accompanying long-line vessels were to join the Seifu Maru fleet. Neither the Fuji Maru No. 3 nor the other Japanese halibut fishing fleet of the Kotoshiro Maru No. 25 and one accompanying long-line vessel were sighted during early June. It appeared likely that the Japanese disbanded their halibut fishing venture because of very poor fishing.

**Fish Meal:** The Japanese fish meal factoryships Hoyo Maru and Gyokuei Maru, each with 30 accompanying trawlers, were operating on the "flats" of outer Bristol Bay northwest of Port Moller. Other fleets licensed by the Japanese for fish meal, oil, and solubles production operating in the eastern Bering Sea the early part of June were the Tenyo Maru with 28 trawlers still working in the area northwest of St. Paul Island and the Soyo Maru and Seifu Maru each with 28 trawlers fishing just north of Unimak Pass. All 5 of those factoryships freeze selected portions of their catches for human consumption.

**Whaling:** Of the 3 whale factoryships which reportedly departed Japan on May 20 only one was sighted. The Kyokuyo Maru, probably

accompanied by 7 whale killers, was operating near Amchitka Pass in the western Aleutians. Another of the fleets, possibly the Nitto Maru was expected to appear in the Gulf of Alaska region between Kodiak and Dixon Entrance.

**"Exploratory" Fishing Activities:** The Japanese factory stern trawler Taiyo Maru No. 81 was last sighted about 70 miles west of Middleton Island in the central Gulf of Alaska. This vessel was primarily seeking Pacific ocean perch and was reportedly been experiencing good catches.

A second Japanese stern factory trawler in the Gulf, the Akebono Maru No. 51, moved from the Shumagin Islands region eastward into the area about 40 miles west of the Trinity Islands, southwest of Kodiak. Japanese "exploratory" efforts in 1963 reported sizeable catches of sidestripe and pink shrimp—the main species sought by that vessel.

**Groundfish Freezing Fishery:** The stern factory trawler Ibuki Maru and one accompanying smaller side trawler were licensed by Japan to engage in the groundfish fishery of the Bering Sea in 1964. About early June the vessel appeared north of Amchitka Pass in the western Aleutians. It was believed that the bulk of catches made by both vessels was being frozen aboard the factory trawler.

Note: See Commercial Fisheries Review, June 1964 p. 9.

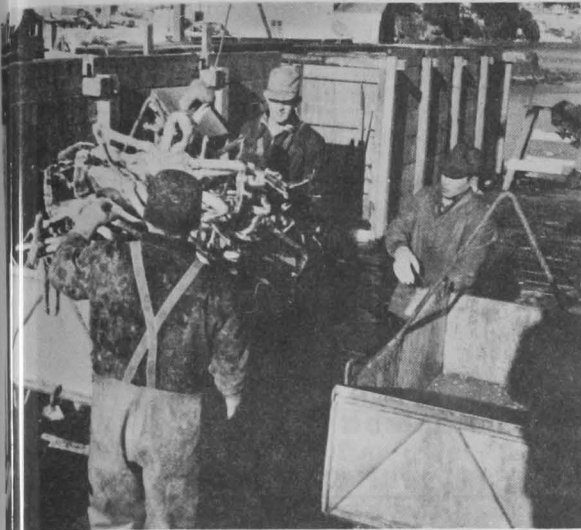
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#### PLANS OF KING CRAB PROCESSORS:

A number of Alaska's seafood processors plan to rebuild following the March earthquake. One processor, whose plants suffered little direct damage due to the earthquake and tidal waves, must raise his shore plants at Port Wakefield and at Seldovia due to land subsidence. A King crab operator at Kodiak plans to replace its shore plant there with facilities aboard a 160 x 60 foot barge. The firm does not plan to rebuild its Shearwater salmon cannery, but will maintain a compressor and gear storage at the old Shearwater cannery site. Another firm plans to rebuild its plant at Kodiak but details were not yet available. Two other king crab plants damaged by the earthquake were back in production by the end of May, but the crab supply was limited. A shrimp processing plant resumed its production of shrimp logs.

Other developments in Alaska's king crab fishery indicated significant expansion west





Handling king crab at a cannery in Kodiak before the March earthquake.

Kodiak. One major processor plans to convert from canning to freezing in the Shumagin Islands area. Significant new fisheries have developed on the Slime Bank in the Bering Sea and in waters surrounding Unalaska Island.

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NEW BARGE FACILITY AT KETCHIKAN BEING BUILT:

A contract was awarded in May to a building firm for construction of a highly versatile barge docking installation at Ketchikan and Northern Terminal Company's \$1.5 million water terminal and industrial park at Ketchikan in Southeastern Alaska.

The new facility will be parallel to the company's modern rail-barge basin and trans-shipment and will accommodate barges up to 100 feet in length. Rail trackage will be extended onto the new dock and a large ramp to the shore end of the basin will provide full on, roll-off capabilities.

As a result handling of cargo will be greatly facilitated on freight moving through the terminal to or from Southeastern Alaska waters. Such commodities as lumber, ores, and canned salmon may be transferred by barge directly from a barge to a railcar for shipment to markets in the other states. Work is scheduled for completion July 1, 1964.

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HERRING ROE READIED FOR SHIPMENT TO JAPAN:

The first 1964 shipment of herring roe to Japan was reported to be about 10 tons. The roe will be brine-cured and shipped to Japan in boxes where it will be placed on the domestic market. The product was being handled by a subsidiary of a leading Japanese fishing firm. The fishing and primary processing of the catch was to be done in Alaska by Alaskans.

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GEAR COUNT FOR SOUTHEASTERN ALASKA REGISTERED FISHING VESSELS:

A gear count has been completed for Southeastern Alaska purse-seine and gill-net vessels registered for 1964. The purse-seine gear count shows that gear is equally divided between residents and nonresidents and the number increased by 2 over the past 3 years. Gill-netting is down somewhat over the past three years.

Registrations for 1964 as compared with prior years are:

Purse Seine:

1964	.....	resident 243; nonresident 243; total 486.
1963	.....	resident 252; nonresident 232; total 484.
1962	.....	resident 247; nonresident 250; total 497.
1961	.....	resident 245; nonresident 206; total 451.

Gill-Netting:

1964	.....	resident 204; nonresident 166; total 370.
1963	.....	resident 287; nonresident 164; total 451.
1962	.....	resident 242; nonresident 168; total 410.
1961	.....	resident 251; nonresident 169; total 420.

Gill-net fishing opened in the Taku-Stikine area April 27 and was scheduled to open in Portland Canal on June 14 and Red Bay-Lake Bay and Lynn Canal on June 15.

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LOW INTEREST RATE LOANS AVAILABLE TO FISHING INDUSTRY:

Emergency loans from the Fisheries Loan Fund of the U. S. Bureau of Commercial Fisheries have been made at an interest rate of 3 percent to fishermen who had fishing vessels or gear lost or damaged in the Alaska earthquake and resulting tidal wave. Applications for loans of that type at this interest rate will be accepted by the Bureau until September 30, 1964.

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**DENIAL OF PETITION FOR REHEARING ON ALASKA STEAMSHIP SEASONAL CARGO RATES:**

The Federal Maritime Commission has ruled that the Alaska Steamship Company must lower its rates by about 2.7 percent to 6.4 percent in the seasonal Alaska trade to avoid receiving a rate of return in excess of 10 percent.

The Alaska Steamship Company had increased rates in late 1961 by 10 percent on general cargo to seasonal areas of Alaska, 20 percent on cannery supplies to Alaskan salmon canners, and 10 percent on salmon cannery products southbound. The Commission started an investigation of the rates in January 1962. In a decision dated March 5, 1964, the tariffs were ordered amended to bring the Alaska Steamship Company a rate of return not in excess of 10 percent in the seasonal service.

The Alaska Steamship Company petitioned the Commission for rehearing of the proceeding, contending that the rate base used by the Commission was not proper. The State of Alaska and the General Services Administration supported the Commission's decision. The Commission denied the petition for rehearing on May 13, 1964, thereby making the decision final. The denial carried with it specific increases. The Commission said it would allow 3.6 percent and 7.3 percent northbound on general cargo and salmon cannery supplies, respectively, and 3.6 percent southbound on salmon cannery products.

Although salmon cannery traffic accounts for over 90 percent of the traffic moving under the contested rates, no Alaska salmon canners took part in the proceeding. The U.S. Bureau of Commercial Fisheries participated, but took no position.



**Alaska Fisheries Exploration and Gear Research**

**CHARTERED EXPLORATORY VESSEL BEGINS ACTIVITIES:**

The chartered exploratory fishing vessel Paragon arrived in Juneau on May 24, 1964, to begin a 4-months charter period to the U.S. Bureau of Commercial Fisheries for exploratory fishing in the area from Kodiak Island westward. After departing Juneau on May 25,

the vessel proceeded en route to Kodiak. Radio-telephone communication the following day revealed that the vessel had struck a reef and that some damage resulted to the main engine cooling system. She was later "beached" at Port Wakefield when repairs were made to the cooling system. Later reports indicate the Paragon was conducting underwater television experiments in the Kupreanof-Raspberry Straits area of Kodiak Island.



**American Samoa**

**EX-VESSEL PRICES FOR TUNA:**

The Japanese trading and fishing firms which have been negotiating tuna ex-vessel prices with the United States tuna packing

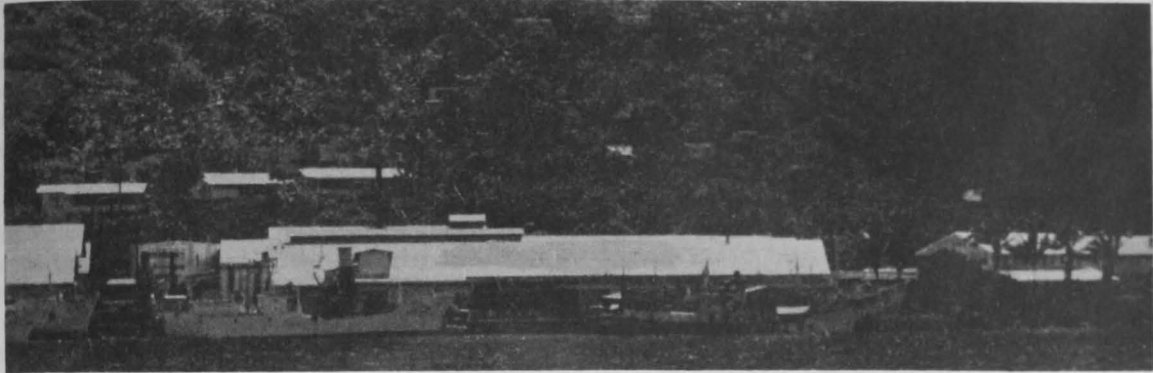


firms located in American Samoa reached agreement in mid-May 1964. Prices agreed on are as follows (in short tons): frozen albacore \$325; iced albacore \$310; frozen gilled and-gutted (head on) yellowfin \$275; frozen dressed (gilled-and-gutted, head and tail on) yellowfin \$285; iced small (20-80 lbs.) round yellowfin \$250; iced medium (80-100 lbs.) round yellowfin \$210; iced large (over 100 lbs.) round yellowfin \$170. (Suisan Tsushin, May 1964.)

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**JAPANESE FISHING FIRM TO CHARGE HANDLING FEE FOR DELIVERIES TO CANNERS:**

One of Japan's leading fishing companies began on July 1, 1964, to assess a flat fee of 10 percent on tuna that it handles for delivery to a United States tuna packing company on American Samoa. Previously, the Japanese firm



Tuna cannery on American Samoa operated by a United States west coast tuna canning firm.

company had bought the fish directly from these fishing vessels operating out of American Samoa and resold them to one of American canneries on the island. (Sui-  
ho Nippo, June 1, 1964.)



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LOTTER POPULATION  
TERMINED BY CENSUS:

An aerial survey of California's sea otter population, made in February 1964, disclosed there are at least 396 of the animals, the California Department of Fish and Game announced in June 1964. The census, taken in the Department's twin engine Beechcraft N5614D, was made at heights of 50 to 150 feet, and visibility was excellent.

The sea otter census was conducted along the coastline between Morro Bay and Monterey. It was the third of three flights planned for the census and was reported to have resulted in the best sea otter count of the three flights.

This year's (1964) census of 396 sea otters is substantially below the 638 figure recorded in the last official census taken in 1957. The Department pointed out that natural mortality has taken a toll regularly, because sea otters are very susceptible to injury from a rough landing and from their natural enemies--white sharks and killer whales. The 1964 census of a minimum of 396 animals does point out, however, the necessity of continued protection of this valuable animal because it is not yet present in large enough numbers to guarantee survival, the Department stated.

Sea otters are protected by State law within the 3-mile limit and by Federal law outside the 3-mile limit.

Note: See Commercial Fisheries Review, May 1964 p. 13, April 1964 p. 12.



Cans

SHIPMENTS FOR FISHERY PRODUCTS,  
JANUARY-APRIL 1964:

A total of 840,463 base boxes of steel and aluminum was consumed to make cans shipped to fish and shellfish canning plants in January-April 1964, an increase of 2.6 percent over the 819,096 base boxes used during the same period in 1963.



Note: Statistics cover all commercial and captive plants known to be producing metal cans. A "base box" is an area 31,360 square inches, equivalent to 112 sheets 14"x20" size. Tonnage figures for steel (tinplate) cans are derived by use of the factor 23.5 base boxes per short ton of steel. (In the years 1962 and 1963, tonnage data were based on the factor 21.8 base boxes per short ton of steel.) The use of aluminum cans for packing fishery products is small.

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NEW EASY-OPEN ALUMINUM CAN  
DEVELOPED FOR  
MAINE SARDINE INDUSTRY:

A good portion of the United States 1964 Maine sardine pack will go to market in a new easy-open aluminum can, according to the Maine Sardine Council. In overall appearance, the new can closely resembles the standard rectangular sardine can, but the cover is equipped with a tab that embodies the features of the lift-tab beer can and the easy-opening citrus concentrate can. (Canning Trade, June 1, 1964.)



## Caroline Islands

### COMMERCIAL FISHERIES PROJECT AT PALAU MAKES HEADWAY:

Construction of a commercial fisheries project at Palau, in the Caroline Islands Group of the United States Trust Territory of the Pacific, has been under way this past year. In April 1964, material and equipment for building a cold-storage freezer plant and other facilities connected with the project arrived in Palau. The project was initiated in 1963 under an agreement with a United States west coast tuna canning firm as a major step toward large-scale development of a commercial fishery--the most important natural resource of the Trust Territory.

In a statement to the Trusteeship Council in May 1964, the High Commissioner of the Trust Territory gave a resume of significant economic events in that area. It included developments toward the establishment of a commercial fishery which could well lead to similar enterprises in other districts of the Territory, and thus stimulate the local economy through increased employment and a higher level of income.

The High Commissioner said that one of the provisions of the agreement with the United States firm calls for the training of Micronesians as tuna fishermen and in the installations ashore where it is anticipated that some 60 or more Micronesians will be employed in the initial phases. Six 25-ton tuna vessels were being built and were expected to begin operating from Koror in Palau by July 1, 1964. Initially 48 Micronesians were to be employed as crew members. Local contractors in Palau participated in the construction of a living quarters building to house some 120 tuna fishermen. Other facilities to be built or installed include a 1,500 ton fish-storage freezer, ice-making machines, water storage tanks, offices, and houses for technical and management staff.

The Trust Territory Administration continued to send trainees to Hawaii to learn live-bait tuna fishing. As of May, some 23 trainees were undergoing training on tuna vessels operating out of Hawaiian ports and others will be given similar opportunity. The High Commissioner said it is from that group of trainees that they hope to develop a nucleus of experienced tuna fishermen which can, in turn, train other Micronesians at the local level.

Most of the pilot projects in local fisheries development have, up to now, been concentrated in Palau. With the establishment of a large-scale commercial fisheries venture in Koror, it is now proposed to establish a pilot fisheries project in the Truk District. This will permit the transfer of the major fisheries development effort to Truk where initial emphasis will be given to the development of a fishing industry capable of supplying all local demands for fresh fish. Fisheries Officer of the Trust Territory will still remain in Palau to supervise the fisheries program but at that stage it is felt that major emphasis must be given to the establishment of fishery facilities in Truk, the Territory's largest district. Recruitment of additional fisheries development personnel is also being planned for the coming year.

Boat building operations in Palau were reported being increased. The Palau Boatbuilders Association during the year completed and sold more than a dozen vessels while an additional 15 vessels are on order. The Palau Boat Yard has been established as a Government pilot project under the Administration Boat Builder and this past May had under construction a 75-foot live bait tuna vessel for the local fisheries project. The Palau Boat Yard will also be used as a training center for advanced training for boatbuilders from all over the Territory. (Press Release of U. S. Mission to the United Nations, May 28, 1964.)

Note: See *Commercial Fisheries Review*, August 1963 p. 85.



## Central Pacific Fisheries Investigations

### BEHAVIOR STUDIES OF LITTLE TUNA:

Swimming speed of little tuna decreases over a 5-day period of food deprivation and to increase again after a meal, it was observed in behavior studies made by the U. S. Bureau of Commercial Fisheries Biological Laboratory at Honolulu, Hawaii. The density of their food is greater than sea water and following a meal the weight of the whole fish in water increases. This increase in speed and weight in water are apparently associated mechanically with the increased speed resulting in an increase in lift from the pectoral fins, and therefore a compensation for the increase in weight. These data plus data on occurrence of gas bladders in scombrid species with different maximum attained weight



presented to the Hawaiian Academy of Science.

The visual acuity of two humans were measured under the same conditions as previously reported data on little tuna and skipjack. The visual stimulus has a brightness of 100 lambert, visual acuity is 0.11 for little tuna, 0.15 for skipjack, and 0.30 for man with a white plate. This means that man can see an object 1/3 and 1/2 the size that can be seen by little tuna and skipjack, respectively, under the same conditions. These data have not yet been corrected for the distortion of the image in the water column.

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TRADE WIND ZONE

OCEANOGRAPHIC STUDIES CONTINUED:

M/V "Townsend Cromwell" Cruise 3

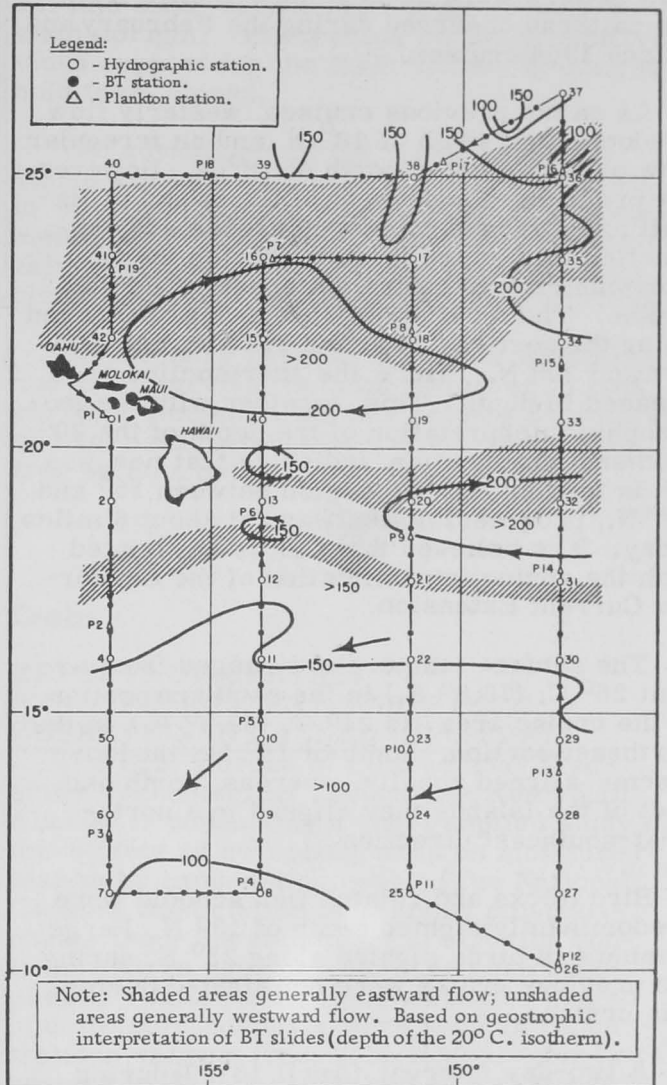
April 12-May 4, 1964): To determine the effects of change in the distribution of properties in the trade wind zone of the central North Pacific was the main objective of this cruise by the U. S. Bureau of Commercial Fisheries research vessel Townsend Cromwell. The cruise was the third in a series of oceanographic cruises designed to investigate the relationship between wind and ocean currents.

A total of 42 oceanographic stations were sampled along the cruise track as shown in Figure 1. At each station, temperatures and samples for salinity analysis were obtained at 200 meters to 1,500 meters.

Bathythermograms (BT) were obtained at 10-mile intervals along the cruise track. Between stations 19 and 21, 26 and 28, 35 and 37 BT casts were made at 10-mile intervals. Surface bucket temperatures and water samples for salinity analysis were obtained at 10-mile intervals. Bathythermograph observation. BT data were coded and transmitted four times daily to the Numerical Weather Facility, Monterey,

At station 24, subsurface currents were measured, using an Ekman meter, while drift was measured relative to a parachute drogue set at 1,200 meters.

When plastic enclosed drift cards were recovered at 30-mile intervals along the entire cruise track and standard marine weather observations were made and transmitted daily at 0000, 0600, 1200, and 1800 G.M.T. Radiation from sun and sky was measured and re-



Cruise track of M/V Townsend Cromwell Cruise 3 (April 12-May 4, 1964).

corded daily by an Eppley pyr heliometer. Colored photographs of cloud formations were made.

Surface plankton tows lasting one-half hour were made using a 1-meter net at 2,000 daily. Flying fish found aboard the vessel were collected and preserved in formalin.

A standard watch for bird flocks and fish schools was maintained during daylight hours. Observers from the Smithsonian Institution on this cruise maintained their own watch for birds.

Field plots of the temperature distribution in the upper 250-meter depth obtained from BT's indicated that both the thermocline structure and also the inferred geostrophic

flow pattern were undergoing a change from the patterns observed during the February and March 1964 cruises.

As on the previous cruises, westerly flow predominated south of  $18^{\circ}$  N. and an irregular flow pattern existed north of  $18^{\circ}$  N. However, the pronounced eddy west of the island of Hawaii and a larger counterclockwise eddy encircling that Island (present during the two previous cruises) were not apparent on this cruise. The most significant change occurred along the sections  $148^{\circ}$  and  $151^{\circ}$  W. between  $15^{\circ}$  and  $20^{\circ}$  N. Here the thermocline increased in depth. This, together with the geostrophic interpretation of the depth of the  $20^{\circ}$  isotherm distribution, indicates that new water is feeding into the region between  $15^{\circ}$  and  $20^{\circ}$  N., progressing westward at about 6 miles a day. It is believed that this is associated with the spring intensification of the California Current Extension.

The surface temperature ranged from about  $26^{\circ}$  C. ( $78.8^{\circ}$  F.) in the southern portion of the cruise area to  $21^{\circ}$  C. ( $69.8^{\circ}$  F.) in the northeast portion. South of  $16^{\circ}$  N., the isotherms aligned zonally, whereas, north and east of the Islands they aligned in a northwest-southeast direction.

Bird flocks and related fish schools were predominantly sighted south of  $13^{\circ}$  N. Large numbers of birds sighted along  $25^{\circ}$  N. during the previous cruise were not sighted during this cruise.

A two-day interval (April 18-20) during this cruise period was spent at Hilo, Hawaii, to conduct a ship's open house and educational exhibit.

Note: See *Commercial Fisheries Review*, July 1964 p. 10, May 1964 p. 13.

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#### OCEANIC EDDIES SOUTHWEST OF HAWAIIAN ISLANDS STUDIED:

M/V "Charles H. Gilbert" Cruise 72-- PHASE I (April 14-21, 1964); PHASE II (May 16-23, 1964): Oceanic eddies in an area southwest of the Hawaiian Islands were studied on this cruise by the research vessel Charles H. Gilbert, operated by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii. The cruise was conducted as two separate phases, each lasting about eight days.

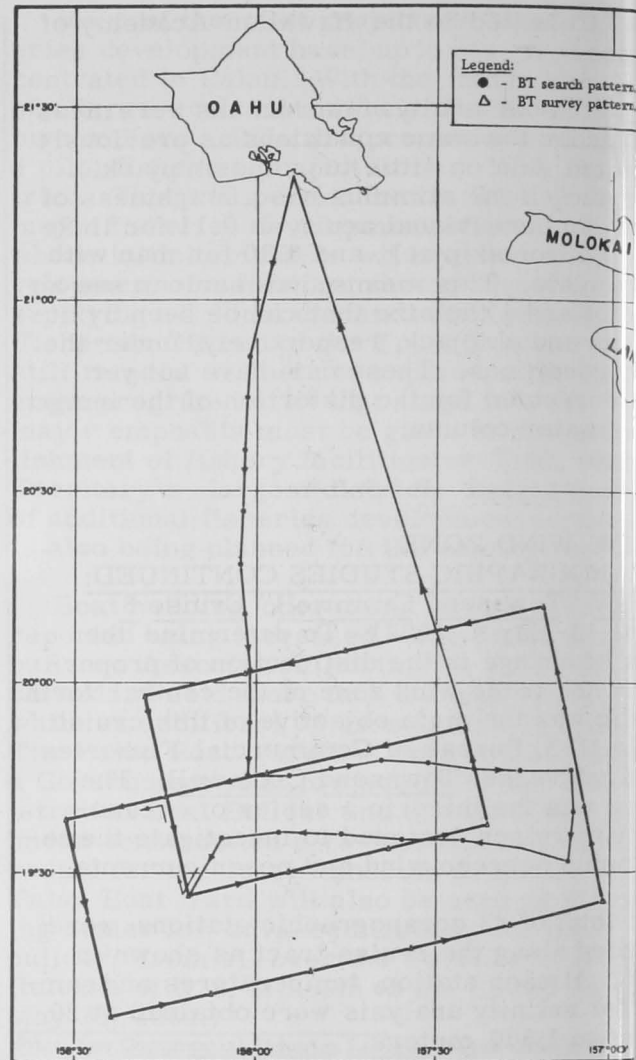
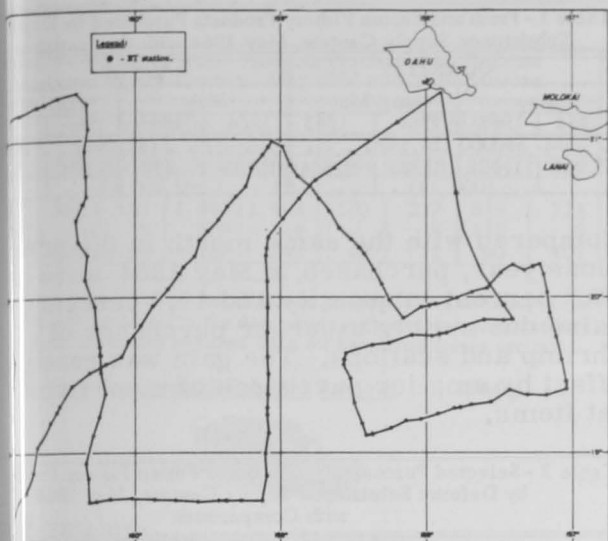


Fig. 1 - Phase I of M/V Charles H. Gilbert Cruise 72, April 14-21, 1964.

During Phase I of the cruise, a large eddy with a radius of about 70 miles was located due west of the island of Hawaii and due south of Oahu. Its position and thermal structure was studied as planned until engine trouble ended the Phase I portion of the cruise. Salinity samples were collected with each bathythermograph (BT) observation.

No drift cards were released during Phase I due to its premature ending.

During Phase II, the eddy which was studied during Phase I could not be located, although a thermal dome was encountered about 60 miles southwest of Oahu. A study was carried on in the area where the eddy may have moved since Phase I. BT observations were made every hour and salinity samples



Phase II of M/V Charles H. Gilbert Cruise 72, May 16-23,

...ined with each BT. A rerun of the pattern of BT observations was made in about the same locations as Phase I. Preliminary studies of the two patterns showed no resemblance to the bathymetric topography in that area.

A total of 420 drift cards and 157 drift bottles were released during Phase II.

A watch was kept for fish schools and birds during both phases. A considerable number of birds were seen, but the fish species could not be identified.

During both phases the thermograph and depthograph were operated continuously, and standard marine weather observations were transmitted four times daily.

Two lures were towed during daylight hours. The total catch consisted of 2 mahimahi (Copypoma hippurus), 2 yellowfin tuna (Neomacropodus macropterus), and 1 wahoo (Acantholatiphanes solandri).

See Commercial Fisheries Review, August 1963 p. 21.



**LABORATORY HOLDING METHOD:**

A new method for holding soft-shell clams in laboratory tanks is employed by the U.S. Bureau of Commercial Fisheries Biological Laboratory at Boothbay Harbor, Maine. A wooden frame covered with an 8-inch saran screen is used. The screen is

cut into slits, each large enough to hold one clam upright. The tension on the screen provides support for the clam valves, helping to hold them closed.

The advantages of the method are: (1) clams are held in a natural upright position to permit siphoning observations or measurements; and (2) support is provided for the valves, and relaxation for the adductor muscles without burying the clams in mud or sand.

Preliminary results have been satisfactory, and clam survival is being observed in comparative studies of the new holding equipment and the usual alternatives of holding clams free on tank bottoms or buried in sand.



**Crabs**

**EFFECTS OF CERTAIN PYROPHOSPHATES ON MOISTURE RETENTION IN CANNED KING CRAB:**

The U.S. Bureau of Commercial Fisheries Technological Laboratory, Ketchikan, Alaska, is conducting a short applied study of the effects of pyrophosphates on moisture retention by canned king crab. (The National Canners Association is studying polyphosphates from the standpoint of struvite control.) Three experiments have been completed. Sodium acid pyrophosphates and sodium tripolyphosphate were used in concentrations ranging from 0.15-0.59 percent (with respect to P<sub>2</sub>O<sub>5</sub>) expressed as a percentage of the fill weight of crab meat. The polyphosphates to be added were included in a brine solution totaling about 50 grams. Other variables under consideration are the pH of the polyphosphate solution, sodium chloride level, and the initial cooking procedures necessary for proper shucking and color retention of the king crab meat.

Preliminary results suggest that polyphosphates used in amounts similar to those proposed for control of struvite in canned king crab can reduce shrinkage during retorting but do not cause the crab meat to absorb additional water. Additional experiments have been planned to verify earlier results and suggest whether the experiments should be continued further.





## Federal Aid for Sport Fish and Wildlife Restoration

### INTERIOR APPORTIONS FUNDS TO STATES FOR FY 1965:

A preliminary distribution of \$14.2 million in Federal-aid funds for fish and wildlife restoration projects was made available to the states on July 1, 1964, Secretary of the Interior Stewart L. Udall announced on June 4, 1964. This is an increase of \$1.6 million over a similar distribution a year earlier.

Of the \$14.2 million allocated so far this year, \$10.9 million is for wildlife restoration and \$3.3 million is for sport fishing projects. The preliminary apportionments enable states with small reserve funds to finance their Federal-aid operations from July 1 until the final apportionment for the year which comes in the fall.

Fish and wildlife restoration funds come from Federal excise taxes collected from manufacturers, importers, and producers of certain types of hunting and fishing equipment. Distribution of the funds is based on the number of paid license holders in a state and on the state area. The Federal Aid in Fish and Wildlife Restoration programs are administered by the Interior Department's Bureau of Sport Fisheries and Wildlife.

Under the Federal-aid programs, states spend their own funds on approved projects and are reimbursed for up to 75 percent of the cost. The laws establishing the programs also provide \$10,000 each for Guam, Puerto Rico, and the Virgin Islands. The total 1965 Fiscal Year apportionment for those areas is included in the July 1, 1964, preliminary apportionment.

Note: See *Commercial Fisheries Review*, July 1963 p. 36.



## Federal Purchases of Fishery Products

### DEPARTMENT OF DEFENSE PURCHASES, JANUARY-MAY 1964:

Fresh and Frozen: For the use of the Armed Forces under the Department of Defense, more fresh and frozen fishery products were purchased by the Defense Subsistence Supply Centers in May 1964 than in the previous month. The increase was 27.5 percent in quantity and 24.4 percent in value.

Table 1 - Fresh and Frozen Fishery Products Purchased by Defense Subsistence Supply Centers, May 1964 with Comparisons

QUANTITY				VALUE			
May		Jan. -May		May		Jan. -May	
1964	1963	1964	1963	1964	1963	1964	1963
..... (1,000 Lbs.) .....				..... (\$1,000) .....			
2,211	1,752	10,735	9,854	1,123	938	5,581	5,123

Compared with the same month in the previous year, purchases in May 1964 were up 26.2 percent in quantity and 19.7 percent in value due mainly to larger purchases of shrimp and scallops. The gain was partly offset by smaller purchases of most fish fillet items.

Table 2 - Selected Purchases of Fresh and Frozen Fishery Products by Defense Subsistence Supply Centers, May 1964 with Comparisons

Product	May		Jan. -May	
	1964	1963	1964	1963
..... (Pounds) .....				
<b>Shrimp:</b>				
Raw headless	109,700	1/	524,350	1/
Peeled and deveined	101,262	1/	377,470	1/
Breaded	399,450	1/	1,853,550	1/
<b>Total shrimp</b>	<b>610,412</b>	<b>450,965</b>	<b>2,755,370</b>	<b>2,509,990</b>
<b>Scallops</b>	<b>483,750</b>	<b>169,851</b>	<b>1,394,100</b>	<b>945,100</b>
<b>Oysters:</b>				
Eastern	51,070	1/	402,490	1/
Pacific	12,044	1/	105,164	1/
<b>Total oysters</b>	<b>63,114</b>	<b>66,832</b>	<b>507,654</b>	<b>498,100</b>
<b>Clams</b>	<b>4,675</b>	<b>20,414</b>	<b>141,533</b>	<b>119,100</b>
<b>Fillets:</b>				
Cod	23,850	61,888	196,616	299,100
Flounder and sole	196,000	266,292	510,816	1,533,100
Haddock	185,390	197,504	2,862,814	1,046,100
Ocean perch	275,800	327,352	1,523,020	1,661,100
<b>Steaks:</b>				
Halibut	104,927	111,882	528,722	612,100
Salmon	25,652	19,570	90,629	89,100
Swordfish	810	2,642	6,820	13,100

1/Breakdown not available.

2/Includes 8,650 pounds of haddock portions.

Total purchases in the first 5 months of 1964 were up 8.9 percent in quantity from those in the same period of 1963, but down 1.5 percent in value because of generally lower prices. In January-May 1964, there were larger purchases of shrimp, scallops, and clams, but noticeably lower purchases of cod fillets, haddock fillets, ocean perch fillets, halibut steaks, and swordfish steaks.

Canned: In the first 5 months of 1964, purchases of the 3 principal canned fishery products (tuna, salmon, and sardines) were up 54.0 percent in quantity and 58.6 percent in value from those in the same period of the previous year. The increase was due to larger purchases of tuna and salmon. The gain was partly offset by smaller purchases of canned sardines.

Table 3 - Canned Fishery Products Purchased by Defense Assistance Supply Centers, May 1964 with Comparisons

	QUANTITY				VALUE			
	May		Jan. -May		May		Jan. -May	
	1964	1963	1964	1963	1964	1963	1964	1963
	..... (1,000 Lbs.) .....				..... (\$1,000) .....			
L	383	465	1,842	1,463	170	217	815	723
S	-	8	679	14	-	5	416	9
S	20	53	127	242	49	22	90	101

(1) Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are more than indicated because data on local purchases are not available.

(2) See Commercial Fisheries Review, July 1964 p. 11.



**Farming**

**LABOR-SAVING GEAR TESTED IN RICE FARM PONDS:**

Several types of fishing gear new to inland farmers were successfully tested in rice-fish ponds near Dumas, Ark., in early May. U.S. Bureau of Commercial Fisheries technicians.

A 2,000-foot nylon haul seine successfully hauled nearly 5,000 pounds of buffalofish and an undetermined number of small crappie from a 39-acre pond. The catch was estimated to include 50 percent of the buffalofish known to be stocked in the pond. An elevator-conveyor belt designed to move the catch from the net to a waiting truck also proved successful when the net was emptied of the 2.5-ton catch in about 1 hour.



This labor-saving method of removing buffalofish from a rice fish pond by means of a fish elevator was successfully demonstrated to local fish farmers.

In other series of tests, slat traps were set in the pond to determine their effectiveness

for catching a relatively small number of catfish for marketing on short notice. Daily lifting of the traps indicated two factors which apparently affect the catch rate of the trap gear. One is the effect of movements of local weather frontal systems, and the other is the decoying effect of captured catfish attracting others to the same trap. One catch of 121 pounds of channel catfish made during a 48-hour set emphasized the decoying effect. Over one-half of the fish were taken from 1 of the 10 traps set, and it was jammed so full that 1 more fish could not have forced through the opening. Such behavior is successfully used in other fresh-water fisheries to improve gear efficiency. The reactions of catfish will be studied further during future slat-trap operations.



Fig. 2 - Catfish in a rice farm fish pond are being concentrated in a small area with a seine-type gear preparatory to removing them from the pond.

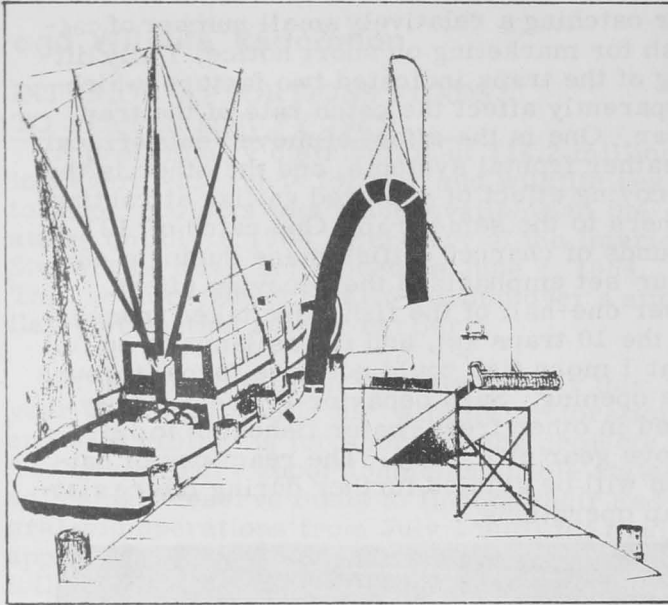
The tests were conducted as part of a gear-development project to assist the farm-pond fish operators to economically harvest fish raised for the commercial market.



**Fish Handling**

**AIR PUMP FOR UNLOADING FISH:**

An air pump to unload fishing vessels is offered by a Texas company. The pump is available in varying capacities to fit different operations. The manufacturer states, "Basically, this new unit operates on a vacuum dry-air suction principle, utilizing a lightweight rubber suction hose that is lowered into the hold of the trawler, through which the product is air-lifted into a vacuum chamber and discharged into a standard-type wash tank equipped with a conveyor belt to remove the product from the tank. No water is required in the hold of the trawler." The manufacturer claims: (1) this method of unloading requires only one man to lower the hose into a vessel and to do such raking as is necessary



to keep a steady flow of product being air-lifted into the tank; (2) the unit does not damage fish or shellfish in any manner and actually eliminates the damage normally done through shoveling as when unloading by basket or barrel methods; and (3) capacity per hour has proven very satisfactory with a low maintenance cost.



## Fish Kills

### FISH KILLS BY WATER POLLUTION IN 1963:

Water pollution killed more than an estimated 7.8 million fish during 1963, reported the U. S. Public Health Service on June 5, 1964. This is an increase of 750,000 fish over the estimated water-pollution fish kill reported in 1962. Industrial operations, the largest identified cause of fish kills, accounted for almost 3.2 million dead fish. Municipal sewage, the second most common cause, killed more than 1 million fish, and agricultural operations caused more than 760,000 fish deaths.

The U. S. Public Health Service does not specify the number of fish that died in the 1963 heavy fish kill on the lower Mississippi River in Louisiana. At the time the State of Louisiana reported the kill it was not known whether the deaths were natural or caused by pollution. The cause of the fish kill has since been found to be endrin (a pesticide).

Eight states did not submit reports on fish kills. Three states reported no known kills occurring in their areas.

In addition to the massive fish kills in Louisiana, three other large fish kills were reported in 1963. An estimated 2 million fish were killed in the Wahiawa Reservoir on Oahu Island in Hawaii. The fish were reported dying in a limited area of the reservoir in the vicinity of the Wahiawa sewage treatment plant. Although the plant gives complete treatment to its sewage, there is a possibility that some toxic substance may have been discharged, but it was not proved.

An accidental spill of lethal quantities of resin acid soaps from a paper company near Weldon, N. C., killed about 100,000 fish. The spill lasted for 8 minutes and dumped between 10,000 and 15,000 gallons of the wastes, affecting more than 100 miles of the Roanoke River.

The third large fish kill in 1963 occurred in the Coweeman River near Kelso, Wash., where an accidental break in a hose dumped 4,000 gallons of Diesel oil into the river. Fish were completely destroyed or severely damaged along a 10- to 13-mile stretch of the river and an estimated total of 59,000 fish were killed.

More than 2,200 miles of river and more than 5,600 acres of lakes were involved in the fish kills reported for 1963.

Note: See Commercial Fisheries Review, July 1963 p. 50.



## Fur Seals

### MODIFIED TAGGING TECHNIQUES SUGGESTED TO PREVENT EXCESS MORTALITY:

The possible reason why the mortality of tagged fur seal pups is higher than that of untagged pups has been indicated by dissection studies by the U. S. Bureau of Commercial Fisheries Marine Mammal Laboratory in Seattle, Wash. Special attention to the flipper revealed that vital blood vessels and "swimming" muscles make up the site where tags for population studies are normally attached. In view of that finding, researchers tagging or marking other animals may wish to examine their marking and tagging techniques.





### WATER TRAWL TESTS SUCCESSFUL PACIFIC COAST HAKE FISHERY:

The first successful use of an experimental midwater trawl to capture large quantities of hake may be a major breakthrough in the establishment of a new commercial fishery on the Pacific Coast of the United States, Secretary of the Interior Stewart L. Udall announced on May 29, 1964. The use of such a trawl to catch hake (a species related to East Coast whiting) indicates the feasibility of commercial harvesting of this abundant but presently unused West Coast resource, the Interior Secretary added.

The trawl (a net with an 80-foot by 80-foot opening which fishes in the mid-depths of the ocean) was developed by fishing gear specialists of Interior's Bureau of Commercial Fisheries Regional Office at Seattle, Wash. The trawls are many times larger than nets commonly used by United States commercial fishermen.

A significant factor in recent tests of the trawl was that it was used on a standard commercial trawler, the St. Michael, a 75-foot vessel operating out of Bellingham, Wash., testing the adaptability of the present West Coast fishing fleet to this type gear. The St. Michael, chartered by the Bureau of Commercial Fisheries, made four one-hour drags during the test in depths of from 50 to 60 fathoms (50 to 360 feet). The catch amounted to 8,200 pounds on the first trawl, 30,000 pounds the second, 42,000 the third, and 60,000 the fourth. The fish were located by an echo-sounder mounted on the west of Destruction Island off the north coast of Washington. They averaged about 22 inches long and weighed from 2 to 3 pounds.

Scientific studies have shown that hake is the most prolific fish along the Pacific Coast, Secretary Udall said. Hake can be used as a table fish, makes a high quality white fish meal for animal and poultry feeds, and has great potential for use in the manufacture of fish oil concentrate.



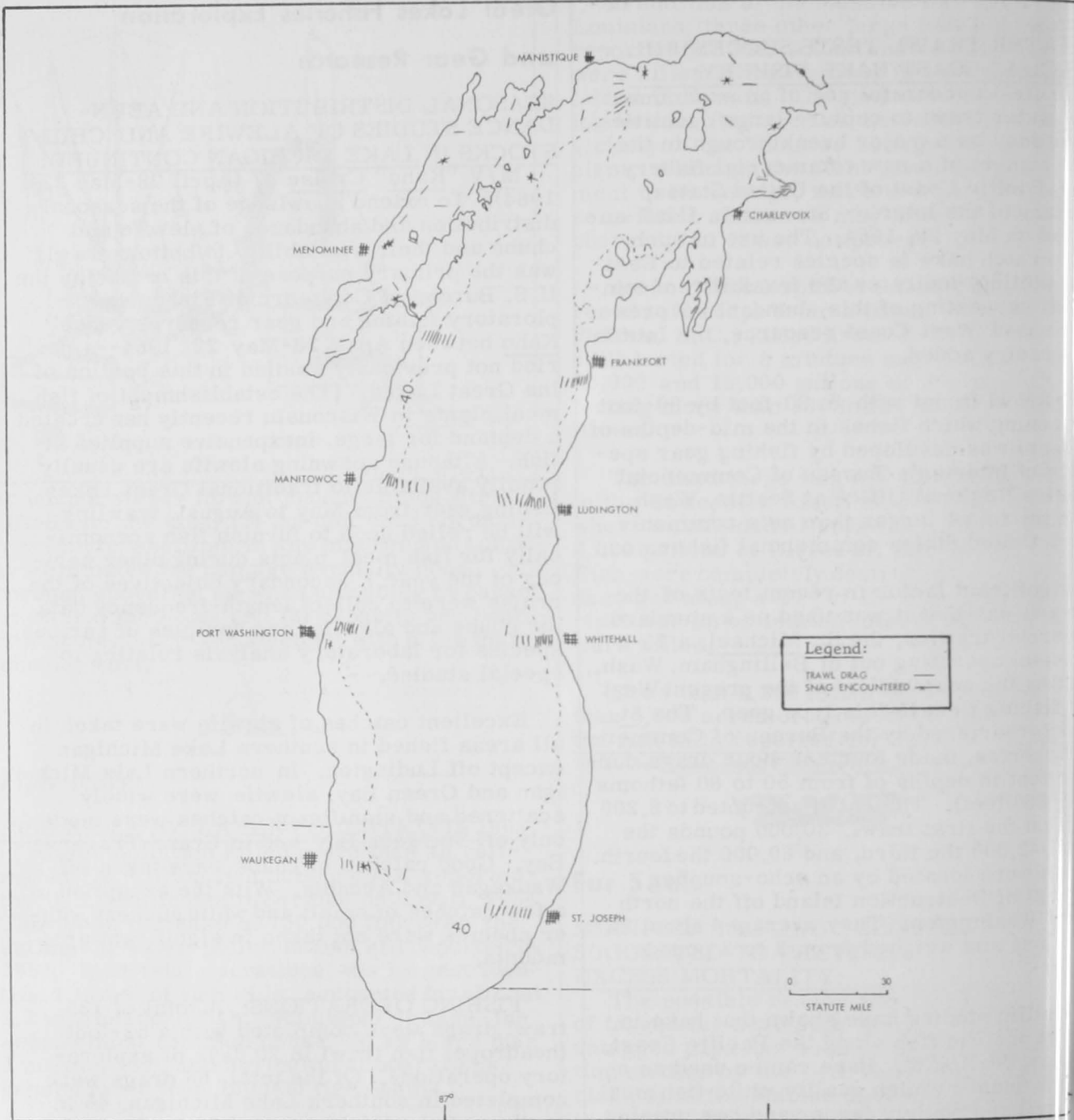
### Great Lakes Fisheries Exploration and Gear Research

#### SEASONAL DISTRIBUTION AND ABUNDANCE STUDIES OF ALEWIFE AND CHUB STOCKS IN LAKE MICHIGAN CONTINUED:

M/V "Kaho" Cruise 17 (April 28-May 22, 1964): To extend knowledge of the seasonal distribution and abundance of alewife and chubs and their availability to bottom trawls was the primary purpose of this cruise by the U. S. Bureau of Commercial Fisheries exploratory fishing and gear research vessel Kaho between April 28-May 22, 1964--a period not previously studied in this portion of the Great Lakes. (The establishment of fish meal plants in Wisconsin recently has created a demand for large, inexpensive supplies of fish. Although spawning alewife are usually readily available to traditional Great Lakes fishing gear from May to August, trawling will be relied upon to furnish fish economically for fish meal plants during other periods of the year.) Secondary objectives of the cruise were to collect length-frequency data for chubs and alewife, and samples of various species for laboratory analysis relating to special studies.

Excellent catches of alewife were taken in all areas fished in southern Lake Michigan except off Ludington. In northern Lake Michigan and Green Bay, alewife were widely scattered and significant catches were made only off Sturgeon Bay and in Grand Traverse Bay. Good catches of chubs were taken off Waukegan and Arcadia. With the exception of a few catches of smelt and white suckers, other species were not taken in significant amounts.

**FISHING OPERATIONS:** A total of 135 trawl drags were completed with a 52-foot (headrope) fish trawl in 20 days of exploratory operations. Of the total, 66 drags were completed in southern Lake Michigan, 46 in northern Lake Michigan, and 23 in Green Bay. At each fishing location in the open lake, paired drags were made in opposite directions at a preselected depth to determine the optimum towing direction for making all other drags in the area. Drags were of 30 minutes duration except for 14 which were terminated



Lake Michigan explorations, M/V Kaho Cruise 17 (April 28-May 22, 1964).

early due to the presence of rough bottom or set nets and 4 others which were terminated after 15 minutes because of the large quantities of alewife being taken.

Although snags were encountered, net damage was relatively minor. Bottom topography and bathymetric distribution of fish were continuously monitored and recorded with a high-resolution echo sounder.

**FISHING RESULTS:** Southern Lake Michigan: Fishing results at stations off opposite shores in the southern portion of the Lake revealed substantial differences in species relationship and availability. Excellent catches of alewife were taken at various depths in each area except off Ludington, where catches of all species were insignificant, possibly due to severe weather conditions immediately preceding the exploration.

ing effort. The best catch rate for alewife experienced off Port Washington at 10 fms, where 1,500 pounds of alewife were caught in a 5-minute drag. At other fishing stations in southern Lake Michigan, the best catches of alewife ranged from 1,340 to 3,800 lbs per drag.

ood catches of chubs (ranging from 300 to 1,000 pounds) were taken at 40 fathoms off Green Harbor, at 25 to 45 fathoms off Waukegan at 25 and 35 fathoms off Port Washington and at 35 and 40 fathoms off Manitowoc. Chubs were taken in moderate amounts at relatively deeper depths.

northern Lake Michigan: Significant catches of alewife in northern Lake Michigan were made off Sturgeon Bay at 15, 20, and 25, fathoms (450 to 650 pounds) and in Grand Traverse Bay at 25 and 35 fathoms (525 and 450 pounds). The best catches of chubs (230 to 600 pounds) were taken at 20 to 45 fathoms off Arcadia, Michigan. A fairly large catch of white suckers (325 pounds) was taken in Green Bay. Sculpins and smelt also were caught in moderate amounts in northern Lake Michigan.

Green Bay: Operations in Green Bay produced only small catches of alewife. Individual catches of smelt (250 pounds) and white suckers (120 and 195 pounds) were the only species caught in significant amounts throughout Green Bay.

hydro-sounder recordings near the entrance to Green Bay indicated scattered fish at mid-depths--apparently the vanguard of the migration of alewife into Green Bay.

**HYDROGRAPHIC DATA:** Bathythermograph casts were made in each fishing area, and water temperatures were recorded continuously. During the cruise, the surface water temperatures of Lake Michigan ranged from 34° to 48° F. and those of Green Bay from 36° to 58° F.

**"Kaho" Cruise 19** (June 23-July 23, 1964). To extend knowledge of the seasonal distribution, abundance, and availability of alewife and chub stocks to bottom trawls was the primary objective of this cruise by the U.S. Fishery Service's exploratory fishing vessel Kaho. Announcement of this cruise was made on June 18, 1964. Following trawl explorations in Green Bay and northern Lake Michigan from June 23 to July 2, the vessel berthed at

its base in Saugatuck, Mich., for about ten days and then resumed trawl explorations in southern Lake Michigan.

**Area of Operation:** Lakewide transects were planned in Lake Michigan between Benton Harbor, Mich., and Waukegan, Ill.; Port Washington, Wis., and White Lake Mich.; Manitowoc, Wis., and Ludington, Mich.; and Frankfort, Mich., and Sturgeon Bay, Wis. Previously established fishing stations in Green Bay and northern Lake Michigan near Manistique, north of Beaver Island, and in Little and Grand Traverse Bays.

**Method of Operation:** High-resolution echosounding equipment was to be used to record bottom and off-bottom fish concentrations. A 52-foot (headrope) fish trawl was to be used at standard stations to assess the commercial trawling potential. Thirty-minute tows were to be made at 5-fathom intervals from 10 to 50 fathoms and at 10-fathom intervals from 50 to 70 fathoms along the lakewide transects. Various hydrographic and meteorologic conditions were to be monitored continuously, and night-light stations occupied in southern Lake Michigan to determine the effectiveness of attracting lights.

Note: See Commercial Fisheries Review, June 1964 p. 15.

\* \* \* \* \*

**MORE EFFECTIVE TRAWLING OF COMMERCIAL SPECIES IN LAKE SUPERIOR STUDIED:**

M/V "Kaho" Cruise 18 (May 25-June 10, 1964): To determine the potential for more effective and profitable methods of catching and handling commercial fish species in Lake Superior was the purpose of this cruise by the U.S. Bureau of Commercial Fisheries exploratory fishing vessel Kaho. The area of operations was in Lake Superior between Munising and the Keweenaw Peninsula.

This 17-day cruise was the first of three planned for this year. Fishery explorations by the Kaho are part of a special program to furnish technical assistance to the fishing industry in the Great Lakes region. Other aspects of the program include studies on the development, preservation, and marketing of fishery products, and economic analyses of existing and potential industry operations.

Principal accomplishments resulting from this cruise included: (1) the location of considerable areas suitable for bottom trawling,



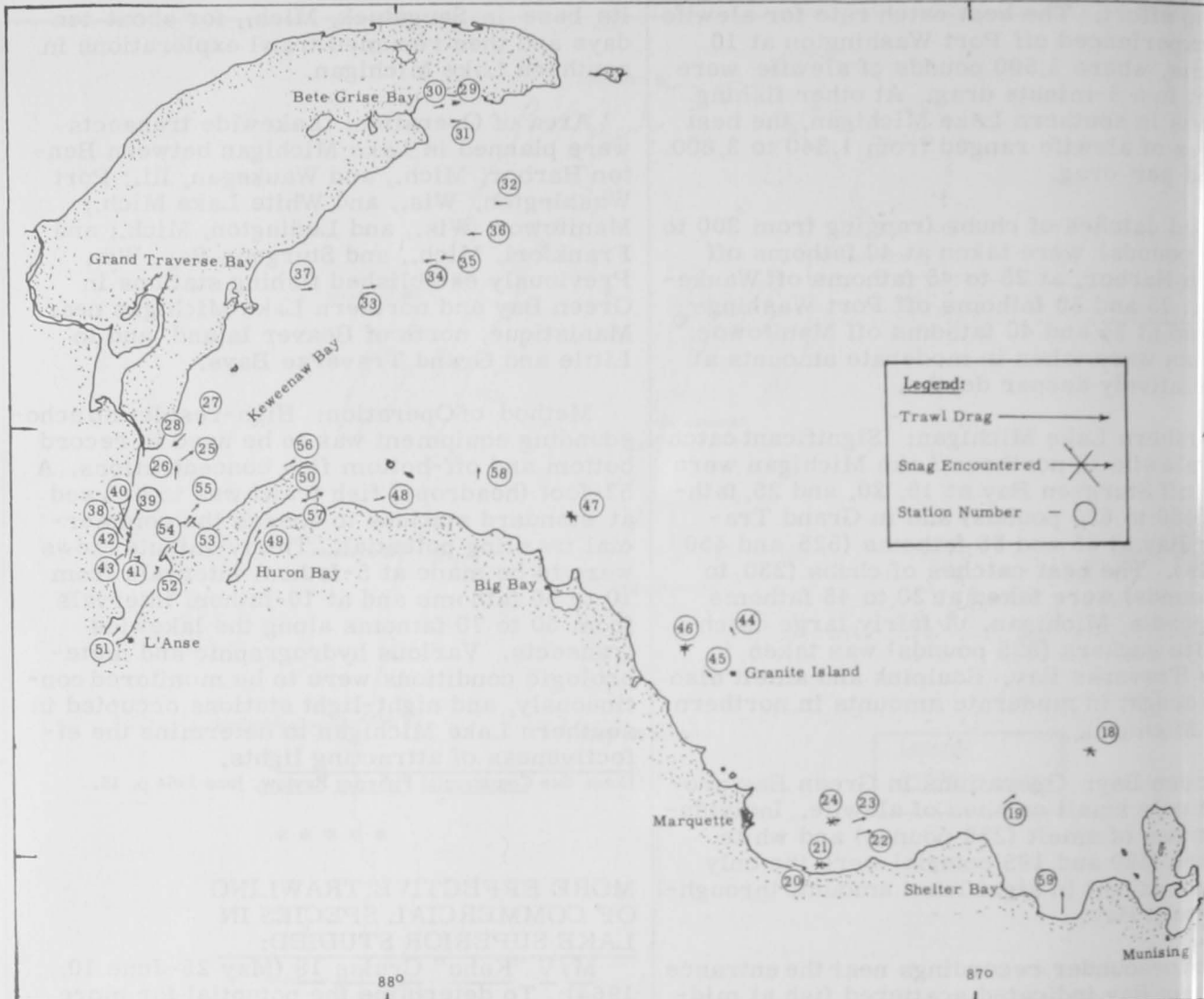
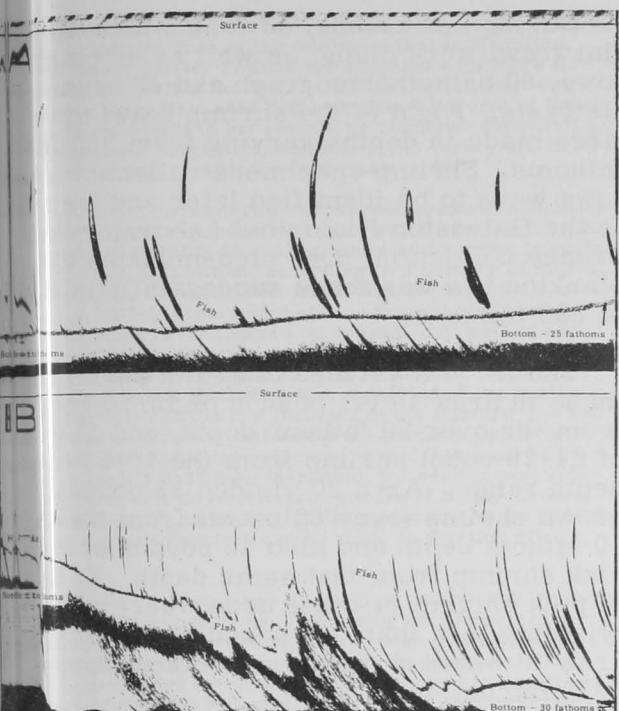


Fig. 1 - Shows area of operation during Kaho Cruise 18, May 25-June 10, 1964.

(2) the catching of commercially significant quantities of chub and smelt, and (3) the incidental detection and recording of midwater concentrations of fish. Although it was necessary to search intensively for good trawling grounds in that area, which is noted for steep and rugged bottom conditions, clear areas were found at various depths ranging from 5 to 62 fathoms. Good catches of chub were taken in Keweenaw Bay and off the eastern shore of Keweenaw Peninsula, and fair amounts of smelt were caught in Keweenaw Bay and Huron Bay. Only small catches of cisco (lake herring) were made during the cruise, but the many small scattered schools of fish detected in middepths could well have been composed of that species. Midwater and surface fishing are to be attempted during the next two cruises scheduled for August and November.

**Exploratory Operations:** Survey trawls totaling about 800 statute miles, were carefully examined with a high-resolution wide-angle line-type echo-sounder and a standard depth water sounder. The former instrument detects subsurface fish, discriminates fish echos from bottom echos when the two are in close proximity, and provides evidence of bottom characteristics (figure 2).

A total of 42 drags was made with a 100-foot (headrope) Gulf of Mexico-type fish trawl where bottom conditions appeared to be suitable (see table 1). Dragging time was held to 15 minutes during most of the operation because of unfamiliarity with bottom conditions and to permit broader coverage within the limited time period. Snags, logs and trees, or other bottom conditions were encountered during 10 drags--most of which were terminated very



Fishing Echograms from a high resolution echo-sounder showing the profile, fish near the bottom, and at midwater depths. A program made at station 50; distance traveled is 2 nautical miles. B--Echogram made near station 53; distance traveled is approximately 4 nautical miles.

difficulties were recognized. Only 3 of the...  
 resulted in severe net damage.  
 others suffered minor damage and the...  
 remaining 6 caused no damage.

actual fishing effort during the cruise...  
 was limited due to the time required for...  
 seeking out trawlable grounds. Activities...  
 from Munising to Big Bay were restricted because...  
 of numerous commercial gill-netting...  
 operations. Although soundings were made to...  
 depths of over 100 fathoms, fishing was...  
 confined for the most part to depths of less than...  
 5000 fms (see table 1).

Fishing Results: The best fishing results...  
 during the cruise were in Huron Bay, Keweenaw...  
 Bay and off the east shore of Keweenaw...  
 Peninsula. Chub were caught in amounts of from...  
 15 pounds in seven 15-minute drags, and...  
 smelt in amounts up to 300 and 320 pounds...  
 in 30-minute drags. Smelt were found to...  
 be distributed over a relatively wide depth...  
 range from 5 to 39 fathoms. Catches of...  
 various species consisted of many sizes ranging...  
 from small 3- to 4-inch juveniles to the older...  
 fish measuring 12 inches long or over. Relatively...  
 large chubs were caught in commercial...  
 quantities at depths ranging...  
 from 5 to 62 fathoms--the deepest water

Table 1 - Fishing Log Maintained during M/V Kaho Cruise 18 in Lake Superior

Drag No.	Depth in Fathoms	Length of Drag in Minutes	Actual Catch in Pounds							
			Total	Alewife	Chub	Smelt	Whitefish	Cisco	Lake trout	Other
<b>Marquette Bay to Munising to Shelter Bay</b>										
59	7-14	30	12	1	-	10	1	-	-	-
18	17-25	2/30	2	-	-	-	-	-	1	1
19	19-21	3/22	0	-	-	-	-	-	-	-
<b>Marquette Bay to Granite Island</b>										
20	5	30	50	-	-	1	41	-	-	8
21	9-11	4/30	5	1	-	1	1	-	-	2
22	18-20	30	8	-	-	4	1	-	-	2
23	23-25	2/24	6	1	-	1	-	-	-	4
45	24	30	32	30	-	1	-	-	-	1
24	29-31	4/30	8	1	-	4	-	-	-	3
46	30	2/7	23	-	-	-	-	-	22	1
44	42	5/10	18	1	15	-	-	-	-	2
<b>Big Bay to Huron Bay</b>										
48	12	4/13	1	-	-	1	-	-	-	-
49	12	15	80	35	-	32	8	1	1	3
47	20	4/5	1	-	-	-	-	-	1	-
57	22-24	30	335	15	2	300	15	-	2	1
58	22-25	15	2	2	-	-	-	-	-	-
50	28	30	350	13	6	320	6	-	3	2
<b>Keweenaw Bay to East Portage Entry</b>										
39	5-6	15	7	-	-	1	-	-	4	2
42	6-8	30	100	7	-	55	9	2	20	7
38	7-8	15	110	-	-	90	5	-	11	4
43	7-10	15	10	-	-	2	1	-	7	-
40	10-11	15	4	-	-	2	-	-	2	-
51	10-15	15	6	-	-	2	1	-	3	-
41	14-15	15	50	-	-	47	-	-	15	1
52	18-22	15	32	-	5	10	-	1	15	1
56	20	6/15	6	1	-	2	-	-	2	1
27	21-25	30	30	-	4	25	-	-	1	-
28	28-30	6/30	80	4	23	42	-	-	8	3
26	32-37	30	125	2	62	45	-	2	12	2
53	35	15	145	-	125	1	-	2	15	2
25	35-39	6/30	75	3	42	21	-	2	2	5
54	41	15	120	-	115	-	-	-	2	3
55	50	5/10	42	-	40	-	-	-	1	1
<b>Grand Traverse Bay to Betsie Grise Bay</b>										
29	5	2/4	0	-	-	-	-	-	-	-
30	10	15	5	-	-	1	3	-	-	1
31	13-15	15	60	-	-	55	-	-	4	1
32	38-39	15	55	-	46	-	1	2	1	5
37	38-39	15	445	1	415	-	-	8	19	2
35	44-47	15	230	-	220	-	-	8	1	1
34	48-51	15	175	-	170	-	-	-	-	5
36	54-55	15	175	-	160	-	-	-	4	11
33	57-62	15	150	-	110	-	-	1	-	5/39

1/ Mostly round whitefish.  
 2/ Snagged, tore net.  
 3/ Encountered gill net, drag terminated early.  
 4/ Logs in net, slight damage.  
 5/ Encountered rough bottom, no damage.  
 6/ Logs in net, no damage.  
 7/ Hung up, no damage.  
 8/ Mostly sculpin.

fished during the cruise. The measurement...  
 of samples indicated that 70 percent (by weight)...  
 of the chub catches were comprised of fish...  
 over nine inches long (No. 2's, No. 1's, and...  
 "jumbos").

Only small numbers of cisco were taken...  
 occasionally throughout the depth ranges...  
 fished. Midwater groups of fish, which may...  
 have been cisco recorded by the depth-sound...  
 er, were judged to be too small and too scat...  
 tered to warrant attempts to fish for them...  
 during this cruise.

Alewife, whitefish, and lake trout were...  
 also caught in relatively small amounts. In...  
 dividual alewife were large in comparison to...  
 those caught in Lake Michigan during recent...  
 years. Round whitefish were taken more of...  
 ten than were common whitefish.

Table 2 - Miscellaneous Species in Trawl Catches by the Exploratory Fishing Vessel M/V Kaho

Species	No. of Drags Yielding	Catch Per Drag
Burbot	10	up to 12 pounds
Pigmy whitefish	11	up to 3 pounds
Sculpin	8	up to 27 pounds
Stickleback	14	up to 4 pounds
Suckers	3	up to 2 pounds
Trout-perch	6	up to 1 pound

**Water Temperatures:** A bathythermograph and continuous surface temperature recorder were used to monitor thermal gradients in the areas fished. Stratification was not well defined, but surface temperatures varied from 40° F. to 52° F. from offshore to sheltered waters and bottom temperatures ranged from 39° F. to 48° F. in the same manner.

**Technological Studies:** Observations were made and fish samples collected to initiate technological preservation and processing investigations in connection with the Lake Superior technical assistance program.



## Great Lakes Fishery Investigations

### SEA LAMPREY CONTROL IN LAKE SUPERIOR AND LAKE MICHIGAN:

The number of spawning-migrant sea lampreys captured at the electric barriers on streams tributary to Lake Superior totaled 8,816 as of June 12, 1964, compared with 6,736 and 6,138 for the same period in 1963 and 1962, respectively. Reports indicated that conditions were favorable for an early sea lamprey run during the 1964 season which may explain the larger number of lampreys captured. The June 1964 catch was still well below that of 1961 when 42,395 adults were taken through the same period. The three barriers on streams entering northern Green Bay of Lake Michigan caught only 4,319 adult sea lampreys through June 12, 1964, compared with 6,995 for the same period in 1963.

Note: See Commercial Fisheries Review, October 1963 p. 23, July 1963 p. 38.



## Gulf Fishery Investigations

### SHRIMP DISTRIBUTION STUDIES:

M/V "Gus III" Cruise GUS-17 (May 12-26, 1964): Shrimp distribution studies in the northwestern part of the Gulf of Mexico (off the Mississippi to Texas coasts) were continued during this cruise by the chartered research vessel Gus III of the U. S. Bureau of Commercial Fisheries Biological Laboratory, Galveston, Tex. Eight statistical areas (13, 14, 16, 17, 18, 19, 20, and 21) were covered and standard 3-hour tows with a 45-foot Gulf shrimp trawl were made.

During this cruise, 43 tows with a 45-foot flat trawl were made, as well as 46 plankton tows, 60 bathythermograph and 43 nansen tile casts. Eight of the shrimp trawl tows were made in depths varying from 200 to 500 fathoms. Shrimp specimens collected in tows were to be identified later and then sent to the Galveston Biological Laboratory's reference collection. One sled-mounted Gulf plankton tow was made successfully in an area of 520 fathoms.

The largest catches of brown shrimp were made in area 16 (41 pounds of 15-20 count from the over 20 fathom depth, and 11 pounds of 21-25 count shrimp from the 10-20 fathom depth range. Area 20 yielded 33 pounds of brown shrimp (over 68 count) from the over 10 fathom depth and also 46 pounds of small pink shrimp from that same depth. Catches of pink shrimp in other areas were sporadic (yielding less than one pound each) except in area 19 where 5 pounds was taken from the 0-10 fathom depth.

Catches of white shrimp were moderate in area 13 (30 pounds of mostly 21-25 count with the 10-20 fathom depth yielding the greater part. White shrimp were also caught in the 0-10 fathom depth of area 19 (20 pounds of 15-20 count), as well as 6 pounds of the same count from 10-20 fathoms in that area.

Notes: (1) Shrimp catches are heads-on weight; shrimp size is the number of heads-off shrimp per pound.

(2) See Commercial Fisheries Review, July 1964 p. 38.



## Industrial Fishery Products

### OBSERVATIONS AND VIEWS IN TEXAS ON USE OF FISHERY BYPRODUCTS IN ANIMAL FEED:

Mixed feed manufacturers and experiment station workers in Texas were visited during April 27-May 5, 1964, by an Animal Nutritionist of the U. S. Bureau of Commercial Fisheries Technical Advisory Unit, Boston, Mass. Observations made during that trip and the views of persons interviewed are as follows:

Whereas nearly all the feed mill officials and experiment station scientists visited on the trip expressed high regard for fish reduction products in nutrition, many offered comments that, taken together, suggest that the future market for those products may tend to decrease unless some changes are made.

The comment most frequently heard was that at the prevailing price in April and May 1964, fish meal is in danger of being "priced off the market." For example, a nutritionist employed by a large firm stated that fish meal is not included in his rations, formulated by linear programming, unless minimum levels are specified. Broiler and poultry breed-



... produced by that firm do contain 3-percent fish meal, this is only because of the minimum that is specified, whereas turkey starter rations are supplied with more liberal levels as "safety factors." Another nutritionist employed by a large firm said that less than 1 percent of fish meal is incorporated in his rations by computer formulation, but includes 3 percent of the meal in his turkey and broiler starter rations "just to be on the safe side."

... comment encountered with second greatest frequency in the mixed feed industry cannot much longer tolerate extreme variability in quality exhibited by some imported meals and, in addition, according to a number of mixed feed producers, domestic fish meals are not invariably of top quality. A leading experiment station scientist pointed out that the amounts of feed mixed by present-day methods according to a single formula are extremely large and, for that reason, mistakes of any kind in feed mixing cannot be tolerated. Ingredients (including fish meal) below the quality specified in the formula are included in the mixture, the end result might be a ration that would not perform properly in the field. The scientist suggested that if fish meal of uniformly high quality cannot be marketed, the second best solution may be to sell three different grades of meal. Several nutritionists employed by feed mills stated that there is little doubt that a grading system can be made to function effectively.

... official of a very large Texas firm stated that for the past 10 years his company has been using only imported pilot meal because of its consistently high quality and also because it is slightly less expensive at the company's mill than the United States whole meal. (Whole meal is preferred to secondary fish meal by the officials of this particular firm.) During a period of several years, only one shipment of inferior richard meal was received and a satisfactory adjustment was made on that shipment without delay.

... nutritionist representing a very large feed-producing firm dramatized the prevailing situation with regard to variability in fish meal quality by exhibiting some samples under microscopical examination. Concerning a sample that contained excessive amounts of salt, scales, and bone, he said: "The sale of this sort of product is going to ruin the market for fish meal unless buyers are informed in advance of the quality of the products they are getting."

... number of nutritionists stated that since the introduction of a market of a uniform high quality poultry byproducts meal, feed producers are no longer dependent entirely upon fish meal. It was also pointed out by a number of nutritionists that the quality of feather meal produced by some firms is high and that such meal is competitive with fish meal as a source of some amino acids and B vitamins.

... also pointed out that the two commonly used methods of measuring the fat in fish meal yield very different results. The two methods are the ether extract procedure and the method of the A.O.A.C. (Association of Official Agricultural Chemists). This problem should receive early attention. A statement that a given sample of fish meal contains a certain amount of fat should not leave the buyer in doubt as to the actual amount of this nutrient present.

... feed producers of cattle feeds expressed interest in fish meal as an ingredient of "range blocks." Such blocks, consisting of a mixture of protein, mineral, and vitamins, often contain fish meal. Cattle feed producers also expressed interest in the possibility of using marine oils in their products, and if, the prices of such oils should decline low enough to make them competitive with stabilized fats.

... Texas research scientist suggested experiments to determine the feasibility of using marine oils in the diets of young turkeys. He suggests that the oils might be fed at levels as high as 5 percent of the ration to stimulate growth for 8 to 16 weeks, then reduced to 1 percent, or less, to avoid the possibility of off-flavors in the meat. Because of the large number of turkeys grown in the United States, such fowl offer a possible market that may be large enough to absorb any overproduction of marine oils that might occur in the future. At present prices, fish oil is

too valuable to be used as a source of energy. However, if at some future time the price of the oil should decline enough to make it competitive with stabilized fats, its use in turkey feeding can be given consideration. (Technical Advisory Unit, U. S. Bureau of Commercial Fisheries, Boston, Mass.)

\* \* \* \* \*

**U. S. FISH MEAL AND SOLUBLES:**

Production and Imports, January-April 1964: Based on domestic production and imports, the United States available supply of fish meal for January-April 1964 amounted to 175,429 short tons--26,059 tons (or 17.4 percent) more than during January-April 1963. Domestic production was 3,229 tons (or 19.8 percent) less, but imports were 29,288 tons (or 22.0 percent) higher than in January-April 1963. Peru continued to lead other countries with shipments of 130,276 tons.

The United States supply of fish solubles (including homogenized fish) during January-April 1964 amounted to 7,377 tons--a decrease of 28.0 percent as compared with the same period in 1963. Domestic production and imports dropped 31.8 percent and 8.3 percent, respectively.

Item	Jan.-Apr.		Total 1963
	1/1964	1963	
. . . . . (Short Tons) . . . . .			
<b>Fish Meal and Scrap:</b>			
<b>Domestic production:</b>			
Menhaden . . . . .	3,146	4,991	181,750
Tuna and mackerel . . . . .	5,207	7,167	26,957
Herring . . . . .	2/	-	7,537
Other . . . . .	4,705	4,129	37,208
<b>Total production . . . . .</b>	<b>13,058</b>	<b>16,287</b>	<b>253,452</b>
<b>Imports:</b>			
Canada . . . . .	19,300	13,603	50,925
Peru . . . . .	130,276	104,219	291,544
Chile . . . . .	7,396	12,220	24,249
Norway . . . . .	-	331	1,819
So. Africa Republic . . . . .	4,578	1,950	12,296
Other countries . . . . .	821	760	2,274
<b>Total imports . . . . .</b>	<b>162,371</b>	<b>133,083</b>	<b>383,107</b>
<b>Available fish meal supply . . . . .</b>	<b>175,429</b>	<b>149,370</b>	<b>636,559</b>
<b>Fish Solubles:</b>			
<b>Domestic production 2/ . . . . .</b>			
	5,838	8,562	107,402
<b>Imports:</b>			
Canada . . . . .	737	781	2,034
Iceland . . . . .	-	105	160
So. Africa Republic . . . . .	604	-	411
Other countries . . . . .	198	792	4,168
<b>Total imports . . . . .</b>	<b>1,539</b>	<b>1,678</b>	<b>6,773</b>
<b>Available fish solubles supply . . . . .</b>	<b>7,377</b>	<b>10,240</b>	<b>114,175</b>

1/ Preliminary.  
2/ Included with "other."  
3/ 50-percent solids. Includes production of homogenized condensed fish.

\* \* \* \* \*

Production and Imports, January-March 1964: Based on domestic production and imports, the United States available supply of fish meal for January-March 1964 amounted to 112,205 short tons--2,218 tons (or 1.9 percent) less than during January-March 1963. Domestic production was 2,160 tons (or 27.2

U. S. Supply of Fish Meal and Solubles, January-March 1964 with Comparisons			
Item	Jan.-Mar.		Total 1963
	1/1964	1963	
	. . . . . (Short Tons) . . . . .		
<b>Fish Meal and Scrap:</b>			
<b>Domestic production:</b>			
Menhaden . . . . .	2/	-	181,750
Tuna and mackerel . . . . .	3,445	5,739	26,957
Herring . . . . .	2/	2/	7,537
Other . . . . .	2,342	2,208	37,208
Total production . . . . .	5,787	7,947	253,452
<b>Imports:</b>			
Canada . . . . .	13,329	9,454	50,925
Peru . . . . .	84,392	87,751	291,544
Chile . . . . .	4,379	6,835	24,249
Norway . . . . .	-	331	1,819
So. Africa Republic . . . . .	3,578	1,450	12,296
Other countries . . . . .	740	655	2,274
Total imports . . . . .	106,418	106,476	383,107
Available fish meal supply . . . . .	112,205	114,423	636,559
<b>Fish Solubles:</b>			
Domestic production 2/ . . . . .	2,793	5,361	107,402
<b>Imports:</b>			
Canada . . . . .	455	563	2,034
Iceland . . . . .	-	105	160
So. Africa Republic . . . . .	429	-	411
Other countries . . . . .	198	729	4,168
Total imports . . . . .	1,082	1,460	6,773
Available fish solubles supply . . . . .	3,875	6,821	114,175

1/Preliminary.  
2/Included with "other."  
3/50-percent solids. Includes production of homogenized condensed fish.

percent) less, and imports were only 58 tons less than in January-March 1963. Peru continued to lead other countries with shipments of 84,392 tons.

The United States supply of fish solubles (including homogenized fish) during January-March 1964 amounted to 3,875 tons--a decrease of 43.2 percent as compared with the same period in 1963. Domestic production and imports dropped 47.9 percent and 25.9 percent, respectively.

\* \* \* \* \*

**Production and Imports, January-February 1964:** Based on domestic production and imports, the United States available supply of fish meal for January-February 1964 amounted to 70,013 short tons--6,300 tons (or 9.9 percent) more than during January-February 1963. Domestic production was 1,403 tons (or 27.3 percent) less, but imports were 7,703 tons (or 13.1 percent) more than in January-February 1963. Peru continued to lead other countries with shipments of 55,222 tons.

The United States supply of fish solubles (including homogenized fish) during January-

U. S. Supply of Fish Meal and Solubles, January-February 1964 with Comparisons			
Item	Jan.-Feb.		Total 1963
	1/1964	1963	
	. . . . . (Short Tons) . . . . .		
<b>Fish Meal and Scrap:</b>			
<b>Domestic production:</b>			
Menhaden . . . . .	2/	-	181,750
Tuna and mackerel . . . . .	2,022	3,930	26,957
Herring . . . . .	2/	2/	7,537
Other . . . . .	1,707	1,202	37,208
Total production . . . . .	3,729	5,132	253,452
<b>Imports:</b>			
Canada . . . . .	7,803	5,794	50,925
Peru . . . . .	55,222	46,631	291,544
Chile . . . . .	1,051	3,800	24,249
Norway . . . . .	-	331	1,819
So. Africa Republic . . . . .	1,678	1,450	12,296
Other countries . . . . .	530	575	2,274
Total imports . . . . .	66,284	58,581	383,107
Available fish meal supply . . . . .	70,013	63,713	636,559
<b>Fish Solubles:</b>			
Domestic production 2/ . . . . .	1,882	2,645	107,402
<b>Imports:</b>			
Canada . . . . .	345	212	2,034
Iceland . . . . .	-	105	160
So. Africa Republic . . . . .	339	-	411
Other countries . . . . .	198	-	4,168
Total imports . . . . .	882	317	6,773
Available fish solubles supply . . . . .	2,764	2,962	114,175

1/Preliminary.  
2/Included with "other."  
3/50-percent solids. Includes production of homogenized condensed fish.

February 1964 amounted to 2,764 tons--a decrease of 6.7 percent as compared with the same period in 1963. Domestic production dropped 28.8 percent and imports increased 178.2 percent.

\* \* \* \* \*

#### U. S. FISH MEAL, OIL, AND SOLUBLES:

**Production, April 1964:** During April 1964 a total of about 3.5 million pounds of marine animal oils and 7,094 tons of fish meal and scrap was produced in the United States. Compared with April 1963, this was a decrease of 3.1 million pounds or 47.0 percent in oil, a decrease of 1,246 tons or 14.9 percent in fish meal and scrap production.

Menhaden oil, amounting to 2.7 million pounds, accounted for 77.9 percent of the April 1964 oil production. Compared with April 1963, this was a decrease of 3.0 million pounds. Menhaden meal, amounting to 3,146 tons, accounted for 44.3 percent of the April meal production--a decrease of 1,845 tons, compared with the same month last year.

A total of 3,045 tons of fish solubles were produced in April 1964--a decrease of 1,

Product	April		Jan.-Apr.		Total 1963
	1/1964	1963	1/1964	1963	
..... (Short Tons) .....					
<b>Fish Meal and Scrap:</b>					
Herring	2/	-	2/	-	7,537
Menhaden 3/	3,146	4,991	3,146	4,991	181,750
Sardine, Pacific	-	-	1	-	-
Tuna and mackerel	1,762	1,428	5,207	7,167	26,957
Unclassified	2,186	1,921	4,704	4,129	22,415
<b>Total</b>	<b>7,094</b>	<b>8,340</b>	<b>13,058</b>	<b>16,287</b>	<b>238,659</b>
..... (1,000 Pounds) .....					
<b>Fish Solubles:</b>					
Menhaden	1,265	1,836	1,325	1,836	74,831
Other	1,780	2,251	4,513	5,476	25,347
<b>Total</b>	<b>3,045</b>	<b>4,087</b>	<b>5,838</b>	<b>7,312</b>	<b>100,178</b>
Homogenized condensed fish	-	950	-	1,250	7,224
<b>Total oil</b>	<b>3,472</b>	<b>6,551</b>	<b>5,001</b>	<b>7,853</b>	<b>185,827</b>

1/ Preliminary data.  
2/ Included with unclassified.  
3/ Includes a small quantity of thread herring.  
4/ Not available on a monthly basis.

Product	March		Jan.-Mar.		Total 1963
	1/1964	1963	1/1964	1963	
..... (Short Tons) .....					
<b>Fish Meal and Scrap:</b>					
Herring	-	-	2/	2/	7,537
Menhaden 3/	-	-	2/	-	181,750
Sardine, Pacific	-	-	1	-	-
Tuna and mackerel	1,423	1,809	3,445	5,739	26,957
Unclassified	812	906	2,341	2,208	22,415
<b>Total</b>	<b>2,235</b>	<b>2,715</b>	<b>5,787</b>	<b>7,947</b>	<b>238,659</b>
Shellfish, marine-animal meal and scrap	4/	4/	4/	4/	14,793
<b>Grand total meal and scrap</b>	<b>4/</b>	<b>4/</b>	<b>4/</b>	<b>4/</b>	<b>253,452</b>
..... (1,000 Pounds) .....					
<b>Fish Solubles:</b>					
Menhaden	-	-	2/	-	74,831
Other	911	1,984	2,793	5,061	25,347
<b>Total</b>	<b>911</b>	<b>1,984</b>	<b>2,793</b>	<b>5,061</b>	<b>100,178</b>
Homogenized condensed fish	-	250	-	300	7,224
<b>Total oil</b>	<b>584</b>	<b>452</b>	<b>1,465</b>	<b>1,301</b>	<b>185,827</b>

1/ Preliminary data.  
2/ Included with unclassified.  
3/ Includes a small quantity of thread herring.  
4/ Not available on a monthly basis.

...or 25.5 percent as compared with April

...the quantity of fish meal processed during the first 4 months of 1964 amounted to 13,058 tons--3,229 tons less than the same period of the previous year. Marine-animal oil amounted to 5.0 million pounds--2,852 pounds less than the same period of 1963.

\*\*\*\*\*

...production, March 1964: During March a total of 2,235 tons of fish meal and 584,000 pounds of marine animal meal was produced in the United States. Compared with March 1963 this was a decrease of 17.7 percent in fish meal production but an increase of 132,000 pounds (29.2 percent) in fish oil production.

...the quantity of fish solubles manufactured in March 1964 amounted to 911 tons--1,073 tons less than in March 1963.

...production of tuna and mackerel meal amounted to 1,423 tons which accounted for 63.7 percent of the March production. The remainder was from tuna and mackerel (199,000 pounds)

...comprised 34.1 percent of the March fish oil production.

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**Major Indicators for U.S. Supply, March 1964:** United States production of fish meal in March 1964 was lower by 17.7 percent as compared with March 1963. Production of fish solubles was down by 59.2 percent, but production of fish oil increased 29.2 percent.

Item and Period	1/1964	1963	1962	1961	1960
..... (Short Tons) .....					
<b>Fish Meal:</b>					
<b>Production:</b>					
March	2,235	2,715	4,245	2,751	3,064
January-February	2/3,729	5,232	6,557	4,794	6,944
Year 3/	-	253,452	312,259	311,265	290,137
<b>Imports:</b>					
March	40,134	47,895	18,528	20,458	18,652
January-February	66,284	58,581	44,246	23,875	16,652
Year	-	383,107	252,307	217,845	131,561
<b>Fish Solubles 4/:</b>					
<b>Production:</b>					
March	911	2,234	2,137	2,564	2,462
January-February	2/1,882	1,662	3,534	3,270	3,509
Year	-	107,402	124,334	112,241	98,929
<b>Imports:</b>					
March	200	1,143	308	135	87
January-February	882	317	2,522	374	2,089
Year	-	6,773	6,308	6,739	3,174

(Table continued on next page)



Major Indicators of U. S. Supply of Fish Meal, Solubles, and Oil, March 1964 (Contd.)					
Item and Period	1/1964	1963	1962	1961	1960
	..... (1,000 Lbs.) .....				
<b>Fish Oils:</b>					
<b>Production:</b>					
March	584	452	440	493	592
January-February	2/945	849	1,177	829	1,101
Year	-	185,827	250,075	258,118	209,143
<b>Exports:</b>					
March	222	44,384	19,167	5,644	3,157
January-February	23,698	2,537	22,156	30,905	25,896
Year	-	262,342	123,050	122,486	143,659

1/Preliminary.  
 2/Preliminary data for 1964 based on reports which accounted for the following percentage of production in 1963: Fish meal, 95 percent; solubles and homogenized fish, 99 percent; and fish oils, 99 percent.  
 3/Small amounts (10,000 to 25,000 pounds) of shellfish and marine animal meal and scrap not reported monthly are included in annual totals.  
 4/Includes homogenized fish.

\* \* \* \* \*

Major Indicators for U. S. Supply of Fish Meal, Solubles, and Oil, February 1964					
Item and Period	1/1964	1/1963	1962	1961	1960
	..... (Short Tons) .....				
<b>Fish Meal:</b>					
<b>Production:</b>					
January	2,487	2,285	2,941	2,723	3,828
February	1,242	2,847	3,616	2,071	3,116
Jan.-Dec.	-	229,646	298,413	291,337	270,343
Year	-	241,646	311,232	311,265	290,137
<b>Imports:</b>					
January	-	18,495	25,427	9,531	8,571
February	-	40,086	18,819	14,344	8,081
Year	-	383,107	252,307	217,845	131,561
<b>Fish Solubles<sup>3/</sup>:</b>					
<b>Production:</b>					
January	1,240	1,441	1,808	1,620	1,697
February	642	1,223	1,726	1,650	1,812
Year	-	96,224	124,334	112,241	98,929
<b>Imports:</b>					
January	-	148	273	219	214
February	-	169	2,249	155	1,875
Year	-	6,773	6,308	6,739	3,174
<b>Fish Oils:</b>					
<b>Production:</b>					
January	396	424	763	489	534
February	549	324	408	366	554
Year	-	184,009	255,808	266,668	215,653
<b>Exports:</b>					
January	-	79	509	13,449	2,068
February	-	2,458	21,647	17,456	23,828
Year	-	262,342	123,050	122,486	143,659

1/Preliminary data for 1963 and 1964 based on reports which accounted for the following percentage of production in 1962: Fish meal, 93 percent; solubles and homogenized fish, 97 percent; and fish oils, 95 percent.  
 2/Small amounts (10,000 to 25,000 tons) of shellfish and marine animal meal and scrap not reported monthly are included in annual totals.  
 3/Includes homogenized fish.



### Inventions

#### MECHANICAL FISHING VESSEL UNLOADER BEING DEVELOPED:

A new mechanical unloader for unloading fish from fishing vessels has been designed by a member of the New Bedford Institute of Technology, and it is being built by a firm in New Bedford, Mass.

The device is lowered into the fish hold where the fish are scooped up into buckets fastened to an endless chain conveyer. The bucket conveyer lifts the fish to deck level where they are deposited onto a belt conveyer and carried up to the wharf. The new type fish unloader was expected to be ready for trial by the end of May 1964.



### Investment Opportunities

#### PHILIPPINE FISHING INDUSTRY:

A sizable unsatisfied domestic market for fish, coupled with an export potential, suggests the possibility of investment opportunities in the Philippines for United States fishing interests. One such opportunity, among others, is the joint venture to exploit the fishing resources of Philippine coastal waters proposed by a Manila group. That group, which has wide-spread interests, has already rigged a tugboat for purse-seining and is negotiating for the acquisition of tidal flats for fish and shrimp culture.

Although a Commission of Fisheries was established in 1963 to promote a program designed to make the Philippines self-sufficient in fish production, the Philippine fishing industry has long been handicapped by antiquated methods, inadequate facilities, and lack of investment capital. Philippine imports of fish are largely canned sardines from South Africa and are running at the rate of around 38,000 metric tons a year. Because of the unsatisfied domestic demand, Philippine exports of fish have been negligible.

United States firms, desiring to obtain additional information about the potential of the fishing industry in the Philippines and about specific investment opportunities there, are invited to write to the Bureau of International Commerce, Office of International Invest-

File 4-0910-4H, Department of Commerce, Washington, D. C. 20230. (International Commerce, June 1, 1964.)

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ABSTRACTS AVAILABLE AT DEPARTMENT OF COMMERCE FIELD OFFICES:

More than 1,200 studies of investment opportunities have been collected, abstracted, and organized into a card system by the U.S. Agency for International Development (AID). Copies of the new catalog of investment opportunities have been placed in U.S. Department of Commerce field offices in various countries.

A potential investor can simply go to the nearest Commerce Department field office and run through Keysort to pick out the type and location of the investment he has in mind, and then read the abstracts. Should he desire a copy of one of the reports in its entirety, he can obtain a copy at a low cost through the field office or from the Office of Technical Services, U.S. Department of Commerce, Washington, D.C. 20230.

Where the original study contains sufficiently detailed information, each abstract card contains specific information on the market, total capital required, projected annual production, finance, profitability, manpower, location, and other relevant data. In other cases, the abstract card contains only a general description and summary.

Indexes of the investment studies breaking them down by country and country are available free of charge at the Commerce Department field offices or by writing to AID's Office of Development Finance and Private Enterprise, Agency for International Development, Washington, D.C., 20523.

Some of the studies were made with AID help and some were sponsored by international banks, foreign governments, universities, and private firms.

In making the catalog of investment opportunities widely available, AID is not vouching for the opportunities it contains, but presenting information to investors who wish to know what studies have already been done in their fields of interest.

Studies of investments involving food and kindred products account for more than those on any other single subject. There are 188 such reports. In second place are the studies on business opportunities for producing chemicals and allied products.

There are more surveys (86) dealing with the Philippines than with any other nation. In second place is Taiwan with 77, followed by Nigeria with 66, Pakistan with 50, and India with 46.

The AID Office of Development Finance and Private Enterprise has arranged to keep the system up to date. AID representatives throughout the world will engage in a continuous search for new studies of investment possibilities and report them regularly, so they can be added to the card system. Those becoming obsolete will be removed. (International Commerce, May 25, 1964.)



Information Preservation

IRRADIATION OF FISH AT SEA:

Work on the preservation of fish at sea, arranged under the terms of a contract, was completed in May 1964 to

install a pilot-model cobalt-60 irradiator aboard the U.S. Bureau of Commercial Fisheries exploratory fishing vessel Delaware. The object of the irradiation experiments at sea is to show that it will result in two important advances: (1) that the quality of fish landed will be significantly higher than that of nonirradiated fish, and (2) that fishing vessels can extend their stay at sea when additional time is needed to make up a full load.

The experiments are part of the research on the irradiation of fishery products conducted by the Bureau's Technological Laboratory at Gloucester, Mass., the home port of the Delaware. Five of the research vessel's trips in 1965 are tentatively scheduled to include laboratory personnel associated with the irradiation programs.

Note: See Commercial Fisheries Review, January 1964 p. 19; February 1963 p. 43.



Maryland

CHESAPEAKE BAY "FISH-KILL" CONTROLS ESTABLISHED:

The Maryland State Natural Resource Board has established procedures for dealing with fish losses in Chesapeake Bay. The Board has arranged: (1) close coordination between State agencies when fish kills occur, (2) a weekly survey of Maryland waters to note any kills, and (3) a research program on the causes of catastrophic fish mortalities.

It has been requested that all heavy fish kills in the Chesapeake area be reported to the Maryland State Department of Chesapeake Bay Affairs. That department coordinates all reports and calls in other agencies and groups when their assistance is needed.

Water conditions are being checked weekly in areas where heavy losses have been seen in past years. The plan of the Department of Chesapeake Bay Affairs began weekly flights June 1, 1964, over the Potomac, Patuxent, Patapsco, Middle, Back, and Choptank Rivers, Tangier Sound, Eastern Bay, and the Maryland portion of the open Chesapeake Bay. In addition, the Maryland State Department of Water Resources research vessel Monitor is taking weekly samples of water at 15 locations between Rock Hall and Herring Bay, an area where fish have died during many summers. Special additional trips are scheduled

when needed. The Monitor is being equipped for automatic data recording and simultaneous sampling of temperature, salinity, oxygen, acidity, and turbidity.

Research on suspected causes of fish kills is scheduled to begin in the summer of 1964 at the University of Maryland's biological laboratories at Solomons Island and College Park.

The research will include a study of the bacteria which killed tremendous numbers of white perch and some other species in 1963, and an investigation of changes in temperature, oxygen, and other environmental conditions which may have caused many of the past fish kills.

It is believed that the heavy fish losses in 1963 will not be repeated in 1964, since the more susceptible fish were killed, and the conditions favoring fish destruction are unlikely to occur in the same patterns in a succeeding year. White perch are widespread and in fairly good supply this year, despite the heavy losses in 1963. There is no indication of any danger to swimmers or other people using Chesapeake Bay waters.



## Mississippi

### MISSISSIPPI SOUND POSTLARVAL SHRIMP STUDIES CONTINUED:

The study of postlarval shrimp in Mississippi Sound by the Mississippi State Gulf Coast Research Laboratory continued during March-May 1964. Young brown shrimp appeared early in the year and were more abundant than in 1963. After the peak was reached in April, the number of postlarval shrimp dropped sharply and remained below the 1963 levels since the first of May. Early growth was slow but increased after the water warmed, and it appeared likely that opening of the season would be delayed. Young white shrimp were about a week later this year and numbers were a little higher. (Gulf Coast Research Laboratory, June 2, 1964.)

Note: See Commercial Fisheries Review, May 1964 p. 25.

\* \* \* \* \*

### STATE GULF COAST RESEARCH LABORATORY RECEIVES GRANTS:

A grant of \$85,700 to the Mississippi State Gulf Coast Research Laboratory by the Na-

tional Science Foundation was announced April 25, 1964. The money is to be used for the purchase of equipment for the Laboratory's oceanography building which was then under construction.

In May, the National Science Foundation awarded another grant of \$11,100 to the Laboratory for Summer Research. That money will go as payments to students who will be selected by a board after they have attended classes at the laboratory. (Gulf Coast Research Laboratory, June 2, 1964.)



## North Atlantic Fisheries Investigations

### SEA SCALLOP POPULATION SURVEY ON GEORGES BANK CONTINUED

M/V "Albatross IV" Cruise 64-7 (May 12-22, 1964): To collect quantitative samples of the sea scallop population on the eastern part of Georges Bank was the main purpose of the cruise by the U. S. Bureau of Commercial Fisheries research vessel Albatross IV.

Operations included 180 tows (of 10 minute duration) with a 10-foot scallop dredge equipped with an odometer, and 10 drags with a 10-foot beam trawl. An underwater camera was attached to the beam trawl during the transect. In another instance, the underwater camera was lowered into a sonar target area. In addition, 200 bathythermograph casts were made.

Note: See Commercial Fisheries Review, August 1963 p. 44.

\* \* \* \* \*

### BLACKBACK FLOUNDER TAGGING PROGRAM:

The Massachusetts State Division of Marine Fisheries and the U. S. Bureau of Commercial Fisheries Biological Laboratory, Woods Hole, Mass., have completed the first phase of a cooperative tagging program. Using Bureau tags, Massachusetts State biologists tagged 7,000 blackback flounders working aboard chartered otter trawlers in Massachusetts coastal waters north and south of Cape Cod. Bureau biologists aboard the Albatross IV tagged 2,400 fish on Nantucket Shoals and Georges Bank. Through May 1964, about 500 tagged fish had been recovered. Of those, 460 had originally been released in shore waters and 40 had been released off



re. All recaptured fish were taken in the  
of tagging.

\* \* \* \* \*

**RETURN OF UNMARKED OCEANIC  
INSTRUMENTS REQUESTED:**

The rate of return of instruments thrown  
board to rest on the bottom without either  
surface or subsurface marker buoy is being

**\$25 REWARD**

BE PAID FOR THE RECOVERY  
THESE INSTRUMENT CASES.

IF FOUND IN YOUR NETS, BRING  
THEM TO ANY REPRESENTATIVE OF THE

U. S. DEPARTMENT OF THE INTERIOR  
BUREAU OF COMMERCIAL FISHERIES

OFFICES LOCATED IN THESE CITIES & TOWNS.

- PROVINCETOWN MASS.
- WOODS HOLE, MASS.
- NEW BEDFORD, MASS.
- BOSTON, MASS.
- GLOUCESTER, MASS.
- ROCKLAND, ME.
- NEW YORK, N. Y.
- PORTLAND, ME.



**Oceanography**

**WATER SAMPLING STUDIES  
IN CENTRAL PACIFIC OCEAN:**

A second air flight around the island of  
Oahu in the Central Pacific Ocean was made  
on April 11, 1964, by staff members of the  
U. S. Bureau of Commercial Fisheries Biolog-  
ical Laboratory, Honolulu, Hawaii, when some  
50 packages of drift cards were released. A  
total of 8 returned drift cards by the end of  
April, from this second flight and a previous  
flight, showed that the water being sampled at  
Koko Head during April had its origin to the  
south or southwest of Oahu.

\* \* \* \* \*

**RESEARCH VESSELS OF UNIVERSTIY  
OF MIAMI NOT SUBJECT TO UNION RULES:**

The Institute of Marine Science, University  
of Miami, is not subject to the National Labor  
Relations Act in the employment of seamen  
on its oceanographic research vessels, an-  
nounced the Institute's Director this past May.  
That decision was handed down by the Nation-  
al Labor Relations Board (NLRB), Washing-  
ton, D. C., and affirmed a ruling made earlier  
at a Miami hearing.

The case arose after the Seafarers Inter-  
national Union filed a petition with the NLRB,  
alleging that the union represented a majority  
of the unlicensed seamen aboard the Institute's  
research vessel Pillsbury. The union asked  
that an election be ordered among the ocean-  
ographic vessel's crew to determine whether  
or not they should be unionized.

The NLRB decision--that the Institute and  
all its research vessels are not subject to  
NLRB jurisdiction (and are therefore, in ef-  
fect, exempt from unionization attempts by  
the Seafarers Union)--is based on the fact that  
the University of Miami is a nonprofit educa-  
tional institution.

In its decision, NLRB stated: "The Uni-  
versity of Miami, Institute of Marine Science,  
although performing research for, and sub-  
stantially supported by, the Federal Govern-  
ment, is first and foremost an educational in-  
stitution for the advanced study of oceanog-  
raphy. Its research activities contribute di-  
rectly to its curriculum and program for the  
practical training of scientists in this field.  
Hence, this research program is an integral



by the U. S. Bureau of Commercial Fish-  
Biological Laboratory, Woods Hole, Mass.  
dummy units were put out on Georges  
in May 1964. Signs offering a \$25 re-  
for their return have been posted at the  
Fish Pier and the New Bedford auction  
Handbills offering the reward have been  
at other ports in New England and  
Canada. If the experiment is a suc-  
and most of the dummy units are re-  
scientists plan to put thermographs in  
cases and set up a program to moni-  
bottom water temperatures continuously on  
parts of Georges Bank.

aspect of the Institute's overall educational function. We conclude, therefore, that the activities of the Institute, including its research program, are primarily educational rather than commercial in character, and we decline to assert jurisdiction herein. Accordingly, we shall dismiss the petition."

The Institute Director stated that the Institute's research expenditures amounted to more than \$2.7 million in 1963--almost one-third of the total spent on research by the entire University of Miami. The Institute of Marine Science has two large seagoing research vessels, the Pillsbury and the Gerda, plus numerous smaller craft. The 176-foot Pillsbury, newest of the fleet, has already logged more than 25,000 miles at sea and has been making a study of the Gulf of Guinea, along the coast of West Africa. The 75-foot Gerda, a converted North Sea trawler, has been doing research in the Gulf Stream and on the Bahama Banks. (Institute of Marine Science, University of Miami, May 13, 1964.)

\* \* \* \* \*

#### DEEP-DIVING SUBMARINE FOR OCEANOGRAPHIC RESEARCH COMMISSIONED BY WOODS HOLE OCEANOGRAPHIC INSTITUTION:

The Alvin, a 22-foot oceanographic research submarine designed to dive 6,000 feet into the ocean, was commissioned June 5, 1964, by the Woods Hole (Mass.) Oceanographic Institution.

A thorough check of all of the installed systems will be made both before and during initial sea trials, and an extensive operator training period in shallow water is planned prior to testing the craft to the design depth of 6,000 feet in the summer of 1964.

Note: See Commercial Fisheries Review, April 1964 p. 25.

\* \* \* \* \*

#### GRANTS AWARDED UNIVERSITY OF MIAMI FOR SEA FLOOR STUDIES:

Two new grants totaling \$348,000 to be used for studies of the ocean floor were received by the Institute of Marine Science, University of Miami, Miami, Fla., announced the Institute Director this past May. The grants, which involve geological investigations of the bottom sediments and the topography of the sea floor, were awarded by the National Science Foundation.

The Institute's scientists will operate from the Institute's 176-foot oceanographic research

vessel, the Pillsbury. Active work on the projects will begin as soon as the vessel completes its assignment off the coast of West Africa, where Institute scientists were making studies of the Gulf of Guinea.

Most of the work on the sea floor project will be done in the Caribbean Sea as previous studies indicate that this is one of the best places to obtain undisturbed bottom sediments extending back a million years or more. Sea sediments consist mainly of Globigerina--composed of the shells of microscopic planktonic organisms which live in surface layers of the sea. After the organisms die, their shells sink to the bottom. Analysis of the sediments reveals the changing climatic conditions during the Pleistocene epoch. Through oxygen isotopic studies made at the Institute of Marine Science, investigators have succeeded in tracing the changes in temperature of surface waters back some 375,000 years. The new study, it is hoped, will extend the record back even farther in geologic time and reveal the pattern of changing conditions throughout the Pleistocene.

The topographic studies of the ocean floor will be concerned primarily with an effort to learn more about the origin, composition, and shape of the abyssal hills--unique hills averaging about 1,200 feet in height which cover half the entire ocean floor. Some geologists believe the abyssal hills may be composed of basalt from the earth's lower crust.

The University of Miami team will investigate in detail some typical abyssal hill fields between Bermuda and Puerto Rico. The distribution of hills within selected areas will be studied, and the shapes of particular hills investigated in detail with a view to mapping their topography. Samples of the hills and the surrounding areas will be taken by coring. (Institute of Marine Science, University of Miami, May 6, 1964.)



#### Oregon

#### STEELHEAD PLANTED IN YAMHILL RIVER:

A total of 256 adult spawning winter steelhead trout were transplanted to the Yamhill River system in May 1964 from the Oregon Fish Commission's Dexter holding pond on the Middle Willamette River. Transplant

adult spawners to the Yamhill and letting  
re near the young of the transplanted fish  
downstream migrant size will help build up  
winter steelhead population of the system.

Until recently, poor seasonal passage con-  
ditions at Willamette Falls as well as Lafay-  
ette Dam on the lower Yamhill had blocked  
fish production potential of the river. In  
1963, a Yamhill County crew, with the  
assistance of Oregon Fish Commission engi-  
neers, breached the obsolete Lafayette Dam  
in an effort to provide access to the upriver  
spawning areas.

Experimental releases of both steelhead  
and silver salmon fingerlings in the Yamhill  
by the Fish Commission during the past sev-  
eral years have demonstrated the suitability  
of the system for rearing the fish to down-  
stream migrant size. The Oregon Game Com-  
mission early in 1964 liberated some 130  
steelhead in the Yamhill system from  
surplus returning to its Alsea hatchery.  
Additional steelhead transplant from the  
Willamette, coupled with progress in  
planning and negotiations for new upstream  
passage facilities over Willamette Falls at  
Portland, Oregon City, has brightened the future out-  
look for the development of a worthwhile steel-  
head run on this readily accessible lower Wil-  
lamette tributary. (Oregon Fish Commission,  
August 20, 1964.)



Salmon

COLUMBIA RIVER SUMMER  
FISHERY POSTPONED:

The Columbia River summer commercial  
fishery season did not open June 16, 1964, as  
previously scheduled. The decision to delay  
opening was the result of joint action tak-  
en by the Washington State Department of  
Fisheries and the Oregon State Fish Commis-  
sion at a public hearing in Portland, Oreg.,  
June 10. The late spring runoff brought  
the Columbia River to near flood stage, ef-  
fectively stopping the migration of chinook  
salmon. A fishery on those stationary fish in  
the river water would take more salmon than  
could be harvested from the run.

When a migration rate of 1,500 chinook  
salmon a day over Bonneville Dam showed  
that the salmon are on the move once again,  
the opening day for the commercial fishery

was to be set. (Washington State Department  
of Fisheries, June 12, 1964.)



Shellfish

ANESTHETIC MAY AID  
BIOLOGICAL RESEARCH:

A proposed shellfish anesthetic has been  
investigated by the U.S. Bureau of Commer-  
cial Fisheries Biological Laboratory at Mil-  
ford, Conn. The experiments involved propy-  
lene phenoxetol, a colorless, oily, nontoxic  
liquid that has been reported effective as an  
anesthetic for shellfish. A drug which would  
permit experimental manipulation of com-  
pletely relaxed but living mollusks would be  
of great value for anatomical and physiologi-  
cal investigations.

Actively pumping hard clams (*M. mer-  
cenaria*) were exposed to varying concentra-  
tions of propylene phenoxetol in sea water.  
At drug levels of 0.5 to 1 percent, about 20  
percent of the treated clams gaped, because  
completely relaxed, and could be freely han-  
dled. Shortly after being returned to normal  
sea water, they showed complete recovery.

In another experiment, clams, oysters,  
and mussels were anesthetized by hypodermic  
injection into the mantle cavity, but high mor-  
tality followed the direct injection treatment.



Shrimp

UNITED STATES SHRIMP  
SUPPLY INDICATORS, MAY 1964:

Item and Period	1964	1963	1962	1961	1960
..... (1,000 Lbs. Heads-Off) .....					
<u>Total landings, So. Atl. and Gulf States:</u>					
July . . . . .	-	19,767	12,294	10,500	21,746
June . . . . .	-	13,161	11,309	8,233	12,427
May . . . . .	8,400	10,152	6,186	5,276	6,335
April . . . . .	5,016	4,427	3,358	3,171	4,728
January-March . .	14,678	11,611	11,294	14,350	13,285
January-December	-	138,281	105,839	91,396	141,035
<u>Quantity canned, Gulf States 1/:</u>					
July . . . . .	-	3,726	3,551	2,793	5,802
June . . . . .	-	5,234	4,913	3,438	6,920
May . . . . .	900	3,831	1,794	1,208	1,461
April . . . . .	-	105	12	9	66
January-March . .	684	842	819	308	587
January-December	-	29,468	23,322	14,500	26,394
<u>Frozen inventories (as of end of each mo.) 2/:</u>					
July 31 . . . . .	-	25,460	13,677	14,849	17,397
June 30 . . . . .	-	24,047	13,796	19,416	15,338

(Table continued on next page)



Item and Period	1964	1963	1962	1961	1960
. . . . . (1,000 Lbs. Heads-Off) . . . . .					
<b>Frozen inventories (as of end of each mo.) 2/:</b>					
May 31 . . . . .	-	24,053	13,904	24,696	17,540
April 30 . . . . .	28,950	24,854	15,637	27,492	20,502
March 31 . . . . .	31,428	27,970	16,607	31,345	23,232
February 29 . . . . .	35,303	28,039	19,012	37,612	29,063
January 31 . . . . .	43,752	28,487	21,328	37,842	34,332
<b>Imports 3/:</b>					
July . . . . .	-	11,002	8,265	6,635	7,319
June . . . . .	-	9,439	9,397	8,065	8,932
May . . . . .	-	11,110	11,020	8,278	9,902
April . . . . .	12,886	11,082	10,210	9,208	7,733
January-March . . . . .	37,739	38,855	33,169	31,617	24,798
January-December . . . . .	-	151,530	141,103	126,268	113,418
. . . (¢/lb., 26-30 Count, Heads-Off) . . .					
<b>Ex-vessel price, all species, So. Atl. and Gulf Ports:</b>					
July . . . . .	-	63.5	82.1	55.8	54.6
June . . . . .	-	77.0	84.4	53.7	64.1
May . . . . .	4/59-62	80.9	83.7	52.8	62.9
April . . . . .	4/57-61	83.6	82.2	55.4	60.6
March . . . . .	4/57-61	85.5	80.9	56.0	56.3
February . . . . .	4/57-62	85.7	78.9	53.5	51.8
January . . . . .	4/57-69	85.0	76.3	52.5	49.5
<b>Wholesale price, froz. brown (5-lb. pkg.), Chicago, Ill.:</b>					
July . . . . .	-	77-97	-	70-75	72-77
June . . . . .	-	95-102	102-104	67-72	76-77
May . . . . .	72-78	100-103	96-103	67-69	74-77
April . . . . .	71-74	100-105	94-97	69-70	74-75
March . . . . .	72-75	102-106	94-95	69-71	65-68
February . . . . .	73-82	102-106	93-95	69-71	65-67
January . . . . .	78-83	102-106	91-94	69-71	64-66

1/Pounds of headless shrimp determined by multiplying the number of standard cases by 30.3.  
 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/Range in prices at Tampa, Fla., Morgan City, La., area; Port Isabel and Brownsville, Texas, only.  
 Note: May 1964 landings and quantity used for canning estimated from information published daily by the New Orleans Fishery Market News Service. To convert shrimp to heads-on weight multiply by 1.68.



## South Atlantic and Gulf of Mexico

### SOVIET FISHING ACTIVITY:

Fifteen Soviet vessels fishing off North Carolina and Virginia with large mid-water trawls were spotted during March and April 1964. Soviet fishing vessels were seen periodically in the Gulf of Mexico. In June some of them were seen 20 miles off Tarpon Springs, Fla. It was reported that Soviet activities in the Gulf appeared to be of an exploratory nature--with evidence of increasing effort. It was believed some of those vessels were based in Cuba.



## South Atlantic Exploratory Fishery Program

### BOTTOMFISH EXPLORATIONS CONTINUED

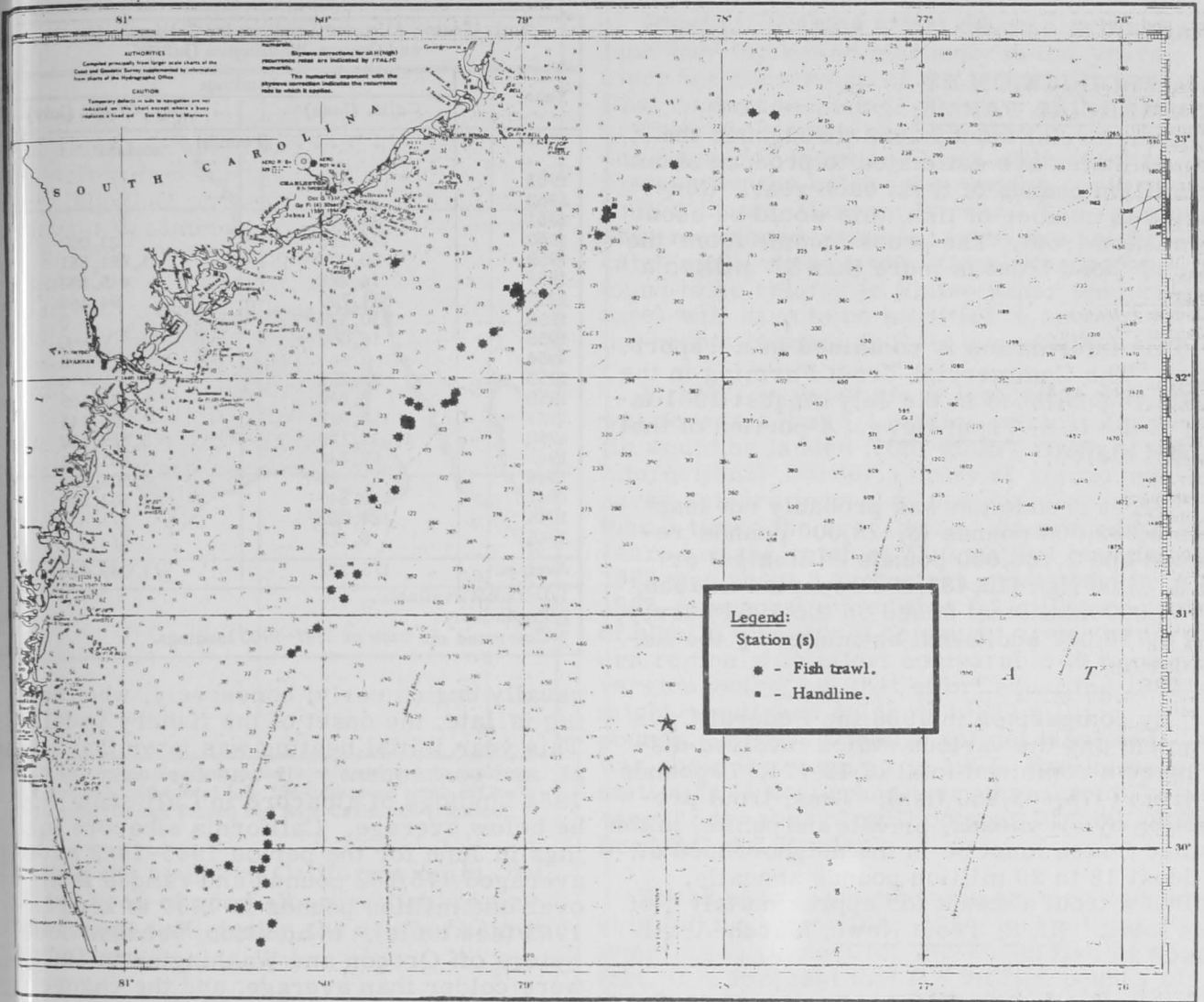
M/V "Silver Bay" Cruise 57 (April 30-May 19, 1964): To continue bottomfish explorations off South Carolina, Georgia, and northern Florida was the primary objective of this 20-day cruise by the U.S. Bureau of Commercial Fisheries exploratory fishing vessel Silver Bay. A total of 68 exploratory fishing stations were occupied on the outer Continental Shelf. Exploratory gear consisted primarily of 50/70-foot, 4½-inch mesh and 70/90-foot, 2½-inch mesh roller-rigged fish trawls. Trawl nets were fished on 8-foot bracket doors with 15-foot leglines. Cod-ends were 1½-inch mesh.

Trawling and sonic fish detection transects confirmed previous observations that the filefish (*Stephanolepis hispidus*) is presently the dominant fish, both numerically and by weight in the 13- to 25-fathom depth range off much of the southeastern coast. Trawling in those depths east of St. Augustine, Fla., produced only small amounts of vermilion snapper (*Rhomboplites aurorubens*), red snapper (*Lutjanus aya*), and groupers mixed with 1,000-4,000-pound catches of filefish.

Limited trawling was done east of the Savannah (Ga.) light vessel to assess the seasonal availability of two fish populations located during previous Silver Bay cruises. In that area, pink porgies (*Pagrus sedecim*) and butterflyfish (*Poronotus triacanthus*) were still present in large numbers in trawl samples 35-40 fathoms and 75-85 fathoms.

Snapper and grouper were taken throughout the survey area. Trawling in 24 fathoms in one area off South Carolina (32°40' N., 78°34' W.), produced small amounts of pink porgy, red snapper, red grouper (*Epinephelus morio*), scamp (*Mycteropera phenas*), and gag (*M. microlepis*). Hand Lines fished for 3 hours in 31-34 fathoms at another South Carolina location (32°21' N., 79°02' W.), produced a 1,425-pound catch consisting of grouper, red snapper, and amberjack.

Extensive midwater and near-bottom fish schools were recorded in 70 fathoms off St. Helena Sound, S. C. Catch results indicate that most of those schools consisted of round herring (*Etrumeus sadina*).



Areas investigated during M/V Silver Bay Cruise 57 (April 30-May 19, 1964).

See Commercial Fisheries Review, March 1964 p. 25.



of the Washington State Department of Fisheries.

A specially developed instrument, on which another patent is pending, inserts a tiny steel wire in the head of the fish. The wire is coded with strips of color or magnetic bits of information, which the fish carries as it moves about. Electronic equipment installed in fish-processing establishments separates the tagged fish from untagged fish and the wires are then extracted for scientific study. The process was originally developed to evaluate Columbia River salmon resources. (Science News Letter, May 2, 1964.)



ng  
 PATENTS AWARDED ON NEW METHODS  
 TRACKING FISH MIGRATIONS:  
 The patent rights on a newly developed de-  
 that may prove effective in more accu-  
 following the migrations of salmon and  
 fish were recently received by the U.S.  
 Department of the Interior.  
 Tagging programs are considered an es-  
 sential part of scientific studies done on fish  
 populations. Recently, a patent on a new  
 method of tagging young fish and later re-  
 turning them was awarded to two employees

**Trout**

**U. S. PRODUCTION BY COMMERCIAL FARMS:**

Commercial trout farms throughout the United States are estimated to produce about 5½ million pounds of trout each year. Converted to number of fish, this would be about 25 million trout. The gross income from the sale of those trout is more than \$5 million a year.

This information is contained in a report titled "The Commercial Trout Farming in the U.S.A.," published in the July-August 1961 issue of the U. S. Trout News. A portion of that report stated:

"Trout production was probably not less than 5,333,000 pounds (3,125,000 pounds reported and 2,188,000 pounds estimated) or 24,987,000 fish (12,481,000 reported in 1959, 3,750,000 additional based on the 1954 survey, and 8,756,000 additional estimated by the Association)."

"By comparison in 1958 the Federal Government and the various states involved distributed a combined total of 12,771,770 pounds of trout (175,602,250 fish). Thus, trout production by all means, private and public, in the United States must be in the neighborhood of at least 18 to 20 million pounds annually. Rainbow trout account for approximately ¾ of this total." (U. S. Trout News, March-April 1964.)



**Tuna**

**1964 ALBACORE AND BLUEFIN TUNA CATCH FORECAST FOR UNITED STATES PACIFIC COASTAL AREA:**

Following is a report by the staff on the Tuna Forecasting Program of the U. S. Bureau of Commercial Fisheries Biological Laboratory, San Diego, concerning the expected catch during 1964 in the temperate tuna fishery of the eastern Pacific Ocean:

Albacore: During 1963 additional research indicated a relationship between oceanic conditions and the onset of the albacore fishery. Normally, in the temperate eastern Pacific, the ocean changes from winter cooling to spring heating in early March. In years when the change occurs early, the albacore fishery

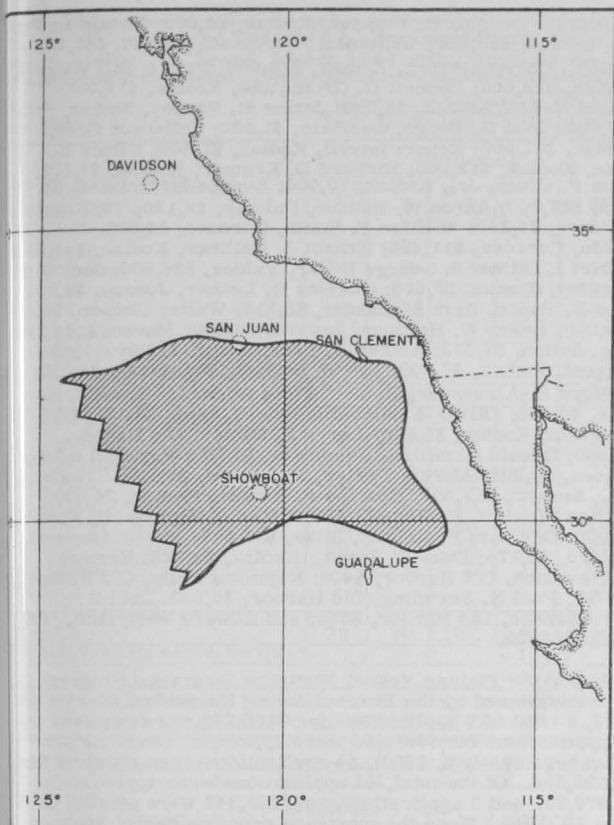
Early-Season Albacore Landings for California (June) and Oregon-Washington (July)		
Year	Landings	
	Calif. (June)	Oreg. -Wash. (July)
..... (Pounds) .....		
1963	2/0	1/
1962	28,414	1/
1961	35,603	1/
1960	126,383	23,007
1959	50,976	1,881,881
1958	14,228	415,892
1957	511,799	94,468
1956	210,527	0
1955	16,002	0
1954	2,866	0
1953	97,258	0
1952	6,299	14,509
1951	157,917	95,145
1950	1,143,139	3,819,132
1949	82,747	1,401,712
1948	85	4,505,801
1947	415,849	2,303,505
1946	424,082	1/
1945	6,175	1/
Average	175,282	3/1,039,646

1/Data not available.  
 2/Preliminary.  
 3/Computed on basis of 1947-1960 landings.

usually begins early; conversely, when heating is late, the onset of the fishery is delayed. This year initial heating was later than usual, and consequently, it was forecast that July 1964 landings of albacore in California would be below average. California albacore landings in June for the period 1945-1963 have averaged 175,282 pounds and ranged from over one million pounds in 1950 to zero in 1963 (see table). In addition, because ocean waters off Oregon and Washington in 1964 were colder than average, and the change from cooling to heating was also late in that area, it was estimated that July 1964 albacore landings in those States would also be below average (see table).

The forecast called for the best albacore fishing in July 1964 off southern California to be located in approximately a rectangle area extending roughly from 30° N. latitude to a line running west through San Clemente and San Juan Islands. The western boundary of that area should be in the vicinity of 124° W. longitude (see chart on following page). The area begins some 30 to 50 miles offshore and encompasses the offshore waters between San Clemente Island and just north of Guadalupe Island. It was indicated that good fishing for albacore could extend to Guadalupe. That area was plotted from April 1964 temperature and salinity data taken at a depth of 10 meters. As a result of an unusually intense upwelling affecting temperature and salinity





Hatched region delineates the area expected to produce about two-thirds of the total July 1964 albacore catch off southern California (United States) and Baja California (Mexico).

Along the southern California coast, the predicted area of good albacore fishing may represent sufficiently the southern limit of the fishery.

The estimate of the 1964 albacore catch is restricted, as in previous years, to the amount which will be taken south of the International Border between the United States and Mexico. The basis of that prediction is the apparent relationship between water temperature at several shore stations during the winter months and the catch the following summer of albacore off Baja California and bluefin off southern California. In "cold" years both species usually occur farther south and in "warm" years, farther north. It is expected that about 14 million pounds of albacore will be caught in 1964 from waters south of the United States-Mexican Border, which is below the 1945-1962 average albacore catch of 14.2 million pounds. In 1963, it was estimated that the landings from waters north of the International Border would be about 7 million pounds, or about 50 percent less than average. Preliminary data indicate that about 7 million pounds were

**Bluefin:** Fishing effort devoted to bluefin tuna has increased markedly in the years since the conversion of the tropical bait-boat fleet to purse-seining. Conduct of the fishery has apparently changed also in less obvious ways, for there has been little success in forecasting the catch from waters north of the United States-Mexican Border. The relationship mentioned above (whereby the bluefin catch north of the International Border was found to be related to winter water temperature) will have to be modified to account for the recent changes in fleet composition.

In 1962, on the basis of historical data, it was forecast that 5.7 million pounds of bluefin would be landed from waters north of the International Border. Entry of converted purse seiners increased fishing effort more than 3 times the average for the preceding 10 years and the catch of 17.0 million pounds in 1962 was about 3 times that predicted. In 1963, it was estimated that 7.7 million pounds of bluefin tuna would be caught from the northern region with effort comparable to pre-conversion years, but that effort equalling 1962 might result in a catch of 15-20 million pounds. Effort, although not yet tabulated, was about the same as in 1962. Preliminary statistics indicate, however, that the fleet still caught only about 7 million pounds north of the International Border.

Based upon the catch-temperature relationship for the years 1945-1959, and without attempting to correct for increased fishing effort, it is forecast that 9.6 million pounds of bluefin will be landed in 1964 from waters north of the United States-Mexican Border. That is 2.7 million pounds more than the average for the years 1945-1959.

**Early Season Surveys:** The U. S. Bureau of Commercial Fisheries research vessel Black Douglas and the California Department of Fish and Game research vessel N. B. Scofield departed the latter part of May 1964 in a joint pre-season albacore oceanographic survey. On May 1, Navy picket vessels began trolling for albacore at offshore stations.

Radio broadcasts were made to the fishing industry on the results of those early season studies. A radio report from the M/V Black Douglas stated that the first albacore were caught on June 7. A total of 61 albacore (ranging from 5 to 15 pounds) were caught in water 63° to 65° F. about 120 miles west-southwest

of Erben Bank, a seamount located about 1,000 miles due west of San Diego. The vessel report said that the tugboat Elaine Foss also caught 2 albacore on the same day in 65° F. water about 250 miles west of the area where the Black Douglas located the fish. The M/V N. B. Scofield reported catching one 13-pound albacore in 60° F. water on June 9, about 400 miles west of Point Conception. Radio broadcasts were being made daily by the research vessels until July 6, to provide information on the shoreward movement of the summer albacore movement.

Note: See Commercial Fisheries Review, July 1963 p. 55.



## U. S. Fishing Vessels

### FISHERIES LOAN FUND AND OTHER FINANCIAL AID FOR VESSELS, APRIL 1-JUNE 30, 1964:

From the beginning of the program in 1956 through June 30, 1964, a total of 1,487 loan applications for \$39,840,256 were received by the U. S. Bureau of Commercial Fisheries, the Agency administering the Federal Fisheries Loan Fund. Of the total, 791 applications (\$17,802,763) had been approved, 504 (\$12,270,419) had been declined or found ineligible, 171 (\$6,394,505) had been withdrawn by the applicants before being processed, and 21 (\$1,406,700) were pending. Of the applications approved, 299 were approved for amounts less than applied for. The total reduction was \$1,965,869.

The following loans were approved from April 1, 1964, through June 30, 1964:

New England Area: James M. White, Peace Dale, R. I., \$4,340; Skipjack Fishing Corp., New Bedford, Mass., \$50,000; Stanley Ripley, Matinicus Island, Maine, \$2,000; Wallace K. Arey, Camden, Maine, \$1,600; Robert L. Goodspeed, Trevett, Maine, \$3,248; and Edward E. Benner, Jr., Round Pond, Maine, \$7,500.

California: Joseph A. Gann, et al, San Diego, \$131,200; William A. McPhee, Moss Landing, \$13,580; Eugene A. Smith, Isleton, \$2,000; San Juan, Inc., San Diego, \$690,000; Richard Robertson, Shell Beach, \$10,449; James Friscia, San Francisco, \$3,800; and Emerson Simmons, San Francisco, \$6,000.

South Atlantic and Gulf Area: Carl Lewis, Cape Charles, Va., \$3,000; James Strickland, Freeport, Tex., \$14,400; Eddie S. Gilden, Aransas Pass, Tex., \$21,787; and John Ross, Biloxi, Miss., \$15,752.

Great Lakes Area: Harold Lamb, Rogers City, Mich., \$4,000.

Pacific Northwest Area: William M. Suryan, Anacortes, Wash., \$9,160; David W. Carr, Seattle, Wash., \$5,000; Ora L. Olson, Snohomish, Wash., \$45,000; Ottar G. Larsen, Seattle, Wash., \$32,000; Nate Smith, Brookings, Oreg., \$5,000; Floyd D. Furfiord, Westport, Wash., \$25,000; Knute Hillmar, Seattle, Wash., \$4,000; Allen K. Rhoades, Bay Center, Wash., \$6,299; Peter C. Rosberg, Burton, Wash., \$35,000; Roy E. Johnson, Seattle, Wash., \$59,000; Jack D. Durham, Seattle, Wash., \$17,400; Lloyd N. Whaley, Seattle, Wash., \$45,000; and Tony Franulovich, Anacortes, Wash., \$8,000.

Alaska: Douglas R. Putansu, Kodiak, \$8,000; Donald B. Foster, Kodiak, \$20,000; William R. Berestoff, Kodiak, \$42,000; Emil C. Christoffersen, Kodiak, \$18,500; Pete & Bill Walkoff, Kodiak, \$28,000; Bennett G. Groteclose, Kodiak, \$11,000; James Veach, Kodiak, \$6,000; James E. Veazey, Kodiak, \$17,000; John R. Boggs, Ouzinkie, \$1,300; Jefferson Grey, Kodiak, \$25,000; Egbert Intvelt, Kodiak, \$1,500; Elmer E. Dean, Kodiak, \$13,000; Richard D. Kramer, Kodiak, \$4,800; Hans P. Olsen, Jr., Kodiak, 70,000; Eugene N. McLeod, Kodiak, \$27,000; Aaron W. Bauder, Palmer, \$8,120; Turi Kivisto, Cordova, \$4,260; William F. Smith, Cordova, \$9,000; J. A. Rollin, Cordova, \$11,486; Ernest J. Galliher, Kodiak, \$40,875; Robert I. Ditman & George Hillar, Valdez, \$36,000; Jack E. Crowley, Juneau, \$2,600; Charles R. Leshner, Juneau, \$9,200; Jess E. Padon, Port Alexander, \$8,316; Walter Cooper, Seward, \$14,000; LeRoy C. Hollman, Seward, \$8,970; Marvin Lyle Draseth, Sutton, \$7,372; Arthur E. Foss, Kenai, \$16,000; Neil Sargent, Kodiak, \$3,200; Ben B. Sudduth, Ketchikan, \$4,500; Clifford E. Alexander, Homer, \$700; Adam J. Cichoski, Kodiak, \$5,000; Oliver & Samuel Selvog, Kodiak, \$3,776; Eli Metrokin, Kodiak, \$6,000; Larry S. Matfay, Old Harbor, \$4,500; Donald Hamilton, Ketchikan, \$9,500; Roy Will Allen, Haines, \$6,400; Morris Porter, Jr., Kenai, \$5,900; Trawlers, Inc., Seward, \$17,500; Charles R. Martin, Kodiak, \$4,880; William Yurioff, Kodiak, \$2,633; Peter P. Squartsoff, Kodiak, \$1,000; Gerasim Pestrikoff, Sitka, \$22,800; Martin Goresen, Seward, \$6,175; Duke R. Jones, Kodiak, \$3,525; Herman Andrewwitch, Old Harbor, \$400; Raymond Kelly, Old Harbor, \$3,050; Paul N. Swenning, Old Harbor, \$6,000; Carl R. Christiansen, Old Harbor, \$650; and Edward Pestrikoff, Old Harbor, \$500.

Under the Fishing Vessel Mortgage Insurance Program (also administered by the Bureau) during the second quarter of 1964, a total of 5 applications for \$155,275 were received and 11 applications for \$381,809 were approved. Since the program began (July 5, 1960), 55 applications were received for \$4,896,614. Of the total, 44 applications were approved for \$2,970,221 and 3 applications for \$238,347 were pending as of June 30, 1964. Since the mortgage program began, applications received and approved by area are:

New England Area: Received 11 (\$1,054,500), approved 8 (\$775,365).

California Area: Received and approved 1 (\$557,000).

South Atlantic and Gulf Area: Received 33 (\$1,384,090), approved 28 (\$1,075,336).

Pacific Northwest Area: Received 7 (\$1,846,250), approved 4 (\$507,546).

Alaska Area: Received 3 (\$54,774), approved 3 (\$54,774).

The large number of loan applications from Alaska during the period was the result of the March 27 earthquake there. In April, the Bureau of Commercial Fisheries opened an emergency Loan Office in Kodiak to arrange for loans to fishing vessel owners in the Kodiak area whose vessels or fishing gear were lost or damaged during the earthquake.

\* \* \* \* \*

### DOCUMENTATIONS ISSUED AND CANCELLED, MARCH 1964:

During March 1964, a total of 27 vessels of 5 net tons and over was issued first documents as fishing craft, as compared with 38 in March 1963. There were 39 documents cancelled for fishing vessels in March 1964, the same as in March 1963.

Table 1 - U. S. Fishing Vessels 1/--Documentations Issued and Cancelled, by Areas, March 1964 with Comparisons

Area (Home Port)	Mar.		Jan.-Mar.		Total 1963
	1964	1963	1964	1963	
..... (Number) .....					
Issued first documents 2/:					
England	-	1	2	4	23
North Atlantic	-	1	2	2	18
Chesapeake	4	3	9	6	66
South Atlantic	6	6	16	13	77
Pacific	13	17	50	40	239
Great Lakes	4	7	10	16	160
Porto Rico	-	1	1	1	5
	-	-	-	-	2
<b>Total</b>	<b>27</b>	<b>36</b>	<b>90</b>	<b>82</b>	<b>590</b>
Deregistered from documentation 3/:					
England	2	3	8	5	48
North Atlantic	-	5	3	15	47
Chesapeake	1	2	10	5	25
South Atlantic	5	4	15	14	53
Pacific	8	13	28	23	118
Great Lakes	20	11	35	26	87
Porto Rico	3	1	8	3	15
	-	-	-	-	3
<b>Total</b>	<b>39</b>	<b>39</b>	<b>107</b>	<b>91</b>	<b>396</b>

For explanation of footnotes, see table 4.

Table 2 - U.S. Fishing Vessels--Documents Issued by Vessel Length and Area, March 1964 2/

Length	Chesapeake	South Atlantic	Gulf	Pacific	Total
..... (Number) .....					
17.9	-	-	-	1	1
14.9	-	-	1	-	1
16.9	1	-	1	-	2
17.9	2	-	-	1	3
10.9	-	-	1	-	1
11.9	1	-	-	-	1
12.9	-	-	1	1	2
14.9	-	-	1	-	1
17.9	-	1	-	-	1
19.9	-	-	-	1	1
13.9	-	-	1	-	1
14.9	-	1	-	-	1
17.9	-	1	-	-	1
18.9	-	-	2	-	2
11.9	-	-	1	-	1
12.9	-	-	2	-	2
14.9	-	-	1	-	1
15.9	-	3	1	-	4
<b>Total</b>	<b>4</b>	<b>6</b>	<b>13</b>	<b>4</b>	<b>27</b>

For explanation of footnote, see table 4.

Table 3 - U.S. Fishing Vessels--Documents Issued by Tonnage and Area, March 1964 2/

Tonnage	Chesapeake	South Atlantic	Gulf	Pacific	Total
..... (Number) .....					
4	4	-	-	1	5
-	-	-	4	-	4
-	-	-	-	2	2
-	1	1	-	-	2
-	-	1	-	-	1
-	-	2	-	1	3
-	-	-	4	-	4
-	2	3	-	-	5
-	1	-	-	-	1
<b>Total</b>	<b>4</b>	<b>6</b>	<b>13</b>	<b>4</b>	<b>27</b>

For explanation of footnote, see table 4.

Table 4 - U. S. Fishing Vessels--Documents Issued by Vessel Horsepower and Area, March 1964 2/

Horsepower	Chesapeake	South Atlantic	Gulf	Pacific	Total
..... (Number) .....					
32	1	-	-	-	1
37	1	-	-	-	1
48	-	-	1	-	1
100	-	-	-	1	1
110	-	1	2	-	3
130	1	-	-	-	1
165	-	1	1	1	3
170	-	1	4	-	5
175	1	-	-	-	1
180	-	-	1	1	2
220	-	-	2	-	2
270	-	-	1	-	1
300	-	2	1	1	4
325	-	1	-	-	1
<b>Total</b>	<b>4</b>	<b>6</b>	<b>13</b>	<b>4</b>	<b>27</b>

1/Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.

2/There were no redocumented vessels in March 1964 previously removed from the records. Vessels issued first documents as fishing craft were built: 21 in 1964; 1 in 1961; 1 in 1958; and 4 prior to 1951.

3/Includes vessel 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

#### IMPORTS OF CANNED TUNA (BRINE) UNDER QUOTA:

United States imports of tuna canned in brine during January 1-May 30, 1964, amounted to 14,496,778 pounds (about 690,320 standard cases), according to preliminary data compiled by the U. S. Bureau of Customs. The quantity of tuna canned in brine which can be imported into the United States during the calendar year 1964 at the 12½-percent rate of duty is limited to 60,911,870 pounds (or about 2,900,565 standard cases of 48 7-oz. cans). Any imports in excess of that quota will be dutiable at 25 percent ad valorem.

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#### PROCESSED EDIBLE FISHERY PRODUCTS, APRIL 1964:

United States imports of processed edible fishery products in April 1964 were down 6.5 percent in quantity and 5.4 percent in value from those in the previous month. There was a general decline in imports of most fish fillet items as well as canned sardines in oil and canned oysters. Imports were up for canned albacore tuna in brine, canned sardines not in oil, and canned crab meat.

Compared with the same month in 1963, imports in April 1964 showed little change in overall totals. A gain this April in imports of fish blocks and slabs, canned sardines not in oil, and canned crab meat was about offset by smaller ship-



U. S. Imports and Exports of Processed Edible Fishery Products, April 1964 with Comparisons								
Item	Quantity				Value			
	Apr.		Jan.-Apr.		Apr.		Jan.-Apr.	
	1964	1963	1964	1963	1964	1963	1964	1963
Fish & Shellfish:	.. (Millions of Lbs.) ..				.. (Millions of \$) ..			
Imports 1/ . . .	40.3	40.6	168.3	165.3	12.2	12.3	49.4	47.0
Exports 2/ . . .	3.0	1.6	14.9	12.6	1.7	0.8	6.4	4.9

1/Includes only those fishery products classified by the U. S. Bureau of the Census as "Manufactured foodstuffs." Included are canned, smoked, and salted fishery products. The only fresh and frozen fishery products included are those involving substantial processing, i. e., fish blocks and slabs, fish fillets, and crab meat. Does not include fresh and frozen shrimp, lobsters, scallops, oysters, and whole fish (or fish processed only by removal of heads, viscera, or fins, but not otherwise processed).

2/Excludes fresh and frozen.

ments of groundfish fillets, sea catfish fillets, canned tuna in brine, canned sardines in oil, and canned oysters.

In the first 4 months of 1964, imports were up 1.8 percent in quantity and 5.1 percent in value from those in the same period of 1963. During January-April 1964 there were larger imports of groundfish fillets, flounder fillets, blocks and slabs, sea catfish fillets, and yellow pike fillets. But imports were down for swordfish fillets, canned sardines in oil and not in oil, and canned tuna in brine.

Exports of processed edible fish and shellfish from the United States in April 1964 were up 20 percent in quantity and 70 percent in value from those in the previous month. In April, there was a sharp increase in exports of canned salmon as well as larger shipments of canned sardines not-in-oil. The gain was partly offset by a drop in shipments of canned mackerel and canned sardines in oil.

Compared with the same month of the previous year, the exports in April 1964 were up 87.5 percent in quantity and 112.5 percent in value. This April there were larger shipments of all leading canned fish export items except canned squid.

Processed fish and shellfish exports in the first 4 months of 1964 were up 18.3 percent in quantity and 30.6 percent in value from those in the same period of 1963. In January-April 1964 there were much larger shipments of canned mackerel and shipments of canned sardines in oil and canned shrimp were also higher, but exports of canned sardines not-in-oil and canned squid were down sharply.

Notes: (1) Prior to October 1963, the data shown were included in news articles on "U. S. Imports and Exports of Edible Fishery Products." Before October 1963, data showing "U. S. Imports of Edible Fishery Products" summarized both manufactured and crude products. At present, a monthly summary of U. S. imports of crude or nonprocessed fishery products is not available; therefore, only imports of manufactured or processed fishery products are reported. The import data are, therefore, not comparable to previous reports of "U. S. Imports of Edible Fishery Products."

The export data shown are comparable to previous data in "U. S. Exports of Edible Fishery Products." The export data in this series of articles have always been limited to manufactured or processed products.

(2) See *Commercial Fisheries Review*, July 1964 p. 36.



## U.S. Research Vessels

### "DELAWARE II" TO BE BUILT AS NEW EXPLORATORY FISHING RESEARCH VESSEL:

A contract for the construction of a 155.5-foot fisheries research vessels has been awarded to a shipbuilding firm in South Portland, Maine, by the U. S. Bureau of Commer-

cial Fisheries. The vessel is to be operated by the Bureau's Exploratory Fishing Base, Gloucester, Mass., and will replace the veteran research vessel Delaware. The new vessel will be named Delaware II and will continue fisheries investigation work in the North Atlantic.

The design and construction of the Delaware II will enable the ship to operate from subarctic regions to the tropics in all seasons. Stores and fresh-water provisions will allow the vessel to remain at sea for 30-day periods. Fuel oil capacity is sufficient to provide an 8,000-mile cruising radius. Air-conditioned quarters are provided for a complement of 6 scientists and 13 crew members. The Delaware II will be equipped with two laboratories and a special chartroom. To aid scientific investigations, the vessel will also be provided with sophisticated electronic fish-detecting equipment and an underwater television system for observing the operation of fishing gear and its effect upon fish.

Of special interest is the deck layout, featuring a new concept in stern trawling. The stern is fitted with a sloping ramp running from waterline to the main deck. A passage 10 feet wide, extends the entire length of the vessel to the trawl winch, which is located forward. Those features allow the trawl to be hauled aboard in a single, fast, efficient operation. The deckhouse, through which the trawl passage runs, affords protection for the crew while working on the net and the catch. Capabilities for side trawling, long-lining, gill-netting, and purse-seining are also provided.

Facilities will be provided to allow future research on methods of preserving and processing fish at sea. Included are equipment for ice-making, brine- and blast-freezing, and irradiation. The vessel's insulated hold will have a 16-ton freezing capacity.

The principal specifications of the Delaware II are: length overall 155.5 feet, beam 30 feet, draft 11.5 feet, displacement (full load) 680 tons, and deadweight 180 tons.

The Delaware II will be powered by a 1,000 hp.-Diesel engine, driving a solid wheel through reduction gears, which will enable the vessel to cruise at 12.5 knots. Two 115-kilowatt a.c. generators will supply the vessel's regular power demand, as well as power

for experimental fishing techniques, such as electro-fishing.

It is believed that the new vessel, in addition to efficiently carrying out the objectives of the Bureau's research programs, will provide an example to the United States fisherman of a modern concept in efficient trawler design.



**Washington**

**SALMON TAGGING IN PUGET SOUND CONTINUED:**

The purse-seiners Welcome, Victory, and Isis have been chartered for salmon tagging during August and September 1964 in northwestern Puget Sound by the Washington State Department of Fisheries. The 3 vessels will operate during weekly 2- and 3-day closures for fishing. They will tag fish at West Point, Rosario Strait, Iceberg Point, Salmon

Banks, Lime Kiln, Mitchell Bay, and Stuart Island. Biologists from the Washington State Department of Fisheries will be on board the vessels at all times during tagging. The project is part of a continuing program to learn more about the migration patterns of adult salmon. (Washington State Department of Fisheries, May 29, 1964.)



**Wholesale Prices**

**EDIBLE FISH AND SHELLFISH, JUNE 1964:**

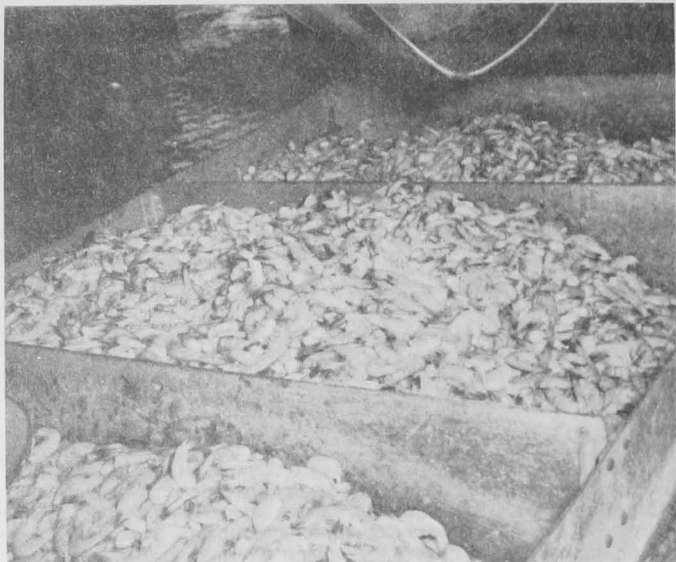
There was only a slight increase (0.2 percent) from the previous month in the June 1964 wholesale price index for edible fish and shellfish (fresh, frozen, and canned). But prices for most salt-water fishery products this June were higher than in May. Processed frozen fish and shellfish was the only subgroup index that rose from May to June, solely because of higher frozen shrimp prices in June. At 105.6 percent of the 1957-59 average, the index this June was 7.7 percent lower than for the same month a year earlier. June 1964 prices for most items were generally lower than in June 1963.

Prices this June were mostly lower in the drawn, dressed, or whole finfish subgroup and the index was down 1.1 percent

Wholesale Average Prices and Indexes for Edible Fish and Shellfish, June 1964 with Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ (\$)		Indexes (1957-59=100)			
			June 1964	May 1964	June 1964	May 1964	Apr. 1964	June 1963
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned) . . . . .					105.6	105.4	103.1	114.4
<b>Fresh &amp; Frozen Fishery Products:</b> . . . . .					107.8	107.4	103.7	120.5
<b>Drawn, Dressed, or Whole Finfish:</b> . . . . .					106.3	107.5	98.4	109.7
Haddock, 1ge., offshore, drawn, fresh . . . . .	Boston	lb.	.10	.08	75.2	60.5	67.4	97.9
Halibut, West., 20/80 lbs., drsd., fresh or froz. . . . .	New York	lb.	.36	.34	107.0	101.5	82.8	106.4
Salmon, king, 1ge. & med., drsd., fresh or froz. . . . .	New York	lb.	.89	.92	124.7	127.8	116.3	118.8
Whitefish, L. Superior, drawn, fresh . . . . .	Chicago	lb.	.43	.62	63.4	92.5	84.3	84.3
Yellow pike, L. Michigan & Huron, rnd., fresh . . . . .	New York	lb.	.43	.58	69.6	94.2	69.6	76.2
<b>Processed, Fresh (Fish &amp; Shellfish):</b> . . . . .					114.8	117.2	115.0	135.1
Fillets, haddock, sml., skins on, 20-lb. tins . . . . .	Boston	lb.	.32	.30	77.7	71.6	75.3	100.8
Shrimp, 1ge. (26-30 count), headless, fresh . . . . .	New York	lb.	1.00	.99	117.2	116.0	111.3	133.0
Oysters, shucked, standards . . . . .	Norfolk	gal.	7.00	7.50	118.0	126.5	126.5	143.3
<b>Processed, Frozen (Fish &amp; Shellfish):</b> . . . . .					98.7	94.7	94.7	113.1
Fillets: Flounder, skinless, 1-lb. pkg. . . . .	Boston	lb.	.37	.37	92.5	92.5	93.8	100.1
Haddock, sml., skins on, 1-lb. pkg. . . . .	Boston	lb.	.35	.36	101.1	104.1	107.0	102.6
Ocean perch, 1ge., skins on 1-lb. pkg. . . . .	Boston	lb.	.30	.30	105.2	105.2	108.7	117.5
Shrimp, 1ge. (26-30 count), brown, 5-lb. pkg. . . . .	Chicago	lb.	.82	.75	96.6	88.3	86.6	118.6
<b>Canned Fishery Products:</b> . . . . .					102.2	102.2	102.5	104.1
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs. . . . .	Seattle	cs.	22.25	22.25	97.0	97.0	95.9	104.6
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs. . . . .	Los Angeles	cs.	11.50	11.50	102.1	102.1	103.3	99.9
Mackerel, jack, Calif., No. 1 tall (15 oz.), 48 cans/cs. . . . .	Los Angeles	cs.	6.25	6.13	105.9	103.9	103.9	100.0
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs. . . . .	New York	cs.	8.81	8.86	113.0	113.7	116.5	113.0

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.  
 Replaced California canned sardines starting December 1962; entered wholesale price index at 100 under revised procedures of Bureau of Labor Statistics.



Fresh East Coast shrimp on display at one of the stands in the New York City Fulton Fish Market.

from the previous month. Prices this June were sharply lower for Great Lakes fresh-water fish and fresh and frozen king salmon at New York City (down 2.4 percent from the previous month). But prices were higher for ex-vessel large haddock (up 24.3 percent) at Boston and fresh and frozen halibut (up 5.4 percent) at New York City. Compared with June 1963, prices in the subgroup this June were lower (by 3.1 percent) for all products, except salmon (up 5.0 percent) and halibut (up 0.6 percent). From June a year earlier, ex-vessel large

haddock prices were down 23.3 percent and Lake Superior whitefish prices were sharply lower by 24.8 percent this June.

The subgroup index for processed fresh fish and shellfish in June 1964 was down 2.0 percent from the previous month. From May to June prices were lower for shucked standard oysters (wholesale price down 50 cents a gallon) at Norfolk. The lower prices for oysters were offset by increases in prices for fresh haddock fillets (up 8.5 percent) at Boston and fresh shrimp (up 1.0 percent) at New York City. Compared with June 1963, the subgroup index this June was down 15.0 percent because prices for all items in the subgroup were down substantially.

In the subgroup for processed frozen fish and shellfish there were price changes only for frozen shrimp and haddock fillets with the index up 4.2 percent from the previous month. Prices for other items in the subgroup were unchanged from May to June. A stronger market for frozen shrimp at Chicago saw higher prices (up 9.4 percent) than the previous month, but prices for haddock fillets were lower by 2.9 percent. As compared with June 1963, prices for all items in the subgroup were considerably lower this June as the index was down 12.7 percent.

The subgroup index for canned fishery products was unchanged from May to June because higher prices for California canned jack mackerel (up 1.9 percent) were offset by a slight drop in prices for canned Maine sardines (down 0.6 percent). Prices for canned pink salmon this June were the same as in May but were 7.3 percent lower than in June 1963. Stocks of canned pink salmon on June 1, 1964, were reported liberal and estimated to be several hundred thousand cases above normal for that date. Stocks of canned jack mackerel were below normal due to lower California landings of the species. Prices for canned Maine sardines were lowered by some distributors in anticipation of the new-season pack. The subgroup index this June was lower than for the same month a year earlier by 1.8 percent principally because of lower pink salmon prices.



#### NORTH AMERICAN CATFISH ARE SOLICITOUS PARENTS

Catfish are known to be careful parents. Many of them build nests and take care of their young after they hatch. Fresh-water catfish can sometimes be seen near the edge of lakes in early summer as one of the parents, usually the father, patiently swims near his brood of finger-sized, dark-colored offspring.

There are about two dozen kinds of catfish in the world. Our North American catfish belong to two families--the fresh-water (Ictaluridae) and the salt-water (Ariidae).

Many catfish males carry the eggs in their mouths, sometimes for a few months. After the eggs hatch, the male catfish carries on with his parental duty by following the tiny offspring, opening his mouth for them to flee inside at the first sign of danger.

They are called catfish because of the whiskers (barbels) around their head, and there are many superstitions about them, including the nickname, children of the devil.

Catfish have spines in the fins which can cut the hand of a careless angler. A gland near the base of the spine secretes a substance that increases the swelling and painfulness of the wound. (Science News Letter, June 20, 1964.)