

TRENDS AND DEVELOPMENTS

Alaska

TRENDS AND DEVELOPMENTS, APRIL 1964:

Developments in the Alaska fisheries following the March 27 earthquake, foreign fishing activity, and other developments for April as reported by the U. S. Bureau of Commercial Fisheries Alaska Regional Office, Juneau:

Commercial Fishing Industry Still Operational in Spite of Earthquake: The March 27, 1964, earthquake in Alaska caused widespread rising or subsidence of large sections of land masses in Alaska. The epicenter was apparently in the Prince William Sound area. As of the end of April, information indicated that the fault line extended from east of Kodiak northerly through the Kenai Peninsula. West of that fault line the land masses subsided 5 or 6 feet, and east of the fault line the land was raised 5 or 6 feet. Along with this tremendous earth movement were tidal waves which inundated large parts of the lowlands surrounding the Gulf of Alaska. Southeastern Alaska, east of Yakutat, was virtually unaffected. The Alaska Peninsula, Aleutian Islands, Bristol Bay, and Arctic coastline also suffered little damage. The prin-



Fig. 1 - This is what the harbor at Kodiak looked like after the earthquake. Pieces of the dock are floating here as well as resting inland. Tides now running 8 feet higher than old maximums.

cipal damage occurred in the Cook Inlet, Kodiak Island, and Prince William Sound areas.

Although the impact of the quake and waves destroyed many boats, skiffs, gear, and some shore plants, the overall impact on the fishing industry was not as severe as at first indicated. The suffering and hardship to individuals cannot be minimized, but the fishing industry as a whole was still functional a month after the catastrophe.

The king crab fishery was the hardest hit with about 15 to 20 percent of its 1963 capability destroyed. The shrimp fishery suffered relatively minor damages, although the largest shrimp plant at Seward was lost. While many salmon vessels and two salmon plants were destroyed, the salmon industry retained the capability for harvesting the 1964 run in the normal fashion. Halibut cold-storage plants lost or damaged will cause a redistribution of this season's halibut landings but otherwise, the halibut industry remains fully capable. The Dungeness crab fishery suffered considerably in the Cordova area with the loss of hundreds of pots and some plant and boat damage. By the end of April it was back in operation almost at full scale. Razor clam beaches off Copper River flats were raised and shifted and some clam mortality occurred but that industry was going ahead with good results. About 50 to 75 percent of the Copper River flats salmon gill-net fishing area was high and dry in April and state regulations in that area will be changed.

The effects of the quake and waves and changes in elevation may have severe effects on the fish themselves. At least 30 miles of red snapper were observed floating dead on the surface. The effects of waves, silting, and of millions of gallons of gas and oil dispersed into intertidal zones have caused un-evaluated damage. Slides and the falling and shifting of ice undoubtedly had some impact on the resource.



22 - Viewing upper downtown section of Kodiak from a hillside. About 24 dwellings were demolished, and many others were moved as much as 4 blocks off their foundations. A good portion of the business district sustained substantial damage.



23 - Part of the downtown section of Kodiak after the earthquake. Note how vessels were tossed onto the land.

Damage to docks and waterfront facilities, because of the change in elevation, may well exceed the actual damage of the quake and fires. The east side of Kodiak Island has subsided 5 to 6 feet and several major docks and plants probably must be relocated. Homer and Seldovia also appear to be 3 or 4 feet lower and will require extensive dock and plant relocation. The land mass around the Cordova area raised in some places as much as 6 feet and docks, boat ways, and wharves will require extension or relocation. The entire city of Valdez will be relocated.

Soviet Fishing Fleet off Yakutat: The Soviet trawling fleet operating off Yakutat during April 1964 extended from Cape St. Elias to the Fairweather grounds northwest of Cape Spencer. That fleet included about 16 trawlers, 16 reefers, 3 factoryships, 2 cargo ships, 1 salvage tug, and 1 tanker. The

Soviet catches appeared to be almost entirely Pacific ocean perch, with no salmon, halibut, or appreciable quantities of other incidental species evident. The Soviet trawlers were fishing in depths of 100 to 165 fathoms, averaging about one hour per drag, and with catches varying between 1,000 and 20,000 pounds. That fleet off Yakutat constituted the most easterly concerted Soviet fishery so far.

Soviet Crab Fleet Off Kodiak: The Soviet crab factoryship Pavel Chebotnyagin and her tangle net-setting SRT's were observed fishing king crab in the Gulf of Alaska on April 6, about 15 miles north of Chirikof Island south of Kodiak Island. Surface and aerial observations of that vessel's operation were analyzed and it was tentatively estimated the catch by that fleet might exceed 30,000 crabs a day. On April 20, aerial patrol units observed the Chebotnyagin under way about 40 miles south of Chirikof Island, indicating the Soviets had withdrawn from the Kodiak area. On April 22, she left the Gulf of Alaska and entered the Bering Sea via Unimak Pass. As of the end of April, she was operating off Unimak Island.

Soviets Continue to Fish Portlock Bank: The Soviet trawling fleet centered in the Portlock Bank region east of Kodiak has remained at a relatively constant level and is estimated to include 8 trawlers and 2 reefers. There is considerable interchange between that fleet and the larger trawling fleet off Yakutat, both of which are fishing mainly for Pacific ocean perch.

Soviet "Flounder" Activities in Bering Sea: Trawling activities in the eastern Bering Sea by Soviet vessels were at their lowest level this year in April as the flounder expeditions were apparently being terminated and/or diverted to other fisheries. The flounder fleet consisted of about 25 trawlers, 5 reefers, 1 factoryship, and various support vessels.

Soviet Vessels Fish for Shrimp in Bering Sea: The Soviets were engaged in a shrimp fishery northwest of the Pribilof Island, it was confirmed in April. Personnel of Japanese shrimp fishing fleets in the area reported that two Soviet trawlers had been active in that fishery for nearly three weeks. One of the Soviet vessels was observed making one haul yielding an estimated 800 pounds of shrimp.

Japanese King Crab Fleet in Outer Bristol Bay: A Japanese king crab fleet consisting

of the factoryships Tokei Maru and Tainichi Maru, each accompanied by six catcher boats, was reported fishing tangle net gear, centered in outer Bristol Bay north of Port Moller during April.

Japanese Shrimp Fishery: The Japanese shrimp factoryship Chichibu Maru and her accompanying fleet of 12 trawlers left the area northwest of Unimak Pass during April and moved into the more common Japanese shrimp grounds north of the Pribilof Islands. The shrimp factoryship Einin Maru and her reported 12 trawlers were operating in the vicinity of the Chichibu Maru fleet at the time.

Japanese Long-Line Fishery: It was believed the Japanese long-line fleets that entered the Bering Sea halibut fishery in the 3B North Triangle area abandoned the halibut grounds near Unimak Pass and moved north nearer the Pribilof Islands. The Fuji Maru No. 3, with 5 accompanying long-line fishing vessels, was sighted southeast of St. George Island in April.

Japanese "Exploratory" Fishing in Gulf of Alaska: The Japanese stern trawler Taiyo Maru No. 81 was reported operating about 40 miles south of the southwest end of Kodiak Island during April. The second Japanese trawler to conduct "exploratory" fishing in the Gulf of Alaska, the 545-gross-ton side trawler Tenryu Maru, was scheduled to leave Japan on April 15 but had not yet been sighted in the Gulf.

Seismic Exploration Agreement Completed: Negotiations were completed providing safeguards for living marine resources during seismic explorations utilizing explosives in the waters off Alaska. The Bureau of Commercial Fisheries and the Alaska Department of Fish and Game developed provisions governing explosive detonations to minimize the possibilities of damage to marine life and commercial fisheries. Those provisions are incorporated into seismic permits issued by the Alaska Department of Fish and Game for exploration in State of Alaska waters and by arrangement with the U. S. Bureau of Geological Survey are integrated into their permits for seismic exploration in the international waters of the outer continental shelf. Fisheries observers will accompany all seismic teams subject to the provisions to ensure compliance. Those observers are empowered to halt operations any time excessive kills of marine life occur or are likely to oc-

cur. A cooperative agreement between the Bureau of Commercial Fisheries and Alaska Department of Fish and Game provides that the observers will function with equal authority whether in State or International waters.

First Halibut of Season Landed at Ketchikan: Several fares of halibut from the Bering Sea were sold through the Ketchikan Fish Exchange during April. The first trip was delivered to Ketchikan this season by the vessel Yakutat on April 15. Bidding by the local buyers brought a standard price of 18.10, and 10 cents for large, medium, and chick halibut, respectively.

Herring Roe-on-Kelp Harvest: The herring roe-on-kelp fishery at the west coast villages of Craig and Hydaburg ended in April. At Craig the quota of 110 tons set by the Alaska Department of Fish and Game was reached in 10 hours of fishing, and at Hydaburg the quota of 50 tons was reached in 6 hours. This year 7 packers participated in the fishery as against 2 packers in 1963. Quota requests from processors to the Alaska Department of Fish and Game totaled more than 600 tons in 1964. Prices paid to pickers jumped from 5 to 6 cents a pound in 1963 to 15-20 cents a pound in 1964.

Bureau of Commercial Fisheries Loan Program Takes Emergency Actions: Under the Secretary of the Interior James K. Carr in cooperation with the Regional Director for Alaska, Bureau of Commercial Fisheries, during his inspection trip to the areas affected by the earthquake disaster. Possible emergency actions that might be initiated and modifications of the Bureau's Fisheries Loan Program that could be affected to aid in recovery operations were discussed. With subsequent authority from the Secretary of the Interior the Bureau opened an emergency office at Kodiak on April 10, under the supervision of the Chief of the Bureau's Branch of Loans and Grants.

The first emergency loan case was received on April 11 and approved on April 12, along with two other cases that were fully processed over that weekend. With additional personnel, offices were also manned at Anchorage, Seward, Cordova, and Valdez, for several days at each location. Personnel from that Branch's Seattle office also handled emergency loan cases to assist those who were south seeking replacement vessels, or repairs to damaged vessels.

In April 34 applications for loans (totaling over \$500,000) were handled in Alaska; 9 additional applications were being processed through the Seattle office. Throughout the month of May the affected areas were to be revisited and processing of loans was to continue as rapidly as possible. As many of the best vessels had not yet made firm plans to obtain replacement vessels, it was expected that applications would continue to be received sporadically for several more months.

Exploratory Fishing Plans Completed: Arrangements were made by the Bureau of Commercial Fisheries Branch of Exploratory Fishing to charter the halibut schooner *Paragon* starting May 18 at Seattle. Unless earthquake repercussions or other circumstances make it unfavorable, exploratory fishing personnel planned to conduct about 3 weeks of underwater television experiments from Port Mckean. Those studies, starting on or about May 26, were planned to determine the feasibility concerning the use of television for locating and studying king crab. Follow-

At the hearing, sportsmen argued that commercial fishermen had already ruined the sardine industry and that the same thing would happen to the anchovies if the permits were granted. They said that the anchovy is the key to sport fishing in southern California and that without the anchovy as a forage fish, the bigger species such as yellowtail, barracuda, tuna, and albacore would have to migrate to more favorable waters toward Mexico.

The California Fish and Game Commission voted 5-0 against the commercial fishermen's request.

Note: See *Commercial Fisheries Review*, June 1964 p. 12.



Cans--Shipments for Fishery Products

January-December 1963: The amount of steel and aluminum consumed to make cans shipped to fish and shellfish canning plants during 1963 was down 6.9 percent from that

Table 1 - U. S. Domestic Shipments of Metal Cans for Fishery Products, 1963 and 1962
(Base Boxes of Metal Consumed in the Manufacture of Cans for Fishery Products)

Shipping Area	First Quarter		Second Quarter		Third Quarter		Fourth Quarter		Year	
	1963	1962	1963	1962	1963	1962	1963	1962	1963	1962
Alaska	155,814	158,531	215,924	189,556	276,572	341,193	173,532	191,087	821,842	880,367
Western	21,010	13,403	38,197	32,668	34,986	21,765	33,673	30,269	127,866	98,105
Central	29	63	5	29	8	22	29	26	71	140
Eastern	381,735	414,199	629,376	701,831	594,561	562,140	315,983	425,942	1,921,655	2,104,112
Total all areas	558,588	586,196	883,502	924,084	906,127	925,120	523,217	647,324	2,871,434	3,082,724

Includes Puerto Rico.
Includes Alaska and Hawaii.

in the experimental studies on king crab, it was planned that detailed shrimp exploration would continue off Kodiak Island and westward along the Alaska Peninsula.

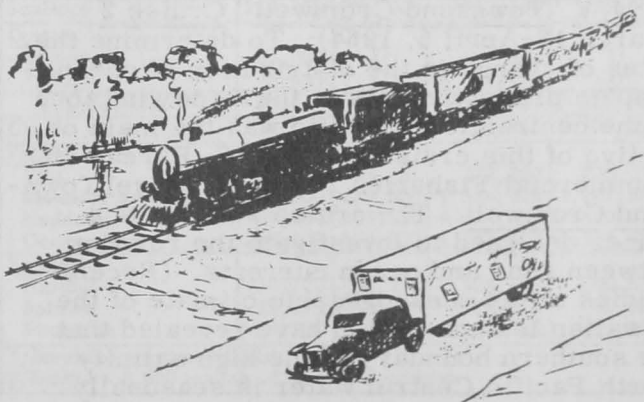


California

REQUEST FOR ANCHOVY INDUSTRIAL FISHERY DENIED:

A request by commercial fishermen of Monterey, Calif., to take 13,000 tons of anchovies for reduction into meal and oil was denied by the California State Fish and Game Commission. This was the result of a special meeting held on May 11, 1964, at Monterey at that public comments could be heard on the proposed experiment to fish for anchovies for reduction purposes, and whether or not permits should be granted to firms in the Monterey area for that purpose.

used during 1962. The decline was due to smaller shipments to the Eastern and Western Areas which were only partly offset by larger shipments to the Southern Area. The pack of salmon and tuna was down on the West Coast. A smaller pack of Maine sardines accounted for the decline in shipments to the East Coast. On the Gulf Coast, however, there was a considerable increase in the pack of shrimp.



January-March 1964: Shipments of cans for fishery products during January-March 1964 were 2.6 percent below shipments in the first quarter of 1963. A decline in shipments to the Western Area (due to a drop in the pack of tuna) was almost offset by larger shipments to the Eastern Area. East Coast canneries now packing tuna account for most of the increase in the Eastern Area.

Table 2 - U. S. Domestic Shipments of Metal Cans for Fishery Products, Jan. -March 1963 and 1964 (Base Boxes of Metal Consumed in the Manufacture of Cans for Fishery Products)

Receiving Area	Jan. -March	
	1964	1963
East ¹	187,707	155,814
Southern	24,761	21,010
North Central	492	29
West ²	359,947	381,735
Total all areas	572,907	558,588

¹/Includes Puerto Rico.

²/Includes Alaska and Hawaii.

In January-March 1964, shipments to the Pacific or Western Area accounted for 62.8 percent of total shipments; shipments to the Eastern Area accounted for 32.8 percent; and shipments to the Southern Area accounted for most of the remaining 4.4 percent. Most of the fish-canning facilities are located in the Pacific Area.

Notes: (1) 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" x 20" size. Tonnage figures for steel (tinplate) cans in 1964 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.

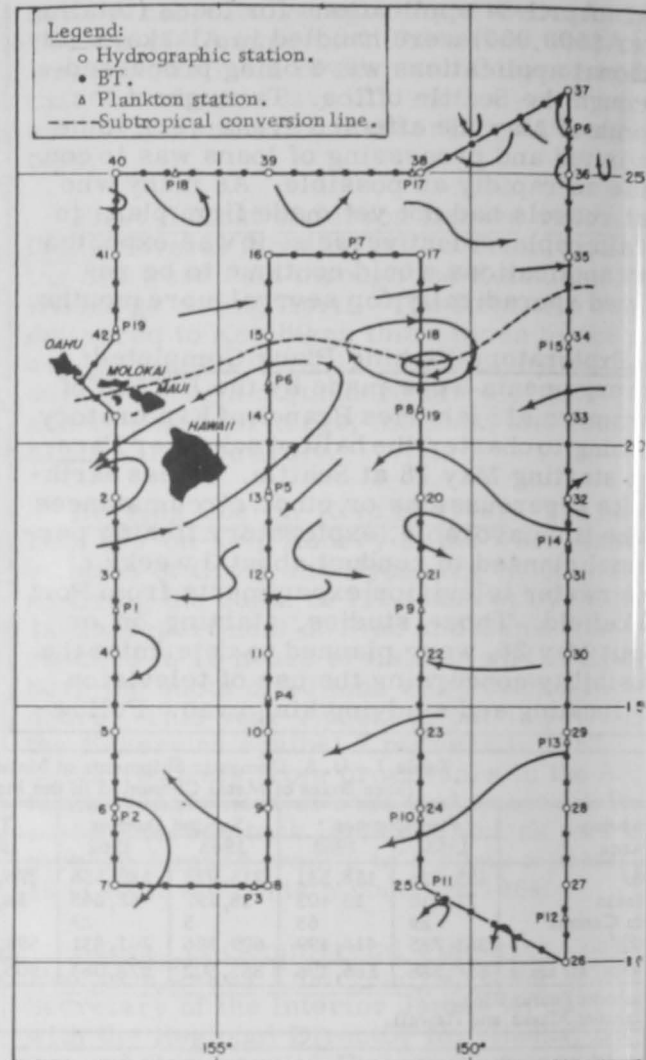
(2) See *Commercial Fisheries Review*, Jan. 1964 p. 9, April 1963 p. 15.



Central Pacific Fisheries Investigations

TRADE WIND ZONE OCEANOGRAPHIC STUDIES CONTINUED:

M/V "Townsend Cromwell" Cruise 2 (March 16-April 5, 1964): To determine the rates of change in the distribution of oceanographic properties within 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 one of a series designed to investigate the relation between wind and ocean currents. (Recent studies of the oceanographic climate of the Hawaiian Islands region have revealed that the southern boundary of the high salinity North Pacific Central water is seasonally



Cruise track of M/V Townsend Cromwell Cruise 2 (March 16-April 5, 1964), and flow patterns based on geostrophic interpretation of the distribution of the depth of the 20° C. isotherm.

displaced north-southward. Those surface water displacements are believed to be associated with seasonal changes in the trade wind system. In addition, the trade wind area is one of the most important energy transfer regions in the North Pacific and events there affect the whole North Pacific Central and North Pacific Equatorial circulation systems.

During the cruise, 42 oceanographic stations were occupied. At each station temperatures and samples for salinity analysis were obtained at 20 depth points extending to 1,500 meters.

Bathythermograms were obtained at 30-mile intervals along the cruise track, and between selected stations (19-21, 26-28, and 37) bathythermograph casts were made at 1-mile intervals.

Surface temperatures and water samples for salinity analysis were obtained at each bathythermograph observation.

Bathythermograph data were coded and transmitted four times daily to the Fleet Numerical Weather Facility, Monterey, Calif.

At station 25, while drifting relative to a parachute drogue, subsurface currents were measured by means of a meter at depths of 25, 50, 75, and 100 meters.

Sets of 10 plastic-enclosed drift cards were released at 30-mile intervals along the cruise track.

Standard marine weather observations were made and transmitted 4 times daily.

Radiation from sun and sky was measured and recorded daily by a pyrheliometer. Color photographs of cloud formations were taken.

Surface plankton tows of 30 minutes were made daily with a 1-meter net.

A standard watch for bird flocks and fish schools was maintained by vessel personnel during daylight hours. In addition, observers from the Smithsonian Institution maintained a watch for birds.

The chart shows, in addition to the cruise track, the ocean current pattern within the study region as inferred from field plots of the distribution of the depths of the 20° C. (68° F.) isotherm. In general, the current pattern was similar to that previously observed by the same method during Townsend Arnwell Cruise 1 (February 14-March 6, 1964). However, the large counterclockwise eddy found at approximately 13°-14° N. latitude between 150°-155° W. longitude on Cruise 1 was not seen on the Cruise 2 distribution. But two other flow patterns, not present during Cruise 1, were noted on the 20° C. isotherm chart for Cruise 2. Those patterns were: (1) a counterclockwise eddy at 18°-19° N. latitude between 148°-152° W. longitude, and (2) a clockwise eddy between stations 6 and 7. At the time of Cruise 2, the subtropical convergence east of the Hawaiian Islands was located at about the same position as during Cruise 1.

A total of 14 unidentified fish schools and skipjack school were sighted during Cruise

2. Eleven of those schools, including the skipjack school were sighted south of 15° N. latitude. The remaining 4 schools were sighted in the vicinity of the Hawaiian Island chain.

Note: See Commercial Fisheries Review, May 1964 p. 13, Oct. 1963 p. 30.



Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-APRIL 1964:

Fresh and Frozen: For the use of the Armed Forces under the Department of Defense, less fresh and frozen fishery products were purchased by the Defense Subsistence Supply Centers in April 1964 than in the previous month. The decline was 27.2 percent in quantity and 26.9 percent in value. Compared with the same month in the previous year, purchases in April 1964 were down 12.6 percent in quantity and 6.4 percent in value.

Total purchases in the first 4 months of 1964 were up 5.2 percent in quantity, but down 6.3 percent in value because of generally lower

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

QUANTITY				VALUE			
April		Jan. -Apr.		April		Jan. -Apr.	
1964	1963	1964	1963	1964	1963	1964	1963
..... (1,000 Lbs.) .....				..... (\$1,000)			
1,734	1,985	8,524	8,102	903	965	4,458	4,757

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

Product	April		Jan. -April	
	1964	1963	1964	1963
..... (Pounds)				
Shrimp:				
Raw headless	132,600	1/	414,650	1/
Peeled and deveined	44,986	1/	276,208	1/
Breaded	359,900	1/	1,454,100	1/
Total shrimp	537,486	432,371	2,144,958	2,059,004
Scallops	219,350	205,000	910,350	775,968
Oysters:				
Eastern	24,502	1/	351,420	1/
Pacific	19,314	1/	93,120	1/
Total oysters	43,816	82,345	444,540	431,867
Clams	16,500	19,470	136,858	99,170
Fillets:				
Cod	45,520	62,455	172,766	238,053
Flounder and sole	141,000	279,680	1,314,816	1,267,532
Haddock	99,530	164,850	2,677,424	849,070
Ocean perch	236,100	364,030	1,247,220	1,334,620
Steaks:				
Halibut	116,770	98,170	423,795	500,598
Salmon	15,675	18,390	64,977	69,925
Swordfish	700	2,050	6,010	11,230

1/Breakdown not available.
2/Includes 8,650 pounds of haddock portions.

prices. In January-April 1964 there were larger purchases of shrimp, scallops, clams, and flounder fillets, but smaller purchases of cod fillets, haddock fillets, ocean perch fillets, and halibut steaks.

Canned: In the first 4 months of 1964, total purchases of the 3 principal canned fishery products (tuna, salmon, and sardines) were up 88.2 percent in quantity and 87.1 per-

Table 3 - Canned Fishery Products Purchased by Defense Subsistence Supply Centers, April 1964 with Comparisons

Product	QUANTITY				VALUE			
	April		Jan.-April		April		Jan.-April	
	1964	1963	1964	1963	1964	1963	1964	1963
Tuna	2	302	1,459	998	1	148	645	506
Salmon	-	-	679	6	-	-	416	4
Sardine	28	46	107	189	11	18	41	79

cent 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.

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

(2) See *Commercial Fisheries Review*, June 1964 p. 14.



Gulf Exploratory Fishery Program

SHRIMP GEAR STUDIES CONTINUED:

M/V "George M. Bowers" Cruise 50-- Phase I (April 16-24, 1964): To continue evaluation of the electrical shrimp trawl was the purpose of this cruise by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel George M. Bowers. The main objectives were to determine the effectiveness of a mechanical tickler chain in conjunction with the electrical array during daylight fishing, and to evaluate the effectiveness of multiple mechanical ticklers.

Trawling tests were conducted off the Florida coast in the Apalachicola-Carrabelle area. Tows were made in St. George Sound behind Dog Island in 4 fathoms of water. The bottom type was soft mud. A 40-foot flat trawl with 6-foot by 32-inch doors rigged with a tickler chain was fished on the starboard outrigger as standard gear, and the experimental electrical trawl was fished simultaneously on the port side. Drags were of one hour duration. Tests were conducted both day and night. The night drags were

made principally to estimate the quantity of shrimp available in the area.

The three principal comparative evaluations made were: (1) daylight electric against daylight standard trawl; (2) daylight electric against night standard trawl; and (3) multiple mechanical ticklers against a single tickler chain.

Catch results from the 20 comparative daylight drags showed the electrical trawl averaged 77 percent more shrimp than the standard gear with the electrical gear always catching more than the standard. Daylight electric catches ranged from 7 to 19 pounds and averaged 12 pounds.

The daytime electric trawl catches averaged 10 percent less than night catches with the standard gear. Night catches from the drags with standard gear ranged from 7 to 22 pounds and averaged 13 pounds.

The chain tickler behind the electrode array did not appear to improve catches on the type bottom.

Five comparative drags were made to obtain an indication of the effect of two mechanical tickler devices. On all of those drags, the experimental trawl caught less than the standard net indicating no improvement attributable to the double tickling action. The results of those drags were not used in the comparisons above.

M/V "George M. Bowers" Cruise 50-- Phase II (May 6-12, 1964): To evaluate the handling characteristics and effectiveness of an electrical shrimp trawl equipped with transverse electrodes in place of the longitudinal electrode array used in previous tests was the primary objective of the second phase of Cruise 50. The vessel operated in the Gulf off Carrabelle, Fla., and returned to port on May 12, 1964.

Dragging trials were conducted in St. George Sound behind Dog Island in 4 fathoms of water. The bottom type also was soft mud. A 40-foot semiballoon trawl with 6-foot by 30-inch doors rigged with a tickler chain was fished on the starboard side as a standard. The experimental gear was fished simultaneously on the port side and was identical except for the electrode array.

Generally, results were the same as achieved with the longitudinal array--daytime

atches with the electrical gear exceeded the daytime catches of the standard gear but were less than the average of the night standard gear catches. Also, night catches with the electrical gear were less than those of the standard gear.

The transverse electrode array design was easily handled with the standard shrimp-trawler rigging.

Further tests of the electrical gear, using "frame trawl," will be conducted in St. Andrews Bay in the near future to determine: (1) vertical and horizontal escapement levels; (2) optimum electrode length; (3) optimum mesh size; (4) optimum power level; and (5) relative effectiveness of longitudinal and transverse electrodes.

See Commercial Fisheries Review, April 1964 p. 18.

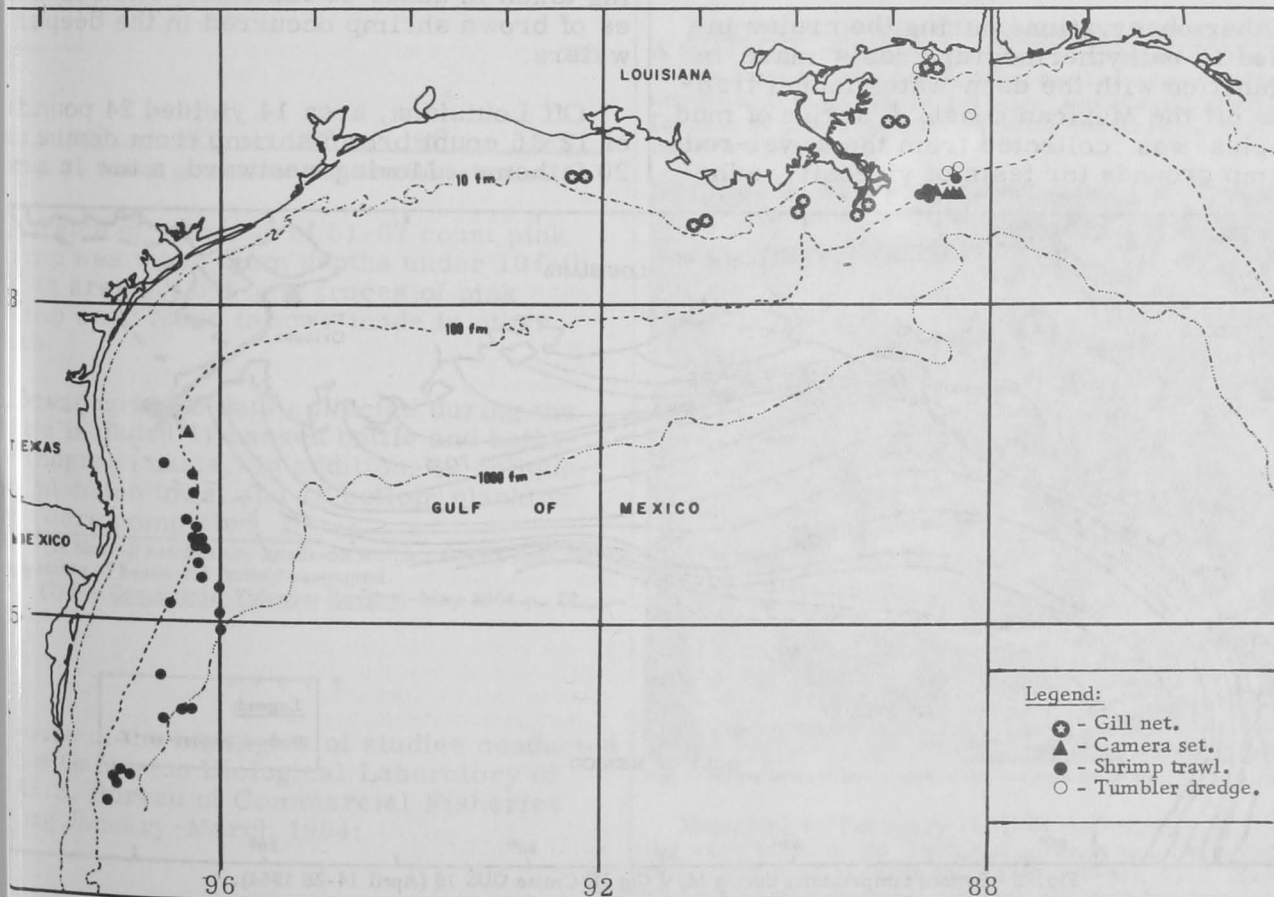
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SHRIMP AND MENHADEN INVESTIGATIONS IN THE GULF OF MEXICO CONTINUED:

M/V "Oregon" Cruise 91 (March 30-April 17, 1964): The main objectives of this 18-

day cruise in the western and southwestern Gulf of Mexico by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Oregon were to: (1) make a preliminary systematic survey of the previously undelineated marine fauna of the international waters from Brownsville, Tex., to latitude 23° N.; (2) obtain motion picture coverage of fauna in the 200-225 depth range; (3) spot check the seasonal abundance of royal-red shrimp resources of the Mississippi Delta and Brownsville areas; and (4) continue investigations on off-season menhaden occurrences along the Mississippi, Louisiana, and Texas coasts.

A total of 24 deep-water faunal transects were made at 100-fathom intervals from 100 to 1,000 fathoms along the Continental Slope off Mexico. Deep-sea snapper (Pristipomoides andersoni) dominated catches from 100 fathoms. Hake (Urophycis sp.) and whiting (Merluccius sp.) were dominant in the 200-300-fathom depth range. Grenadiers (Macrouridae) were predominant in the deeper waters. Because of the unexplored nature of the offshore waters south of Brownsville, specimens collected in that area constituted new distri-



Areas investigated during Cruise 91 by the M/V Oregon (March 30-April 17, 1964).

bution records. Four 400-foot rolls of 16 millimeter film (2 color and 2 black and white) were exposed in the royal-red shrimp depths.

Royal-red shrimp catches from the grounds off Brownsville were very light. The best catches were made off the Mississippi Delta and consisted of 340 pounds of heads-on shrimp from three 3-hour drags in 220-225 fathoms.

Twelve gill-net stations were occupied. At each station, 6 bottom and 6 surface sets were made in depths ranging from 7 to 20 fathoms. The gill-nets used were of No. 7 monofilament nylon thread made up in four 300-foot sections of $2\frac{5}{8}$ -, $2\frac{3}{4}$ -, $2\frac{7}{8}$ -, and 3-inch stretched mesh, and one 300-foot section of No. 69, 2 -inch stretched multifilament. The catch of large-scale menhaden (*Brevoortia patronus*) consisted of 30 specimens caught in the surface sets and 23 taken in the bottom sets. (U. S. Bureau of Commercial Fisheries Beaufort Biological Laboratory personnel conducted 25 plankton tows to supplement the studies on Gulf menhaden.)

Other observations during the cruise included 18 bathythermograph casts made in conjunction with the deep-water faunal transects off the Mexican coast. A series of mud samples was collected from the royal-red shrimp grounds for tests of viscosity, adhe-

siveness, and friction. Six tumbler-dredge stations were occupied in various depths to collect live molluscs for study.

Note: See Commercial Fisheries Review, May 1964 p. 21.



Gulf Fishery Investigations

SHRIMP DISTRIBUTION STUDIES:

M/V "Gus III" Cruise GUS-16 (April 14-26, 1964): Shrimp sampling in the northwestern Gulf of Mexico was continued during the cruise by the chartered research vessel *Gus III* operated by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Galveston, Tex. Eight statistical areas (13, 14, 17, 18, 19, 20, and 21) were covered. Standard 3-hour tows with a 45-foot shrimp trawl were made.

Although still light, catches were not as spotty as during the previous month's cruise in March 1964. During the April 1964 cruise white shrimp were encountered in all statistical areas sampled, with the best catches being taken in under 10 fathoms. The best catches of brown shrimp occurred in the deeper waters.

Off Louisiana, area 14 yielded 24 pounds of 12-15 count brown shrimp from depths of 20 fathoms. Moving westward, a tow in area

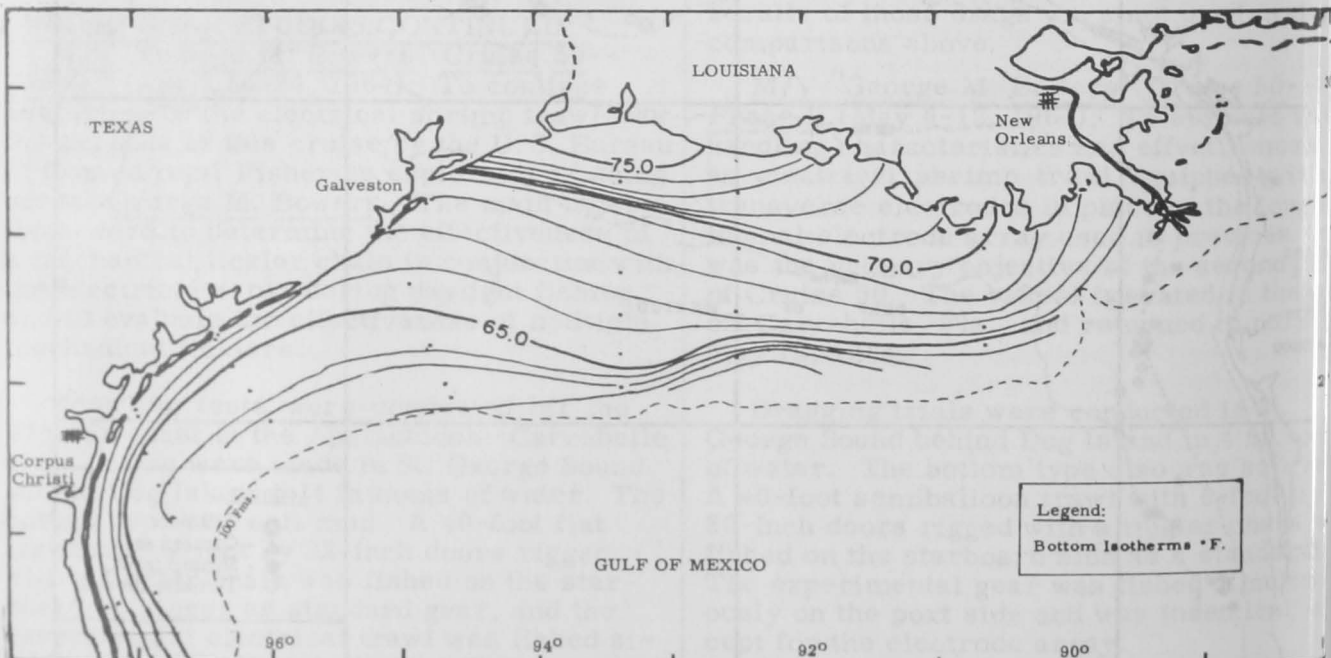


Fig. 1 - Bottom temperatures during M/V *Gus III* Cruise GUS 16 (April 14-26 1964).

produced 20 pounds of 21-25 count white shrimp from depths under 10 fathoms, and area 17 yielded 13 pounds of 26-30 count white shrimp from the depth under 10 fathoms.

Off the Texas coast, area 18 produced 12 pounds of 21-25 count brown shrimp from depths over 20 fathoms and 12 pounds of 31-count white shrimp from depths under 10 fathoms. In area 19, the 10-20 fathom range yielded 18 pounds of 26-30 count brown shrimp and 11 pounds of 15-20 count white shrimp. In area 21, a tow in 10-20 fathoms produced 24 pounds of 12-15 count brown shrimp.

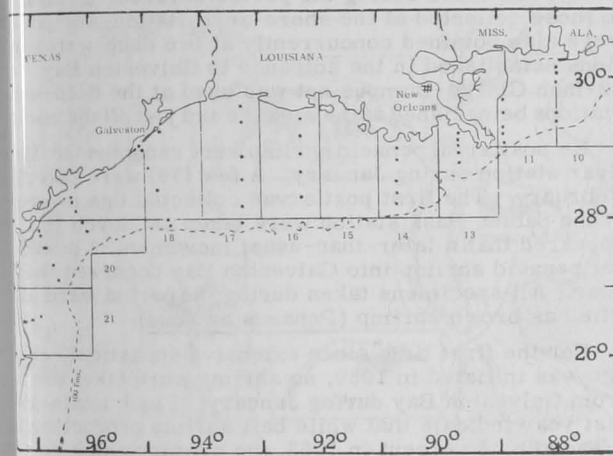


Fig. 2 - Station pattern for shrimp distribution studies.

A catch of 8 pounds of 51-67 count pink shrimp was taken from depths under 10 fathoms in area 20, but only traces of pink shrimp were found in tows made in other areas.

Oceanographic data collected during the cruise included 41 nansen bottle and bathythermograph casts. In addition, 41 oblique-plankton tows, and 10 bottom plankton tows were completed.

- (1) Shrimp catches are heads-on weight; shrimp sizes are number of heads-off shrimp per pound.
- (2) See *Commercial Fisheries Review*, May 1964 p. 22.

* * * * *

Some of the highlights of studies conducted at the Galveston Biological Laboratory of the U.S. Bureau of Commercial Fisheries during January-March 1964:

SHRIMP BIOLOGY PROGRAM: Shrimp Larvae Studies--Distribution and Abundance: Examination of 84 plankton samples collected in January and February 1963 showed that although planktonic-stage penaeids were distributed over the entire sampling area, there was a marked decrease in abundance from the high noted in December 1962. Penaeids were slightly more abundant in the offshore waters between Galveston and Port Aransas, Tex., than in waters east or west of that general area.

Larval and postlarval shrimp of the genus *Penaeus* also decreased in numbers with the total catch being about 7 times lower in January and February 1963 than in December 1962.

Mysis and postlarval stages, most abundant at the 15-, 25-, and 40-fathom stations, constituted about 70 percent of the January catch, while in February 90 percent of the sample catch consisted of postlarvae which were most abundant at the 4-, 7½-, and 40-fathom stations.

To investigate the possibility that large concentrations of postlarval *Penaeus* sp. occur on the bottom just prior to their movement into nursery areas, a plankton "sled" was constructed and put into operation early in the quarter. This device consists of a Gulf-V plankton net mounted on ski-type runners. The mouth of the plankton net is about 1 foot off the bottom when the runners are on the bottom. Results of the "sled" tows appear quite promising and use of this gear will continue on an exploratory basis.

Migrations, Growth, and Mortality of Pink Shrimp: A third mark-recapture experiment was undertaken to obtain supplemental information on (1) rates of fishing and natural mortality in Tortugas pink shrimp stocks, (2) rate of growth as related to temperature, and (3) pattern of dispersal.



Fig. 1 - Shrimp being stained as part of the investigations on shrimp migrations.

Beginning on February 15, 1964, shrimp for marking were taken on the Tortugas grounds and delivered to a shore base at Stock Island (Key West), Fla. Those shrimp were measured, marked, and held for a few days before release over an area of 50 square miles

near the center of fishing activity on the Tortugas grounds. A total of 964 shrimp, measuring 118-128 millimeters (4.6-5.0 inches) in total length and marked with Trypan blue dye, were released on February 23; 1,392 shrimp measuring 115 millimeters (4.5 inches) or more in total length (approximate sizes retained by the shrimp fishery) and marked with fast green FCF dye, were released on February 24. All releases were made on the bottom by means of a release box. By March 20, a total of 256 recoveries had been verified.

Of 360 seabed drifters designed to measure the direction and speed of bottom currents and released on the Tortugas grounds with the marked shrimp, about 90 had been recovered by commercial fishermen as of April 1.

Abundance and Distribution of Pink Shrimp Larvae: Three sampling cruises were completed on the Tortugas shrimp grounds. Bottom temperatures on the first cruise (February 18 and 19) were about 18° to 19° C. (64.4° to 66.2° F.), and few or no pink shrimp larvae or postlarvae were taken.

During the period covered, material contained in 83 plankton samples was sorted and the penaeid shrimp counted and identified. This counting and sorting process has been facilitated by a new technique in which cupric ammonium sulfate is added to the sample to break up filamentous algae and detrital material in the samples. A tentative card format has been developed for computer analysis of plankton data.

The number of pink shrimp postlarvae sampled at the Buttonwood Canal bridge at Flamingo, Fla., was consistently found to be related to current velocity in the canal. When a plankton pump and a conventional plankton net were operated simultaneously, the plankton pump was found to catch more than twice as many pink shrimp postlarvae. (Conducted by University of Miami under contract.)

Juvenile Phase of the Life History of the Pink Shrimp in Everglades National Park (Fla.) Nursery Grounds: Routine sampling with the large channel net for juvenile shrimp in Buttonwood Canal, Fla., continued. The use of wing nets as comparative sampling devices was discontinued because of a lack of good correlation between catches by the wing nets and the channel net. The first field tests with a new conical net to determine the distribution of shrimp in the canal have proved promising. Since very few shrimp have been caught during flooding currents, sampling at that tidal stage will in the future be undertaken seasonally rather than monthly.

The U. S. Weather Bureau has installed a recording barometer at Flamingo, Fla., and the data from that facility will now provide the opportunity to determine whether or not there is a relationship between shrimp movement in the canal and barometric pressure. (Conducted by University of Miami under contract.)

Seasonal Distribution Patterns of Adult and Larval Shrimp in Aransas Pass (Tex.) Inlet: The "tide-trap" data for May 1963 to March 1964 have been summarized. Peaks in the total biomass moving through Aransas Pass occur during the spring and fall transition periods. In the spring, water temperatures rise and water levels are high, whereas in the fall temperatures and levels both decline. Greatest seaward movement of juvenile brown shrimp and the less abundant pink shrimp usually occurred at the full moon.

Seasonally, both species were most abundant in the Pass from the first week of May through June. Neither was collected between the middle of December and the first of May.

Postlarval brown shrimp moved from the Gulf of Mexico through the Pass in maximum numbers during April, May, and early June. The greatest number of pink shrimp postlarvae was noted in August and September. The two species occurred in about equal numbers in late June, July, and early August. None was found between October and January. White shrimp postlarvae were noted only occasionally. (Conducted by Institute of Marine Science, University of Texas, under contract.)

SHRIMP DYNAMICS PROGRAM: Surveys of Postlarval Abundance and Fisheries for Bait (Juvenile) Shrimp: Weekly and semiweekly sampling to determine the abundance of postlarval shrimp as they move through Sabine Pass and Galveston Entrance (Bolivar), respectively, continued during the period covered. In addition to those collected at the shore-zone station, samples were also obtained concurrently at two deep-water stations established in the entrance to Galveston Bay. A 12-inch Clarke-Bumpus net was used at the deep-water stations being fished at the surface and just off the bottom.

No postlarval penaeid shrimp were caught at the Bolivar station during January. A few (19) were taken in February. The first postlarvae collected this season at the Sabine Pass station were taken on March 18. It appeared that a later-than-usual movement of postlarval penaeid shrimp into Galveston Bay occurred this year. All specimens taken during the period were identified as brown shrimp (*Penaeus aztecus*).

For the first time since extensive statistical coverage was initiated in 1959, no shrimp were taken for bait from Galveston Bay during January. Final totals for last year indicate that while bait shrimp production increased by 6 percent in 1963, the average catch per hour of effort increased by 13 percent.

Table 1 - Catch and Fishing Effort in Galveston Bay Shrimp Fishery, 1962-1963

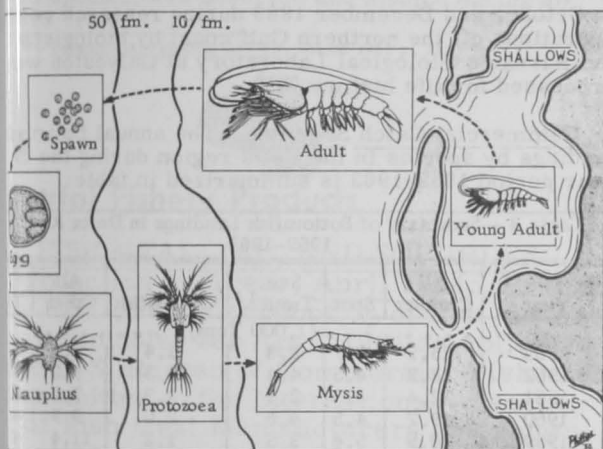
Year	Catch	Fishing Effort	Average Catch Per Hour
	Lbs.	Hrs.	Lbs.
1963	1,994,600	29,120	34
1962	1,062,900	33,620	31

Commercial Catch Sampling: The normal late-winter period of low shrimp production along the Texas and Louisiana coasts provided an opportunity to analyze data previously collected in those areas. Maps illustrating the spatial distribution of catch and effort in the Texas brown shrimp fishery were constructed for the period August-December 1963. The maps are to be used to relate fishing intensity to changes in shrimp density. Data collected were used to compare statistics of relative size composition of shrimp as determined by the box and machine methods of grading. Results indicated that the two processes give similar results when large numbers of landings are compared. During some parts of the year, however, the reported size composition was found to be biased, presumably as a result of marketing practices.

A canvass of vessels fishing on the Tortugas grounds was continued during the period. Information relating to catch, effort, fishing area, and discards of small shrimp was obtained from more than half of the fishing fleet by having its catch at Key West, Fla. Three trips were made by Bureau personnel on commercial shrimp vessels to obtain data concerning the size of shrimp culled at

Migrations, Growth, and Mortality of Brown and White Shrimp: The brown shrimp mark-recapture experiment undertaken off the Mississippi coast in June was ended, with 429 (9 percent) of the 4,801 brown shrimp recovered. Inspection of the recovery pattern indicated little dispersion of the marked group from its general area of release. Calculations of fishing effort expended in the study area during the study period (June-August 1963) were completed. Examination of the effort indicated that it varied with time and showed a downward trend.

Of the 3,115 stained white shrimp released in Galveston Bay in August 1963, 412 (13 percent) have been recovered. Work was completed on the tabulation and estimation of fishing effort expended in the study area. Fishing effort was found to vary with time and declined in magnitude from mid-August through September 1963. Preliminary evaluation of mortality per 10-day interval yielded values of 15 percent for natural mortality and 10 to 18 percent for fishing mortality.



2 - Diagram of the life cycle of the white shrimp (*Penaeus setiferus*).

The most direct means presently used for estimating the growth of shrimp is by mark-recapture experiments using biological stains as marks. Because biological stains concentrate in the gills, the question has arisen as to whether or not the stain affects oxygen uptake, subsequently, metabolism and growth. To answer that question, a series of laboratory experiments was initiated in which the oxygen uptake of whole individuals as well as gill tissue from stained and unstained shrimp was measured. If the oxygen uptake of stained individuals proved lower than that of unstained shrimp, it could be assumed that stains retard growth. Preliminary results from those experiments indicate no difference in oxygen uptake between stained and unstained shrimp.

Population Dynamics: Studies related to the selectivity characteristics of shrimp nets and those concerning the relative fishing power of shrimp vessels are continued. Measurements of a large number of shrimp collected during net trials in fall 1963 were completed. Results from those experiments show that significantly fewer shrimp escape from the body of shrimp nets than from the cod ends. But when nets with meshes as large as 2½ inches and 3 inches (attached mesh) are used, about one-third and two-thirds of the 40-count shrimp encountered escape from the body of the net. Almost no marketable shrimp (more than 68 count) escape from nets with meshes smaller than 1½ and 2 inches, the sizes commonly used by commercial fishermen.

An improved method for processing data required to evaluate the comparative fishing power of shrimp boats has been developed. The procedure now in use will make it feasible to compare boats fishing in different geographic areas and on different species of shrimp.

The Seasonal Occurrence, Distribution, and Abundance of Postlarval Brown and White Shrimp in Vermilion Bay (La.): Beam-trawl sampling of postlarval *Penaeidae* was continued. Three stations were occupied biweekly, a fourth station once a week, and the remainder not at all. Certain stations were not checked according to schedule due to inaccessibility resulting from rough-water conditions. Postlarval brown shrimp first appeared in samples taken on February 24, 1964, at the station in Southwest Pass. (Conducted by University of Southwestern Louisiana under contract.)

Abundance of Postlarval Shrimp in Mississippi Sound and Adjacent Waters: As of the end of March 1964, identification of all postlarval shrimp taken during the study was completed. Specimens in 636 samples included 37,250 penaeids belonging to one of the three major commercial species. Of those, 5,257 were classified as juveniles. Specific composition of the inshore postlarval collections (November 1962-October 1963) and the 1962 commercial landings from Mississippi Sound (Area 011.1) are shown in table.

Table 2 - Mississippi Sound 1962 Commercial Shrimp Landings and Inshore Postlarval Collections

Item	Total	Percent		
		Brown	White	Pink
Commercial landings, 1962 (Headless) in lbs.	201,662	61.0	31.9	6.9
Postlarvae at inshore stations (Nov. 1962-Oct. 1963) no.	25,974	61.3	32.3	6.3

Brown shrimp postlarvae appeared early in February this year and sampling was increased immediately. Some offshore island stations were eliminated and two stations were added to extend the sampling to the mouth of Tchouticabouffa River. Numbers of postlarvae increased rapidly through March. The average catch at stations sampled in both years was more than twice that of the corresponding period in 1963. (Conducted by Gulf Coast Research Laboratory under contract.)

ESTUARINE PROGRAM: Ecology of Western Gulf Estuaries: Systematic data collection according to the plan initiated in January 1963 was refined following completion of sampling operations in February 1964. The addition of 8 marsh stations and 6 plankton stations should provide better biological coverage of the Galveston Bay system, whereas the inclusion of dissolved oxygen, total nitrogen, and phosphate measurements at 40 of the previously established hydrology stations will enhance the water-quality aspects of the overall study. Sampling with small trawls will continue on a monthly basis at 64 of the original 65 stations. Recent acquisition by the Bureau of Commercial Fisheries of the research vessel *Redfish* (a 29-foot inboard cabin cruiser) is expected to greatly facilitate future sampling activity. This vessel was put into service on a trial basis in March and was to be completely outfitted and ready for extensive operation by mid-April 1964.

The total weight and numbers of organisms collected during the period were well below those of the previous quarter. This reduction is attributed to the low water temperatures sustained during January and February, averaging 10.0° and 12.9° C. (50.0° and 55.2° F.), respectively. Temperatures during March increased

significantly, averaging 17.9° C. (64.2° F.), as did the quantity of trawl-caught individuals.

The Atlantic croaker was the dominant species taken in trawl samples throughout the system during the period. The bay anchovy persisted at about the same level as in the previous period. Adult white shrimp and blue crab, which were found in very small numbers during January and February in the deep-water channels, appeared to be slowly moving back into the bay in March. Gravid female blue crabs appeared in March for the first time since November 1963, while adult brown shrimp were very scarce throughout the period. An indication that menhaden had spawned, possibly in November or December, was confirmed by the appearance of large numbers of postlarvae in plankton samples collected during February and March.

Intensive sampling for postlarval brown shrimp throughout the Galveston estuary was initiated on a weekly basis early in March. It is scheduled to continue throughout the period of peak influx of postlarvae and until the young shrimp begin to enter the trawl catches as juveniles. The purpose of this study is to determine the rate of dispersion of postlarval shrimp throughout the system and to establish their relative abundance in the various habitats and areas within the system. As of March 11, 1964, brown shrimp postlarvae were in evidence in small numbers in East and Lower Galveston Bays. A gross examination of samples collected a week later indicated an increase in numbers in those two areas and dispersion throughout most of the estuary. Peak immigration, however, did not appear to have been reached by mid-March.

Number and average weight data for brown and white shrimp collected during 1963 were compiled in terms of unit of effort (5 minutes of trawling) and then grouped by subarea as well as habitat. On an annual basis (1963), the greatest abundance of white shrimp occurred in East Bay, followed in diminishing order by Trinity Bay, Upper Galveston Bay, Lower Galveston Bay, the mouth of the San Jacinto River, and the tidal pass at Galveston Entrance. East Bay also had the highest average catch of brown shrimp followed by Trinity Bay, the mouth of the San Jacinto River, Upper Galveston Bay, Lower Galveston Bay, and the tidal pass. The smallest shrimp, both white and brown, were taken in the upper bays (East and Trinity) while the largest individuals were caught near large oyster reefs in the lower bay areas, in the tidal pass, and in the adjacent Gulf of Mexico. The Gulf Intracoastal Waterway, adjacent to East Bay, yielded high catches of small white and brown shrimp, indicating it is a major transport system from the tidal pass and East Bay to thousands of acres of adjoining and connecting marshes.

The most important habitat for white shrimp seemed to be the system's tertiary bays and bayous as against other habitat types such as the open-water and shoreline areas of the larger bays. In contrast, average catches of brown shrimp from the shoreline areas of the larger bays were as good as those from the tertiary bays and bayous.

INDUSTRIAL BOTTOMFISH FISHERY PROGRAM:
Life Histories of Central Gulf Bottomfish: Length and weight frequency distributions of Atlantic croaker collected during research as well as commercial vessel operations in Mobile Bay, Mississippi Sound, and in the Gulf east of the Mississippi River Delta revealed the presence of three distinctly separate size groups during October 1963. Fish in Mobile Bay and in Mis-

issippi Sound averaged 12 centimeters (4.7 inches) total length and 15 grams (0.5 ounce) in weight, and were presumed to be 1 year old. Individuals collected from industrial bottomfish catches made on near-shore grounds (2 to 7 fathoms) in the Gulf averaged 17 centimeters (6.7 inches) and 50 grams (1.7 ounces), and were classified as 2-year-old and older fish. Specimens caught offshore in 15-40 fathoms averaged 20 centimeters (7.8 inches) and 83 grams (2.9 ounces), and are considered to have been 3 years old. It is therefore apparent that the fall fishery is dependent upon 2- and 3-year-old fish, while 1-year-old croaker remain largely unavailable. Three-year-old fish in offshore areas do not contribute significantly during the fall season.

Samples of juvenile fish collected in Mississippi Sound and adjacent estuaries during the fall and winter of 1963-64 by personnel of the Bureau of Commercial Fisheries Gulf Coast Research Laboratory working on the postlarval shrimp project were being examined for the presence of croaker. A total of 1,400 croaker taken in October and December 1963 during research vessel operations off the northern Gulf coast by biologists of the Bureau's Biological Laboratory at Galveston were processed for life history data.

Commercial Catch Sampling: The annual bottomfish landings by species in the Delta region during the 5-year period 1959-1963 is summarized in table.

Table 3 - Summary of Bottomfish Landings in Delta Region 1959-1963

Year	Croaker	Spot	Sea Trout 1/2	Cutlassfish	All Other	Total
	(1,000 Tons)					
1963	25.2	3.7	2.3	1.4	7.0	39.6
1962	27.9	4.5	4.4	2.3	9.2	48.3
1961	22.4	4.3	2.1	2.3	7.2	38.3
1960	19.7	4.5	4.6	2.0	9.9	40.7
1959	20.9	5.6	3.5	1.2	11.4	42.6
Average	23.2	4.5	3.4	1.8	8.9	43.8
Percentage	56	11	8	4	21	100

1/Sand and silver.

The industrial fish catch in 1963 (excluding menhaden) dropped 18 percent to about 39,600 tons. At ports in Louisiana and Mississippi, 2,055 vessel landings represented a 29-percent decrease over 1962. Increased use of tuna, chicken parts, and beef and pork byproducts in canned petfoods was primarily responsible for the drop in the demand for fish. Competition from a growing number of other petfood companies also contributed to the decreased use of Gulf bottomfish. Increasing 6 percent from the previous year, the estimated catch of croaker in 1963 was 64 percent of the total of all fish landed. Spot accounted for 9 percent, sand and silver sea trout combined amounted to about 6 percent, while cutlassfish contributed nearly 4 percent.

Measurements of total catch, relative abundance, and total fishing effort have been completed for the northern central Gulf by month from 1959 through 1962. Analyses of the data according to subareas were partially completed.

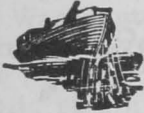
Distribution and Abundance of Western Gulf Bottomfish: Processing of subsamples of fish collected during the regularly scheduled survey cruises continued. The bottomfish catch-per-unit-of-effort for 1963 discloses, as did the data for 1962, that the concentration of industrial-type bottomfish is much greater off Louisiana and off Texas.

Table 4 - Industrial-Type Bottomfish Catch Per-Unit-of-Effort, 1963

Area	Depth (Fathoms)				
	4	7	15	25	40
	.....(Pounds Per Hour ^{1/}).....				
Louisiana (West of Mississippi River)	55	70	75	75	90
Trawling with 45-foot (flat), 2-inch mesh trawl with rollers.	130	225	250	220	130

Observations of an experimental group of Atlantic croaker held in a 28,000-gallon 18-foot high tank of recirculating sea water have indicated that the fish are only more active when not near the bottom, and that they only infrequently leave the bottom, even during daylight hours, when the water temperature remains as high as it does during the winter season. It appears that the magnitude of their diurnal variation, with reference to the bottom, is related to water temperature. Distinct diurnal variation in sample catches of spot, a closely related species, was observed and studied during an offshore cruise.

See Commercial Fisheries Review, March 1964 p. 17.



Industrial Fishery Products

FISH MEAL, OIL, AND SOLUBLES:

Production by Areas, April 1964: Preliminary data on U. S. production of fish meal, oil, and solubles for April 1964 as collected by the U. S. Bureau of Commercial Fisheries and submitted to the International Association of Fish Meal Manufacturers are shown in the table.

Table 1 - Production^{1/} of Fish Meal, Oil, and Solubles by Areas, April 1964 (Preliminary) with Comparisons

Area	Meal	Oil	Solubles	Homogenized ^{3/}
	Short Tons	1,000 Pounds	..... (Short Tons)	
April 1964:				
Gulf Coast ^{2/}	5,702	3,248	2,539	-
Atlantic ^{2/}	2,625	382	1,575	-
Total ^{2/}	8,327	3,630	4,114	-
April 1963:				
Total ^{2/}	15,273	6,655	7,359	-
April 1963:				
Total ^{2/}	15,902	7,757	7,018	1,250

Does not include crab meal, shrimp meal, and liver oils. Includes American Samoa and Puerto Rico. Excludes condensed fish.

Production, February 1964: During February 1964, a total of 1,834 tons of fish meal and scrap and 236,000 pounds of fish oil was produced in the United States. Compared with February 1963 this was a decrease of 1,013 tons (5.6 percent) in meal production and 88,000 pounds (37.3 percent) in oil production.

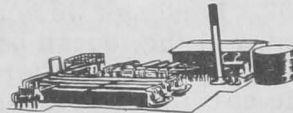
The quantity of fish solubles manufactured in February 1964 amounted to 592 tons--631 tons less than in February 1963.

Production of tuna and mackerel meal amounted to 898 tons which accounted for about 49.0 percent of the February meal production. Oil from tuna and mackerel (120,000 pounds) comprised 50.8 percent of the February oil production.

Table 2 - U. S. Production of Fish Meal, Oil, and Solubles, February 1964^{1/} with Comparisons

Product	February		Jan.-Feb.		Total
	1/1964	1963	1964	1963	
	..... (Short Tons)				
Fish Meal and Scrap:					
Herring.....	2/	-	2/	2/	7,537
Menhaden ^{3/}	-	-	2/	-	181,750
Sardine, Pacific.....	-	-	1	-	-
Tuna and mackerel.....	898	2,222	2,022	3,930	26,957
Unclassified.....	936	625	1,706	1,202	25,208
Total.....	1,834	2,847	3,729	5,132	241,452
Shellfish, marine-animal meal and scrap.....	4/	4/	4/	4/	12,000
Grand total meal and scrap.....	4/	4/	4/	4/	253,452
Fish Solubles:					
Menhaden.....	2/	-	2/	-	74,831
Other.....	592	1,223	1,882	2,595	25,347
Total.....	592	1,223	1,882	2,595	100,178
Homogenized condensed fish.....	-	-	-	50	7,224
	..... (1,000 Pounds)				
Oil, Body:					
Herring.....	2/	-	2/	2/	5,709
Menhaden ^{3/}	-	-	2/	-	167,635
Sardine, Pacific.....	-	-	-	-	-
Tuna and mackerel.....	120	254	577	544	5,735
Other (including whale).....	116	70	368	204	6,555
Total oil.....	236	324	945	748	185,634

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



Maine Sardines

CANNED STOCKS, APRIL 1, 1964:

Canners' stocks of Maine sardines on April 1, 1964, were 41,000 cases less than those on hand April 1, 1963, but were 613,000 cases above stocks on hand two years ago on April 1, 1962 (the pack for the 1961 season was unusually small).

The 1963 season pack totaled 1,584,000 standard cases, according to the Maine Sardine Council. On April 15, 1963, carryover stocks at the canners' level amounted to about 660,000 cases. Adding the 1963 season pack results in a total supply of 2,244,000 cases as of April 1, 1964--up 4.4 percent from the total supply of 2,150,000 cases reported April

Canned Maine Sardines--Wholesale Distributors' and Canners' Stocks, April 1, 1964, with Comparisons ^{1/}													
Type	Unit	1963/64 Season			1962/63 Season				1961/62 Season				
		4/1/64	1/1/64	11/1/63	7/1/63	6/1/63	4/1/63	1/1/63	11/1/62	7/1/62	6/1/62	4/1/62	1/1/62
Distributors	1,000 actual cases	291	261	308	217	215	264	271	230	134	99	148	193
Canners	1,000 std. cases ^{2/}	658	1,063	1,255	643	536	699	1,092	1,348	374	50	45	144

^{1/}Table represents marketing season from November 1-October 31.

^{2/}100 3 3/4-oz. cans equal one standard case.

Note: Beginning with the Canned Food Report of April 1, 1963, U. S. Bureau of the Census estimates of distributors' stocks were based on a revised sample of merchant wholesalers and warehouses of retail multiunit organizations. The revised sample resulted in better coverage. The January 1, 1963, survey was conducted with both samples to provide an approximate measure of the difference in two samples. That survey showed that the estimate of distributors' stocks of canned Maine sardines from the revised sample was 1 percent above that given by the old sample.

Source: U. S. Bureau of the Census, Canned Food Report, April 1, 1964.

1, 1963, and higher by 98.9 percent from the short supply of 1,128,000 cases of April 1, 1962.

Note: See Commercial Fisheries Review, March 1964 p. 22.



Marketing

EDIBLE FISHERY PRODUCTS, 1963:

The total supply of edible fishery products for 1963 (domestic catch plus imports) dropped about 3 percent below the record high of 1962. On a round-weight basis (as caught), United States imports of fishery products accounted for 45 percent of the edible supply and domestic landings accounted for 55 percent. This was a record high proportion for imports and a new low for United States fishery landings.

The 1963 edible fish landings by United States fishermen declined about 85 million pounds from 1962. Landings were sharply lower for salmon, whiting, ocean perch, Pacific mackerel, haddock, Maine herring, blue crab, and Pacific sardines. Increased landings of shrimp, king crab, and yellowtail flounder partially offset the declines. The United States landings of edible fish and shellfish have trended downward since 1950.

The United States per capita consumption of fishery products declined slightly to 10.6 pounds in 1963, and no appreciable change is in prospect for 1964.

United States holdings of fishery products in cold storage early in 1964 were a little above a year earlier, indicating an adequate supply until commercial landings increase seasonally. Stocks of frozen ocean perch and cod fillets and steaks were well above the same period last year and inventories of halibut and shrimp were substantially higher. Among the canned fishery products, shrimp and canned pink salmon stocks were larger than the same period a year earlier.

In general, retail prices of fishery products are more favorable for the American consumer than a year earlier. They were expected to hold about steady through the second quarter of 1964.

Note: This analysis was prepared by the Bureau of Commercial Fisheries, U. S. Department of the Interior, and published in the Department of Agriculture's May 1964 issue of the National Food Situation (NFS-108).



Michigan

SPORT FISH SURVEY IN GREAT LAKES WATERS:

An inventory of the sport fishing potential in Michigan's Great Lakes waters was begun in the spring of 1964 by the Michigan State Department of Conservation. The survey is part of a broader effort to develop an improved program of commercial and sport fisheries management of the inshore waters of the Great Lakes.

At the start, the inventory program was devoted to examining the backlog of available information, and to setting up a field crew for exploratory fishing. For the next several years, the exploratory team will carry on a systematic study of Great Lakes inshore waters to find new areas for sport fishing. (Bulletin, Michigan Department of Conservation, April 23, 1964.)



Minnesota

REGULATIONS FOR FISH-PROCESSING ESTABLISHMENTS:

The Minnesota State Department of Agriculture published rules and regulations in early 1964 relating to fish-processing establishments. Included in the new rules and regulations are stipulations requiring a permit to process fish for sale at wholesale. The

mit must be renewed annually and the re-
al is subject to satisfactory sanitary con-
ons of the plant. The regulations cover
struction of buildings and structures, wa-
supply, sanitary facilities and accommo-
ons, processing equipment, operations
operating procedures, and health of per-
nel.



National Fisheries Center

Aquarium

DESIGN PROGRAM BEING PREPARED:

An architectural firm in Bryan, Tex., has
selected to prepare a design program
for the National Fisheries Center and Aquar-
ium to be built in Washington, D. C., the Gen-
eral Services Administration (GSA) and U. S.
Department of the Interior announced on May
1964. The Public Buildings Service of
negotiated a \$50,000 contract with the
architectural firm to prepare propos-
als for allocating facilities within the Fish-
eries Center for convenience of public view-
ing and operations.

The design program was expected to be
completed by June 1964. After approval, the
program would serve as the basis for archi-
tectural design of the Fisheries Center. The
design will be done by two firms selected
separately. The design program will include
recommendations for traffic access to the
aquarium site in East Potomac Park, parking
accommodations, and other aspects of site
development at Hains Point, a short distance
from the Nation's Capitol. The program
will make recommendations for the
placement of facilities according to their re-
lationship within the Fisheries Center, such
as type and location of display areas,
viewing facilities, research laborato-
ry and feed rooms and water supply for
aquatic animals.

The National Fisheries Center which will
cost an estimated \$10 million and show a-
bout 1,300 different kinds of aquatic life is
expected to be completed in late 1967. Leg-
islation by Congress in 1962 which author-
ized the Fisheries Center requires that it be
self-supporting. Construction and operations
costs are to be paid from an admission
charge to all except supervised youth groups.

RESEARCH FACILITIES TO BE EXTENSIVE:

The National Fisheries Center and Aquar-
ium being designed for construction in Wash-
ington, D. C., will serve the dual function of
an educational center and aquatic research
institution. It promises to be outstanding in
both fields, the U. S. Department of the In-
terior reported on May 10, 1964.

The self-supporting Fisheries Center will
display one of the world's largest collections
of aquatic life in near-natural habitat, ranging
from dolphins to barnacles. Behind the scenes,
but basic to operation of the Center, will be
research accommodations for 32 scientists.
They will be drawn from several agencies of
the Federal Government, from private insti-
tutions and universities, and from foreign
countries.

The National Fisheries Center will be op-
erated by the Interior Department's Bureau
of Sport Fisheries and Wildlife. Scientists
of that Bureau will conduct research in ge-
netics, reproduction, nutrition, fish diseases,
experimental ecology, behavior of aquatic
organisms, and production of antibiotics and
chemicals by marine animals. Secretary of
the Interior Stewart L. Udall said the broadly
based research program is expected to make
important contributions to the fishery sciences
and to human health. Some of the studies may
have application in national defense. The Of-
fice of Naval Research, for example, seeks
answers to some of its most vexing problems
through biological research on marine or-
ganisms. The studies may lead to better ves-
sel design, more efficient underwater com-
munications, and better protection against
dangerous forms of sea life. Several other
Government agencies have also been inter-
viewed by the Acting Director of the Fisheries
Center to learn how the new facility can serve
their research programs.

The head of the Biology Branch, Office of
Naval Research, proposed that the Fisheries
Center include facilities for growing and
maintaining marine invertebrates, such as
squid and barnacles. He said a problem com-
mon to all such research is a shortage of
healthy marine animals and plants for ex-
periments. If the National Fisheries Center
can help ease this shortage, he said, it would
provide a valuable service to the country's
scientific community. The squid is of special
research importance because its large cen-
tral nerve fiber permits a variety of experi-

ments. Also needed is a better supply of the Nubilis barnacle, because of its large muscle sheath.

The Hydrobiology Research Program of the Office of Naval Research is supporting more than 120 basic research projects in academic and industrial institutions in the United States and abroad. One of the most important quests is for ways to prevent the fouling of ships and underwater equipment. The Naval Research official said more than 2,000 marine plants and animals have been implicated as fouling pests. The cost to the U. S. Navy alone for protecting ships, waterfront structures, and other equipment from these pests is about \$100 million a year.

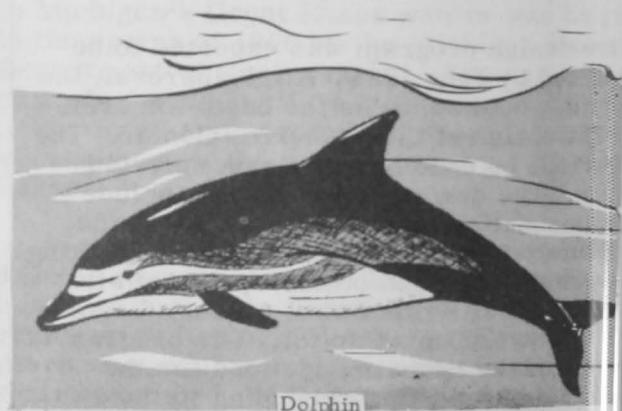
The continued development of new kinds of underwater equipment will further increase the cost. Both the military and industry are beginning to place large stationary structures on the bottom of the ocean, or close to the bottom. These include acoustic devices and other instruments for geophysical and marine biological exploration. Once the structures are submerged, it will be impossible in some cases to retrieve them for maintenance and repair. There will be no way to clean off accumulated marine organisms that could impair operation of the equipment. The solution appears to be in long-life protection against fouling. The research approach is to learn more about the steps or links in the chain of biological processes which govern the life of the offending organisms. Scientists hope that weak biological links can be found and that they will offer a key to control methods.

Another research objective is to find ways to repel or deter dangerous forms of marine life which hamper underwater and amphibious operations. Better protection is needed against sharks, barracuda, moray eels, and other carnivorous marine species. Researchers are also looking into the problem caused by a variety of poisonous organisms in the sea.

Scientists are trying to learn more about the ability of some marine organisms to emit light so this phenomenon can be controlled. During World War II, several ships were attacked because the wake of their propellers churned up the organisms and caused them to glow in the dark. The intensity and rate of biological light emission was also said to be a useful tool for measuring energy con-

version in living tissue. This information is acknowledged to be important to a variety of biomedical investigations. There is interest in the ability of some marine animals to navigate over long distances with extreme accuracy and in their ability to communicate efficiently with each other. The U. S. Navy hopes that by discovering the biological basis for these capabilities, it may be able to simulate some of the desirable features by mechanical or electronic means.

A marine species of particular interest is the dolphin, which has a remarkably well-developed natural sonar. The dolphin uses its echo-ranging ability to find food and to avoid obstructions in murky water. Some experiments indicate that it can even distinguish the shape and texture of hidden objects. It is generally conceded that the dolphin's natural sonar is far superior to the manmade version. The hydrodynamics of the dolphin also offer a promising field of research. The dolphin swims through water with an almost complete absence of drag. When researchers find out how, the answer may result in better designs for both surface vessels and submarines.



Other areas of scientific interest include the ability of some aquatic organisms to breathe deeply without the adverse effects sometimes suffered by human divers. There is also interest in the development of artificial gills to obtain oxygen from water, and the use of algae to purify air in underwater equipment.

The Acting Director of the National Fisheries Center said that the new facility will provide every possible assistance to the Office of Naval Research in reaching its research objectives.

Note: See Commercial Fisheries Review, May 1964 pp. 26-27 and April 1964 p. 22.

North Atlantic Fisheries

Developments in the North Atlantic fishery as reported by the U. S. Bureau of Commercial Fisheries North Atlantic Regional Office, Gloucester, Mass., May 13, 1964:

SOVIET FISHING VESSELS RETURN TO ENGLAND WATERS: About 60 Soviet fishing vessels and support craft returned to fishing grounds off New England during the first week in April 1964, after a winter hiatus which few foreign vessels were seen. A total of 32 Soviet factory stern trawlers, 25 ice trawlers, and 5 refrigerated fish transporters were observed fishing for whiting 130 miles east of Nantucket Island. From 10 to 15 Soviet trawlers were also seen fishing for clupeoid (porphy) off the coast of Virginia and North Carolina.

HADDOCK AND WHITING ABUNDANCE ON GEORGES BANK HOLDING UP DESPITE HEAVIER FISHING:

Fishing vessels of 9 nations fished on Georges Bank during 1963. They were from Canada, U. S. S. R., Poland, Germany, Japan, Norway, Denmark, United Kingdom, and the United States. Despite such heavy fishing pressure, haddock stocks are holding up well, and the large 1963 year-class is expected to enter the fishery next winter (1965). No evidence has been noted of a serious decrease in the abundance of whiting. Fluctuations in yellowtail flounder stocks, fished heavily by United States fishermen, do not appear to be closely related to fishing effort. Estimates of the abundance of various species of groundfish by the U. S. Bureau of Commercial Fisheries Biological Laboratory at Woods Hole, Mass., are greatly affected because of the Bureau's new research vessel Albatross IV.

SIGNAL USED TO INDICATE U. S. VESSEL FISHING: United States vessels fish close to the Soviet fishing fleet this summer are asked to display a basket in their rigging. It is the only signal Soviet vessels recognize that another vessel is fishing and thereby yield the right of way.



North Atlantic Fisheries Investigations

NORTHERN EDGE OF GEORGES BANK SURVEYED:

"Albatross IV" Cruise 64-6 (April 6, 1964): To obtain pictures of fish

on or near the bottom, to conduct a special sampling experiment, and to tag blackback flounders at the Northern Edge of Georges Bank was the purpose of this cruise by the U. S. Bureau of Commercial Fisheries research vessel Albatross IV.

A total of 80 survey stations were completed on this cruise, 526 blackback flounders were tagged, 20 camera lowerings were made, and 400 haddock scales and 120 argentine otoliths were collected. A temperature-recording buoy was set near Block Island, and bathythermograph lowerings were made throughout the cruise.

The results of this survey by the Albatross IV will be known following further analysis of data collected. Films from the underwater camera showed that turbidity was a major problem in obtaining photographs of fish or bottom.

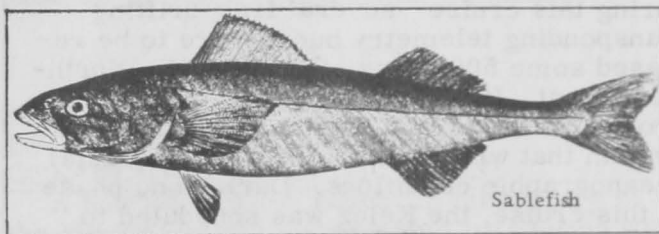
Note: See Commercial Fisheries Review, June 1964 p. 21.



North Pacific Exploratory Fishery Program

DEMERSAL FISH OFF SOUTHERN WASHINGTON SURVEYED:

An investigation of the demersal fish of the continental slope off southern Washington was started April 13, 1964, when the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb left her base at Seattle, Wash.



Sablefish

During the early phase of the investigation a series of tracklines was run to establish the bottom topography of the region and to determine areas where potential experimental fishing could be conducted. Some of the first experimental drags made at depths greater than 300 fathoms yielded catches of sablefish exceeding 1,200 pounds an hour. Relatively large concentrations of ocean perch were also found (3,000 pounds per hour tow) near the continental break at depths of about 105 fathoms.

Oceanography

OBSERVATIONS IN PACIFIC NORTHWEST COASTAL WATERS BY BUREAU OF COMMERCIAL FISHERIES

RESEARCH VESSEL:

M/V "George B. Kelez" Third Oceanographic Cruise: To develop a capability for handling and tracking buoys was the primary objective of this oceanographic cruise in Pacific Northwest coastal waters by the U. S. Bureau of Commercial Fisheries research vessel George B. Kelez. The vessel left her base at Seattle, Wash., on April 17, 1964, for this third scheduled cruise. Physical, chemical, and biological observations at a number of stations within 550 miles offshore of British Columbia, Washington, and Oregon, were to be made.



U. S. Bureau of Commercial Fisheries research vessel George B. Kelez.

The Kelez was to initiate a new project during this cruise--several free-drifting transponding telemetry buoys were to be released some 500 miles off the Pacific Northwest coast. It is anticipated that this new project will lead to the establishment of a system that will permit forecasts of coastal oceanographic conditions. During one phase of this cruise, the Kelez was scheduled to make closely-spaced oceanographic observations with the Oregon State University research vessel Acona.

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BUREAU OF COMMERCIAL FISHERIES RESEARCH VESSEL "GERONIMO" MAKES NEW DISCOVERIES:

The probable discovery of a new ocean current and the finding of an unusually "hot ocean area," were the results of a four-month

oceanographic research cruise (EQUALANT III) off the central west coast of Africa by the research vessel Geronimo, operated by the Washington, D. C., Biological Laboratory of the U. S. Bureau of Commercial Fisheries. The discovery of a new ocean current is relatively rare with only a few having been found in the past 50 years.

Scientific personnel aboard the Geronimo had first indications of a westerly flowing undercurrent in the Gulf of Guinea in September 1963 when EQUALANT II (the second phase of the International Cooperative Investigation of the Tropical Atlantic) was being completed and the Syncom II communications satellite transmitted oceanographic data for the first time. On that voyage, test equipment dropped from the vessel into the easterly flowing Guinean Current was unexpectedly pulled to the west at the end of long wires.

On the last cruise completed May 12, 1964, as part of EQUALANT III, the Geronimo went back to the Gulf of Guinea and obtained additional data which supports the probable existence of the newly discovered current. The Director of the Bureau's Biological Laboratory at Washington, D. C., said a current meter aboard the vessel did not function properly, but other measurements indicated that the undercurrent is from 50 to 80 feet below the ocean surface. He said no data have been obtained on the dimensions and velocity of the current but that further studies will probably be made in the fall of 1964 or the following spring.

The chief of the scientific group aboard Geronimo on this recent voyage said the so-called ocean "hot spot" was found early in February 1964, and began about 30 miles southeast of Cape Three Points, Ghana. The hot ocean area measured about 60 miles in diameter and extended to a depth of about 100 feet. The water temperature in the area was 88° F., 6 degrees higher than the surrounding ocean. That warmer area was reported to be virtually without motion and may have resulted from a surrounding counter-clockwise eddy.

The Geronimo's chief scientist said there was an unusually large concentration of turtles at one point on the edge of the "hot spot," that this apparently was associated with an adjacent upwelling of water from the ocean floor which brought nutrients to the surface. The "hot spot" disappeared 10 days after it was discovered by the Bureau's research

Further study is to be made in that area to learn if the heated water recurs. Tuna fishing in the area of the discovery is said to be additionally good, and this may be related to a recurrence of the separate warmer water area.

Other oceanographic research vessels which participated in the most recent study of ocean currents and fishery resources in the area off the African Coast were sponsored by the University of Miami and the Governments of Ghana, Congo-Brazzaville, Spain, Republic of Ivory Coast, and the Soviet Union.

See Commercial Fisheries Review, December 1963 pp. 37-40.

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NEW ENGLAND UNIVERSITIES MAY ADJUST MARINE SCIENCE PROGRAMS:

The University of Massachusetts at Amherst has set up a commission to study the feasibility of establishing a fishery technology school. Also, the University of Maine is considering the addition of a marine laboratory. Plans of both schools have been discussed with the U. S. Bureau of Commercial Fisheries.

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RHODE ISLAND UNIVERSITY RECEIVES GRANTS FOR GRADUATE RESEARCH TRAINING GRANTS:

A total of \$166,380 has been awarded to the University of Rhode Island Graduate School of Oceanography by the National Institutes of Health to provide graduate research training grants, announced the dean of the University's Graduate School on May 21. It is the largest amount for that purpose ever received by the school.

Starting July 1, 1964, the grants will be used to provide financial support for 20 graduate students (mostly doctoral candidates) during the next five years. In addition, the grants will defray the costs of student trainees who will cruise aboard the University of Rhode Island research vessel Trident, the purchase of new equipment and supplies, and also help meet some of the Graduate School's operating costs through an "overhead" allowance. The School's dean said they "have been in considerable need of a financial assistance program for graduate students and that the lack of sufficient funds for that purpose has been an obstacle to enrolling many of the best students who apply each year."

There are now 41 graduate students at the School of Oceanography, who are assisted directly or indirectly by the University of Rhode Island, the National Defense Education Act, the U. S. Bureau of Commercial Fisheries, the Atomic Energy Commission, the Office of Naval Research, and others.

The grants by the National Institutes of Health will mean five additional students will be on campus the first and fifth years of the program. During the middle three years of the undertaking, 10 additional students each year will increase enrollments some 25 percent. Each will receive funds for the calendar year totaling \$3,000. It is expected the students will be on campus for two years each.

The dean of the Graduate School said that "oceanography has a direct bearing on public health problems. The inevitable direction of flow of all industrial and domestic wastes is into the estuarine and subsequently into the coastal marine environment. To understand how these wastes may be dissipated and perhaps converted, absorbed, or dispersed in the environment, requires broader knowledge of estuarine and coastal exchange, flushing, and other circulation processes."

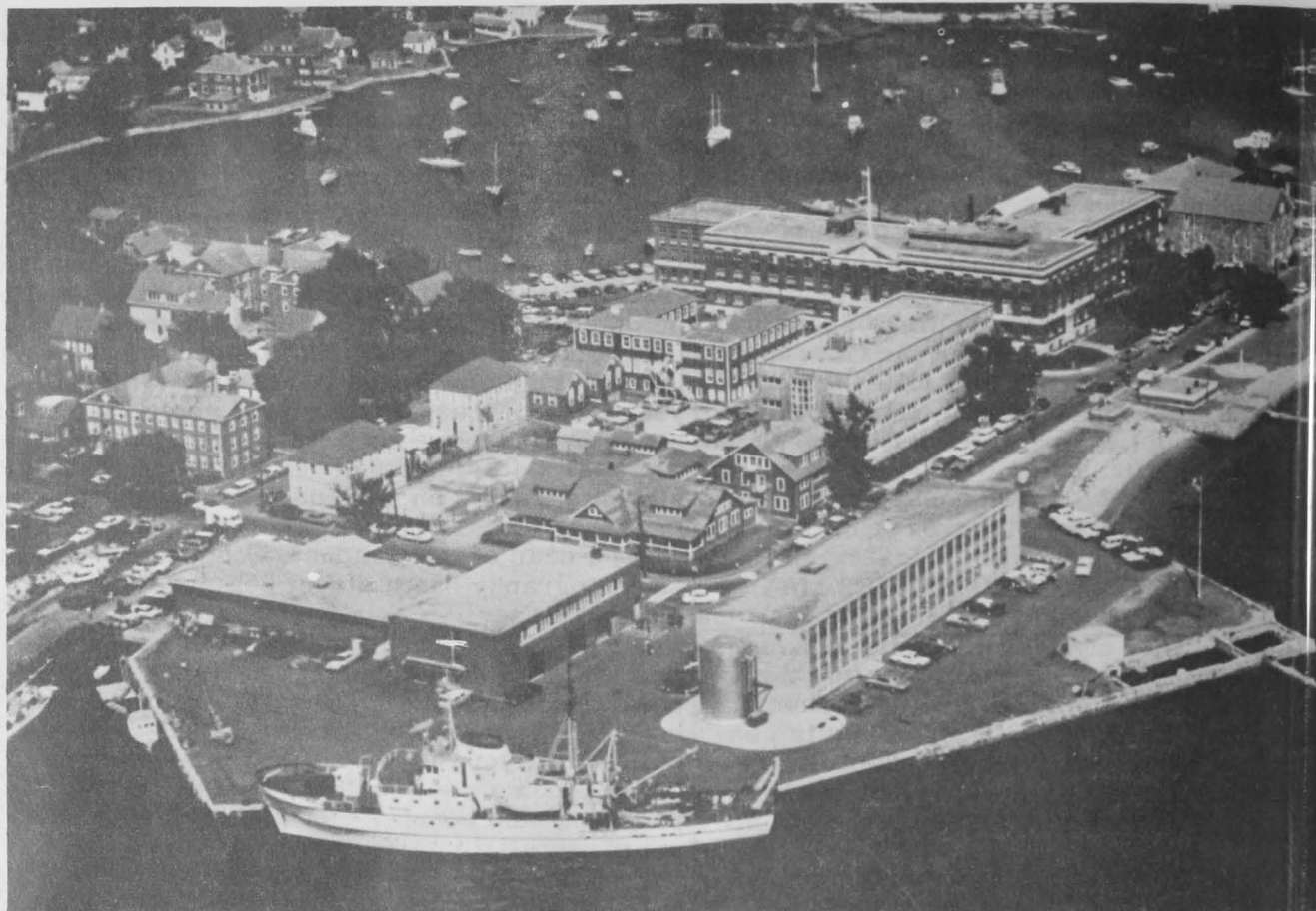
This latest training grant raises to more than \$1 million the amount received in grants by the Graduate School of Oceanography in a period of several weeks. Earlier the National Science Foundation had awarded \$850,000 to the School for the construction of a new laboratory-office building to be built on the University of Rhode Island Narragansett Bay Campus.

Note: See Commercial Fisheries Review, January 1964 p. 27.

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NEW RESEARCH LABORATORY DEDICATED AT WOODS HOLE OCEANOGRAPHIC INSTITUTION:

A new \$2-million research laboratory of the Woods Hole Oceanographic Institution was formally dedicated May 8, 1964, at Woods Hole, Mass. Named the Laboratory for Marine Sciences, the new 3-story building contains 45,000 square feet of floor space and was designed to accommodate the marine biology and chemistry departments of the Institution. Some of its special features include: 23 temperature- and humidity-controlled instrument rooms; 5 "environmental" rooms which can maintain any temperature from 0° to 40° C. (32° to 104° F.); rooms for frozen storage of



The modern building in the right foreground is the Woods Hole Biological Laboratory of the U. S. Bureau of Commercial Fisheries. To the left of the Laboratory is the Woods Hole Oceanographic Institute. The vessel in the foreground is the Albatross IV, the Federal Government's most modern fishery research vessel.

marine specimens; a large aquarium room with running sea water at regulated temperatures; a dissecting room; and an auditorium.

An afternoon session of the dedication was devoted to the presentation of papers by members of the Institution's scientific staff. The following papers were delivered: "The Organic Chemistry of a Fossil," "The North Atlantic Continental Shelf," "Diving and the Physiology of Marine Animals," and "Exchanges of Energy between Air and Sea." (Woods Hole Oceanographic Institution.)

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UNIVERSITY OF MIAMI RECEIVES NEW RESEARCH GRANTS FOR STUDIES IN MARINE BIOLOGY:

The National Science Foundation has awarded the Institute of Marine Science, University of Miami, a \$230,000 grant for research at sea aboard the Institute's 176-foot research vessel Pillsbury and aboard smaller

vessels of the Institute. The work will include collection and study of crustaceans, planktonic organisms from the Straits of Florida; studies on the migration and growth of marlin, sailfish, and other large ocean fish, and the effect of the Gulf Stream upon their distribution; a study of squid and octopus, and shark investigations to determine their reaction to sounds played back into water in the open ocean.

The Director of the Institute of Marine Science stated that the grant specifically provides for the cost of operating Institute vessels for biological purposes as far afield as Brazil and West Africa, but also in Florida, Caribbean, and Bermuda waters.

Another grant, in the amount of \$62,500, was awarded to the Institute of Marine Science to provide special equipment for behavior studies of fish and invertebrates in the Institute's newly completed controlled environment building. The new equipment will

... it possible to keep fish, shellfish, and other experimental marine animals alive under a wide variety of accurately controlled conditions. Temperatures will be regulated to a fraction of a degree, while oxygen, salinity, light, and other variables can also be strictly controlled. In the new building, studies will be made on the reactions of fish to different types of light and sound, their hearing ability and color vision, their behavior under a variety of conditions including weightlessness, and the manner in which they orient themselves under changing conditions. Work will also be carried out upon the reactions of commercial species of shrimp. (University of Miami, April 9, 1964.)

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NEW MARINE LABORATORY BUILDING PLANNED AT UNIVERSITY OF MIAMI:

A grant of \$1,040,000 from the National Science Foundation will make possible the construction of a new laboratory building for the Institute of Marine Science, University of Miami. The new building at the Institute will house the entire Division of Physical Sciences which carries out research upon currents, waves, tides, underwater sound and the chemistry of sea water and sediments, the topography and composition of the deep sea floor, and other studies. With the construction of the new laboratory, many of the activities of those various research programs can now be concentrated in a single location.

... be completed and in use by the spring of 1965, the new laboratory will consist of 3 stories and will have about 30,000 square feet of working space. The ground floor will contain model basins and pressure tanks, including space for a rotating tank and a scuba roof chamber. Tanks will be used for calibration of instruments and also to simulate some conditions of the open sea for experimental purposes. The second and third floors will house offices and laboratories, classrooms, a computer room, chartroom, dining room, and a radio communications center. Maintaining contact with the Institute's fleet of research vessels.

President of the University of Miami stated that the new facility will allow certain Institute programs to make much more rapid progress than heretofore has been possible. (University of Miami, April 24, 1964.)



Ohio

COMMERCIAL FISHERY LANDINGS, 1963:

Commercial fish landings at Ohio ports of Lake Erie during the 1963 fishing season (March 15-December 20) totaled 14.2 million pounds, about one million pounds or 6.6 percent less than in 1962. There was an appreciable drop in landings of carp (2.5 million pounds) and yellow perch (4.5 million pounds) from the previous year, but landings of sheepshead (up 18 percent) and yellow pike (up 90 percent) increased.



Leading species landed in 1963 were yellow perch (4.5 million pounds), sheepshead (4.0 million), carp (2.5 million), catfish (1.0 million), white bass (1.0 million)--these accounted for about 90 percent of the total landings. Landings of blue pike and whitefish, once important commercial species in Lake Erie, were down to only a few hundred pounds.



Oregon

RECORD SILVER SALMON RELEASE FROM STATE HATCHERIES:

A record release of 10.4 million silver salmon yearlings from Oregon Fish Commission hatcheries during the liberation season from November 1963 to May 1964 has been announced by the Commission's fish culture director. Coastal areas received 2.3 million of the fish while 8.1 million went into Columbia and Willamette River tributaries.

In addition to the yearlings which were reared to seaward migrant size, some 10 million salmon fry (surplus to hatchery needs) were placed in selected streams, ponds, and lakes for natural rearing under "wild" conditions. Areas for liberation of zero-age fry were selected on the basis of fish production

potential after thorough biological investigation. That was in contrast to indiscriminate planting of fry which characterized fish-cultural operations in many places during earlier times when large numbers of newly hatched fry were dumped with little more basis than hope that they would survive.

This season's release of 10.4 million yearlings tops the previous record of 8.5 million silver salmon released last season by the Oregon Fish Commission. Emphasis during recent years on release of yearling fish ready for seaward migration appears to be playing an important role in the increasing success of the silver program, the Commission's fish culture director indicated. He reported increasing annual returns of adult silver salmon to the hatcheries totaled 22,544 in 1961, 36,107 in 1962, and 44,840 in 1963. He also cited improved disease control and superior nutrition during the year or more the fish are held in the hatcheries and good ocean survival conditions as factors in the success of the hatchery program. (Oregon Fish Commission, May 4, 1964.)

* * * * *

FISH DISEASE STUDY CENTER OPENED:

The Oregon Fish Commission has established an Infectious Disease Study Section to investigate and control fish disease. The new unit will be directed by an expert in the field of medical research who will be assisted by a resident staff of five fisheries scientists. The section is housed principally in a new laboratory building at the Commission's Clackamas Research Center.

The fisheries disease work is divided, much as human investigation might be, into diagnostic and research areas. The diagnostic division at the laboratory is concerned principally with the diagnosis of disease in juvenile salmon and steelhead in hatcheries. Fishery scientists, in the role of medical examiners, determine the problem and prescribe treatment. Various antibiotics and drugs are administered through the diet by way of specially prepared pellet foods or by solutions introduced into the water in which the fish live.

Research in the infectious disease section deals primarily with controlling diseases in adult fish which return to Commission hatcheries to spawn. Most of the large fish are held in ponds until "ripe" and ready to re-

lease their eggs. In one species, the spring chinook, the holding period may be as long as 5 months, allowing ample opportunity for disease and parasitism to infect and kill the important parent fish. Treatment of spawning is mainly external as adult salmon ingest no food after returning to fresh water.

As hatcheries gain increasing importance in maintaining anadromous fish runs, the speedy diagnosis and control of disease assume new consequence. As in human populations, the forced concentration of thousands of individual fish in a small area increases manifold the chance for epidemic outbreaks of disease. The new laboratory will be a formidable tool in removing causes of mortality in hatchery-reared salmon and steelhead. Close liaison is kept with the superintendents of Commission hatcheries to keep them aware of developments, as well as to receive the earliest possible warnings of disease problems. Discoveries made in the Clackamas Laboratory could also lead to increased production in the many natural salmon spawning and rearing streams of the Northwest.

The fishery infectious disease center has specialized equipment and a unique spring water source. The Center has an elaborate water-temperature control system which can simultaneously supply 4 strong and continuous flows of water, each with its own precise water temperature of less than 1° F. variation and in a range of from 35° F. to above 100°. Each of the 4 separately adjustable flows can supply a separate aquaria.

In conjunction with the Clackamas Center Oregon Fish Commission contract research



on virus diseases and tissue culture is being carried on at Oregon State University. Six of the Fish Commission research laboratories supplement infectious disease investigations. A mobile diagnostic laboratory mounted on a truck should be ready for use later this year and will be equipped with the tools necessary for field study at the hatchery sites.

At present, 93 percent of the entire Oregon Fish Commission budget and 85 percent of

Research budget is spent on programs to enhance the runs of salmon and steelhead. (Oregon Fish Commission, May 4, 1964.)

**FISH AND WILDLIFE KILLS
BEING INVESTIGATED:**

The opening of a field office and laboratory in Klamath Falls, Oreg., in June 1964, to investigate the cause of fish and wildlife kills in that area, was announced on May 21 by the U. S. Public Health Service, Department of Health, Education, and Welfare. The fish and wildlife deaths are believed to have been caused by the runoff of chemicals into the river basin or by agricultural practices in the area. There have also been reports of poisons in the area contracting dermatitis, as an irritation.

The investigation is to be handled by the Division of Water Supply and Pollution Control. Scientists will also study the area's algal growth, which has reportedly reached nuisance proportions. The complete study is expected to take four years and will also include the land areas drained by Lost River.

Headquarters for the project is in San Francisco, Calif., and preliminary work was done there in December 1963. The project's work will be coordinated with the Corvallis Laboratory at Corvallis, Oreg. The project staff will consist of 8 engineers and scientists in the initial phase of the study (scheduled to begin in June) and entails data collection and analysis of the Klamath Lake and Lost River systems.

The investigation was begun at the request of the U. S. Fish and Wildlife Service and the State of California and Oregon. It is to be operated in conjunction with work being done by the Fish and Wildlife Service.



**INDUSTRY-GOVERNMENT
PROMOTION CAMPAIGN:**

Industry-Government promotion campaign to move the liberal stocks of canned salmon into trade channels was announced by Secretary of the Interior Stewart L. Udall on May 15, 1964. The Department's Bureau of Commercial Fisheries will cooperate with

the Alaska canned salmon industry in the campaign. Fishing is Alaska's largest industry, Secretary Udall commented, and the American public can help boost Alaska's economic recovery from the March 27 earthquake by serving more canned salmon.

The nationwide campaign was geared to reach its peak during May, June, and July. Although record stocks of canned pink salmon are available, industry spokesmen are confident that the inventories can be substantially reduced because canned salmon fits so well in warm weather menus.

plentiful foods
A MONTHLY MERCHANDISING GUIDE FOR FOOD DISTRIBUTORS

Feature
Milk and Dairy Products
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Canned Pink Salmon

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PF-340 ISSUED MAY 1964
USDA - AMS - Food Distribution Division - 536 South Clark St., Chicago, Ill.

With a supply of this versatile canned food on their shelves, housewives can provide their families with a variety of appetizing and quick and easy to prepare summer meals. In addition, they will find that canned pink salmon is an economical, no-waste, high-protein food that is an excellent source of vitamins, minerals and other nutrients. Budget-minded housewives will find that loaves, croquettes, and casserole dishes prepared from canned pink salmon are extremely practical, and tasty.

Secretary Udall said the Bureau of Commercial Fisheries will give special emphasis to canned pink salmon in its contacts with consumer groups, schools, other institutions, and the food trade associations. Special materials also are being prepared for distribution to newspapers and television and radio stations to provide maximum consumer attention to the availability of this convenient canned fishery product.

The U. S. Department of Agriculture also is cooperating in this promotional program,

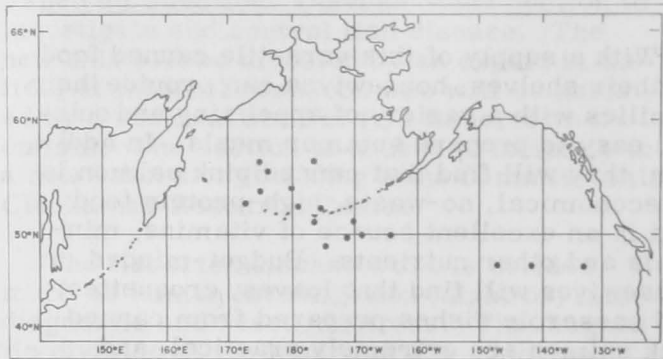
and canned pink salmon was listed in their June "List of Foods in Plentiful Supply." That Department also distributed specially designed merchandising tips to the retail grocery trade with the recommendation that increased merchandising attention be given canned pink salmon at the local level.

Note: Many attractive recipes are available to the homemaker in the Interior Department's full color 16-page recipe booklet, "Take a Can of Salmon," Fish and Wildlife Service Circular 60. As part of its contribution to this promotional campaign, the Canned Salmon Institute, Box 1200, Seattle, Wash., has supplies of this recipe booklet and will send a complimentary copy to interested homemakers. They are also available from the Superintendent of Documents, Washington, D. C. 20402, for 25 cents a copy, with a discount of 25 percent on individual orders of 100 copies or more.

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NORTH PACIFIC WINTER DISTRIBUTION AND TAGGING:

M/V "George B. Kelez" Winter 1964 Cruise (January 17-March 18, 1964): To further delineate the winter distribution of salmon in the North Pacific Ocean and Bering Sea, tag individuals to determine migration routes and area of origin, and to compare the catch rates and selection properties of gill nets and floating longlines were the principal objectives of this three-months cruise by the U. S. Bureau of Commercial Fisheries research vessel George B. Kelez.



Fishing stations completed by the M/V George B. Kelez during the 1964 winter cruise, January 17-March 18, 1964.

Unusually severe weather conditions over the entire Aleutian region and ice limits further south than anticipated permitted only 16 fishing stations and necessitated modification of the planned cruise track.

Salmonids were taken at every station but in comparatively low numbers. With the exception of one chum salmon and a few pinks and steelhead at the easternmost three stations, the catches were exclusively sockeyes, 90 percent of which were large and possibly maturing.

Gill nets and long lines were fished simultaneously only twice and catches in both types of gear were too small for statistical comparison.

The total number of fish caught and tagged during the cruise were:

Species	Caught	Tagged
	... (Number of Fish)	
<u>Salmon:</u>		
Sockeye	263	18
Chum	1	
Pink	24	
Steelhead	18	
Total	306	17

At the termination of this cruise, the George B. Kelez returned to Seattle to be refitted for an oceanography cruise scheduled for April 1964.

Note: See Commercial Fisheries Review, August 1963 p. 6.

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NORTH PACIFIC HIGH-SEAS TAGGING PROJECT:

From 4 to 5 months of high-seas salmon tagging is to be undertaken by two purse seiners chartered by the U. S. Bureau of Commercial Fisheries, according to an April 1964 announcement by the Bureau's North Pacific Regional Office at Seattle, Wash. The vessels are the Commander and the Storm.

The areas to be covered will be (1) Central Gulf of Alaska; (2) Central Aleutians; (3) North-Central Gulf of Alaska; and (4) Coastal area of Northeast Gulf of Alaska. As part of the studies of salmon migration at sea, the Bureau's scientists aboard the vessels plan to experiment with sonic tags as a means of following the movements of individual salmon for 24 to 48 hours after tagging. This experiment will be conducted in connection with the vessel Storm in the area south of the Central Aleutians where the abundance of salmon is usually high and salmon movements are apparently directional.

The tag and hydrophone "sniffer" used will be of the type developed by the Bureau's Passage Program. Of interest will be the rate of travel of the salmon, direction of movement and reactions to tide changes and darkness. It is possible the fish will "mill" for some time due to the effects of tagging. Small boats from the Storm will be used to track the sonic-tagged salmon. The tests will be repeated as often as practicable.



**Atlantic Exploratory
Fishing Program**

**EXPLORATORY TRAWLING OFF NORTH
SOUTH CAROLINA CONTINUED:**

**M/V "Silver Bay" Cruise 56 (March 30-
April 20, 1964):** To conduct basic and sea-
trawling surveys off Long, Onslow, and
Maleigh Bays was the main objective of this
cruise off North Carolina and South
Carolina by the U. S. Bureau of Commercial
Fishes exploratory fishing vessel Silver
Bay. A total of 88 exploratory fishing sta-
tions was occupied between 5 and 100 fath-
oms. Exploratory gear consisted primarily
of 70-foot, nylon, roller-rigged fish trawls
on 8-foot bracket doors with 15-foot
leaves. The trawl nets were 4½-inch mesh
at the ends of 1½-inch mesh.

LONG BAY: In Long Bay, 36 trawling sta-
tions were occupied. In depths of less than
20 fathoms, catches were dominated by small
numbers of scup (*Stenotomus* sp.), sea robins
(*Prionotus* sp.), and miscellaneous sharks and
rays. In 20 to 25 fathoms, all catches were
dominated by filefish (*Stephanolepis hispidus*),
which were taken in amounts up to 9,000
pounds per 90-minute drag. Snappers and
grouper were taken at several locations be-
tween 26 and 40 fathoms. One area where
dragging was productive is located at 33°11'
N. latitude, 77°30' W. longitude in 29 fathoms.
Two drags on this "lump" produced an aver-
age of 400 pounds of grouper, 300 pounds of
gray triggerfish (*Balistes capriscus*), 90
pounds of snapper, 50 pounds of hogfish (*Lach-
nolaimus maximus*), and 20 pounds of white
pergy (*Calamus* sp.), for an average of 860
pounds of fish per drag. The grouper catches

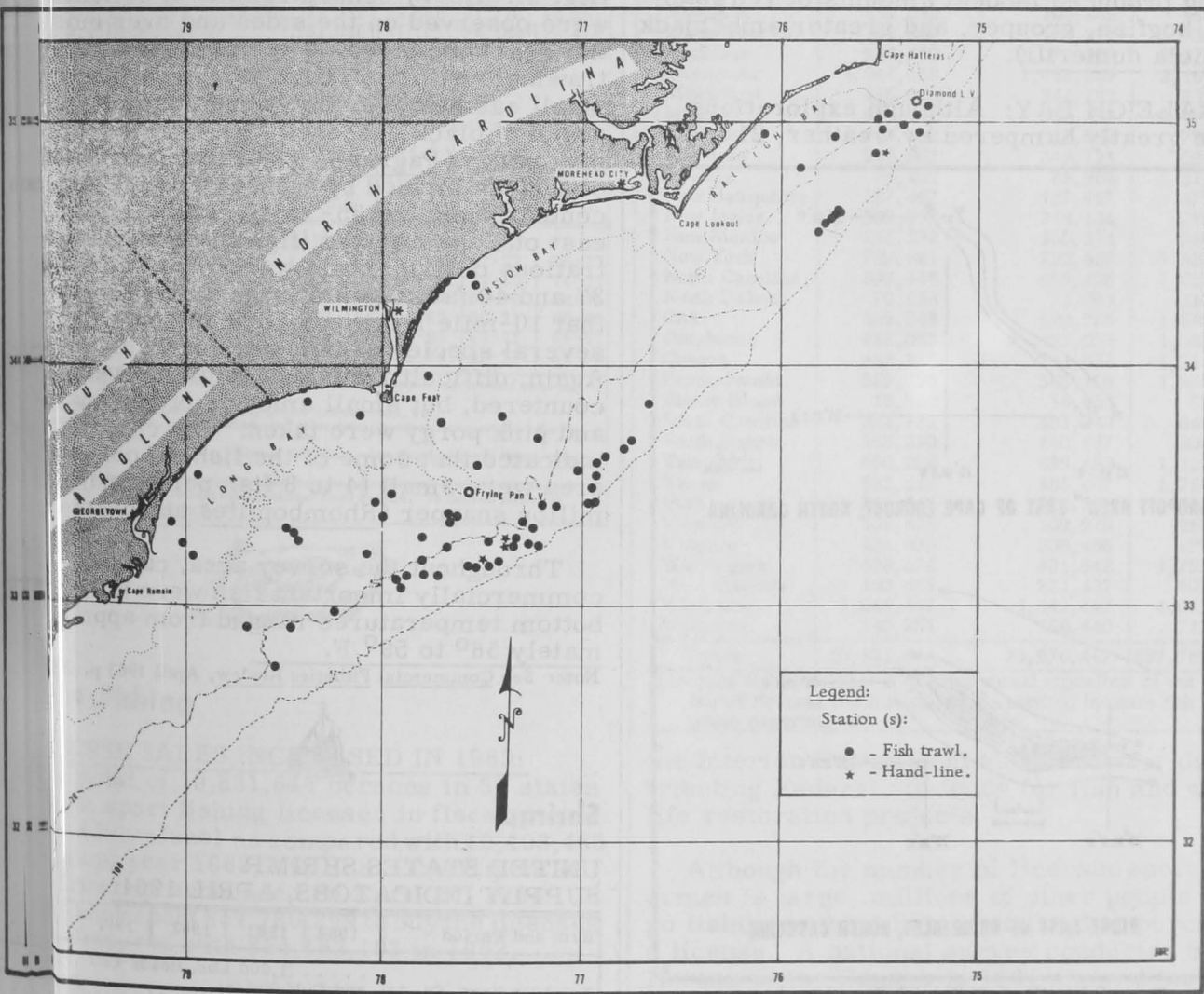


Fig. 1 - Shows the station pattern for Cruise 56 of the M/V Silver Bay, March 30-April 20, 1964.

consisted of gag (*Mycteroperca microlepis*), scamp (*M. phenax*), and red hind (*Epinephelus guttatus*). The snapper catches consisted of red snapper (*Lutjanus aya*), yelloweye snapper (*L. vivanus*), mutton snapper (*L. analis*), black fin snapper (*L. buccanella*), and yellow tail snapper (*Ocyurus chrysurus*).

ON SLOW BAY: In Onslow Bay, 31 stations were occupied for trawl or hand-line operations. Due to weather conditions, only the southwest portion of the bay was surveyed. In depths of less than 25 fathoms, the catches were generally unproductive and, again, were dominated by filefish. Heavy concentrations of fish were observed in 30 fathoms south-east of Frying Pan Light Ship 33°15' N. latitude, 77°22' W. longitude. Trawling was generally unsuccessful in that area due to rough bottom, but both trawling and hand-lining produced modest amounts of red snapper, hogfish, grouper, and greater amberjack (*Seriola dumerili*).

RALEIGH BAY: Although explorations were greatly hampered by weather, 21 sta-

tions were occupied in Raleigh Bay. Catches inside 25 fathoms were dominated by shark rays, and northern puffers (*Sphaeroides maculatus*). One drag east-southeast of Ocracoke Inlet in 17 fathoms produced 65 pounds of small (1 to 4 fish per pound) summer flounder (*Paralichthys dentatus*).

Extremely heavy concentrations of bottom fish were recorded at three locations in 30 to 40 fathoms near the edge of the Continental Shelf. The first of those areas consists of a small spot of broken bottom at 34°59.5' N. latitude, 75°24' W. longitude in 37 fathoms where the only drag made resulted in a damaged trawl. The catch consisted of 35 pounds of medium-size black sea bass (*Centropristis striatis*). The second area is a ridge, 4 miles in length, which shoals to 30 fathoms from a depth of 37 fathoms due east of Drum Inlet (fig. 2). Heavy concentrations of bottomfish were observed on the sides and over most of the top of the ridge. The bottom was not trawlable with the exploratory gear used, but small catches taken by hand-line were composed of black sea-bass, red snapper, and pink porgy (*Pagrus*). The third area consists of a ridge formed by a sharp dropoff in bottom contour from the 35- to 40-fathom curve due east of Cape Lockout (fig. 2). Heavy concentrations of fish shoals were recorded between 37 and 40 fathoms along the entire length of that 10-mile ridge. Recordings indicate that several species of fish were probably present. Again, difficult trawling conditions were encountered, but small amounts of red snapper and pink porgy were taken. The catches also indicated that some of the fish schools in that area were small (4 to 8 fish per pound) yellowtail snapper (*Rhomboplites aurorubens*).

Throughout the survey area, catches of other commercially important fish were made and bottom temperatures ranged from approximately 56° to 59° F.

Note: See *Commercial Fisheries Review*, April 1963 p. 25.



Shrimp

UNITED STATES SHRIMP SUPPLY INDICATORS, APRIL 1964:

Item and Period	1964	1963	1962	1961	1959
..... (1,000 Lbs. Heads-Off)					
Total landings, So. Atl. and Gulf States:					
June	-	4,427	3,358	3,171	4,171
May	-	10,152	6,186	5,276	6,171

(Table continued on next page)

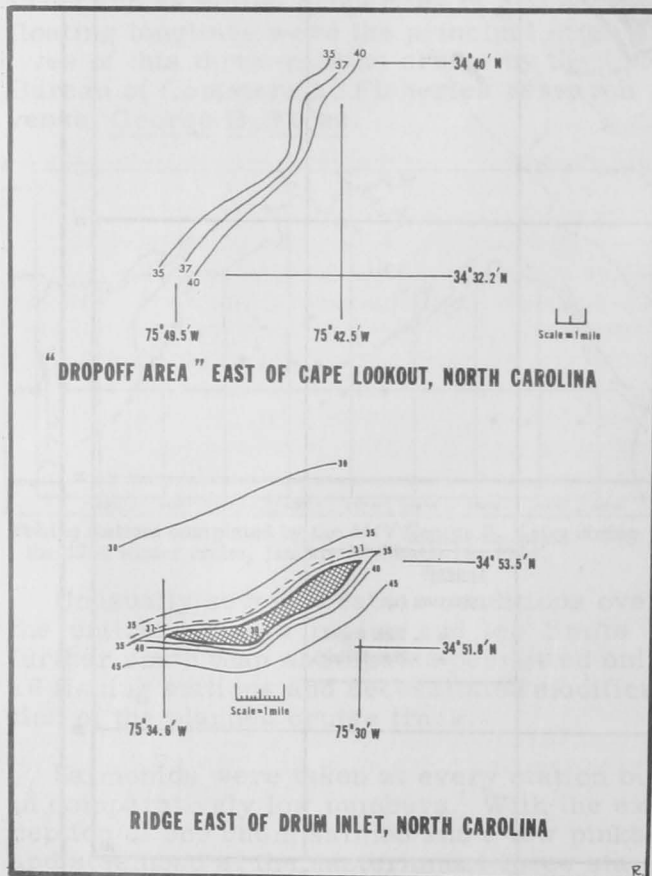


Fig. 2 - Shows 2 locations off Raleigh Bay where heavy concentrations of bottomfish were located during Cruise 56 of the M/V Silver Bay.

Item and Period	1964	1963	1962	1961	1960
. (1,000 Lbs. Heads-Off)					
April	4,800	4,427	3,358	3,171	4,728
March	4,269	3,632	3,331	4,754	4,099
January-February	10,409	7,979	7,963	9,596	9,186
January-December	-	138,281	105,839	91,396	141,035
Quantity canned, Gulf States 1/:					
June	-	5,234	4,913	3,438	6,920
May	-	3,831	1,794	1,208	1,461
April	-	105	12	9	66
March	12	92	86	35	117
January-February	634	750	733	273	470
January-December	-	29,468	23,322	14,500	26,394
Frozen inventories (as of end of each mo.) 2/:					
June 30	-	24,047	13,796	19,416	15,338
May 31	-	24,053	13,904	24,696	17,540
April 30	-	24,954	15,637	27,492	20,502
March 31	31,476	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
January 1	45,335	31,577	19,755	40,913	37,866
Exports 3/:					
June	-	9,439	9,397	8,065	8,932
May	-	11,110	11,020	8,278	9,902
April	-	11,082	10,210	9,208	7,733
March	12,777	13,616	9,658	10,347	8,545
January-February	24,962	25,239	23,506	21,270	16,253
January-December	-	151,530	141,103	126,268	113,418
. . . (¢/lb., 26-30 Count, Heads-Off) . . .					
Wholesale price, all species, So. Atl. and Gulf Ports:					
June	-	77.0	84.4	53.7	64.1
May	-	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
Wholesale price, froz. brown (5-lb. pkg.) Chicago, Ill.:					
June	-	95-102	102-104	67-72	76-77
May	-	100-103	96-103	67-69	74-77
April	72-74	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

Quantities of headless shrimp determined by multiplying the number of standard cases by 30.3.
 1/ Law headless only; excludes breaded, peeled and deveined, etc.
 2/ Includes fresh, frozen, canned, dried, and other shrimp products as reported by the Bureau of the Census.
 3/ Range in prices at Tampa, Fla.; Morgan City, La.; area; Port Isabel and Brownsville, Tex., only.
 April 1964 landings and quantity used for canning estimated from information published daily by the New Orleans Fishery Market News Service. To convert shrimp to shell-on weight multiply by 1.68.



Sport Fishing

LICENSE SALES INCREASED IN 1963:
 A total of 19,831,644 persons in 50 states bought sport fishing licenses in fiscal year 1963 (July-June) as compared with 19,403,465 in fiscal year 1962, the U. S. Department of the Interior announced on April 20, 1964. In 1963 they spent \$57,780,259 to buy the licenses as compared with \$54,163,163 in 1962.

The state game and fish departments provide the license holder and sales information to

Summary of the Number of Paid Fishing License Holders, License Sales, and the Cost to Fishermen in the United States, July 1, 1962 to June 30, 1963.			
State	Paid Fishing License Holders ^{1/}	Fishing Licenses, Tags, Permits, and Stamps Issued	Gross Cost to Fishermen
Alabama	393,635	393,635	\$ 832,589
Alaska	58,844	63,771	347,775
Arizona	226,947	311,605	889,020
Arkansas	435,956	435,956	1,185,150
California	1,611,639	3,823,431	6,839,903
Colorado	440,669	445,362	1,604,313
Connecticut	111,845	111,845	433,759
Delaware	9,644	10,761	27,821
Florida	496,923	517,251	1,098,353
Georgia	530,722	555,911	716,706
Hawaii	4,264	4,264	9,496
Idaho	279,070	321,641	1,292,639
Illinois	700,555	733,032	1,639,974
Indiana	726,447	731,721	1,018,597
Iowa	391,355	402,811	993,318
Kansas	273,155	273,607	834,265
Kentucky	320,994	333,160	977,724
Louisiana	218,537	220,335	271,443
Maine	220,859	222,663	799,923
Maryland	101,031	103,642	333,216
Massachusetts	193,567	182,271	751,807
Michigan	903,190	1,079,322	2,272,541
Minnesota	1,344,658	1,465,269	3,163,715
Mississippi	336,673	344,799	539,628
Missouri	654,142	950,392	2,471,016
Montana	249,032	249,032	775,339
Nebraska	218,801	249,721	528,991
Nevada	74,102	83,964	311,684
New Hampshire	127,467	127,467	473,289
New Jersey	139,589	218,134	782,014
New Mexico	147,338	150,231	550,016
New York	727,821	758,835	2,388,428
North Carolina	309,448	459,406	1,027,586
North Dakota	70,638	71,093	118,436
Ohio	820,583	820,965	1,885,305
Oklahoma	485,053	485,053	1,085,279
Oregon	482,317	731,053	1,718,891
Pennsylvania	585,156	585,156	1,955,818
Rhode Island	18,983	18,983	57,811
South Carolina	292,731	321,939	646,790
South Dakota	155,230	160,477	304,832
Tennessee	650,256	895,832	1,128,930
Texas	882,111	883,407	1,764,546
Utah	209,510	221,541	635,490
Vermont	108,822	109,979	262,909
Virginia	321,896	506,466	897,135
Washington	398,676	401,942	1,797,237
West Virginia	180,465	221,427	607,034
Wisconsin	1,049,447	1,049,447	4,019,513
Wyoming	140,851	156,440	712,265
Totals	19,831,644	23,976,447	\$57,780,259

^{1/}A paid license holder is one individual regardless of the number of licenses purchased. Data certified by state fish and game departments.

the Interior Department as a basis for distributing Federal aid funds for fish and wildlife restoration projects.

Although the number of licensed sport fishermen is large, millions of other people also go fishing without being required to purchase a license. A national survey conducted by the Bureau of the Census in 1961 showed there were more than 25 million sport fishermen in the United States who participated substantially



Sport fishing in Montauk State Park, Mo., at the opening of trout season.

in fishing during 1960. Including the more casual participants, the number of fishermen undoubtedly was greater in 1963. In many states, minors are not required to purchase a fishing license, and only six states require a license to fish in salt water.

Some states require sportsmen to purchase separate licenses, stamps, permits, or tags to fish for different kinds of fish. For example, a special stamp is required in several states to fish for trout.



Tuna

U. S. CANNED TUNA INDUSTRY PRESENTS AWARD TO INTERIOR DEPARTMENT FOR MARKETING ASSISTANCE:

The United States tuna canning industry presented an award, in the form of a scroll, to Secretary of the Interior Stewart L. Udall on May 5, 1964, for Interior's successful efforts in support of the tuna industry during the past year. In presenting the award, the President of the Tuna Research Foundation commended the Department of the Interior and its Bureau of Commercial Fisheries for "good will and practical support" in boosting tuna sales during 1963. He said the Department's support of the industry was "an inspiring demonstration of the partnership of Government and business" which added strength to the free enterprise system.

Secretary Udall said the Department of the Interior was very pleased to have worked

with the tuna canning industry. He praised the industry for having a "very fine product and very high standards" and said, "We are happy to have had a part in this program. We feel it is the type of relationship with industry that is most productive for our national economy."



Fig. 1 - From left to right, Under Secretary of the Interior James K. Carr, Bureau of Commercial Fisheries Director Donald L. McKernan, and Secretary of the Interior Stewart L. Udall accept United States tuna canning industry award from Jack Gorb, President of the Tuna Research Foundation, Terminal Island, Calif.

In 1963, the Bureau of Commercial Fisheries conducted a nationwide promotional campaign for canned tuna which included the distribution of recipe leaflets, marketing bulletin, television slides, and news releases about the nutritional value of tuna. The Department of Agriculture also played an active role in the promotion by featuring canned tuna in its monthly List of Foods in Plentiful Supply.

Easy Does It...with TUNA



SUMMERTIME IS TUNA TIME

Wonderful tuna — flavorful convenience in a can — truly the chef's best friend. Always available, priced right and prepared so easily in so many sparkling ways. Versatile tuna goes with so many things — it flatters fruit — teams with greens — and coddles casseroles. Tuna sings in sandwiches, too! Terrific tuna, easy and elegant, bright and light, at your fingertips everywhere.

SPARKLING SALADS

Tempting Tossed Salad . . .
Spork interest in a bowl of tossed salad by adding chunks of delicious tuna.

Tuna Potato Salad . . .
Send an old standby soaring to new flavor heights by mixing chunks of tuna with your favorite potato salad.

Tuna Lettuce . . .
Top shredded lettuce with a generous portion of flaked tuna. Cover with a spicy lemon dressing and garnish with tomato wedges.

Tuna Slaw . . .
Give added interest to a crisp cabbage slaw with chunks of flaked tuna.

Macaroni Salad . . .
For a delicious flavor accent, try adding chunks of tuna to your macaroni salad.

Splendid Fruit Salad . . .
Make a summer fruit salad extraordinary good with the addition of chunks of tuna or sparkling of flaked almonds.

Summer Sogarden . . .
Tomatoes stuffed with tuna salad are the main dish which for hot weather appetizer.

Surprise Apple . . .
Accent a spicy tomato soup by folding in flakes of heavy tuna. Serve on salad garnish with cheese slices and slippery green dressing.

Summer Sparkler . . .
As a variation on the ever popular warm salad, add chunks of tuna for a wonderful flavor combination.

Fig. 2 - Portion of Special Fisheries Marketing Bulletin issued by the U. S. Bureau of Commercial Fisheries and the U. S. Department of Agriculture to promote tuna sales.

In addition to marketing assistance, the Bureau of Commercial Fisheries also assists the fishing industry through biological research, participation in international fishery commissions, loans and grants for vessel construction, and through fishing gear research and exploratory fishing.

See Commercial Fisheries Review, August 1963 p. 54.



United States Fisheries

FISH STICKS AND PORTIONS PRODUCTION, 1963:

The United States production of fish sticks and portions during 1963 amounted to 173.9 million pounds valued at \$31.6 million—a gain of 15 percent in quantity and 13 percent in value as compared with 1962. Fish sticks totaled 74.1 million pounds in 1963—7.1 million pounds or 10 percent above 1962, and fish portions amounted to 99.8 million pounds—up 16.0 million pounds or 20 percent.

Table 1 - U.S. Production of Fish Sticks by Months and Type, 1963 1/

	Cooked	Uncooked	Total
	..... (1,000 Lbs.)		
January	7,213	341	7,554
February	7,782	459	8,241
March	7,688	365	8,053
April	6,249	297	6,546
May	5,369	381	5,750
June	5,828	297	6,125
July	4,489	381	4,870
August	5,427	269	5,696
September	5,336	529	5,865
October	7,200	928	8,128
November	6,026	445	6,471
December	5,525	471	5,996
Total quantity 1963 1/	74,132	5,163	79,295
Total quantity 1962	66,801	5,416	72,217
	..... (\$1,000)		
Total value 1963 1/	29,732	1,855	31,587
Total value 1962	28,029	2,047	30,076
1/Preliminary.			

Table 2 - U.S. Production of Fish Sticks by Months, 1960-63

	1963	1962	1961	1960
	..... (1,000 Lbs.)			
January	7,554	6,082	6,091	5,511
February	8,241	6,886	7,097	6,542
March	8,053	7,658	7,233	7,844
April	6,546	5,719	5,599	4,871
May	5,750	5,643	5,129	3,707
June	6,125	5,117	4,928	4,369
July	4,870	3,740	3,575	3,691
August	5,696	5,760	6,927	5,013
September	5,865	6,582	5,206	5,424
October	8,128	6,698	6,133	6,560
November	6,471	6,305	6,288	6,281
December	5,996	6,027	5,618	5,329
Total	79,295	72,217	69,824	65,142
1/Preliminary.				

Table 3 - U. S. Production of Fish Sticks by Areas, 1963 and 1962

Area	1/1963		1962	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States . . .	24	64,205	26	57,398
Inland & Gulf States	7	8,316	6	8,331
Pacific Coast States	12	6,774	10	6,488
Total	43	79,295	42	72,217
1/Preliminary.				

Table 4 - U.S. Production of Fish Portions by Months, 1963 1/

Month	Cooked	Breaded Uncooked	Total	Un-breaded	
				Total	Total
	..... (1,000 Lbs.)				
January	1,416	6,563	7,979	194	8,173
February	1,317	5,746	7,063	298	7,361
March	1,406	7,107	8,513	322	8,835
April	1,466	6,271	7,737	182	7,919
May	1,769	5,246	7,015	278	7,293
June	846	7,749	8,595	179	8,774
July	830	3,482	4,312	212	4,524
August	1,156	5,264	6,420	264	6,684
September	1,846	7,475	9,321	300	9,621
October	2,001	7,554	9,555	322	9,877
November	1,448	6,398	7,846	290	8,136
December	1,122	6,115	7,237	213	7,450
Tot. qty. 1963 1/	16,623	74,970	91,593	3,054	94,647
Tot. qty. 1962 ..	14,007	62,290	76,297	2,381	78,678
	..... (\$1,000)				
Tot. value 1963 1/	6,846	26,100	32,946	1,035	33,981
Tot. value 1962 ..	5,999	21,257	27,256	833	28,089
1/Preliminary.					

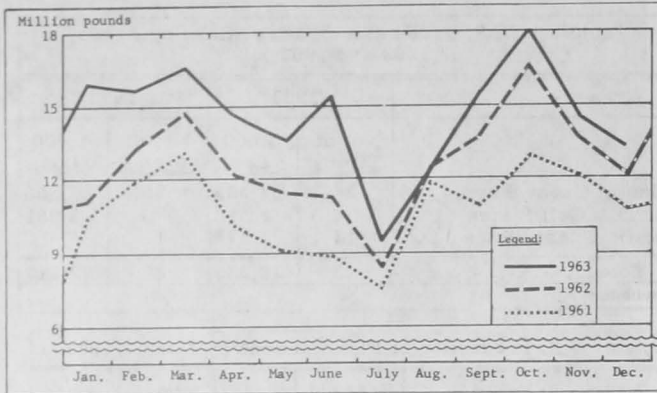
Table 5 - U. S. Production of Fish Portions by Areas, 1963 and 1962

Area	1/1963		1962	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States	27	53,211	26	44,072
Inland & Gulf States	10	38,223	12	32,081
Pacific Coast States	11	3,213	8	2,525
Total	48	94,647	46	78,678
1/Preliminary.				

Table 6 - U. S. Production of Fish Portions by Months, 1960-1963

Month	1/1963	1962	1961	1960
	 (1,000 Lbs.)		
January	8,173	5,077	4,303	3,632
February	7,361	6,360	4,902	3,502
March	8,835	7,036	5,831	4,706
April	7,919	6,408	4,484	3,492
May	7,293	5,818	3,879	3,253
June	8,774	6,137	4,039	3,995
July	4,524	4,679	3,962	4,088
August	6,684	6,687	4,963	3,558
September	9,621	7,180	5,745	4,631
October	9,877	9,871	6,759	5,275
November	8,136	7,406	5,789	4,790
December	7,450	6,019	5,191	4,459
Total	94,647	78,678	59,847	49,381
1/Preliminary.				

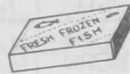
Cooked fish sticks (74.1 million pounds) made up 93 percent of the 1963 fish stick total, while the remaining 5.2



U. S. production of fish sticks and portions, 1961-63.

million pounds or 7 percent consisted of raw fish sticks. A total of 91.6 million pounds of breaded fish portions (of which 75.0 million pounds were raw) and 3.0 million pounds of unbreaded portions were processed during 1963.

The Atlantic Coast was the principal area in the production of both fish sticks and fish portions with 64.2 and 53.2 million pounds, respectively. The inland and Gulf States were next with 8.3 million pounds of fish sticks and 38.2 million pounds of fish portions. The Pacific Coast States made up the remaining 10.0 million pounds of fish sticks and fish portions.



U.S. Foreign Trade

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

United States imports of tuna canned in brine during January 1-May 2, 1964, amounted to 11,744,881 pounds (about 559,300 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.

PROCESSED EDIBLE FISHERY PRODUCTS, MARCH 1964:

United States imports of processed edible fishery products in March 1964 were up 20.7 percent in quantity and 25.2 percent in value from those in the previous month. There was a seasonal increase in imports of groundfish fillets and blocks and slabs. Imports were also up for canned tuna in brine, canned sardines not in oil, and canned oysters.

Compared with the same month in 1963, imports in March 1964 were down 8.5 percent in quantity and 3.7 percent in value. Imports of canned sardines not in oil were much lower this March. Imports were also down for most other canned fishery products, except canned oysters. The decline was

partly offset by much heavier arrivals of groundfish fillets and blocks and slabs.

In the first 3 months of 1964, imports were up 2.6 percent in quantity and 7.2 percent in value from those in the same period of 1963. During January-March 1964 there were large imports of groundfish fillets, flounder fillets, blocks and slabs, sea catfish fillets, yellow pike fillets, and canned sardines in oil, but imports were down for swordfish fillets, canned sardines not in oil, canned tuna in brine, and canned crab meat.

U. S. Imports and Exports of Processed Edible Fishery Products March 1964 with Comparisons

Item	Quantity				Value			
	Mar.		Jan.-Mar.		Mar.		Jan.-Mar.	
	1964	1963	1964	1963	1964	1963	1964	1963
.. (Millions of Lbs.) (Millions of \$)								
Fish & Shellfish:								
Imports ^{1/}	43.1	47.1	128.0	124.7	12.9	13.4	37.2	34.8
Exports ^{2/}	2.5	3.1	11.9	11.0	1.0	1.2	4.7	4.4

^{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.

Exports of processed edible fish and shellfish from the United States in March 1964 were down 50 percent in quantity and 54.5 percent in value from those in the previous month. In March, there was a decline in shipments of all leading canned fish export items, except canned sardines in oil.

Compared with the same month of the previous year, the exports in March 1964 were down 19.3 percent in quantity and 16.7 percent in value. A sharp drop in exports of canned salmon, canned sardines not in oil, and canned squid, was partly offset by larger shipments of canned sardines in oil, canned shrimp, and canned mackerel.

Processed fish and shellfish exports in the first 3 months of 1964 were up 8.2 percent in quantity and 14.6 percent in value from those in the same period of 1963. In January-March 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.



Washington

SALMON PLANTING PROGRAM CONTINUES:

The Washington State Department of Fisheries has not stopped planting young salmon in streams that run through or border Indian reservations. Both the Indians and others will share in the future salmon harvest.

During April 1964, more than 3.5 million young chinook salmon were planted in the Naches, Puyallup, and Skokomish Rivers, and 315,000 fall chinook fingerlings were to be

anted in the Nisqually in May 1964, along with a plant of 100,000 in the Puyallup. The rivers will then have received the following chinook salmon plants in 1964: Nisqually - 1,831; main Skokomish and Purdy Creek tributary - 2,809,750; and Puyallup - 362,784.

The Puyallup plants are small because this year very few salmon reached the Puyallup salmon hatchery due to unrestricted reservation Indian fishing on the spawn-run of chinook salmon. (Washington State Department of Fisheries, May 1, 1964.)

DOG FISH SHARK FOR FISHERY FISH FEED:

A firm in Tacoma, Wash., plans to use the popular dogfish shark to make moist pellet food to feed desirable fish such as trout and salmon, the Director of the Washington State Fisheries Department announced May 1, 1964. The Tacoma firm has plans to process around 200 tons of dogfish each month into hatchery feed.

The moist pellet food was perfected by the Oregon Fish Commission and used successfully by the Washington State Department of Fisheries in rearing silver salmon. Tuna meal has been the chief ingredient of the pellet, but experiments have been made using dogfish as the chief ingredient. Fish culturists say the dogfish pellet food can meet high quality standards set by fisheries agencies for food used in rearing trout and salmon.

Permits have been granted two trawlers to fish for dogfish in Puget Sound south of Port Defiance. Both commercial and sports fishermen, it is believed, will support any efforts to thin out the dogfish population of Puget Sound. The Tacoma company will release some dogfish, over that needed for pellet food, for use as fertilizer. (Washington State Department of Fisheries, May 1, 1964.)



Wholesale Prices

Wholesale Fish and Shellfish, May 1964:

Wholesale prices for edible fishery products (fresh, frozen and canned) in May 1964 moved upward for a number of fresh and frozen items--principally halibut, salmon, and

shrimp. But the higher prices were offset to some extent by lower prices for several of the other fresh, frozen, and canned fishery products. The overall wholesale price index this May at 105.4 percent of the 1957-59 average was up 2.2 percent from April, but was down 9.1 percent from the same month a year earlier.

Higher prices prevailed this May for the first-of-the-season supplies of western fresh halibut (up 22.6 percent) and salmon (up 9.9 percent) at New York City, and also for Great Lakes fresh-water fish. Those were largely responsible for the 9.2-percent increase from April to May in the subgroup index for drawn, dressed, or whole finfish. In contrast, May prices were lower for ex-vessel large haddock (down 10.2 percent) at Boston, and those were lower than in May 1963 by 29.8 percent. Compared with May 1963, prices in the subgroup this May were lower for all items except salmon (up 0.2 percent), and the subgroup index was down 6.8 percent.

Higher prices from April to May for South Atlantic fresh shrimp (up 4.2 percent) at New York City were the direct cause of the 1.9-percent increase in the subgroup index for processed fresh fish and shellfish. Wholesale prices for fresh haddock fillets at Boston this May were down 4.9 percent from the previous month, and compared with May a year earlier they were lower by 25.3 percent. Compared with May 1963, the subgroup index this May was down 12.5 percent because prices for all items in the subgroup were down considerably.



Buyer examining fresh West Coast halibut at Fulton Fish Market, New York City.

The May 1964 subgroup index for processed frozen fish and shellfish at 94.7 percent of the 1957-59 average was unchanged from the previous month. From April to May, prices for frozen fillets in the subgroup were lower, but frozen shrimp prices at Chicago were higher (up 2.0 percent) and tended to cancel out any apparent drop in the May subgroup wholesale price index. As compared with May 1963, the subgroup index this May was down 16.9 percent--prices were sharply lower for shrimp, and substantially lower for fillets of ocean perch and flounder.

May 1964 prices for canned tuna (down 1.2 percent) were somewhat lower than in April, as were prices for canned Maine sardines (down 2.4 percent). As a result, the subgroup index was down 0.3 percent despite higher canned salmon prices (up 1.1 percent). Higher prices for canned pink salmon were the result of improved demand and partial clearance of stocks. The subgroup index this May was lower than the same month a year earlier by 2.6 percent. Prices for canned salmon and canned Maine sardines were lower than in May 1963, but canned tuna prices (up 2.2 percent) were higher.

Wholesale Average Prices and Indexes for Edible Fish and Shellfish, May 1964 with Comparisons								
Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ (\$)		Indexes (1957-59=100)			
			May 1964	Apr. 1964	May 1964	Apr. 1964	Mar. 1964	May 1963
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					105.4	103.1	104.1	115.9
<u>Fresh & Frozen Fishery Products:</u>					107.4	103.7	105.5	122.4
<u>Drawn, Dressed, or Whole Finfish:</u>					107.5	98.4	100.9	115.4
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.08	.09	60.5	67.4	61.8	86.2
Halibut, West., 20/30 lbs., drsd., fresh or froz.	New York	lb.	.34	.28	101.5	82.8	89.2	105.9
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.92	.83	127.8	116.3	114.2	127.5
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.62	.57	92.5	84.3	108.2	110.4
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.58	.43	94.2	69.6	114.7	108.1
<u>Processed, Fresh (Fish & Shellfish):</u>					117.2	115.0	116.1	133.9
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.30	.31	71.6	75.3	77.7	95.9
Shrimp, lge. (26-30 count), headless, fresh.	New York	lb.	.99	.95	116.0	111.3	113.1	134.8
Oysters, shucked, standards	Norfolk	gal.	7.50	7.50	126.5	126.5	126.5	139.1
<u>Processed, Frozen (Fish & Shellfish):</u>					94.7	94.7	96.2	114.0
<u>Fillets: Flounder, skinless, 1-lb. pkg.</u>	Boston	lb.	.37	.37	92.5	93.8	98.9	98.9
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.36	.37	104.1	107.0	108.5	102.6
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.30	.31	105.2	108.7	114.0	117.5
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	.75	.73	88.3	86.6	87.2	120.4
<u>Canned Fishery Products:</u>					102.2	102.5	102.2	104.9
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	22.25	22.00	97.0	95.9	94.8	105.7
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.50	11.63	102.1	103.3	103.3	99.9
Mackerel, jack, Calif., No. 1 tall (15 oz.), 48 cans/cs.	Los Angeles	cs.	6.13	6.13	103.9	103.9	103.9	2/100.0
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	8.86	9.09	113.7	116.5	118.2	116.2

1/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

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



RADIATION AND FOOD

Consumers are hearing more and more about foods treated with some form of "radiation" to preserve them, or to kill insects or insect eggs, or to prevent sprouting, or to accomplish some other purpose.

They have begun to ask the U. S. Food and Drug Administration (FDA) questions about such "irradiated" foods.

What are the advantages of irradiating foods? Proponents of the process claim that for some foods irradiation substantially extends the life of a product without refrigeration—an advantage more important at the present time for the armed services than for the general consumer public. But sponsors of the process view it as a development with important implications for the consumer.

The advantage of irradiation of wheat, of course, is that the radiation kills the insect life that would otherwise develop and destroy the wheat or render it unusable for food ("FDA Memo for Consumers," U. S. Food and Drug Administration, February 19, 1964.)