

TRENDS AND DEVELOPMENTS

American Fishery Advisory Committee

INDUSTRY AND INTERIOR DEPARTMENT VIEW COMMON FISHERY PROBLEMS: The recent "Industry-Interior" discussion on how to fit the commercial fisheries into the America of the future should prove a fitting note on which to end the old year and begin the new, according to Assistant Secretary of the Interior Ross Leffler in an end-of-the-year statement on commercial fishing.

Assistant Secretary Leffler's reference was to the most recent meeting of the American Fishery Advisory Committee. At this meeting, numerous long-range problems were discussed with the Bureau of Commercial Fisheries, United States Fish and Wildlife Service; several of the Bureau's current programs also were reviewed.

The Bureau is already working on some of the matters discussed and has "tagged" other problems for consideration at some appropriate time in the future. The Advisory Committee was created by the Saltonstall-Kennedy Act of 1954 for the betterment of the domestic commercial fishing industry.

Among the problems discussed were: the effect of a 12-mile fishing limit, the effect of industrialization and subdivision on estuarine habitat, improvement of fish stocks by cross-breeding or selective breeding, the effect of "fish farming" upon the commercial fisheries, the need for more research on processing and preserving, the changing food habits of the consumer, the problems of foreign trade, and developing new uses for industrial fishery products.

One of the more urgent matters which will have lasting effects on commercial fisheries relates to the rapid removal of estuarine areas which is in progress in this country. Industrial construction, navigation channeling, and real estate projects are altering or reducing the coastal marshes, rivers, and estuaries which are important areas for the spawning and rearing of fish and shellfish. Committee members urged an aggressive Federal-State program to halt the destruction of coastal marshlands until the full damage to fish and wildlife could be assessed and rectifying measures taken. The Fish and Wildlife Service has already begun a joint program with States on this matter.

The threat of other countries extending their territorial limits to 12 miles as far as fishing is concerned was discussed at length. Committee members recommended that the Department of the Interior work with other Federal agencies to try to hold to the present three-mile limit.

The Committee also urged the Department to use its energies and influence to get foreign markets open to American-produced fishery products. Trade specialists should evaluate foreign markets, efforts should be increased to eliminate trade barriers, balance-of-payment restrictions should be overcome, the fishing industry should be urged to exhibit in foreign trade fairs, and more favorable shipping rates should be sought.

The Committee reviewed the presently developing fish-farming-on-rice-lands trend in the United States and the possible effects of a potentially large production

of catfish and buffalofish on established fishery marketing patterns. The Committee requested that the Bureau of Commercial Fisheries follow the development of this young industry and present a report on its progress at a future meeting.

Suggestions for developing better stocks of fish and shellfish through cross-breeding, selective breeding, or importation of foreign fish were generally approved, especially with regard to shellfish, and declared worthy of consideration after some of the more pressing problems were settled.

Mechanization of the fishing industry was listed as a problem for the industry itself, but the Bureau was urged to keep up its pioneer work in this field. Bureau programs include the introduction of the Gulf of Mexico shrimp trawl to the west coast, efficiency studies on equipment used in shellfish predator control, and a safety-at-sea program which should not only eliminate much human suffering but also save vessel owners insurance money.

Another consideration for future action, in the form of a pilot study, is the proposal to determine eating patterns of the populace and to predict fish consumption for years to come, somewhat similar to studies being made on agricultural products.

The Committee expressed interest in dehydrofreezing and dehydrocanning work which is now being done on agricultural products. It urged the Bureau to watch developments in this field but to avoid initiating costly experimentation. Under the dehydro processes, the agricultural product is partially dehydrated and then frozen or canned.

The meeting was opened with formal presentations by Bureau personnel on the shrimp program in the Gulf area, fishery problems in the atomic age, fishery products standards and inspection, and market promotion.

Assistant Secretary Leffler stated that the advice and counsel supplied by the Committee was of tremendous value to the Department of the Interior. He was pleased that the Committee was complimentary of the work being done by the Bureau. The next semiannual meeting of the American Fisheries Advisory Committee will be held on May 6, 7, and 8 in Duluth, Minn. Previous meetings have been held in Washington, D. C.; Boston, Mass.; Long Beach, Calif.; Chicago, Ill.; Biloxi, Miss.; Ketchikan, Alaska; and San Francisco, Calif.



California

AERIAL CENSUS OF COMMERCIAL AND SPORT FISHING CONTINUED: Airplane Spotting Flight 58-21: Coastal waters from Monterey to the Russian River were surveyed from the air (November 17, 1958) by the California Department of Fish and Game Cessna 180 (3632C) to determine the fishing localities of the central California crab fleet and to determine the distribution of pelagic fish schools within the survey area.

Excellent weather and sea conditions greatly facilitated observations of crab-trap buoys. Although effort was concentrated between the Russian River and Half Moon Bay and in the Monterey Bay area, a cursory inspection was made between Half Moon Bay and Santa Cruz.

A total of 97 trap strings were sighted between Half Moon Bay and the Russian River and five in Monterey Bay near Moss Landing. A census of gear units was not taken because of time limitations.

Five anchovy schools were observed in the Monterey Bay area. These schools were small in size.

Airplane Spotting Flight 58-22: The inshore area from Monterey to the Mexican Border and the Channel Islands was surveyed from the air (December 2-3, 1958) by the Department's Beechcraft to (1) locate specific areas of commercial abalone diving activities; and (2) determine the distribution and abundance of pelagic fish schools in the area south of Point Conception offshore and among the Channel Islands.

Almost all of the commercial abalone diving was confined to the Channel Islands where five diving boats were observed. Two were operating on the south side of Santa Cruz Island, about midway between Gull Rock and the east end of the island. Two were operating on the west side of San Clemente, about five miles south of the northern tip of the island, and one on the offshore side of Santa Catalina Island near Catalina Harbor. San Miguel Island was not checked because of Navy restrictions and San Nicholas was not checked because of military restrictions.

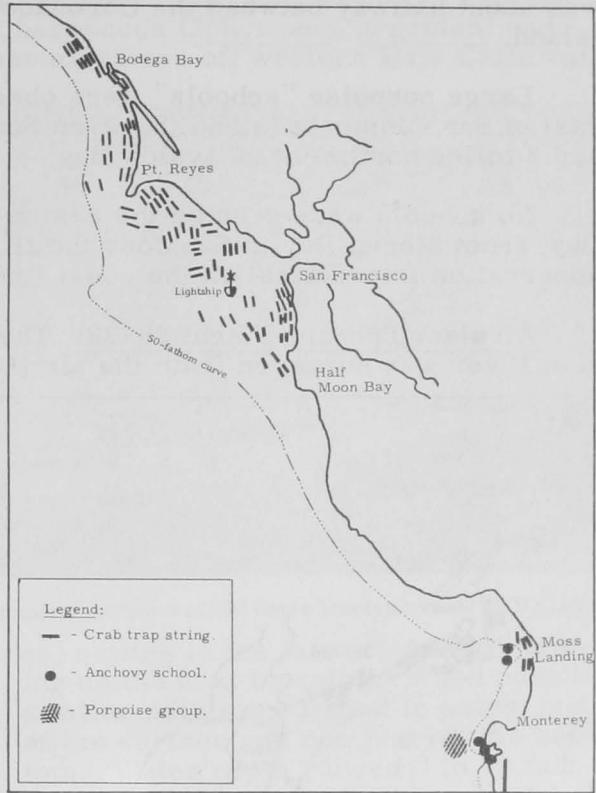


Fig. 1 - Airplane Spotting Flight 58-21 (November 17, 1958).

The only diving activity along the mainland coast was a single boat working in the vicinity of Goleta, Santa Barbara County. North of Point Conception the water was too rough and dirty for diving.

Kelp beds that had been extensive in the San Simeon, Cambria, Morro Bay region prior to the influx of warm water during 1957 and 1958 have not been re-established as yet.

A total of 25 anchovy schools, 2 large schools of sardines, 4 groups of porpoises, and many "working" birds were seen during the flight of December 3.

Of the anchovy schools, 20 were present in Los Angeles-Long Beach Harbor, 4 were close to shore at the east end of Santa Catalina Island, and 1 was off False Point near La Jolla. The anchovies off La Jolla were accompanied by larger fish which in turn were being fished by several sport boats, a gill netter, and a troller.

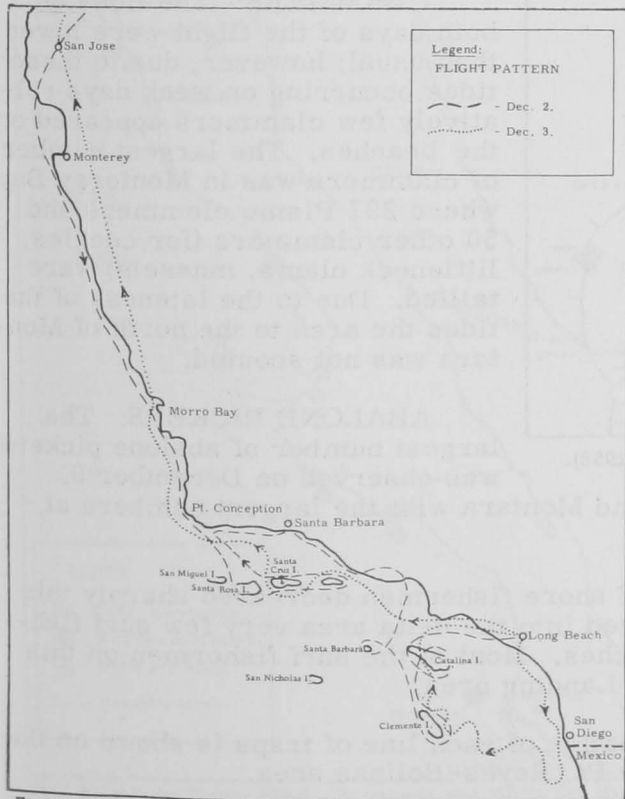


Fig. 2 - Airplane Spotting Flight 58-22 (December 2-3, 1958).

One sardine school was seen 3 to 4 miles off the Coronado Strand and the other was about halfway between the Coronado Islands and the east end of San Clemente Island.

Large porpoise "schools" were observed two miles off Del Mar, 15 miles south-east of San Clemente Island, between San Clemente Island and Santa Catalina Island, and 3 miles northwest of Avalon Bay.

No schools were seen on the return leg of the flight from Long Beach to Morro Bay; from Morro Bay to San Jose the flight was inland, rough water making further observation impractical on the coast line.

Airplane Spotting Flight 58-23: The inshore area between Carmel and the Russian River was surveyed from the air (December 8-9, 1958) by the Department Cessna 180 (3632C) to determine the distribution and abundance of pelagic fish schools, sport fishermen, abalone pickers and clambers, and to record the distribution of crab traps within the boundaries of the area surveyed.

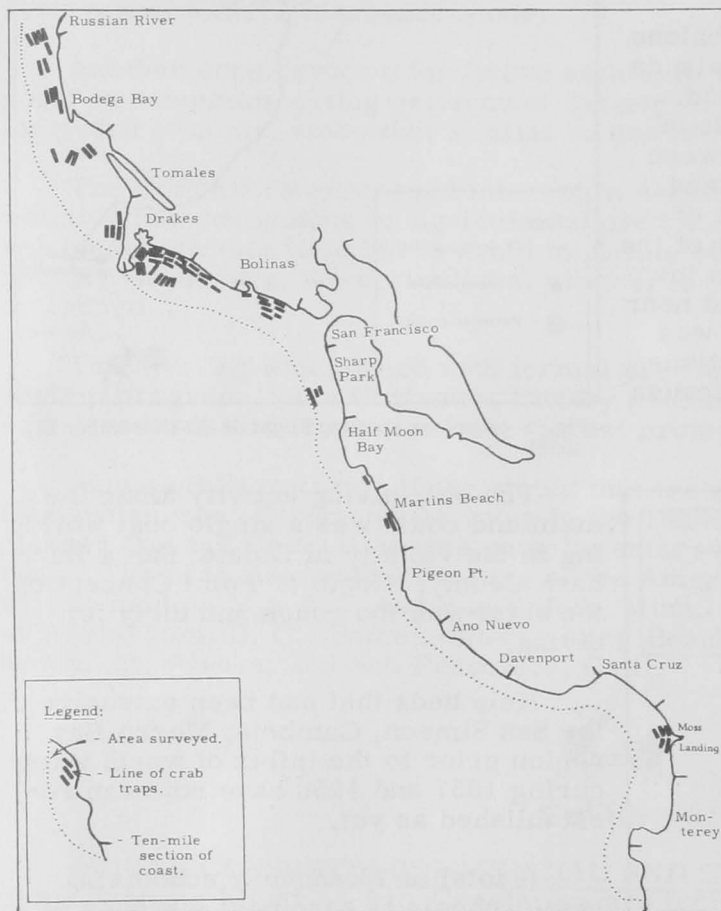


Fig. 3 - Airplane Spotting Flight 58-23 (December 8-9, 1958).

Ninety-two were tallied between Carmel and Montara with the largest numbers at Ano Nuevo Point and Pigeon Point.

SHORE FISHERMEN: The numbers of shore fishermen decreased sharply this flight. Now that the striped bass have moved into the delta area very few surf fishermen are utilizing the San Francisco beaches. Most of the surf fishermen on this flight were tallied in the Santa Cruz-Moss Landing area.

CRAB TRAP DISTRIBUTION: The location of each line of traps is shown on the map. The largest concentration was in the Pt. Reyes-Bolinas area.

PELAGIC FISH: No pelagic fish schools were observed on this flight. Since weather conditions were ideal for fish spotting the scarcity of fish was probably due to changes in schooling behavior and distribution.

CLAMMERS: The tides on both days of the flight were lower than usual; however, due to these tides occurring on week days relatively few clambers appeared on the beaches. The largest number of clambers was in Monterey Bay where 297 Pismo clambers and 50 other clambers (for cockles, littleneck clams, mussels) were tallied. Due to the lateness of the tides the area to the north of Montara was not scouted.

ABALONE PICKERS: The largest number of abalone pickers was observed on December 9.

DISTRIBUTION OF BARRACUDA AND WHITE SEA BASS SURVEYED OFF BAJA CALIFORNIA (M/V Alaska Cruise 58A6-Barracuda-White Sea Bass): To explore for occurrences and concentrations of adult barracuda (*Sphyraena argentea*) and white sea bass (*Cynoscion nobilis*) in the coastal waters off western Baja California, Mexico, from Ensenada south to Almejas Bay was the principal objective of the October 3-25, 1958, cruise of the *Alaska*, research vessel of the California Department of Fish and Game. Other objectives were (1) to explore for nursery grounds of these species; (2) to collect samples of barracuda and white sea bass for various biological studies ashore; (3) to conduct a pilot tagging experiment on barracuda; and (4) to collect and save other species as time and condition permitted.

Gill nets were the principal tool used in exploring for barracuda and white sea bass. The usual routine was to fish 2 to 4 nets in an area, setting in the late afternoon and picking up the next morning. When possible similar nets were fished in pairs, one at the surface and one just off the bottom. Water depth ranged 3 to 12 fathoms. Sets were usually in or near kelp beds although several were made over sandy bottoms. All sets, except one, were anchored at both ends. The nets were cotton, linen, or nylon and of either uniform or variable mesh.



Fig. 1 - California Department of Fish Game's research vessel M/V *Alaska*.

Other fishing methods included rod-and-reel with live bait or artificial lures; blanket-net fishing under a 1,500-watt light suspended several feet above the surface of the water; dip-netting; and brailing.

Adult California barracuda were taken with gill nets and rod-and-reel, or observed under the night light, in the coastal waters from Todos Santos Bay to Knepper Shoals just south of Abreojos Light. The area from Cape Colnett to Point Baja appeared to be the most productive. The largest catch was made at San Martin Island. Surface water temperatures ranged from 18.9° C. to 20.9° C. (66.0° F. to 69.6° F.).

The only fish of the 1958 year-class was a small specimen taken in Todos Santos Bay by dip net under the night light.

At Knepper Shoals two species of barracuda were taken, the California

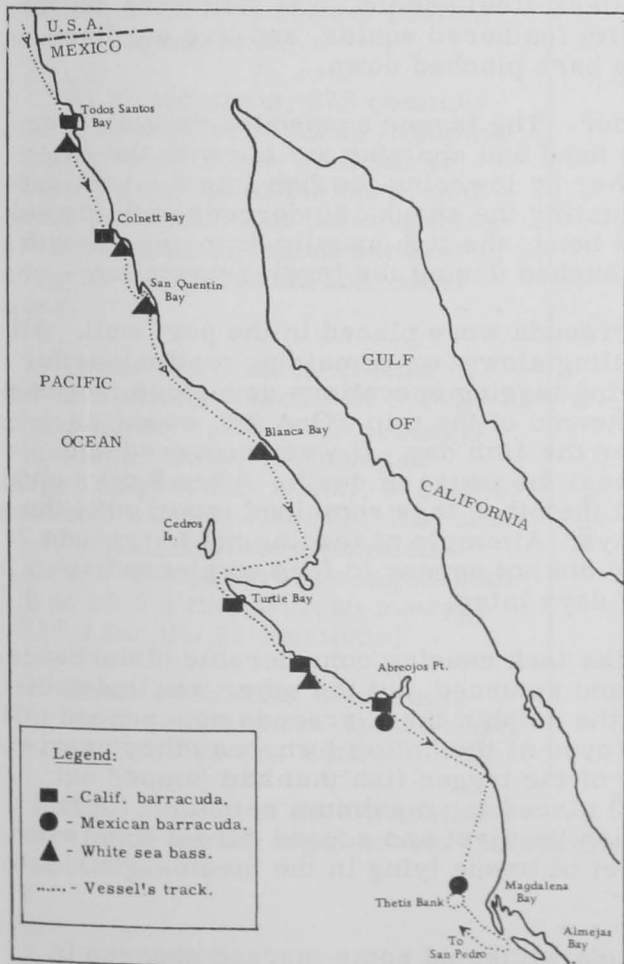


Fig. 2 - *Alaska* Cruise 58A6 - Barracuda and White Sea Bass (October 3-25, 1958).

barracuda and a species that has been known for 20 years but not yet described. The latter was also taken at Thetis Bank a few days later and about 120 miles further south. The taking of both species in the same area is not new, having been noted on previous surveys. Surface water temperatures were 6.2° C. to 11.4° C. warmer in this area than in the San Martin Island area. They ranged from 25.7° C. to 26.7° C. (78.3° F. to 80.1° F.).

White seabass were taken at only five widely separated stations between Soledad Bay and Asuncion Island. All were caught in gill nets fishing near the bottom in about 30 feet of water. Adult fish, ranging in total length from 85.5 to 136.0 cm., were taken only in northern Baja California. At these stations, Soledad Bay, San Jacinto Point, and Hondo Canyon, the nets were fished in or adjacent to kelp beds. The largest catch was made off Hondo Canyon, San Quentin Bay in a dense stand of kelp. A good catch of young fish, 36.0 to 50.3 cm. total length was made in a deteriorating kelp bed on the south side of Asuncion Island. A single juvenile, 15.6 cm. total length, was taken at Blanca Bay in a set over sandy bottom. Surface water temperatures where adult sea bass were caught ranged from 19.8° C. to 22.0° C. (67.6° F. to 71.6° F.), while the young fish were taken in slightly warmer water, 21.9° C. to 24.8° C. (71.4° F. to 76.8° F.).

At San Martin Island, on October 9, a pilot tagging experiment was conducted on barracuda to develop handling techniques and to observe tag retention of a new dart-type tag. The head of the tag was made of a hard plastic with one barb. The body, which carried the legend, was a 6-inch piece of flexible plastic tubing, size #19. Tags were applied with a hollow stainless steel needle. The fish were caught with rod-and-reel on bone jigs, red and white feathered squids, and live sardines. Most of the hooks were barbless or had the barb pinched down.

The fish were lifted aboard by the leader. The tagger suspended the fish over the ship's well, holding the leader with one hand and applying the tag with the other in a swift jabbing motion. Release was either by lowering the fish into the tank and allowing it to shake the hook loose or by rotating the shank 180 degrees with the aid of another hook which took the strain at the bend, the fish usually dropping off with ease. In general, the barracuda were not touched during the tagging operation.

A total of 26 tagged and 1 untagged barracuda were placed in the port well. All except one adjusted readily to the tank, milling slowly or remaining motionless for long periods. Those that were handled during tagging operations developed fungus infections which, however, cleared up by the end of the trip. One fish swam as though it had a back injury until it died after the 10th day. It was recovered and preserved for study but autopsy did not reveal the cause of death. After 8 days one tag was seen on the bottom of the tank. All the other tags remained intact until the end of the trip, a total confinement of 18 days. Attempts at feeding the barracuda dried trout food were unsuccessful and they did not appear to feed on pinhead anchovies which were added to the tank a few days later.

On October 20 a dolphin was added to the tank causing considerable disturbance. Two barracuda jumped out, one was found and returned, but the other was undetected for several hours. With the addition of the dolphin the barracuda commenced milling at the top of the tank (the dolphin stayed at the bottom) whereas they previously had milled near the bottom. Autopsy of the tagged fish that had jumped out and died revealed that the tag had been well placed for maximum retention. It had gone through the muscles of the back between the first and second dorsal fins, with the barb of the dart hooked through the sheet of tissue lying in the mediosagittal plane.

While confined in the tanks the barracuda withstood some marked changes in temperature, the most notable being on the return trip to San Pedro from Almejas Bay. During the 70-hour run, the temperature dropped 7.5° C., from 27.8° C. to 20.5° C.

During the course of the cruise samples of sardines, Pacific mackerel, jack mackerel, and anchovies were collected and turned over to the Pelagic Fish Investigation for processing. A small collection of scallops, *Pecten subodosus*, was made in Black Warrior Lagoon and turned over to interested museums. In all, 83 different species of fish were caught.

* * * * *

DUNGENESS-CRAB DISTRIBUTION AND ABUNDANCE STUDIES CONTINUED

(M/V Alaska Cruise 58A7-Crab): The Northern California coastal waters from Point Arena to the Oregon border were surveyed (November 12-December 9, 1958) by the California Department of Fish and Game's research vessel *Alaska*. The objectives were (1) to fish for dungeness crabs, *Cancer magister*, on the fishing grounds in northern California coastal waters to determine the pre-season distribution, abundance, composition, and condition; (2) to tag crabs with suture tags for migration, growth and population studies; and (3) to collect limited oceanographic data.

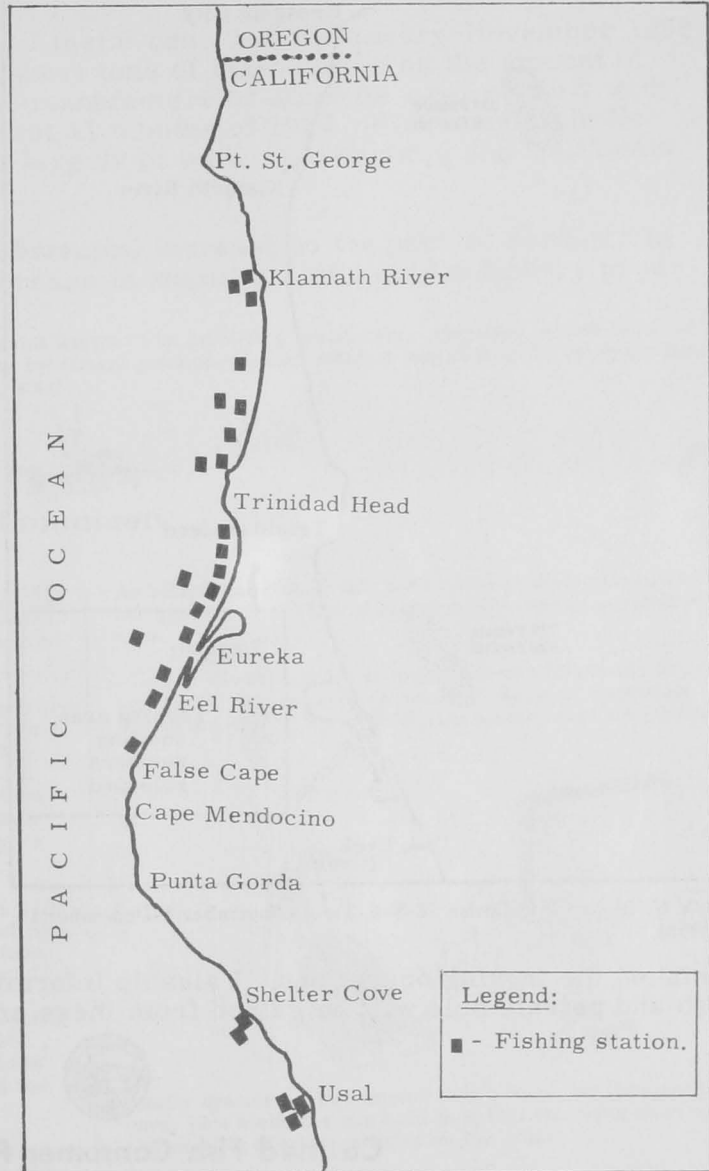
At 25 locations, 379 commercial trap sets were made in depths ranging from 10 to 32 fathoms. Fishing stations at the north and south extremities of the operating area were not occupied because of adverse weather and sea conditions.

Crabs were taken at each of the 25 stations fished. Of 6,165 crabs taken, 5,476 (88.8 percent) were legal males (7 inches or larger in greatest width), 672 (10.9 percent) were sublegal males, and 17 (0.3 percent) were females. Catches of legal crabs ranged from 7.5 to 25.3 a trap with an average of 14.4 for the 25 locations.

Shoulder widths made anterior to the outermost spines were recorded for the entire catch.

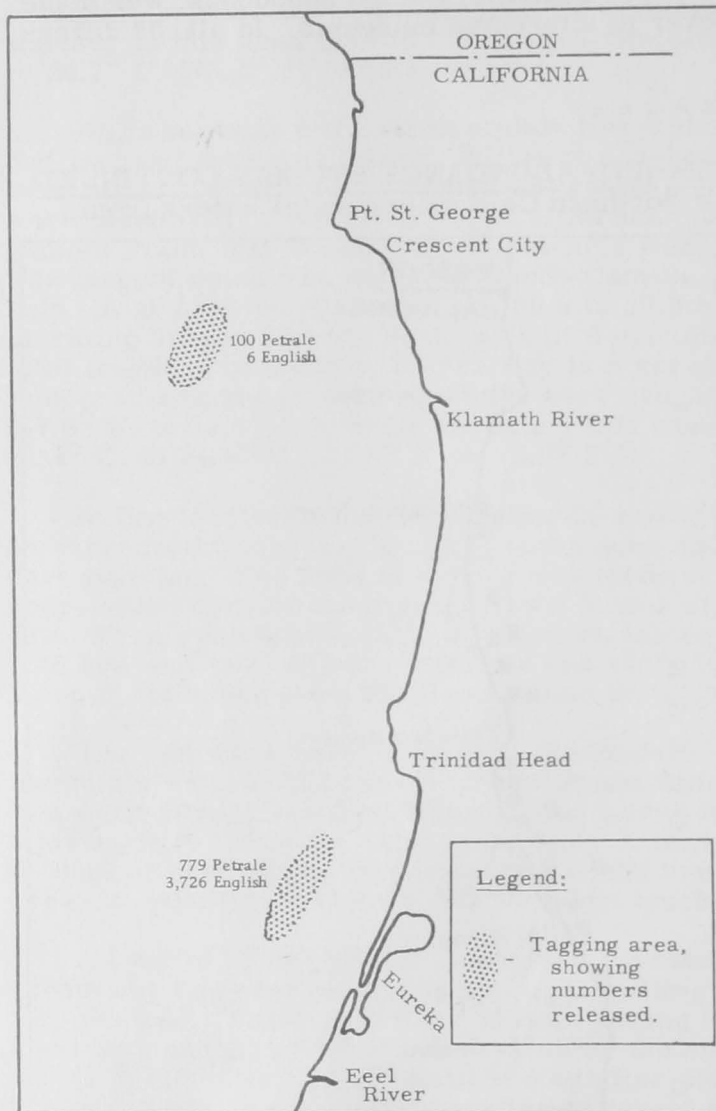
Shell condition determinations were made for all legal crabs. Soft crabs comprised only 0.7 percent of the legal-crab catch.

* * * * *



M/V *Alaska* cruise 58A7-Crab (Nov. 12-Dec. 9, 1958).

PETRALE AND ENGLISH SOLE TAGGED IN COASTAL WATERS (M/V N. B. Scofield Cruise 58-S-8-Trawl): The California coastal waters from Eureka to Crescent City were surveyed by the



M/V N. B. Scofield Cruise 58-S-8-Trout (November 8-December 16, 1958).

finished the tagging operations. Valuable information on seasonal movement of English and petrale sole will be gained from these and future returns.

Crescent City were surveyed by the California Department of Fish and Game's research vessel N. B. Scofield from November 8-December 16, 1958. The objectives were (1) to tag petrale and English sole with spaghetti tags; and (2) to collect specimens for various investigations and for the Steinhart Aquarium.

A total of 879 petrale and 3,732 English sole were tagged and released. Fishing was started in the vicinity of Crescent City and continued for six days. During the period, 100 petrale sole were tagged and released in depths ranging from 67 to 205 fathoms. In addition, 6 English sole were tagged and released in depths ranging from 67 to 170 fathoms.

On information supplied by the commercial trawling fleet the tagging operation was moved to the vicinity of Eureka for the remainder of the trip. A few drags in waters of 150-200 fathoms proved unproductive. Subsequently, fishable concentrations of English sole were found and 3,726 were tagged and released in 35 to 65 fathoms. While the primary effort was concentrated on English sole, 779 petrale sole were also released in this area.

Returns were being gathered even before the vessel had



Canned Fish Consumer Purchases

DECEMBER 1958: Canned tuna purchases in December 1958 were 714,000 cases of which 43,000 cases were imported. By type of pack, domestic-packed tuna purchases were 160,000 cases solid, 428,000 cases chunk, and 83,000 cases grated or flakes. The average purchase was 1.8 cans at a time. Only 25.5 percent of the households bought all types of canned tuna; only 1.7 percent bought the imported product. The average retail price paid for a 7-oz. can of domestic solid or fancy was 36.4¢ and for a 6½-oz. can of chunk 29.1¢. Imported solid or fancy was bought at 31.4¢ a can. Decem-

ber purchases were less than the 769,000 cases bought in November by about 7.2 percent. Over 38 percent of the December purchases were made in the Northeast area.

During December 1958, consumer purchases of Maine sardines were greater through the independent outlets than through the chain outlets. Canned sardine purchases in December were 131,000 cases, of which 73,000 cases were Maine, 26,000 cases California, and 32,000 cases imported. The average purchase was 2.1 cans at a time for all sar-

Canned salmon purchases in December 1958 were 208,000 standard cases, of which 115,000 cases were pinks and 43,000 cases reds. The average purchase was 1.2 cans at a time. Only 14.3 percent of the households bought all types of canned salmon; 7.4 percent bought pinks. The average retail price paid for a 1-lb. can of pink was 56.9¢, and for red 84.5¢. December purchases were down about 22.7 percent from the 269,000 cases bought in November. About one-third of the December purchases were made in the south region.

dines, but 2.4 cans for Maine, 1.5 cans for California, and 1.9 cans for imported. Only 7.0 percent of the households bought all types of canned sardines; 4.3 percent bought Maine, 1.4 percent California, and 1.7 percent imported. The average retail price paid for a 4-oz. can of Maine sardines in oil was 11.3 cents, for a one-pound can of California 25.5 cents, and for a 4-oz. can of imported 26.9 cents. December purchases were down by 5.8 percent from the 139,000 cases bought in November.



Cans--Shipments for Fishery Products, January-November 1958



Total shipments of metal cans during January-November 1958 amounted to 117,326 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 109,543 tons in the first 11 months of 1957. Fish canning in November was confined largely to tuna, Gulf shrimp, and California sardines.

The record pack of tuna and a substantial increase in the pack of sardines in California in 1958 account for the increase in shipments of cans for fishery products.

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



Containers

HOMEMAKERS APPRAISE CONTAINERS FOR CANNED AND FROZEN FOODS: American housewives are satisfied with the sizes and types of containers in which canned and frozen food products are being sold.

According to a recent three-city survey by the Agricultural Marketing Service of the U. S. Department of Agriculture, most women like both cans and cartons. They point out the convenience of cans, the ease with which they can be stored, and the fact that canned goods "last indefinitely." They like frozen food containers because they're "easy to open" and "don't take up a lot of space in the trash."

There are, however, a few things the women don't like about each type of container. Some women, for instance, complain that cans are "hard to open," that frozen food cartons don't always come in enough variety of sizes.

These comments--both pro and con--came from some 1,300 homemakers in Atlanta, Ga., Kansas City, Mo., and San Francisco, Calif., who were given a chance to sound off about what they did and did not like about the packages used for canned and frozen food products.

Interviewers first asked the housewife if she preferred cans or frozen food cartons, then if she was satisfied with the sizes offered, and if the information on the labels were adequate.

The choice of whether to buy food in cans or cartons varied with the housewife and with the product.

On the question of quality, some 4 in 10 of the homemakers felt that frozen foods provide superior quality because the "freshness is preserved by the freezing process."

An additional 2 in 10 felt the canned product provided better quality; 3 in 10 were unable to distinguish any difference.

Once the selection was made between frozen and canned foods, the brand name provided the most important key to buying. Other information on the label was almost



totally ignored. Most women didn't know, or apparently care, how much the can held in actual ounces or even in the number of servings listed on the label.

Yet, almost 9 out of 10 women found the array of existing can sizes adequate for their needs. From past experience, they were able to select the right size to serve their families.

Although 6 out of 10 housewives said the size of the frozen food containers was about right, some complained that "there wasn't enough variety in the sizes offered." A few said the packages were "too small."

The women who bought frozen food, however, paid more attention to the cooking instructions and suggested recipes on the label. They also consulted the label to find out how to defrost and handle the food. Nonetheless, only about 25 percent looked beyond the brand name.

When the interviewer asked the housewife if she would prefer only the brand name on the label, most women objected. Nearly 6 out of 10 felt the maximum amount of information should be included. (Agricultural Marketing, September 1958.)



Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-DECEMBER 1958:
Fresh and Frozen Fishery Products: For the use of the Armed Forces under the

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Market Centers, December 1958 with Comparisons

QUANTITY				VALUE			
December		Jan.-Dec.		December		Jan.-Dec.	
1958	1957	1958	1957	1958	1957	1958	1957
..... (1,000 Lbs.) (\$1,000)			
1,630	1,756	22,511	23,452	883	903	1/	12,080

1/Not available.

Department of Defense, 1.6 million pounds (value \$0.9 million) of fresh and frozen fishery products were purchased in December 1958 by the Military Subsistence Market Centers. This exceeded the quantity purchased in November by 8.7 percent, but was 7.2 percent under the amount purchased in December 1957.

The value of the purchases in December 1958 was lower by 2.8 percent as compared with November and 2.2 percent less than for December 1957.

During 1958 purchases totaled 22.5 million pounds--a decrease of 4.0 percent in quantity as compared with 1957.

Prices paid for fresh and frozen fishery products by the Department of Defense in December 1958 averaged 54.2 cents a pound, about 6.4 cents less than the 60.6 cents paid in November, but 2.8 cents higher than 51.4 cents paid during December 1957.

Table 2 - Canned Fishery Products Purchased by Military Subsistence Market Centers, December 1958 with Comparisons

Product	QUANTITY				VALUE ^{1/}	
	December		Jan.-Dec.		December	
	1958	1957	1958	1957	1958	1957
	... (1,000 Lbs.) (\$1,000) ...	
Tuna ..	918	490	5,884	2,711	486	240
Salmon	-	-	3,336	3,111	-	-
Sardine	142	22	253	215	19	7

1/Values unavailable Jan.-Dec. 1957 and 1958.

Canned Fishery Products: Tuna was the principal canned fishery product purchased for the use of the Armed Forces during December. In 1958 purchases of the three principal canned fishery products were up by 56.9 percent from the 1957 purchases. Purchases of canned fish rose 117.0 percent for tuna, 17.7 percent for sardines, and 7.2 percent for salmon.

Note: Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than indicated, because it is not possible to obtain local purchases.



Florida

FISHERIES RESEARCH: The Marine Laboratory of the University of Miami carried on research on fisheries with funds provided by the Florida State Board of Conservation, the U. S. Fish and Wildlife Service, and private sources. The research of interest to commercial fisheries contained in the Laboratory's January 1959 Salt Water Fisheries Newsletter follows:

Shrimp: Important animals in the Everglades National Park estuary, both from the economic and from the scientific point of view, are the pink shrimp. They occur there in great numbers and small sizes. At times they pour out into Florida Bay, as the first leg in their migration offshore, where many of them end up in trawlers' nets on the Tortugas grounds. Collections of these small migrating shrimp are made periodically. Their change in size with the season gives an estimate of their growth, and some idea can also be obtained as to their relative abundance. It may be possible later to relate this to fishing success of the commercial boats, and thus provide a system of catch predictions.

Biologists continued to tag small shrimp in the estuary, and 383 tagged animals were released during October-December 1958. Considerably more tagged shrimp were released in the commercial fishery--2,795 in the three months. The tag consists of two small green discs, fastened to the abdomen of the shrimp with a nickel pin. Each tag is numbered and the shrimp is measured when tagged. The place of tagging is noted also, of course, so that when tagged shrimp are recovered their growth and movements while at large can be determined.

Returns of tagged shrimp have been lower in recent months than they were in the first period of tagging. Part of this is probably due to a less intense fishery, but it is suspected that the interest of fishermen may also have slackened.

It is important that every tagged shrimp caught be reported, so the reward has been doubled to \$1.00. In addition, a \$100 prize is being offered for one tag, to be drawn from all those returned from November 1 to April 1. A new \$100 prize will be offered every six months thereafter.

Sea Trout: Sea trout continue to be tagged with internal tags, as well as "anchor" tags. The internal tags consist of a piece of green plastic, with a number. These are inserted in a body cavity of the fish through a small slit made by a scalpel. The anchor tags are the same except that a piece of yellow plastic string is attached to the tag and protrudes through the hole in the fish's abdomen, calling attention to the tag. It is hoped that more tags will be recovered through this device. So far 10 tagged trout have been recaptured, and this is a good return from internal tags, which of course are difficult to detect.

So far little movement has been shown by tagged trout (the greatest was 14 miles), but this may be because they were free only a short time. An average growth of 0.21 cm. per month was shown.

* * * * *

GRANT RECEIVED FOR RESEARCH ON CUSK EELS: A grant of \$9,000 has been awarded to the University of Miami, Fla., by the National Science Foundation for the support of basic research on the fish family Ophidiidae, more commonly known as cusk eels. The research will be under the direction of C. Richard Robins, curator of fishes at The Marine Laboratory of the University.

Cusk eels are commonly taken in shrimp trawls in tropical and semitropical waters and in Chile three members of the family are important food fishes. Quite a few are caught by anglers in the Miami area.

Though they bear the name cusk eels, they are related neither to eels or to the cusk (which is a member of the cod family). However, they are a long, slender fish bearing a slight resemblance to both cusk and eels. Thus the common name of cusk eels.

The research is to determine how many kinds of cusk eels there are, depth distribution, and a study of the anatomy to find out the relationship of the family to other fishes. Many have not been described scientifically.

* * * * *

GULF COAST HARBOR IMPROVEMENTS REPORTED ON BY ARMY ENGINEERS: The U. S. Army Engineers have been investigating the advisability of Federal improvement of harbors and waterways for small craft along the west coast of Florida south of Tampa Bay. Public hearings were held at Venice, April 30, 1948, and January 24, 1951; Fort Myers Beach, January 23, 1950; Naples, April 25, 1950; and Englewood, April 26, 1950. A report by the District and Division Engineers is partially favorable to the improvements.

In compliance with the authorizations and with the requests of local interests as presented at the hearings, investigations were made to determine the feasibility for provision by the United States of a channel and basin 9 feet deep at Venice, a jetty-protected inlet and channel 9 feet deep at Lemon Bay, a channel 15 feet deep and a jetty at Fort Myers Beach, and a jetty-protected entrance channel 14 feet deep through Gordon Pass and a connecting channel 12 feet deep to upper Naples Bay. Based on information now available, the reporting officers' findings are as follows:

Venice: The authorized rerouting of the project Intra-coastal Waterway, Caloosahatchee River to Anclote River, will provide the requested channel, leaving the basin as the remaining request. Although some benefit would result from a basin, it is found that the development of appreciable barge traffic or other general commerce at this locality is unlikely and, furthermore, that terminals in the area are reasonably adequate for small craft. Provision of a basin by the United States is not economically justified at this time.

Lemon Bay: Construction of the authorized project Intra-coastal Waterway, Caloosahatchee River to Anclote River will improve navigable access to the local area. Provision of the requested inlet would either damage adjacent beach property or entail great expense for protective measures. The evaluated benefits are largely local in character and are insufficient to justify the cost of the requested improvement.

Fort Myers Beach: Federal provision and maintenance of a navigation channel would benefit the shrimp industry through reduction of boat damage and delay in an amount that would exceed the annual charges for a suitable navigation channel. Improvement is therefore economically justified.

Improvement of Gordon Pass and the Channel in Naples Bay: Would provide substantial benefits to fishing, shrimp, and recreational craft and to barge operation. The benefits would result primarily from reduction of boat damage and delay, and would exceed the annual charges. Improvement is therefore economically justified.

In conformance with their findings, the reporting officers recommend:

1. The adoption of a Federal project for Fort Myers Beach, Fla., to provide for a channel 12 feet deep and 150 feet wide in San Carlos Bay, thence 11 feet deep and 125 feet wide through Matanzas Pass to the upper shrimp terminals, at an estimated cost of \$168,000 for dredging and \$20,000 annually for maintenance by the Corps of Engineers, subject to certain conditions of local cooperation including a local cash contribution currently estimated at \$2,200, the final amount to be determined after actual construction costs are known;

2. The modification of the existing Federal project for a channel from Naples to Big Marco Pass to provide for a channel 12 feet deep and 150 feet wide in the Gulf of Mexico, thence 10 feet deep and 100 feet wide through Gordon Pass to upper Naples Bay, thence 10 feet deep and 70 feet wide for 400 feet to U. S. Highway 41 bridge; a turning basin 10 by 150 by 200 feet in upper Naples Bay, and a turning basin 8 feet deep and generally 250 feet wide and 670 feet long at the Municipal Yacht Terminal, at an estimated cost of \$331,000 for dredging and \$39,000 additional annually for maintenance by the Corps of Engineers, subject to certain conditions of local cooperation including a local cash contribution currently estimated at \$123,800, the final amount to be determined after actual construction costs are known.

* * * * *

STUDY OF MARINE YEASTS OF BISCAYNE BAY: A grant of \$16,000 has been received by the Marine Laboratory of the University of Miami, Fla., from the National Science Foundation to continue investigation and study of marine yeasts of Biscayne Bay started in 1958 under a previous grant from the same institution.

The research, which relates to micro-organisms found in salt water, is to determine the occurrence and activity of these organisms. It is part of the microbiological research being conducted by the Laboratory.

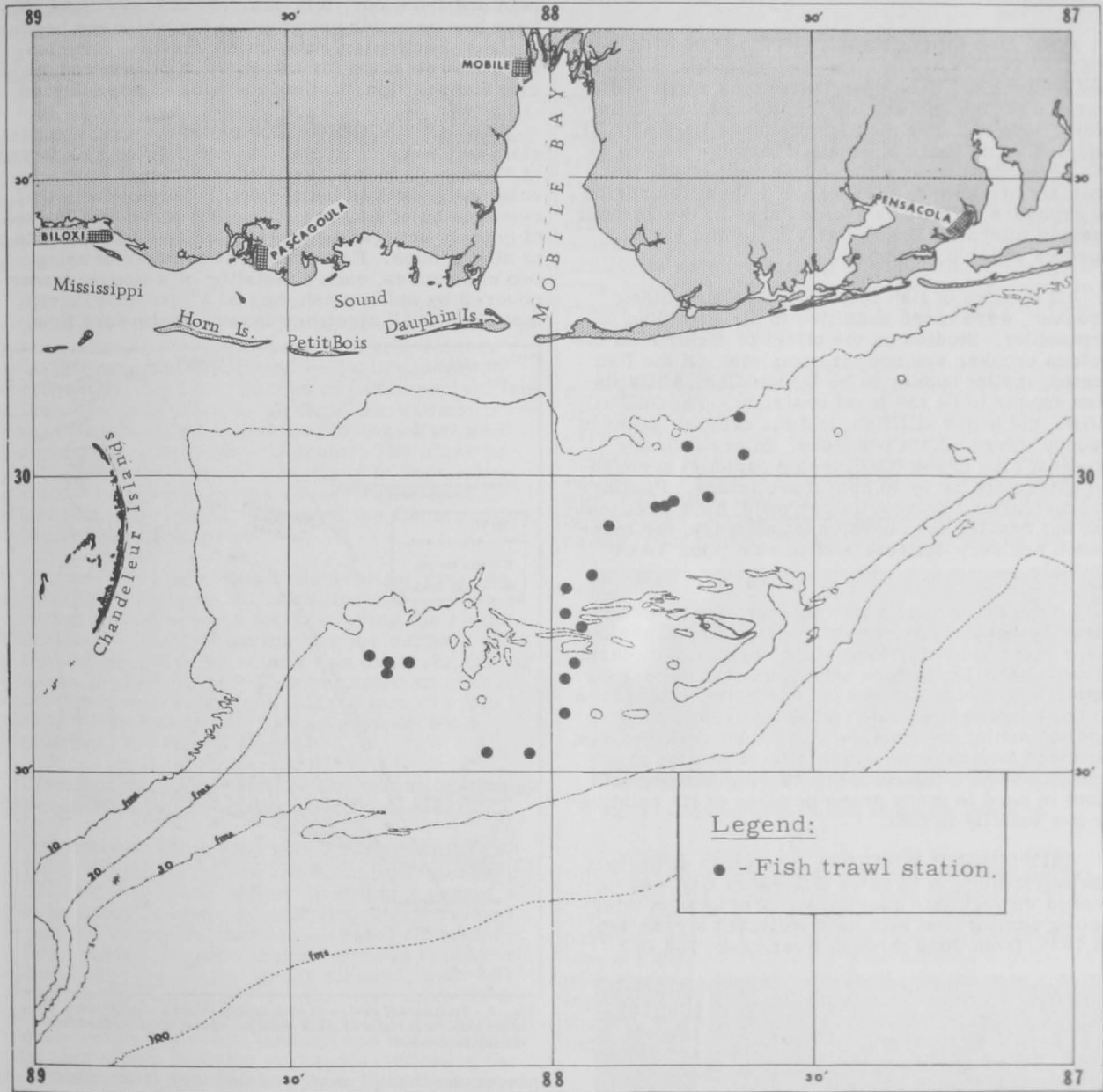
The work is being carried out by a research assistant professor on the laboratory staff and student assistants.



Gulf Exploratory Fishery Program

NORTHEAST GULF OF MEXICO SURVEYED FOR INDUSTRIAL FISH STOCKS (M/V Silver Bay Cruise 13): To determine if commercial stocks of industrial fish were available, the U. S. Bureau of Commercial Fisheries chartered exploratory fishing vessel Silver Bay made 21 tows in January 1959 off the coasts of Mississippi, Alabama, and Florida. The area surveyed was on broken bottom in depths of 12-30 fathoms, which is avoided by the commercial fishing fleet. However no gear damage was suffered by the Silver Bay. An 80-foot semiballoon trawl rigged with rollers and a 50-foot square mid-water trawl (modified to fish on the bottom) were used in the fishing trials.

The principal species taken were spot (*Leiostomus*), croaker (*Migropogon*), and porgy (*Stenotomus*). Porgy accounted for 90 percent of the catch in depths over 20 fathoms. Individual drags yielded from 100-1,200 pounds per one-hour tow and the average was about 500 pounds a tow.



M/V Silver Bay Cruise No 13 (January 13-15, 1959).

An extensive bed of 1-1½-inch scallops (*Pecten gibbus*) was located in 16-20 fathoms between Mobile and Pensacola. Numerous samples of food and industrial fish were collected and preserved for further study.



Gulf Fishery Investigations

Following are some of the highlights of the studies conducted by the Galveston, Tex., Fisheries Biological Laboratory of the U. S. Bureau of Commercial Fisheries during October-December 1958.

FISH AND SHELLFISH TESTED FOR INSECTICIDE TOLERANCE: Two insecticides, dieldrin and heptachlor, have been tested on a number of species of fish and shrimp found commonly in in-shore waters. The median tolerance limit (TL_m), adopted as an index of relative toxicity, refers to the concentration at which 50 percent of the test animals are able to survive for a specified period of exposure. There is a wide range in the 24-hour median tolerance limits derived for the various species under consideration.

All species of fish tested, except the golden croaker, were more sensitive to dieldrin than to heptachlor. Studies on the effect of dieldrin on the golden croaker are not yet complete. Of the fish tested, mullet appear to be the hardest, while pinfish appear to be the least resistant. The Gulf killifish, the broad killifish, and the croaker seem to occupy intermediate positions. In preliminary studies, blue crabs (*Callinectes sapidus*) seem to be extremely hardy to both insecticides. Postlarval menhaden (*Brevoortia patronus*) have been tested, but results have been unsatisfactory; the menhaden are very delicate and make poor test animals.

On the other hand white shrimp were affected more by heptachlor than by dieldrin. Brown shrimp were more sensitive than white shrimp to dieldrin and probably heptachlor although results using the latter insecticide are not yet complete. Compared to benzene hexachloride tested last year, dieldrin and heptachlor are considerably less toxic to shrimp. Benzene hexachloride which affects shrimp at extremely weak concentrations (2-32 parts per billion) is used in many areas because of its relatively low toxicity to fish.

BAIT SHRIMP FISHERY: The study of the bait shrimp fishery in Greater Galveston Bay was extended through this quarter and provides an interesting comparison with data collected a year ago. In 1957, from June through November, 208,852



Fig. 1 - Typical bait shrimp stand, showing plastic container used to measure shrimp and tank for holding live shrimp.

pounds of shrimp were caught for bait compared with 382,902 pounds caught during the same period

in 1958. Production in every month was greater in 1958. The increase may be partially due to greater efficiency in collecting statistics from bait dealers, but according to information from local bait fishermen and from our field samples at Clear Lake, this year has been very productive for white and brown shrimp, particularly the latter species. Samples have been obtained for information on size and species composition, but the data remain to be analyzed.

SHRIMP TAGGING: During the quarter emphasis was placed upon staining and tagging pink shrimp at Flamingo, in the Everglades National Park. Insofar as growth is concerned, it is necessary that releases be of a known size. A method was devised of quickly separating large quantities of shrimp into size groups. Essentially, it consists of using two enclosures, each consisting of a wooden frame covered by nylon mesh, one of $\frac{3}{4}$ " stretched mesh, the other of 1" stretched mesh. Shrimp are first

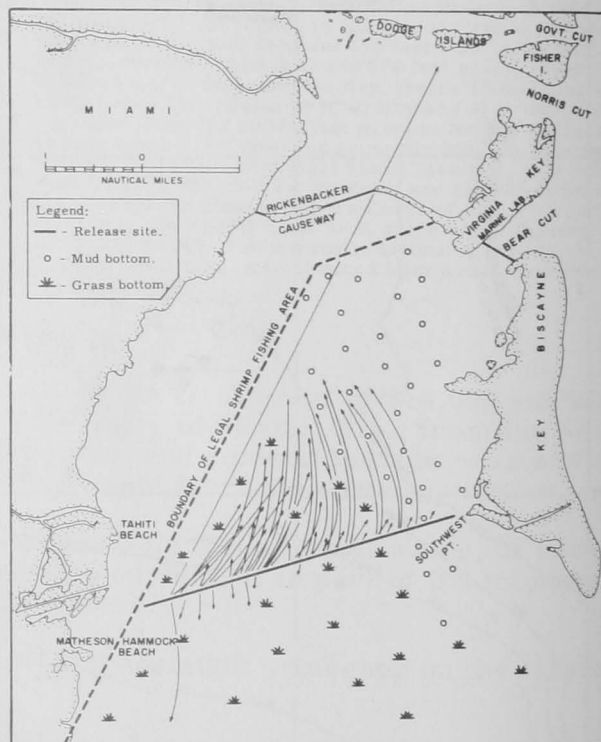


Fig. 2 - Preliminary studies of pink shrimp migration off Miami, Fla., using biological stains to mark shrimp. Arrows indicate direction of shrimp movement.

placed in the $\frac{3}{4}$ " mesh enclosure, from which those under 13.5 mm. carapace length escape. The remaining shrimp in the enclosure are placed in the 1" mesh enclosure, from which shrimp under 22.0 mm. carapace length can escape into a large holding box. The size-separating process is more efficient when the enclosed shrimp are held in a current of water. Under this condition shrimp force their way upstream and escape more readily. Even in still water, escapement is generally through the sides of the enclosure, not the bottom.

A total of 7,264 shrimp between 13.5 mm. and 22.0 mm. carapace length were stained with Trypan Blue and released at Flamingo over a period of 10 days. During the first part of the tagging session a dye was used which had been prepared

several weeks previously--it proved exceedingly toxic and a 40-percent mortality occurred. Later a freshly-prepared dye mixture was used and mortality was reduced to 8 percent. Aging apparently intensifies the toxicity of the dye to shrimp. Those shrimp larger than 22.0 mm. carapace length were tagged using a single small Petersen disc attached with monofilament nylon. Some tagged shrimp were released concurrently with the stained shrimp, and all were released within a week of the last stained shrimp.

During the same period, the University of Miami released 200 shrimp using the conventional method of attaching Petersen discs. It is hoped that this experiment will be of value in comparing the three methods in respect to growth and movement of shrimp. Presently, effort is being directed toward the recovery phase of this marking and tagging operation.

TORTUGAS PINK SHRIMP: Four sampling cruises were made on the Tortugas shrimp fishing grounds during August, September, and October 1958 by University of Miami biologists under a contract with the U. S. Bureau of Commercial Fisheries. The abundance of algae on the western portion of the grounds limited the fishing effort and sampling there throughout August. The algae began to decrease in abundance early in September, and later in September the concentration was so slight that it no longer restricted the fishing effort or sampling of that area.

An airplane flight was made over the grounds on the night of August 20, 1958, for the purpose of counting fishing vessels and observing their distribution. Discard of shrimp for the purpose of maintaining particular counts was observed during Cruises 20, 21, and 22. This reflected an unusual occurrence of extremely small (10 mm.-15 mm.) shrimp found across the fishing grounds from Smith Shoal to Pulaski Light.

The Florida State Board of Conservation closed the controlled area to fishing on September 12, 1958.

FISHING POWER AND VESSEL CHARACTERISTICS: "Standardization" of effort statistics is facilitated if it can be determined that a vessel's fishing power is directly (and adequately) related to any one of several available vessel characteristics. Shrimp trawler characteristics being considered at present are: gross tonnage, over-all length, and horsepower. Preliminary analysis of Aransas Pass data suggest that power factors are closely related to gross tonnage and horsepower, with both acting together perhaps constituting the best indicator. A similar approach has been accorded a group of 8 standard and 17 nonstandard vessels fishing the same general area during the same period but at depths ranging from 21 to 30 fathoms. Plots of mean catch-effort ratios computed for the "standard" vessels operating in each depth range indicated little change in day-to-day relative densities of exploitable portions of the brown shrimp populations present off Aransas Pass during October 1957.

Employing an approach quite different from that used with the Aransas Pass trawlers, relative power factors were calculated for groups of 20 and 10 "standard" trawlers all fishing the Campeche Flats

together on two or more occasions during June-October 1957. Briefly, the procedure was to secure an estimate of the over-all mean shrimp density during "standard" trawler operations. Since a vessel's relative fishing power is a function of an exploited population's density, an estimate of it is given by the antilog of the difference between the log of any other trawler's catch per unit effort and the log mean relative density.

Incomplete analyses of standard trawler data with analysis of covariance techniques indicated no differences in relative population density from trip to trip during June-October, or in vessel-to-vessel mean power factors during the same period. That portion of the United States fleet commonly fishing the Campeche Flats is comprised of trawlers having rather similar specifications. This, of course, would account for the general lack of variability in relative fishing power, and, at the same time, preclude attempts to relate fishing power to vessel characteristics over a wide range of values for each of the latter.

PRELIMINARY SURVEY OF GULF SHRIMP FISHING TRENDS, 1956-58: Work began in December 1958 on the task of consolidating shrimp catch and effort data into a preliminary report describing Gulf shrimp fishing trends during the period for which data are available. Using Gulf-wide statistical data since 1956, a preliminary run to establish format was made for that portion emanating from United States fleet activities on the



Fig. 3 - Laboratory tests on toxicity of dinoflagellates to fish.

Campeche-Obregon (Mexico) pink shrimp grounds. Catch and effort data summed over all coastal units making up this area have been broken down by year, month, and 5-fathom depth zones. Although only partially stratified estimates, the catch-effort ratios are considered fairly good indices of relative pink shrimp abundance in the depth zones and during the periods indicated, since preliminary investigation suggested little variability in relative fishing powers of vessels fishing this general area.

Relatively little insight as to the general welfare of the Campeche pink shrimp population(s) can be gleaned from the small amount of information available. Total catch and effort data are incomplete since those originating from activities of the Mexican fleet are not immediately available. And although population densities in the "middle" depth ranges have remained fairly stable since 1956, lack of prior data obviate comparisons with levels of former abundance. However, the exploitation of pink shrimp off Campeche, insofar as the United States fleet is concerned, appears to be a marginal operation.

Other items of interest:

(a) There is a suggestion that pink shrimp in the Campeche area become increasingly abundant with increasing depth and progressing season.

(b) The annual mean size count has remained constant since 1956 (21-25 heads off). Monthly count sizes average slightly higher during the summer months (26-30 compared with 21-25 at other times) with larger shrimp generally being taken in deeper water (21 or more fathoms).

(c) Practically no pink shrimp are presently taken by United States fishermen within 12 miles of the western Yucatan coast. East of 93° W, longitude, no water exceeds 10 fathoms in depth and relatively little exceeds 5.

RED TIDE STUDIES: Investigations of the response of *Gymnodinium breve* to various total inorganic salt concentrations have been completed. Results show the optimal growth range for the bacteria-free organism to extend from 35 to 50 grams total salts per liter of distilled water-base medium. Within this range, high growth levels occurred in at least 15 of the 20 replicate cultures in each salinity group. Occasional instances of good growth were observed in medium containing 32 or 53 grams per liter, but none occurred in 29 grams per liter. The development of high population levels in relatively high salt concentrations suggests that salinity *per se* is not the limiting factor which precludes the occurrence of *G. breve* in open sea environments. However, the lower end of the tolerance range indicates that low salinity may be important in determining the distribution of this organism in estuarine environments.

A study of the effect of pH on growth of *G. breve* in 220 individual cultures shows that growth is unhampered by pH's of 7.5 to 8.2, inclusive. Growth took place at a reduced rate at a pH of 7.3, and lower values were definitely toxic. Medium having a pH of 7.2 was 100 percent lethal to this organism within 6 days, while 7.0 killed all cells within two days. Further work will be designed to show the efforts of pH's above 8.2. (Values of 8.3 and 8.4 are commonly encountered in sea water.)

Preliminary experiments using constant-temperature incubators have provided some information on low-temperature tolerance in *G. breve*. A temperature of 16° C. (61° F.) produced no observable reduction in the density of cells in any of the 48 10-ml. test cultures. Over 90 percent of the organisms were killed in each of 24 cultures within 17 hours after introduction into an 11° C. (52° F.) environment. Seventeen of these cultures showed slight growth during the subsequent 12 days, but were still well below the original population level at the conclusion of the 14-day study. The other cultures exposed to this temperature did not change in regard to population after the initial decrease. Cultures of this organism are routinely kept successfully at a temperature of 25° C. (77° F.).

The last quarter of 1958 has been marked by the gradual buildup of *G. breve* in the deeper offshore waters of the Gulf off Florida and their decline in the coastal and bay waters. This indicates that, during periods of non-red tide, *G. breve* are able to maintain themselves and to approach pre-bloom stages in waters of stable environmental conditions in benthic areas. *G. breve* are now the

dominant phytoplankton in subarea 6, 10-40 miles west of Egmont Key. With the approaching winter weather and a more unstable environment the chances of a red tide developing in the coastal waters from Venice to Tarpon Springs are greatly reduced. It should be stressed that as long as *G. breve* are found in division stages in subarea 6, reseeding of the coastal and bay waters could occur next summer or fall.

MENHADEN: Routine sampling of the commercial catch of menhaden landed at Sabine Pass, Tex., continued until operations of the plant ended in early November 1958. Since the beginning of the season on May 5, 1958, over 900 scale samples were mounted for analysis. Reading of the 1957 scale samples for Sabine Pass and Moss Point, Miss., were completed.



Fig. 4 - Age and growth studies of Gulf menhaden.

Post-larval menhaden began appearing in local waters in mid-November. Last year they were not present until January. This might be explained by the relatively mild autumn experienced in 1957, compared to the below-normal temperatures occurring this year during the same period.

INDUSTRIAL FISHERIES: During the first few months of operation the staff at Pascagoula has concentrated on familiarizing themselves with the fishery involved and its problems; experimenting with sampling procedures to determine a sample size that will give a reasonably accurate estimate of the species composition by weight and numbers coming into the pet-food plants; collecting periodical samples of various important species for life history data; determining equipment needs and acquisition of same; and setting up a procedure for collecting accurate catch and effort data from the industry and the fishermen.

To date, 52 boats have been sampled, to determine species composition of the catch by number and weight. Various numbers and sizes of samples were taken to determine a minimum sample necessary to give a valid estimate of species composition within each boat. Variation between boats and between time intervals is being tested to determine the minimum number of boats that is necessary to sample in order to obtain year-around accurate species composition breakdown by weight and numbers.

The sampling has revealed that 40 families and 65 species of mainly shallow water fish are represented in the catch here. New ones are being identified frequently, and no doubt the list will eventually include most of the shallow water and many of the pelagic species of the Gulf of Mexico.

Preparations are being made for offshore studies of midwater and surface school fish in the Gulf of Mexico during 1959, with the Bureau's exploratory fishing vessels Oregon and George M. Bowers.



Maine Sardines

CANNED STOCKS, JANUARY 1, 1959: Distributors' stocks of Maine sardines totaled 268,000 actual cases on January 1, 1959--38,000 cases or 16.5 percent more than the 230,000 cases on hand January 1, 1958, according to estimates made by the U. S. Bureau of the Census.

Canners' stocks on January 1, 1959, totaled 891,000 standard cases (100 $3\frac{3}{4}$ -oz. cans), a decrease of 220,000 cases (19.8 percent) as compared with January 1, 1958.



The pack for the 1958 season (April 15-December 1) amounted to 2,021,000 standard cases as compared with 2,117,151 standard cases in the 1957 season.

Table 1 - Canned Maine Sardines--Wholesale Distributors' and Canners' Stocks, January 1, 1959, with Comparisons^{1/}

Type	Unit	1958/59 Season		1957/58 Season				
		1/1/59	11/1/58	7/1/58	6/1/58	4/1/58	1/1/58	11/1/57
Distributors	1,000 Actual Cases	268	312	184	237	293	230	298
Canners	1,000 Standard Cases ^{2/}	891	1,037	386	235	476	1,111	1,337

^{1/}Table represents marketing season from November 1-October 31.
^{2/}100 $3\frac{3}{4}$ -oz. cans equal one standard case.

The total supply at the canners' level as of January 1, 1959, totaled 2,434,000 standard cases or 4.3 percent less than total supply of 2,543,000 cases as of January 1, 1958. Cannery shipments from April 15, 1958, to January 1, 1959, amounted to 1,543,000 standard cases as compared with 1,432,000 cases during the same period a year earlier.

* * * * *

CANNERS SEEK EXPANSION OF QUALITY-GRADING PROGRAM: Impressed with results obtained during the 1958 packing season, Maine sardine canners have asked the Maine State Commission of Agriculture to expand their mandatory quality grading program.

If the Industry's recommendation is accepted, standard quarter-size flat cans of sardines in mustard sauce and 12-ounce cans in oil will be included in the grading program for the 1959 pack. After a public hearing to be held in the late winter, a decision will be rendered by the Commissioner.

At present only standard quarter-size ($3\frac{3}{4}$ oz.) cans packed in oil are under the program which was promulgated into action by the Commissioner in April 1958.

Meeting with the Sardine Industry Advisory Board on January 30, 1959, the Commissioner advised the group that he was in accord with the industry's request unless facts were presented at the hearing to change his thinking to the contrary.

He congratulated the packers on their cooperation in making the first year of operation of the program "such an outstanding success" and predicted that it would mean much to the economic advancement of the industry in the future.

Under the system, which was set up at the industry's request, every lot of sardines packed is graded for quality by experts at a specially-equipped and manned laboratory at Bangor, Me., and certificates of grade are issued to the canners accordingly.

According to the Commissioner, records of his Inspection Division which administers the program indicated that the over-all quality of the 1958 pack of approximately 2.0 million cases was the highest in the history of the industry.

Quarter-mustards represent about 12 percent of the industry's production while the 12-ounce oils are a newly-developed pack designed for the military, restaurant, and institutional markets. These two items, with the quarter-oils, total about 95 percent of the industry's production.

The Maine canners made history with their program which was the first instance in the canned food business whereby an industry requested mandatory quality grading of their product. The 1957 Maine Legislature passed laws to make this possible.



Maryland

BLUE CRAB UTILIZATION LOWER IN 1958: In 1958 the blue crab industry in Maryland used 37.4 million pounds of hard crabs (including crabs imported from other states) and 877,268 dozen soft crabs from Maryland waters, the Maryland Tidewater Fisheries Commission stated in a January 1959 release. This was a drop of about 4.0 million pounds in the quantity of hard crabs processed and a drop of 279,137 dozen soft crabs as compared with 1957. Poor weather that delayed the start of the season was blamed for the decrease.



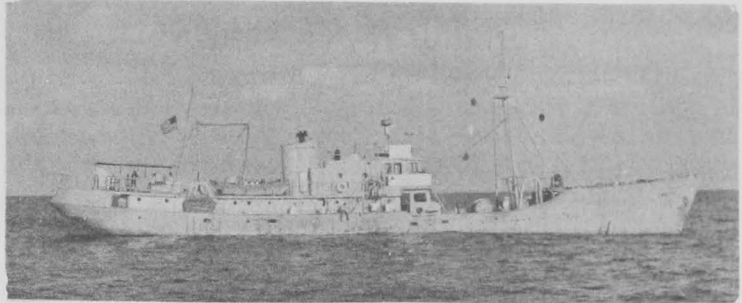
New York

SHIPPERS OF SCALLOPS MUST COMPLY WITH STATE REGULATIONS: Several recent shipments of scallop meats have been challenged by the Shellfisheries Management Unit of the New York State Conservation Department. The Shellfisheries Management Unit stated that: "Future shipments of fresh or frozen scallop meats into New York State for sale and distribution must be in compliance with the following minimum requirements: (1) The establishment and packing operation of scallop packers must be approved by the shellfish control authorities or health authorities of the state in which the packing takes place; (2) All containers of scallop meats must be identified to indicate the contents and the packer. (The method of identification as developed by the packer and the authorities of his state will be acceptable to this office.); (3) Scallop meats must be packed in new containers; (4) Scallop meats must be clean, free of foreign material and shall not have an excessive bacterial content; and (5) Scallop meats must be adequately refrigerated."



North Atlantic Fisheries Investigations

BLOCK ISLAND SOUND AREA SURVEYED FOR INDUSTRIAL FISH (M/V Albatross III Cruise 125): To survey the Block Island Sound area for industrial fish (used for animal food or fish meal) and to determine the size distribution of the fish in two types of otter trawls was the purpose of the January 13-15, 1959, cruise of the Albatross III.



Service's research vessel Albatross III.

Four stations were fished with a No. 36 census trawl with a small-mesh liner in the cod end. Eight replicate tows were made alternating 2 identical No. 36 otter trawls except for the cod-end mesh size.

All fish caught in the tows were measured and identified. Cod were found to be the most abundant species at the inshore stations, while alewives and blueback herring were most abundant at the offshore stations.

The tests with the No. 36 otter trawls with the different mesh in the cod ends demonstrated that more fish were taken in the trawl with the smaller mesh. Alewives dominated the catches made with these two trawls.



Oysters

CHESAPEAKE BAY OYSTER STUDIES: Mortalities: Serious oyster mortalities are occurring in small ocean-side bays along Maryland and Virginia shores. Studies conducted by Rutgers University under a contract from the U. S. Bureau of Commercial Fisheries indicate that these mortalities may be linked to the severe oyster kills in Delaware Bay which are believed to be caused by an organism similar in appearance to Dermocystidium, the organism responsible for severe losses in the Gulf of Mexico area. Hoping to confine the spread of the mortality to the presently-affected areas, Rutgers' biologists made a recommendation to the States of Maryland and Virginia suggesting that no seed oysters from these ocean-side bays be transported to the Chesapeake Bay oyster grounds.

Dr. Reed Logie, oyster pathologist from eastern Canada, was brought to New Jersey during January for conferences regarding these mortalities. Similar mortalities since 1955 have caused the death of a high percentage of the oysters in New Brunswick and Nova Scotia.

Off-the-Bottom Cultch Superior to Bottom Cultch: At Smith Creek in southern Maryland in 1957 the Bureau's biologists compared the production of seed oysters produced on the bottom with that of oysters produced off the bottom.

They found that the off-the-bottom cultch generally produced many more and larger spat than did the bottom shells. They found also that the summer mortality of the original set may have approached 70 percent on the bottom but considerably less off the bottom.

Maryland Survey: Biologists of the Maryland Department of Tidewater Fisheries and Research and Education and the Bureau of Commercial Fisheries Annapolis Laboratory surveyed the major oyster bars of the Maryland Chesapeake in October. In the Upper Bay setting was nil but gradually increased southward, culminating in high counts in the strait areas of the lower eastern side of the Maryland part of the Bay.

Drills and drilled spat were encountered in Tangier Sound in small numbers as far down the salinity gradient as the most northerly station at Sharkfin Shoal (16.83 parts per thousand). Tangier Sound, in general, had a higher set survival than usual, resulting from either depressed drill activity or greater spatfall.

With few exceptions the condition and growth of the oysters throughout the Bay was excellent. The Potomac River, though it had a poor strike, produced large, single well-shaped oysters.

* * * * *

EUROPEAN VARIETY THRIVES IN MAINE WATERS: The European oyster (Ostrea edulis) seems to have adapted well to its new environment and to occupy an unusual ecological niche. In October a survey was made of known colonies of this oyster in the Boothbay Harbor, Me., area. The present self-sustaining population is the result of the spawning of about one bushel of oysters held at the U. S. Bureau of Commercial Fisheries Boothbay Harbor station wharf nine years ago in cooperation with the Maine Department of Sea and Shore Fisheries.

The European species is well established to the extent of at least a five-mile radius of the original spawners. Some beds are fairly extensive, show good growth and good survival below mean low water, and several year-classes through 1958 are represented.

* * * * *

STUDIES ON RAFT CULTURE: The first phase of the project of raft culture of oysters in Oyster River, Chatham, Mass., by the U. S. Bureau of Commercial Fisheries has been completed. On November 13, 1958, about 25-30 bushels of raft-grown oysters, averaging $2\frac{3}{4}$ inches in height, were planted on the bottom. The majority of these oysters were from a 1957 set caught in Mill Creek, a tidal estuary in Chatham, and should be large enough for market this fall.

Several strings of 1956 Wareham oysters grown on rafts were planted also on the bottom. They were only a few millimeters larger than those grown from the 1957 Mill Creek set. The shell growth of the oysters suspended from raft slows down to such a rate in the second year that suspending them longer than one year is unprofitable.

In 1958 there was a 17-percent mortality among the Wareham oysters suspended since 1956. Over half of this mortality resulted from the falling of oysters from the strings. There was over a 90-percent mortality among the same set planted on the bottom.

To compare growth rates, oysters from different localities were suspended from a fiber-glass raft in Taylors Pond, Mass. Oyster set from James River, Va., Long Island, Conn., and Mill Creek and Wareham River, Mass., were used. A sample from each group was measured when shell growth ceased because of cold weather. After Taylors Pond became frozen observations on oysters kept on raft ceased but they were expected to be resumed when the ice melted.



Pacific Oceanic Fishery Investigations

CONTRACT AWARDED FOR TEST OF COMMERCIAL LIVE-BAIT TUNA FISHING IN MARQUESAS AREA: On December 15, 1958, bids on a contract for a trial commercial live-bait tuna fishing trip to the Marquesas Islands area were opened at the Hawaiian office of the U. S. Bureau of Commercial Fisheries Pacific Oceanic Fishery Investigations. The only bidder was awarded the contract at \$24,900. The contract provides for a 30-day tuna fishing trip in the vicinity of the Marquesas Islands or until 130 tons of tuna have been caught. It is expected that this trial commercial tuna fishing trip will supply a good evaluation of that area for future commercial fishing trips.

* * * * *

ECOLOGY OF ALBACORE TUNA: Studies on the relationships between albacore tuna and its environment by the Pacific Oceanic Fishery Investigations have lead to the following tentative conclusions:

- (1) Surface and subsurface albacore generally occupy the same range of temperature, roughly within 55° F. to 65° F. and both to some extent occupy colder water with an increase in size.
- (2) There is a remarkable coincidence in the distribution and relative abundance of albacore in the central and eastern North Pacific with that of the oceanographic

patterns of enrichment and of the standing crops of the trophic levels. In one case it is shown that this agreement can be quite detailed.

(3) It is concluded that the macroecology of the albacore in the area investigated is primarily governed by temperature in that its distribution is generally within a certain range 55° F. to 65° F., and its abundance associated with the patterns of enrichment within that range. This conclusion should not be extrapolated to areas outside those investigated.

Using these conclusions and other information obtainable from the literature, a unified concept of the ecology of the albacore is arrived at by hypothesizing their migrations and movements in the North Pacific. In general this hypothesis suggests that their migrations and movements are governed by the seasonal rise and fall of oceanographic patterns of enrichment.

Analyses of other species taken by albacore cruises were started in the fourth quarter of 1958. It is hoped that they will show that certain features of the albacore's ecology are more or less generally representative of those of the fish population north and northeast of the Hawaiian Island chain.

In the plankton studies evidence was found to support the hypothesis that there is a seasonal latitudinal advance of a biological frontier in the North Pacific. This frontier is composed of phytoplankton, herbivore and predator components. The relative latitudinal positions of the maxima of these components appear to be related to surface temperature. There appears to be no interrelation between these components independent of surface temperature.

* * * * *

OBSERVATIONS ON TUNA BEHAVIOR: Tests of the effects of lampblack dye and water sprays on feeding, comparison of skipjack and yellowfin behavior, use of mullet and tilapia as chum, and the applicability of Tricaine-Sandoz as a skipjack anaesthetic were made by the Bureau's Pacific Oceanic Fishery Investigations, Honolulu, during the fourth quarter of 1958. The lampblack, water spray, and Tricaine tests gave inconclusive results; yellowfin were found to swim deeper than skipjack; and mullet proved to be good bait. Laboratory work consisted of transcribing Audograph records of observations and of separating movie film into experimental sequences.

Because its effectiveness was greatly hampered by the turbulence it produced, the underwater observation caisson was removed from the research vessel Charles H. Gilbert, and various improved methods of observing tuna were considered. These included underwater television and construction of a porthole beneath the ship's waterline. A decision as to the best method awaits comparative cost estimates.

The fishermen's belief that the offshore nehu differs from inshore nehu (an important baitfish) was investigated during the quarter. The two forms are closely related, but the offshore one is new to science.



Sardines

CALIFORNIA CATCH SAMPLES SHOW TWO DOMINANT YEAR-CLASSES: The commercial catch of sardines was slightly over 100,000 tons in 1958. Samples obtained in November from the landings showed a decrease in the numbers of larger fish, a slight increase in small fish (1957 class), and the increasing dominance

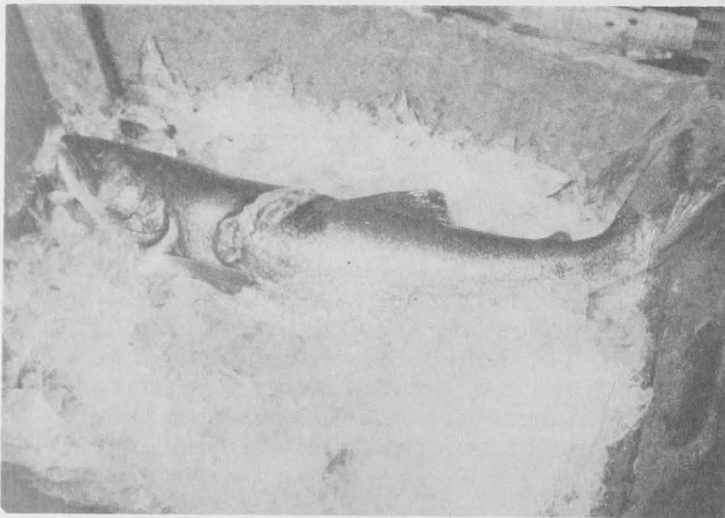
of the 1956 class. Approximately 75 percent of the fish samples were between 7 and 8 inches in standard length, and only 12 percent were larger than 8 inches. In contrast, approximately 35 percent of the fish landed during September were over 8 inches in standard length.

While fish of the 1957 class have been dominant in the catches made off Monterey, fish of the 1956 class have been dominant in the fish caught off southern California. This is not inconsistent with the Bureau's previous findings and the 1957 class may still prove to be of greater size than other recent year-classes. Normally, any particular year-class will make its greatest contributions to the class as 2- and 3-year old fish. The influx of fish of the 1956 class is somewhat of a surprise, largely because it is probably of fairly southern origin and was, therefore, not well represented in the southern California bait catch in 1957.



Sea Lamprey

DECLINED IN CERTAIN GREAT LAKES IN 1958: Sea lampreys in Lake Michigan and eastern Lake Superior declined in 1958. Weirs operated in Green Bay and



Lake trout from the Great Lakes scarred by sea lamprey.

along the west shore of Lake Michigan took 53 percent fewer lampreys in 1958 than in 1957. The decline was less in eastern Lake Superior (29 percent) than in Lake Michigan, but still was substantial. Both decreases are viewed as random fluctuations in stocks that have reached or are approaching numerical stability.

Further evidence of stability of the stocks of sea lampreys in eastern Lake Superior comes from the records of lamprey scars on lake trout landed at Marquette, Mich. The upward trend in the percentage of scarred individuals that had continued since 1950 came to an end in 1958.



Shad

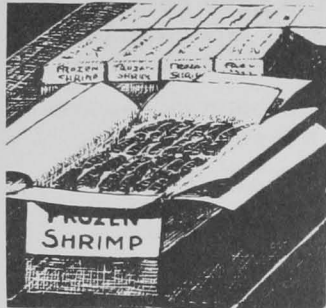
CONNECTICUT RIVER RUNS PREDICTED: A system of predicting the size of shad runs in the Connecticut River has been developed by the Atlantic Shad Investigations of the U. S. Bureau of Commercial Fisheries, Beaufort, N. C. The biologists predicted a run of 334,000 fish in 1958; it actually amounted to 372,000 fish. The commercial catch amounted to 126,000 fish and the sport catch 39,000 fish--or a total of 44 percent of the available fish.



Shrimp

UNITED STATES PACK OF MANUFACTURED PRODUCTS, 1957:

The 1957 pack of manufactured shrimp products in the United States declined about 4.4 percent in quantity, but was higher by 1.5 percent in value as compared with 1956. The most pronounced decline occurred in the pack of canned shrimp--down about 33.2 percent in quantity. This drop in the pack of canned shrimp reflects (1) the shortage of the smaller sizes of shrimp available to the canners in the Gulf area and (2) higher ex-vessel prices which diverted shrimp from the canners to the fresh and frozen packaged trade. Although the pack of fresh and frozen packaged shrimp products was down less than 1 percent in 1957 as compared with the previous year, the value was up about 5.5 percent. The trend towards ready-for-the-table products is indicated by the 25-percent increase in the 1957 pack of raw peeled shrimp.



United States Manufactured Shrimp Products, 1956-1957				
Shrimp Product	Quantity		Value	
	1957	1956	1957	1956
	.. (1,000 Lbs.)..		.. (\$1,000)..	
Fresh and Frozen Packaged:				
Headless	58,269	61,355	45,070	43,632
Peeled raw (including deveined)	9,375	7,512	9,952	7,304
Cooked (includes peeled and deveined)	1,444	2,237	2,488	3,101
Breaded, raw and cooked	51,085	50,888	37,764	37,301
Specialities (burgers, cocktail, chow mein, egg roll, sticks, etc.)	3,555	2,907	2,858	1,688
Total fresh and frozen packaged	123,728	124,899	98,132	93,026
Canned:				
Wet and dry pack	9,120	13,636	13,136	16,421
Specialities (aspic, cocktails, spreads, soups, and stews)	123	178	159	336
Total canned	9,243	13,814	13,295	16,757
Dried, Cured, and Smoked:				
Sun-dried	347	471	561	607
Salted, spiced, and vinegared	35	23	51	26
Smoked	42	14	52	31
Total dried, cured, and smoked	424	508	664	664
Meal, scrap, and bran	808	1,122	23	34
Total all products	134,203	140,343	112,114	110,481



Striped Bass

FEDERAL AND STATE BIOLOGISTS TAG LARGE FISH ON POTOMAC: Biologists from the Virginia Fisheries Laboratory, the Maryland Chesapeake Biological Laboratory, and the U. S. Bureau of Commercial Fisheries were working together on the Virginia research vessel Pathfinder on Maryland's Potomac River late in January 1959.

Long before commercial fishermen set their nets for striped bass in March, scientists were attempting to locate schools of over-wintering striped bass and tag large numbers, some of which will be caught in nets or on rod-and-reel later in the spring and summer. From tags returned by commercial and sports fishermen, scientists hope to estimate the number of large-size fish present in the Potomac and derive other biological information.



Virginia's Fisheries Research vessel Pathfinder.

The Pathfinder, her bow sheathed to protect it against drifting ice, was now stationed in the upper Potomac. Not only was her trawl net being used to locate and to supply the scientists with fish for tagging, but she also furnished living quarters.

Although piece-meal studies of striped bass have been made in both Maryland and Virginia by biologists from state and Federal laboratories, never before has so concerted an effort been made to study the habits of these fish and the extent of the fishery.



Tuna

CALIFORNIA TUNA CLIPPER RETURNS FROM TRIAL TRIP OFF AFRICAN WEST COAST: The first trial tuna fishing trip of a California-based tuna clipper, Chicken of the Sea, off the African West Coast has been completed. Good tuna fishing grounds were located off Ghana's coast and the catch was generally satisfactory with respect to size and quality of tuna and the time required to locate and land the fish. However, the tuna clipper departed from African waters without attaining an optimum solution of the live-bait problem, the United States Embassy in Accra reported on December 16, 1958.

Future plans on the part of California operators of the clipper for this area are unknown. It is assumed, however, that the firm will take advantage of the territorial waters fishing privileges and port facilities offered by the Ghana Government for a period of one year beginning September 1958 and return with bait nets specially adapted to local conditions. The Ghana Government is eager to cooperate with the California firm in continuing the survey and hopes that these efforts will lead to the establishment of a Ghana-based tuna fishing and canning industry.

Bait problems were confirmed by a Ghana Fisheries Department officer who spent approximately two weeks aboard the tuna clipper. With respect to bait fishing, this observer stated that a number of sizable herring schools were located close to shore but in waters too deep to give satisfactory results with the clipper's shallow-water lampara nets. A local fishing firm contacted for the purpose was more successful using a deep-water purse seine. However, before the purse-seine catch could be transferred to the clipper's live bait tanks, the fish were no longer in a serviceable condition. As a last resort the tuna clipper returned to the Senegal bait fisheries off the coast of Dakar to obtain the needed supply.

Unless a more satisfactory solution of the bait problem can be found, a Ghana-based freezing and canning industry on a large commercial scale would probably not be feasible. On the other hand, the lack of shallow-water bait in Ghana waters would not necessarily rule out voyages to the African West Coast by American tuna clipper based on the eastern seaboard of the United States or in Puerto Rico.

* * * * *

UNITED STATES CANNED PACK SETS NEW RECORD IN 1958: The pack of canned tuna and tunalike fish in the United States, Hawaii, Puerto Rico, and American Samoa in 1958 set a new record of 14.3 million standard cases, according to preliminary estimates. Record consumption is also indicated. The 1958 pack was 20 percent greater than in 1957 and the increase was reflected in all areas. California, which packs the bulk of the tuna, increased its pack in 1958 by almost 18 percent; the States of Washington and Oregon by 10.2 percent; and the Atlantic and Gulf

coasts and United States territories of Hawaii, American Samoa, and Puerto Rico by 47 percent.

A substantial amount of the canned tuna pack is produced from imported frozen tuna and tuna loins from Japan.

The pack dropped from 10.9 million cases in 1954 to 9.9 million cases in 1955, and climbed again to 11.8 million cases in 1956 and 11.9 million cases in 1957.

Imports of tuna already canned in 1958 were 2.3 million cases, also a record for imported canned tuna. This means that 16.6 cases of tuna were made available to the United States consumer during the year. Preliminary figures indicate that tuna consumption in the United States during 1958 was well over 15 million cases.

United States canned tuna stocks on hand at the end of 1958 were greater than a year earlier, but it appears that most of

United States and Territories ^{1/} Tuna Pack, 1958 (Preliminary Data)				
Area	1958			1957
	Albacore	Light Meat	Total	Total
	.(1,000 standard cases--48 # $\frac{1}{2}$ cans).			
Calif.	1,260	9,940	11,200	9,510
Wash. and Oreg.	852	370	1,222	1,109
Atlantic & Gulf coasts and U. S. Territories ^{1/}	770	1,116	1,886	1,284
Total	2,882	11,426	14,308	11,903

^{1/}Includes pack in American Samoa, Hawaii, and Puerto Rico.

the gain in production and imports was consumed during the year. A study made by the Bureau in 1953 estimated that it would be 1960 before tuna consumption reached the 15.0 million-case mark, but this has been achieved a year earlier than predicted.

Bureau records also show that not only has the total amount of tuna canned each year increased but that in recent years tuna has displaced salmon as the leading canned fish on a per capita consumption basis. In 1925 the tuna pack reached a million cases for the first time. In 1935 it was twice that figure and in 1945 it had again doubled. In 1950 the pack was just short of 9.0 million cases. Data for 1957 show that the supply of tuna was 1.61 pounds per capita, that of salmon 1.01 pounds, and for sardines 0.46 pounds.

The catch of tuna landed in continental United States in 1958 was 314.0 million pounds, or 17.0 million pounds more than in 1957, but far below the record landings of 1950 when United States tuna fishermen brought 390 million pounds of tuna into American ports. The amount of frozen tuna imported for canning purposes in 1958 is not yet known, but during the first 10 months of the year these tuna imports totaled 162.0 million pounds as compared with 139.0 million during all of 1957.



U. S. Bureau of Commercial Fisheries

FISCAL YEAR 1958 PROGRESS REPORT: The three-pronged effort being made by the Bureau of Commercial Fisheries to solve technological problems in processing and distributing fish and fishery products--studies of the physical and chemical property of fish; applied research to show usefulness of fish oils in diet, ore flotation, and other things; efforts to encourage faster application of technological knowledge--is pointed out in the Annual Report of the Secretary of the Interior for the Fiscal Year ended June 30, 1958.

Other activities of the Bureau of Commercial Fisheries mentioned in the report are:

1. The development of a commercial shrimp fishery off the Oregon-Washington coasts,

2. The discovery of an important shrimp fishery off the Shumagin Islands in Alaska,

3. More precise information on the fishery resources in the Gulf Stream,

4. The development of a simple telemeter which not only shows the depth of a trawl in operation but which records water temperatures,

5. Numerous studies of distribution factors, such as transportation costs and producer-consumer price spread,

6. Studies of economic factors affecting supply; wages and employment; competition of domestic fish with imports,

7. Presentation of 151 fish-cookery demonstrations,
8. Cooperation with the fishing industry in nationwide promotional campaigns to emphasize the value of fish as a low-cost, high-value food,
9. Numerous market and preference studies,
10. Continued assembling of fish production, receipts, and price data by the Market News Service and dissemination of that information to the public,
11. Continued processing of fishery loan applications which in 20 months have totaled 445 requests for \$16,000,000 in loans; 240 applications for \$6,000,000 approved,
12. Continued research which showed the value of copper ions in repelling oyster drills,
13. Search for ways to combat the devastating starfish invasion of the Long Island Sound oyster grounds,
14. Research which proved the necessity of protecting hard-shell crabs from predation during the first year,
15. Comprehensive studies on passage of fish through fishways of various widths and gradients and with various water velocities,

16. Four large-scale field tests which proved the devastating effect of the newly-developed selective poison on sea lamprey larvae without injury to native fish,

17. Underwater television studies on the behavior of cod, haddock, whiting, and flounders captured in trawl nets,

18. Additional experiments on electrical guiding of downstream migrants,

19. Intensified efforts to identify fish populations which must be studied to explain abundance variation, to forecast fishery success, and to develop new ways of managing species for highest sustained yield.

The report also showed that Alaska fisheries products (including fur-seal byproducts) in 1957 totaled 197 million pounds with a wholesale value of \$79,231,000 as compared with 229 million pounds and \$94,618,421 for 1956. In 1957, there were 23,130 persons engaged in fisheries in Alaska as compared with 24,549 in 1956.

The world's largest fish ladder, 3 miles long, went into operation at Pelton Dam on the Deschutes River.

* * * * *

VIRGINIA BIOLOGIST HEADS FISHERY BIOLOGY RESEARCH PROGRAM: Dr. John Laurence McHugh, Director of the Virginia Fisheries Laboratory at Gloucester Point since 1951 and Professor of Marine Biology at the College of William and



Dr. John Laurence McHugh.

Mary at Williamsburg, has assumed his duties as Chief of the Division of Biological Research of the U. S. Bureau of Commercial Fisheries. He replaces Dr. Albert L. Tester, who resigned several months ago to accept a professorship at the University of Hawaii.

McHugh was born in Vancouver, British Columbia, November 24, 1911. He received his B.A. and M.A. degrees in Zoology from the University of British Columbia. In 1950 he received his Ph. D. in Zoology from the University of California.

Before coming to his Virginia position, McHugh served as Research Associate at Scripps Institution of Oceanography at LaJolla, Calif., for three years and as assistant in research for two years before that. Before coming to California he served almost 5 years as an Infantry Officer in the Canadian Army. Prior to his Army service McHugh was with the Pacific Biological Station, Nanaimo, British Columbia.

McHugh is the author of 52 biological papers, some of which he co-authored with Tester when they were working together in Canada. He has done extensive herring research in the Pacific fisheries. He has several papers on sharks and some on albacore as well as other papers on fresh-water fishes. Since coming to

Virginia he has devoted considerable time to research on oysters, menhaden, and other Atlantic fish and shellfish. Since 1956 he has been Chairman of the Biological Section of the Scientific Committee of the Atlantic States Marine Fisheries Commission.

The Division of Biological Research is engaged in studying the fluctuations in the numbers of fish available in the various fisheries utilized by American fishermen. The purpose of the program is to recommend conservation measures which will maintain continuing production without hampering fishing operations, and to predict changes in abundance sufficiently in advance to minimize their effects upon dependent industries. The areas under study encompass the waters of the Great Lakes, the Atlantic Ocean from the Grand Banks to Florida, the Gulf of Mexico and the eastern, northern, and central Pacific. In addition to numerous biological laboratories located in strategic places along the coast lines and in Alaska, the Division has research vessels based at Woods Hole, Mass., LaJolla, Calif., Honolulu, T.H., and Juneau, Alaska.



United States Fishing Fleet^{1/} Additions

OCTOBER 1958: A total of 55 vessels of 5 net tons and over was issued first documents as fishing craft in October 1958. Compared with the same month of 1957,

Table 1 - U. S. Vessels Issued First Documents as Fishing Craft by Areas, October 1958

Area	October		Jan.-Oct.		Total
	1958	1957	1958 ^{1/}	1957 ^{1/}	
 (Number)				
New England. . . .	-	-	11	17	19
Middle Atlantic . .	1	-	12	21	23
Chesapeake	18	11	87	93	104
South Atlantic . . .	12	13	122	104	130
Gulf	16	15	247	132	166
Pacific	7	9	103	98	102
Great Lakes	-	-	6	5	8
Alaska.	1	1	31	47	48
Puerto Rico	-	-	-	1	1
Virgin Islands. . .	-	-	1	-	-
Total	55	49	620	518	601

Table 2 - U. S. Vessels Issued First Documents as Fishing Craft by Tonnage, October 1958

Net Tons	Number
5 to 9	29
10 to 19	5
20 to 29	8
30 to 39	10
40 to 49	3
Total	55

this was an increase of 6 vessels. The Chesapeake Area led with 18 vessels; the Gulf was second with 16; and the South Atlantic third with 12 vessels.

^{1/} Revised.
Note: Vessels assigned to the various sections on the basis of their home ports.

Fishing craft issued documents as fishing craft during the first ten months of 1958 totaled 620 vessels--an increase of 102 vessels, or 20 percent, as compared with the same period of 1957. Of the vessels documented for fishing, 40 percent were reported from the Gulf States.

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



U. S. Fish Stick and Fish Portion Production, 1958

FISH STICK PRODUCTION: The United States production of fish sticks during 1958 amounted to 60.9 million pounds, an increase of 7.8 million pounds (15 percent) as compared with 1957. During 1958, cooked fish sticks (55.3 million pounds) accounted for 91 percent of the fish-stick total. The remaining 5.6 million pounds or

Table 1 - U. S. Production of Fish Sticks by Months and Type, 1958^{1/}

Months	Cooked		Uncooked	Total
	(1,000 Lbs.)			
January	4,997	474	5,471	
February	5,488	437	5,925	
March	5,136	390	5,526	
April	4,346	509	4,855	
May	3,720	509	4,229	
June	4,223	479	4,702	
July	4,189	385	4,574	
August	3,918	440	4,358	
September	4,748	580	5,328	
October	4,901	584	5,485	
November	4,640	451	5,091	
December	5,013	346	5,359	
Total 1958	55,319	5,584	60,903	
Total Value 1958	22,516	4,318	26,834	

^{1/} Preliminary data.

Table 2 - U. S. Production of Fish Sticks, 1954-1958

Month	1958 ^{1/}	1957 ^{2/}	1956	1955	1954
	(1,000 Lbs.)				
January	5,471	4,261	4,862	5,345	2,771
February	5,925	5,246	5,323	5,794	3,180
March	5,526	5,147	6,082	7,205	4,003
April	4,855	4,492	3,771	5,953	3,841
May	4,229	3,380	3,873	4,879	3,941
June	4,702	3,522	3,580	5,392	4,381
July	4,574	3,821	3,153	4,340	3,810
August	4,358	4,643	4,166	4,520	4,364
September	5,328	4,861	4,085	4,536	4,272
October	5,485	5,162	5,063	5,261	5,637
November	5,091	4,579	4,585	4,946	4,803
December	5,359	4,014	4,019	4,876	4,959
Total	60,903	53,128	52,562	63,046	49,962

^{1/} Preliminary data. ^{2/} Revised.

9 percent was made up of uncooked fish sticks. The year's production of fish sticks was greatest in February, when 5.9 million pounds were manufactured. March and October followed with 5.5 million pounds each.

Table 3 - U. S. Production of Fish Sticks, By Areas, 1958 and 1957

Area	1958 ^{1/}		1957 ^{2/}	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States	24	49,905	27	43,531
Inland and Gulf States	4	6,003	5	5,084
Pacific Coast States	12	4,995	11	4,513
Total	40	60,903	43	53,128

^{1/} Preliminary data. ^{2/} Revised.

FISH PORTION PRODUCTION: During 1958 about 21.7 million pounds of fish portions were packed. Of this amount, 91 percent consisted of breaded portions (3.4 million pounds cooked and 16.4 million pounds uncooked). Unbreaded portions

Table 4 - U. S. Production of Fish Portions (Produced from Blocks), 1958^{1/}

Month	Breaded			Unbreaded	Total
	Cooked	Uncooked	Total		
(1,000 Lbs.)					
January	316	1,446	1,762	211	1,973
February	251	878	1,129	125	1,254
March	351	989	1,340	131	1,471
April	251	1,788	2,039	229	2,268
May	246	1,061	1,307	171	1,478
June	303	1,084	1,387	117	1,504
July	213	1,760	1,973	188	2,161
August	386	1,050	1,436	80	1,516
September	155	1,274	1,429	137	1,566
October	306	2,091	2,397	163	2,560
November	278	1,558	1,836	143	1,979
December	300	1,438	1,738	273	2,011
Total 1958	3,356	16,417	19,773	1,968	21,741
Total Value 1958	1,654	5,504	7,158	796	7,954

^{1/} Preliminary data.

accounted for the remaining 2.0 million pounds or 9 percent. Production was largest during October (2.6 million pounds). April was next with 2.3 million pounds.

Fish portions are defined as uniform pieces of fish blocks, different from fish sticks in size and shape. Collection of production data on fish portions was started the last quarter of 1958.

Table 5 - U. S. Production of Fish Portions (Produced from Blocks), By Areas, 1958^{1/}

Area	1958	
	No. of Firms	1,000 Lbs.
Atlantic Coast States	19	12,047
Inland, and Gulf, and Pacific Coast States	7	9,694
Total	26	21,741

^{1/}Preliminary data.
Note: During 1958, four firms produced fish portions that did not produce fish sticks.

FISH STICK AND FISH PORTION PRODUCTION BY AREA:

The Atlantic Coast States led all other areas in the production of fish sticks and fish portions with 49.9 and 12.0 million pounds, respectively. The inland and Gulf, and

Pacific coast areas followed with 9.7 million pounds of fish portions and 11.0 million pounds of fish sticks.

Table 6 - U. S. Production of Fish Portions (Produced from Blocks), By Quarters, 1958^{1/}

Period	Breaded			Unbreaded	Total
	Cooked	Uncooked	Total		
	(1,000 Lbs.)				
1st Quarter	918	3,313	4,231	467	4,698
2nd Quarter	800	3,933	4,733	517	5,250
3rd Quarter	754	4,084	4,838	405	5,243
4th Quarter	884	5,087	5,971	579	6,550
Total	3,356	16,417	19,773	1,968	21,741

^{1/}Preliminary data.



U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, OCTOBER 1958: Imports of edible fresh, frozen, and processed fish and shellfish into the United States during October 1958 increased by 6.4 percent in quantity and 6.1 percent in value as compared with September 1958. The increase was due primarily to higher imports of groundfish fillets (up 5.6 million pounds) and frozen shrimp (up 3.9 million pounds), and to a lesser degree, an increase in the imports of other fillets, and canned salmon. These increases were partly offset by a 5.0 million pound decrease in the imports of frozen tuna (including albacore) and frozen salmon (down 1.0 million pounds).

Compared with October 1957, the imports in October 1958 were up by 6.0 percent in quantity and 9.0 percent in value due to higher imports of groundfish fillets, frozen tuna other than albacore (up 8.4 million pounds), canned tuna in brine, and frozen shrimp. Compensating, in part, for the increases was a drop of about 2.4 million pounds in the imports of groundfish and other fillets and frozen and canned salmon (down 3.8 million pounds).

United States exports of processed fish and shellfish in October 1958 were higher by 164.3 percent in quantity and 246.2 percent in value as compared with September 1958. Compared with the same month in 1957, the exports in October 1958 were

United States Foreign Trade in Edible Fishery Products, October 1958 with Comparisons

Item	Quantity			Value		
	October 1958	1957	1957	October 1958	1957	1957
	(Millions of Lbs.)			(Millions of \$)		
Imports:						
Fish & shellfish:						
Fresh, frozen, & processed ^{1/}	98.3	92.4	837.0	27.9	26.3	248.4
Exports:						
Fish & shellfish:						
Processed only ^{1/} (excluding fresh & frozen)	11.1	4.2	69.7	5.8	1.3	16.8

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

higher by 136.4 percent in quantity and 246.2 percent in value. The exports in October 1958 as compared with the same month in 1957 were sharply higher due to increased supplies of exportable California sardines and Pacific salmon. The exports of processed fish and shellfish in October this year returned to a normal pattern, (October 1956 exports totaled 11.8 million pounds).

* * * * *

GROUND FISH FILLET IMPORTS: Year 1958: 1958 imports of groundfish (including ocean perch)

Country of Origin	1958 ^{1/}	1957 ^{1/}	1956
	(1,000 Lbs.)		
Canada	103,013	108,309	99,810
Iceland	29,141	22,283	27,178
Japan	763	2	-
Norway	6,201	4,590	4,124
Denmark	9,774	3,150	3,010
United Kingdom	237	77	-
Netherlands	554	564	480
France	91	190	919
West Germany	3,977	1,240	2,036
Greenland	189	532	811
Miquelon & St. Pierre	709	243	321
Union of South Africa	66	-	19
Sweden	-	-	6
Total	154,715	141,180	138,714

^{1/} Revised.
 Notes: (1) Data on 1958 imports revised because a substantial quantity of fish bits and pieces blocks were reclassified from a different category and included under the groundfish fillet and block category.
 (2) See Chart 7 in this issue.

Preliminary data indicate that fillets and blocks into the United States reached the record total of 154.7 million pounds--9.6 percent or 13.5 million pounds more than in 1957. The drop in imports from Canada was more than offset by increased imports from Iceland, Norway, Denmark, and West Germany.

December 1958: Imports of cod, haddock, hake, pollock, cusk, and ocean perch fillets (including blocks) into the United States during December 1958 totaled 8.0 million pounds--an increase of 952,000 pounds or 14 percent as compared with the same month of 1957.

The quota of groundfish and ocean perch fillets and blocks permitted to enter the United States at 1 $\frac{7}{8}$ cents a pound in the calendar year 1958 was 35,892,221

pounds, based on a quarterly quota of 8,973,055 pounds. The quota for the calendar year 1957 amounted to 37,375,636 pounds. Imports during individual quarters in excess of the established quarterly quota enter at a duty of 2 $\frac{1}{2}$ cents a pound.



Wholesale Prices, January 1959

The over-all mid-month January 1959 wholesale price index for selected edible fishery products was about unchanged from the preceding month because price increases and decreases occurred over a relatively narrow range. On the other hand, the January 1959 edible fish and shellfish (fresh, frozen, and canned) wholesale price index (135.4 percent of the 1947-49 average) was 9.5 percent higher than in the same month last year due to price increases for all the products in the index, except canned salmon, California sardines, and tuna.

The January 1959 price index for the drawn, dressed, and whole finfish subgroup was 1.9 percent lower than in December 1958 due to lower prices for almost all items. But compared with January 1958, the subgroup index this January remained substantially higher (30.5 percent) due to higher prices for all items included.

The fresh processed fish and shellfish subgroup index this January was higher by 4.2 percent due to an 8.0 percent increase in fresh shrimp prices at New York City and an increase of 1.6 percent for fresh haddock fillet prices at Bos-

ton. Shucked oyster prices in January 1959 were unchanged from the preceding month. The index in January 1959 as compared with the same month in 1958 was higher by 6.9 percent because fresh haddock fillet prices were up 31.3 percent, fresh shrimp prices were up 6.8 percent, and shucked oyster prices were up 2.1 percent.

The index for January 1959 for frozen processed fish and shellfish was down slightly (0.8 percent) from December 1958 due only to a drop of 2 cents a pound in the frozen 26-30 count shrimp price at Chicago. The frozen fillet prices were unchanged from mid-December 1958 to mid-January 1959. From January 1958 to January 1959, wholesale prices for the subgroup were up 5.8 percent because the prices of all products in the subgroup were higher.

In January 1959 canned fish prices were higher by 0.6 percent as compared with December 1958 due to an increase of about 50 cents a case in canned pink salmon prices at Seattle. This increase more than offset another drop in prices for California sardines. Canned Maine sardines and California tuna prices were unchanged from December 1958 to January

this year. When compared with the same month a year ago, prices in January this year for the selected canned fish items were higher by 1.5 percent due to a 32.7-percent increase in the Maine sardine prices. All other items in the subgroup were lower this January as compared with January a year ago. Primary wholesale markets for Maine sardines and Pacific

salmon remained firm, but California sardines were moving slowly and sales of tuna were maintained at a high level due only to vigorous promotion on the part of the canners. Movement of canned tuna into consumption was good because the canners were willing to lower prices in order to move large inventories which are the result of a record pack in 1958.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, January 1959 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices ^{1/} (\$)		Indexes (1947-49=100)			
			Jan. 1959	Dec. 1958	Jan. 1959	Dec. 1958	Nov. 1958	Jan. 1958
			ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					135.4
Fresh & Frozen Fishery Products:					160.6	2/160.1	147.4	140.3
Drawn, Dressed, or Whole Finfish:					174.1	177.5	155.0	133.5
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.23	.23	232.9	235.0	152.3	152.3
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.34	.34	103.7	104.2	105.2	96.4
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.78	.79	174.1	176.9	174.1	138.8
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.67	.75	166.1	185.9	179.7	146.3
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.73	.90	146.6	182.0	151.7	128.4
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.66	.65	153.6	152.4	117.3	111.4
Processed, Fresh (Fish & Shellfish):					154.2	148.0	138.7	144.2
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.63	.62	214.4	211.0	163.3	163.3
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.95	.88	150.1	139.0	128.0	140.6
Oysters, shucked, standards	Norfolk	gal.	6.00	6.00	148.5	148.5	148.5	145.4
Processed, Frozen (Fish & Shellfish):					138.9	140.0	135.5	131.3
Fillets; Flounder, skinless, 1-lb. pkg.	Boston	lb.	.42	.42	108.6	108.6	108.6	103.4
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.41	.41	128.7	128.7	127.1	117.7
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.31	.31	124.9	124.9	120.8	114.8
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.89	.91	137.7	139.6	132.7	131.5
Canned Fishery Products:					98.9	98.3	101.1	100.4
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	22.00	21.50	114.8	112.2	112.2	120.0
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.00	11.00	79.3	79.3	86.2	81.8
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs. 3/	Los Angeles	cs.	7.75	8.25	91.0	96.9	96.9	113.8
Sardines, Maine, keyless oil, No. 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	8.47	8.47	90.1	90.1	87.5	67.9

^{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/} Revised.

^{3/} Pricing beginning with January 1959 on price per case of 48 cans instead of 24 cans. Index for previous months is comparable.

