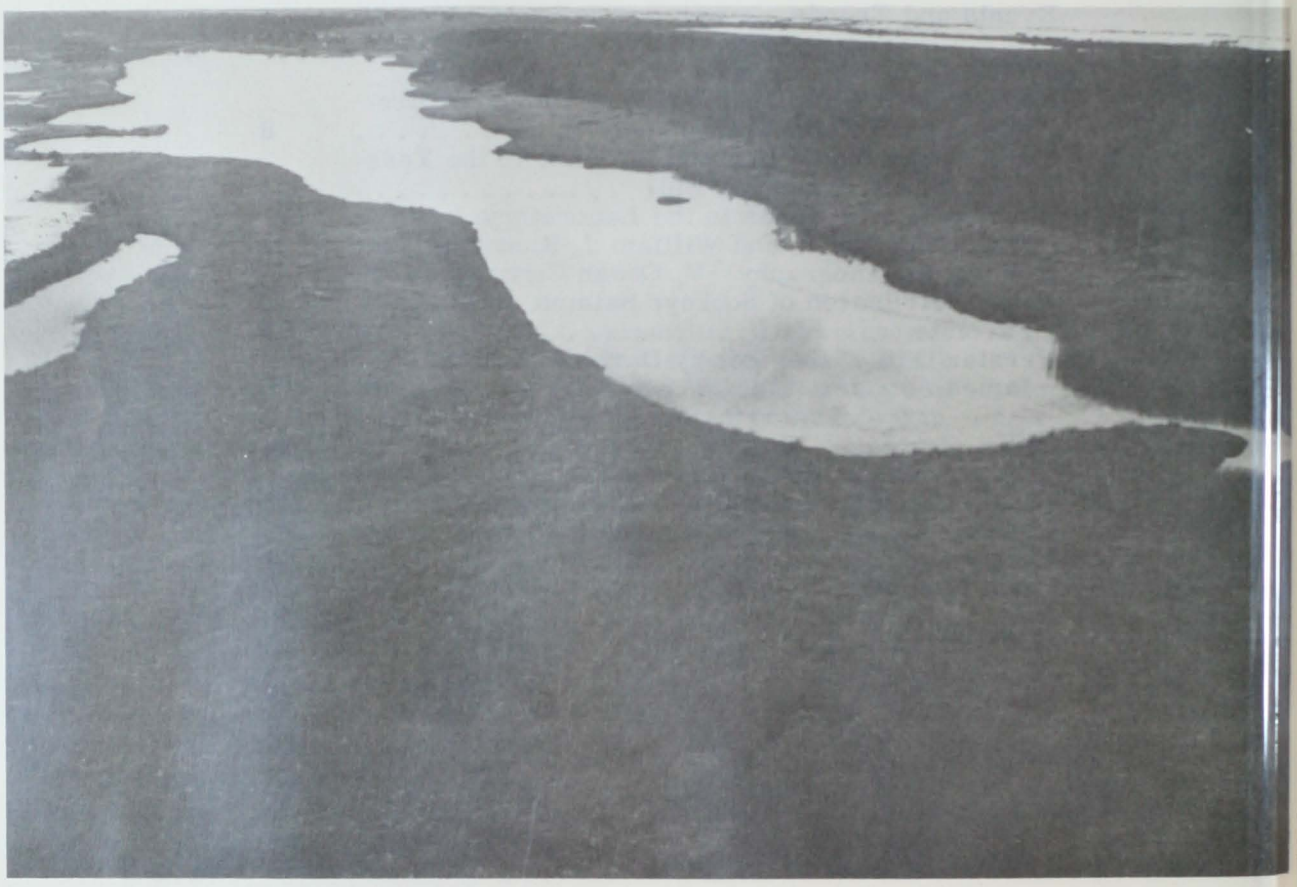


Horn Island, part of Gulf Islands in Gulf of Mexico off Texas. (National Park Service, M. W. Williams)

INTERIOR SEEKS COASTAL-ZONE LEGISLATION

The Department of the Interior has asked Congress to establish a new national program to encourage and help coastal and Great Lakes states to protect and develop their estuarine and other coastal lands and waters. The proposed legislation is based on a 3-year Estuarine Pollution study recently completed by Interior's Federal Water Pollution Control Administration.

The legislation would authorize matching Federal grants to coastal and Great Lakes states to develop comprehensive management programs for their coastal zones. These programs would follow guidelines that are established to promote the national interest. Follow-up matching Federal grants would be provided the states to carry out the plans.

The Estuarine Study reveals that long-range land and water management is mandatory to balance increasing demands on the vulnerable estuarine waters and wetlands.

Irreplaceable Areas

Secretary of the Interior Walter J. Hickel said: "Our coastal and estuarine areas contain irreplaceable habitat for most of our sport and commercial fisheries, as well as waterfowl and other wildlife. These areas are used for recreation and enjoyment by millions of people, and the demand is rapidly increasing.

"But it is here where our population and technological pressure are the greatest. Consequently, these resources are susceptible to man's alterations, such as pollution, housing and industrial development, which continue without a comprehensive plan on a piecemeal basis.

"The legislation would assist and strengthen the role of the coastal states in the orderly planning of their land and water resources of the coastal zone."

$2 Million U.S. Grant

Under the legislation proposed by Interior, the Federal Government would be authorized to grant, on a matching basis, $2 million for fiscal year 1971. The U.S. also would make available "such sums as may be necessary for the fiscal years thereafter prior to June 30, 1975" to assist states in developing comprehensive coastal zone management programs. (See Gulf Coast, pages 11-15.)

UNITED STATES

TEKTITE II IS SCHEDULED FOR SPRING 1970

The most ambitious underwater exploration program ever attempted--Tektite II--was announced on Oct. 31, 1969, by Secretary of the Interior Walter J. Hickel. More than 50 scientists and engineers, including some from abroad, will spend varying periods in the ocean over a 7-month span.

The operation will begin spring 1970 off St. John, U.S. Virgin Islands. This was the site of Tektite I, Feb. 15-Apr. 15, 1969, in which four Interior Department scientists spent a record-breaking 60 days living on the ocean floor.

Cooperative Effort

Tektite II will be a cooperative effort of government and private organizations. The lead agency will be Interior. Others include: the National Aeronautics and Space Administration, the National Science Foundation, the Department of the Navy, the Government of the Virgin Islands, the Smithsonian Institution, Public Health Service, the U.S. Coast Guard, and the Environmental Science Services Administration. Universities will participate: New Hampshire, Texas, Rhode Island, and the College of the Virgin Islands.

The General Electric Company, which designed and built the Tektite habitat, is providing it again. GE will furnish engineering support.

Vital to U.S.

Secretary Hickel said: "The Department of the Interior intends to play a major and active role in exploring and developing our Nation's marine resources. It is vital to the United States' continued growth and development that the secrets locked in this last frontier of our planet be uncovered and fully developed and utilized to meet many of the pressing demands of the future."

Study Ocean & Man

The Tektite II program will include a major marine scientific mission and extensive human behavioral studies. As in Tektite I, special emphasis will be placed on the behavioral and biomedical problems of small crews living in isolation for long periods under stress. These are the conditions that may be encountered in space and undersea exploration.

New equipment and techniques will be developed and evaluated for increasing man's undersea performance: oceanographic instrumentation, underwater communications and navigation equipment, swimmer propulsion systems, and long-duration, closed-cycle SCUBA devices.

The Habitat

The main 2-story undersea laboratory-dwelling will be 50 feet down. A smaller 2-man habitat at 100 feet will determine whether nitrogen/oxygen breathing mixtures can be used safely there.

U.S. FISHERY PRODUCT CONSUMPTION IS STABLE

At the end of September 1969, U.S. supplies of edible fishery products were about the same as a year earlier. Larger frozen stocks at the start of 1969 and heavier imports are offsetting a probable decline in domestic landings of edible fish. Per-capita consumption in 1969 likely will equal 1968's 11 pounds. Of this figure, about 6 pounds will be fresh and frozen, $4\frac{1}{2}$ pounds canned, and $\frac{1}{2}$ pound cured products.

Inventories Slightly Lower

November 1969 inventories of all frozen fish and shellfish combined were 4% below last year. They dipped below year-ago levels for the first time this year in September. Holdings of fish are down 10%, but shellfish are 13% above 1968. November 1969 inventories of fish sticks and portions were down 17%, mainly because sales in first-half 1969 were 28% greater than 1968.

More Shellfish Stocks

Larger stocks of shellfish resulted from sluggish sales reflecting consumer resistance to higher prices in 1969. Retail prices for all fishery products have been running 4 to 5% above a year earlier. The increase is less than that of meat and eggs--but larger than for most other foods.

Wholesale Price Higher

Wholesale fish prices have been running 10% higher than a year ago. Wholesale prices for fresh and frozen fish and shellfish are averaging 15% higher; prices for some canned products are averaging a fraction below last year. Fish sticks and portions--and cod and ocean-perch fillets--are among the few fresh and frozen items whose prices have not advanced much.

Imports Higher

Imports of edible fishery products through August 1969 were 4% above a year earlier. Imports of fish fillets rose 16%. Imports of frozen tuna were about the same as 1968; imports of canned tuna increased nearly a fourth. Imports of shellfish also were higher, sparked by an 8% increase in shrimp.

New England Landings Drop

Landings of edible fish in New England through September 1969 were 15% less than in 1968. Among the popular varieties, flounder landings were up slightly. Cod increased 17%. More than offsetting these increases were declines of 37% for haddock, 8% for ocean perch, and a more than 50% drop in whiting catch.

Forecast Through Dec. 1969

BCF economists provide this forecast for major fishery products for the remainder of 1969: Supplies of most fishery products are expected to be ample, although price levels, in general, will be higher than last year. Supplies of fresh and frozen salmon and Pacific halibut will be heavier than in 1968. Domestic production of canned tuna may be off a little. Inventories of frozen crabs are considerably above a year ago. These resulted in some price weakness recently for all varieties of West Coast crabs. Prices for live lobsters likely will average higher than a year ago; supplies will be about the same. Supplies of haddock will remain relatively short and prices higher than a year earlier. Supplies of cod fillets will be heavier than a year ago and prices about the same as in late 1968. Supplies of flounder and ocean perch fillets likely will be a little larger and prices higher.

SITUATION & OUTLOOK: SHRIMP, SEA SCALLOPS, NORTHERN LOBSTERS, SPINY LOBSTER TAILS

SHRIMP

Supplies of shrimp are running a little heavier than a year ago, BCF economists report. Total landings are higher than a year ago and may pass the record landings of 1967. At the end of October 1969, landings in the Gulf States were 8% behind October 1968. However, this decline was being offset by higher landings in the South Atlantic States, New England, and on the West Coast.

A bucket-load of Kodiak-caught shrimp is dumped in a processing plant container. (BCF-Alaska photo: J.M. Olson)

Imports

In the first 10 months, imports were about 5% above a year earlier. Imports for 1969 probably will set a new record at close to 220 million pounds, heads-off weight.

Fresh & Frozen Shrimp

Sales of fresh and frozen shrimp dropped sharply--about 7%--during the first 10 months of 1969. Total sales of fresh and frozen shrimp likely will be 15 to 20 million pounds, heads-off weight, lower than last year. The sales decline probably is the result of these factors: (1) record high prices, (2) no gain in "real" disposable personal income in 1969 after allowances are made for inflation, and (3) little growth in restaurant sales.

Inventories Rise

Inventories are considerably above a year ago because sales dropped while supplies increased slightly. Cold storage holdings on January 1, 1970, probably will be higher than this year's carryover and may be slightly higher than the record inventory at the start of 1968.

With record prices at all levels, no gain over a year earlier was expected in sales of fresh and frozen shrimp during November-December 1969 if prices remained at mid-November levels. A slight drop in sales from last year may be in prospect.

In light of the current inventory and sales situation, price strength does not appear likely except, possibly, for larger-sized shrimp. Even if prices hold steady at current levels, they still will average considerably higher than in November-December 1968.

SEA SCALLOPS

Total supplies are down 15% from a year ago. The general decline in abundance of northwest Atlantic sea scallops continued in 1969. Landings in New England are the lowest since 1945. Landings in Middle Atlantic and Chesapeake Bay States are much below a year ago. Scallop landings in Alaska have not been large enough to offset the East Coast deficit. Scallop landings in Canada and, consequently, scallop imports are down about 10% from January-October 1968.

Consumption of sea scallops also is down about 15%. Demand for sea scallops has not declined in 1969 even though consumption fell considerably. Lower supplies and higher prices caused the drop in sales. Because of this drop, prices for sea scallops at all levels have risen sharply since midyear 1969; currently, these average considerably higher than a year ago.

Though a drop in sales was expected during November-December 1969, compared with a year ago, inventories on January 1, 1970, probably will be lower than at the start of 1969.

Prices for the rest of 1969 will average much above a year ago and will continue high in the early months of 1970. Scientists expect abundance to continue low--so the prospect for increased domestic landings of sea scallops in 1970 is not bright.

NORTHERN LOBSTERS

Landings in Maine are down a little this year, but the decline probably is being offset by increased landings from offshore areas where lobster pots are being fished. Total landings for 1969 likely will be about the same as 1968. Imports from Canada also are about the same as a year ago.

During January-September 1969, prices paid to fishermen and at wholesale averaged nearly the same as in 1968. Prices are higher now and are expected to remain above year-ago levels for the rest of 1969. Prices for 1969 will average higher than a year ago--the effect of strong demand on a relatively fixed supply.

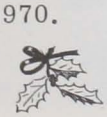
SPINY LOBSTER TAILS

Supplies of imported spiny lobster tails are slightly heavier in 1969 than in 1968. Imports were down a little for the first 10 months, but higher inventories account for the larger supplies.

Imports of cold-water tails are down considerably this year. As a result, warm-water tails have a much larger share of the market than in previous years.

The almost constant increase in lobster tail prices since mid-1967 halted in summer 1969. In first-half 1969, prices for cold-water tails were 90 cents to $1 higher than a year ago. Resistance to the price climb has been evident all year: sales have lagged 8 to 10% and inventories have mounted. Prices have dropped sharply since midyear--as much as a dollar per pound for cold-water tails--as efforts are being made to increase sales and decrease inventories before the seasonal upswing in imports at the beginning of 1970.

Supplies of lobster tails will be plentiful for the rest of 1969. Lower prices likely will increase the sales over November-December 1968. However, the January 1, 1970, carryover in cold storage will be considerably above that at the start of 1969 and likely will be a record. With high inventories at the start of 1970, and seasonally heavy imports, relatively stable prices are in prospect for the early months of 1970.



FIRST TAGGED ATLANTIC SWORDFISH RECOVERED

The first swordfish ever to be tagged and recaptured in U.S. Atlantic waters was taken off Martha's Vineyard, Mass., reports the Sandy Hook Marine Laboratory (Highlands, N. J.) of Interior Department's Bureau of Sport Fisheries and Wildlife. When recaptured, about 48 miles east-southeast of tagging site, it had been at liberty almost 4 years--1,408 days. It weighed 356 pounds dressed; its total weight was about 535 pounds.

Montauk & Martha's Vineyard Sites

The swordfish was first caught and tagged on Aug. 25, 1965, 20 miles south of Montauk, N. Y. The tag was an M-type dart tag, a tiny stainless steel harpoon with a plastic message capsule attached. The fish was harpooned and recovered on July 4, 1969, about 40 miles south of Martha's Vineyard.

Swordfish Distribution

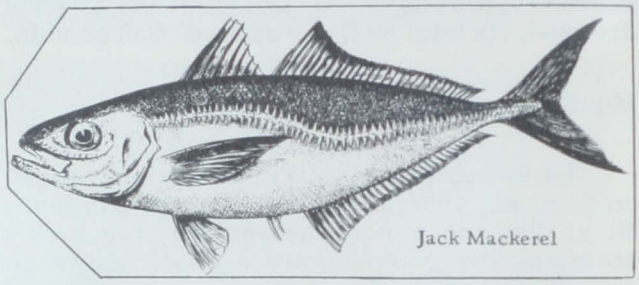
Swordfish are found throughout the world in tropical and temperate areas. They are recorded from Newfoundland to Cuba in the western north Atlantic. Present off the north Atlantic coast from late June or early July, they remain throughout the summer. Then they move south and offshore into deeper water along the edge of the continental shelf. Swordfish are sought by anglers and commercial fishermen using hook and line, harpoons, and longline gear.

World Record

The world's record hook-and-line swordfish was taken off Chile. It weighed 1,182 pounds. The largest taken in the western north Atlantic was 602 pounds. Swordfish taken along the Atlantic coast in recent years averaged 200 to 300 pounds, although several fish over 300 pounds were reported in 1969.

JACK MACKEREL'S SWIMMING SPEED IS DETERMINED

Dr. John Hunter of BCF's laboratory in La Jolla, California, has completed a study of the swimming ability of the jack mackerel. This medium-sized predator ranges over a million-square-mile oceanic region off the west coast of North America from Mexico to Alaska. It is an area as big as Alaska, Texas, and California combined.



Jack Mackerel

Dr. Hunter and his assistants worked with a flow channel he designed. This flow channel is the "wet" equivalent of a wind tunnel or treadmill. The major features of swimming behavior he studied were the frequency of the tail beat, the amplitude of the tail beat, and the relationship of these two factors to swimming speed and body length. He found a simple mathematical relationship among these factors that could be applied as well to many other kinds of fish.

Determining Its Speed

When swimming at a constant speed, the amplitude of the tail beat was a constant $\frac{1}{5}$ of the fish's body length. The tail of a ten-inch jack mackerel moves back and forth 2 inches. The swimming speed itself is a simple function of tail-beat frequency. When the tail beats 9 times per second, the 10-inch fish is propelled at 4 miles per hour (3.5 knots); when the tail beats 4 times per second, the fish moves 1.4 miles per hour (1.25 knots).

When changing speeds, the amplitude of the tail beat increases momentarily until the new constant speed is attained when the amplitude drops back to the constant $\frac{1}{5}$ body length and the tail-beat frequency characteristic of the new speed is retained. Tail-beat frequencie up to 25 per second were recorded, but no fis was able to keep a "pace" greater than beats per second. At 8 beats per second, t fish could swim almost indefinitely.

Can Swim Far

It is now possible to illustrate how the ja mackerel may range over the 2000 x 500 mi area of the northeast Pacific. At the hi cruising speed (4 mph), the jack macker could swim 1000 miles in about 11 days; the lower cruising speed, the same fish woul cover this distance in a month. Adult jac mackerel are about 20 inches long. The could easily range 1000-1500 miles betwee the breeding grounds off Mexico and the feed ing grounds off Washington, British Columbia and Alaska. If the jack mackerel had a goo sense of direction, the entire 3000-mile roun trip could be accomplished in about 4 days.

Speed Probably Geared to Food

An older generalization pertaining to a travel in air and water is that it takes abou 4 times as much energy to travel at twice th speed. The swimming speed the jack mack erel uses when searching for food is probabl geared to the amount of food the fish is likel to find. Schooling habits of the jack macker and their food will have to be studied to u ravel this.

These basic swimming facts were appli to fish as widely different as a goldfish a shark. It appears that the simple mathema ical relations developed from the ja mackerel study may bear on much wid swimming-speed problems. This generali may be sufficient for many questions abo swimming speed. The estimates fro such a generality will provide the startin point for more precise work on other spe cies. Dr. Hunter's study will save muc time, effort, and money in new researc programs seeking to estimate and defin swimming speeds.

BCF DISTRIBUTES ALASKAN FISHING LOG OF SCALLOP EXPLORATIONS

BCF's Exploratory Fishing and Gear Research Base in Juneau, Alaska, has made available to fishermen and other interested persons a fishing log of Alaska scallop explorations conducted in summer 1969. The explorations started west of Kodiak Island and extended westward along the southern coast of the Alaska Peninsula.

90-Day Scallop Explorations

On Aug. 19, 1969, the charter vessel 'North Pacific' completed 90-day scallop explorations to locate beds of commercial importance in this area. The cruise involved a search pattern of 646 stations at 5-mile intervals within the 25-60-fathom depth zone. Thirty-minute dredge hauls were made at each station using a standard commercial 13-foot, New Bedford-type, scallop dredge with 4-inch rings and using 1-inch cable.

Fig. 1 - Bags of iced scallops wait to be processed in this Seward, Alaska, processing plant.

Fig. 2 - Scallops are packed in 5-pound boxes at Alaskan Scallop Fleet plant in Seward.

Fig. 3 - Scallops are placed in refrigerated vans for shipment to 'south 48' (U.S.) via van ships.

(All BCF-Alaska photos: J. M. Olson)

THE GULF COAST: 1. DANGER IN THE ESTUARIES

NEW U.S. policy aims to promote development of coastal areas and the Great Lakes. The Coastal Zone of the Gulf of Mexico is an important part of this national goal. The October 1969 issue of 'Gulf Review,' published by the 18 Southern institutions of higher learning in the Gulf Universities Research Corporation, focuses on the Gulf.

"Estuaries and pollution have become inseparable in America's affluent society," the newsletter states. Each year in the U. S., public health officials condemn more shellfish water because of pollution than they reopen. Estuarine pollution is a very important matter in the Gulf Coast area, which produced more than 275 million pounds of shellfish in 1967.

Gulf's Shoreline 88% Estuarine

'Gulf Review' states: "The Gulf's 17,141 miles of tidal shoreline are 88 percent estuarine in character. Thirty-nine primary estuarine systems and 175 secondary-tertiary systems account for approximately 60,000 square miles along the Gulf. And these systems serve as receptacles for run-off from all or part of thirty-one states. Twenty-four U.S. trunk rivers, draining more than 1.5 million square miles of land, dump approximately 700 million tons of sediment into the Gulf estuarine environment. These rivers have an average total discharge amounting to 205.5 cubic miles of water which pass through the estuarine environment each year. The sediment and waters which eventually find their way to the Gulf carry with them chemical wastes, industrial pollutants, insecticide and pesticide residue, and myriad other man-produced toxins which threaten the life of the Gulf's estuaries.

"The effects of man have already begun to show up. The U.S. commercial catch of eight species of estuarine dependent fish in the Gulf and Atlantic coasts fell from 393 million pounds in 1955 to 291 million pounds in 1965."

Texas Pesticide Study

The Texas Parks and Wildlife Department has been studying pesticides, primarily DDT, since 1965. It has monitored most of the State's coastal bay system and taken random samples from the Gulf. Oysters, forage fish, game or predator fish, and shore birds have been included.

The highest residues have been found consistently in the Lower Laguna Madre. In forage fish samples, average DDT residues ranged from 0.173 part per million (ppm) to 3.275 ppm.

All oyster tissue samples averaged much less than 1 ppm DDT or other pesticides.

'Gulf Review' states: "Evaluation of the data taken during the study indicates that the impairment of reproductive ability and decrease in the survival of young are the greatest dangers to a species at the present time." DDT residues in the Texas study were "still much below the danger level." The newsletter notes that DDT has been banned in some parts of the U.S. because of its effects on the marine environment.

2. MARSHES & MARICULTURE

"Much of the coastal zone of the Gulf of Mexico is marshland. The Gulf's lowlands and deltas, fed by the discharge of 24 U. S. rivers, account for hundreds of thousands of square miles of the coastal zone. In this soft, wet, and often inundated land, tidal pools provide a breeding ground for marine life and establish a refuge for sea birds and other wildlife.

"Conservationists have long appreciated the vast desolation of the salt marshes but the interests of industry, agriculture, and other user groups have recently turned to this resource."

Pompano Research in Louisiana

Louisiana State University (LSU) and Texas A&M University (TAMU) are conducting Sea Grant-sponsored fishery studies in Gulf marshlands.

The LSU work has shown that pompano can live in water that does not have the high salinity content of their native ocean habitat. Pompano are growing in tanks with water of

salinity comparable to the brackish water of the Louisiana marshes.

LSU scientists believe the fish can be raised in brackish water ponds in the widespread Louisiana marsh. Pompano fish farms would develop--as with catfish. If the research shows pompano can be farmed successfully, "pompano crops may become an important new industry for the marsh country."

In the first experiments, pompano fingerlings placed in ponds did not grow to market size in a year. But the researchers are optimistic.

Texas Research on Shrimp Farming

Near Angleton, Texas, TAMU is experimenting with marsh use for shrimp farming. Researchers are developing manmade ponds in the boggy marsh.

Three natural marsh ponds were leveed and ten half-acre reservoir type ponds were built. In April 1969, 17,000 post-larvae brown shrimp averaging 8 mm were put in a $1\frac{1}{2}$-acre natural pond. Ninety days later, the shrimp had reached mean length of 147 mm; market value was 856 per pound.

In July, a harvest flume designed by the researchers collected the shrimp. The flume is a floodgate through which water is drained from pond. Shrimp are trapped in a net stretched across the flume. The brown shrimp were susceptible to the flume. They reacted as though they were returning to the Gulf on an outgoing tide.

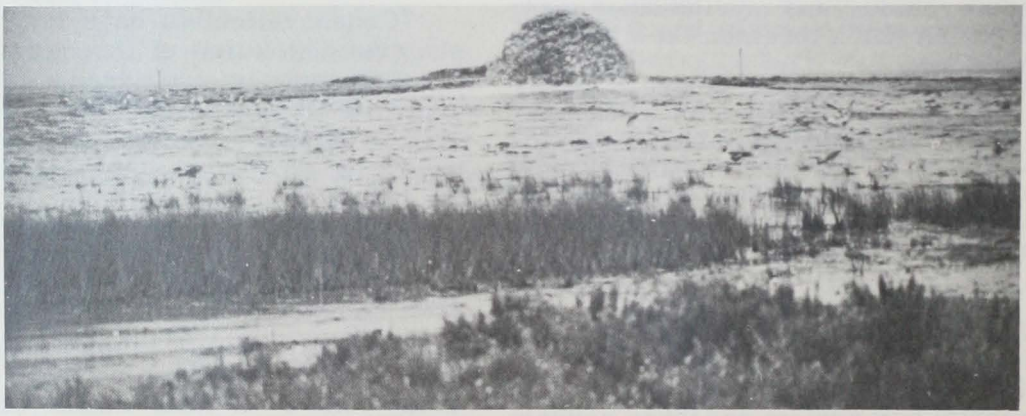
Fish Predation A Problem

In the first experiment, the chief problem was that fish ate many shrimp. To evaluate effect of the fish predation, the natural ponds were stocked in August with juvenile white shrimp. A fish toxicant, rotenone, was applied to one pond. Diuron was used to control all aquatic vegetation. A commercial catfish food supplemented natural foods.

Early sampling showed survival in all ponds greater than in the earlier experiment. Where predators were eliminated, growth rate was highest. The researchers advise that an accurate measure of survival will have to wait the shrimp harvest.

BEFORE

AFTER



Destruction of valuable estuarine marsh by spoil from hydraulic dredging for real estate development. The mound in the right background is the discharge end of the dredge line. The widespread effect upon the marsh and water areas is readily evident.

3. CAMILLE: DEVASTATES GULF COAST

In early morning, Monday, Aug. 18, 1969, as Hurricane Camille's 200-mile-an-hour winds lessened, the U.S. Food and Drug Administration's New Orleans District put into operation its prepared plan to meet a natural disaster. All inspectors, chemists, sanitation engineers, and microbiologists were alerted for service. Other FDA districts sent specialists.

Using whatever means of communication were still working, FDA contacted State and local health and civil defense officials in Mississippi, Louisiana, and Alabama to determine the hardest-hit areas and the ways FDA could help.

The following are excerpts and photos from 'FDA Papers', October 1969, which tell part of the FDA operation following Hurricane Camille.

"After building steadily to full intensity for several hours, Hurricane Camille's Sunday punch came at 10 p.m. August 17, striking the Gulf Coast with unprecedented 200-miles-an-hour winds that continued unabating until 2 a.m. Monday. Although the entire coastal area felt some of the hurricane's impact, its biggest was against the coasts of Mississippi, southeast Louisiana, and Alabama, destruction by winds ranging in some places up to 200 miles inland. Along the Mississippi and Louisiana coasts tidal waves up to 20 feet high slammed impartially into the works of man and nature alike, destroying, flooding, and killing.

"Within 48 hours the same hurricane was to carry torrential rains as far as central Virginia, precipitating flash floods there that brought further death and destruction, before heading out to sea to die in the Atlantic.

"On the Gulf Coast the hurricane, its potential death toll kept down only by hurried, partial evacuation of the most dangerous areas, had left thousands homeless and jobless, had wiped out almost the entire economies of some cities that were built largely on seafood processing and the tourist trade, and had so flattened the mostly residential Mississippi city of Pass Christian that it was later almost entirely reevacuated of returning inhabitants. It had left almost all the immediate coastal areas without electric power,

Fig. 2 - A field of canned seafood and fruit drinks.

telephones, gas, passable roads and bridges, potable water supplies, workable sewerage, safe food, and adequate medical facilities and supplies.

"The winds and tidal waves had downed or defoliated trees small and large, had twisted steel and concrete structures and undermined pavements and seawall, and had even beached three oceangoing freighters docked and lashed together at Gulfport, Mississippi, along with many smaller vessels. In most areas waterfront structures were flattened or in ruins, including those of the extensive seafood packing industry along the coastline, where these products in cans were scattered and exposed to the elements and to hungry human scavengers.

"Flooded, mosquito-breeding areas, dispossessed rats, snakes, and other vermin,

Fig. 1 - One of shrimp trawlers beached by Camille.

Fig. 3 - Employes of seafood packing plants wash and sanitize cans in vast salvage operation. (All photos FDA)

and the unburied bodies of animals and humans, unfit drinking water, unrefrigerated perishable foods, the lack of public eating and sleeping accommodations, together with intermittent spells of rain and hot sun, posed the threat of famine and disease. Clearly, the hurricane had left in its wake a public health problem of the worst order, one that called for the utmost and combined efforts of State, local, and Federal health, law enforcement, and civil defense officials, the military, and the citizenry."

Seafood Inspection

FDA inspectors began the enormous job of checking, "street-by-street, door-to-door," seafood-processing and other food firms to see what foods could be saved and what had to be thrown away.

An FDA "reconditioning" team "kept watch over the operations of firms seeking to recondition products potentially fit for distribution into commerce. For canned seafood and other canned products, reconditioning consisted of sorting unlabeled cans by code numbers stamped on the can to identify the product, washing the can in detergent, and dipping it in a sanitizing bath. Cans beginning to rust were examined for pinholes and were required to be buffed to remove traces of rust. The reconditioning was a special problem because of the unavoidable exposure of the cans to the weather and the difficulty the firms encountered in finding qualified people to do the salvaging work. . .

"At the Port of Gulfport (Miss.) some 800 tons of fishmeal and a million one-pound cans of cat food were flooded, and FDA Inspectors maintained surveillance over destruction by burial of all but 100 tons of the fishmeal that was removed to Louisiana for reconditioning under an agreement reached between Mississippi and Louisiana State authorities."

1968 GREAT LAKES COMMERCIAL FISHERY PRODUCTION DECLINED

The 1968 catch by U.S. and Canadian Great Lakes commercial fishermen was 115.7 million pounds, about 12 million below 1967 but less than $300,000 lower in value. This was reported by the Great Lakes Commission.

The substantial catch decline was due primarily to a lower alewife harvest in Lake Michigan. Excluding alewife, the 1968 catch was up about 2.8 million pounds from 1967 due to Canadian gains. U.S. landings of species other than alewives were about 40 million pounds for both years.

Particularly important in Canada's harvest are landings of yellow perch and smelt. The 1968 catch of perch from Province of Ontario waters was a record. In 1967 and 1968, this species was about half total weight of Canadian commercial catch; smelt landings were a quarter.

20 Species Commercially Important

About 20 species are netted by commercial fishermen in significant quantities--50,000 pounds or more annually. But of this group, 10 species provide most of the production and income for U.S. fishermen; Canadian lake fishermen rely heavily on 5 species.

Below are figures compiled by BCF Ann Arbor, Mich.

Catch & Makeup Vary Widely

The commercial catch varies widely for the several lake basins in size and composition. For combined U.S.-Canadian production, Lake Erie is normally the leader. But, in 1967, the top position went to Lake Michigan as a result of the exceptional catch of alewives; this brought Lake Michigan's share of Great Lakes total to 46%. However, the 1967 value of Lake Erie's U.S.-Canadian catch was $4.7 million, compared to slightly under $3 million for Lake Michigan.

In 1968, Lake Erie again became production leader. Catch rose to 51.3 million pounds, up 2 million over 1967; the lake remained first in value despite drop to $4.1 million.

	1967 (000 Lbs.)	1968 (000 Lbs.)	1967 (000 $)	1968 (000 $)
U.S. total	81,957	67,324	5,961	5,766
Lake Ontario	284	342	63	71
Lake Erie	11,615	11,921	1,326	1,165
Lake Huron	3,211	2,678	476	439
Lake Michigan	58,951	45,810	2,963	3,087
Lake Superior	7,895	6,573	1,133	1,004
Canadian total	45,646	48,340	4,834	4,746
Lake Ontario	1,832	2,010	243	284
Lake Erie	37,770	39,416	3,339	2,972
Lake St. Clair	810	1,122	200	271
Lake Huron	2,666	2,428	700	815
Lake Superior	2,568	3,364	351	404
U.S.-Canada total	127,603	115,664	10,795	10,512

	Pounds				Dollar Value			
	1967 (000s)	% of Total	1968 (000s)	% of Total	1967 (000s)	% of Total	1968 (000s)	% of Total
U.S. total	81,957	100	67,324	100	$5,961	100	$5,766	100
10-species	78,924	96	64,043	95	5,219	88	4,948	86
Alewives	41,895	51	27,194	40	447	7	280	5
Chubs	11,313	14	11,126	17	1,743	29	1,722	30
Carp	6,579	8	2,093	9	329	6	207	4
Yellow perch	5,778	7	5,267	8	715	12	621	11
Lake herring	3,831	5	3,663	5	433	7	423	7
Sheepshead	2,568	3	3,154	5	102	2	65	1
Smelt	2,776	3	3,115	5	95	2	98	2
Coho salmon	1,484	2	1,999	3	161	3	320	6
Whitefish	1,600	2	1,704	2	922	15	1,054	18
White bass	1,100	1	728	1	272	5	158	3
Canadian total	45,646	100	48,340	100	$4,834	100	$4,746	100
5-species total	39,588	87	42,265	87	3,983	82	3,846	81
Yellow perch	22,700	50	24,931	52	2,401	50	2,104	44
Smelt	12,660	28	12,490	26	508	10	486	10
Lake herring	1,924	4	2,715	6	90	2	166	3
Walleye	1,498	3	1,098	2	581	12	568	12
Whitefish	806	2	1,031	2	403	8	522	11

Canadian figures: Ontario Dept. of Lands & Forests.

Lake Michigan

In U.S. Great Lakes fishery, the Lake Michigan catch of 45.8 million pounds in 1968 was 68% of total compared to about 72% in 1967 record year (second table). The 1968 catch was nearly $3.1 million; it was the first $3-million year since 1958.

The Alewife

The alewife is found in all Great Lakes, but is sought by commercial fishermen only in Lake Michigan. There, the population recently became particularly high. In 1968, the catch was about 27.2 million pounds, or 14.7 million lower than 1967 record. However, it is a low-value species used for fish meal, oil, and pet foods. So this decline did not affect substantially the Lake Michigan catch value. In fact, the increase in dollar value of coho salmon, introduced into Great Lakes in 1966 and caught commercially only in Lake Michigan, was about equal to 1967-68 decline in value of alewife landings (first table).

The Chub

The chub is the most valuable commercial species in U.S. Great Lakes. Lake Michigan accounts for a large share. L. Michigan's yield rose from 9.1 million pounds in 1967 to about 10.2 million in 1968. For 1968, the value was $1.6 million, or 52% of total.

Yellow Perch

In contrast, the yellow perch catch in Lake Michigan presents a dismal outlook. The annual production of 4-5 million pounds in the early 1960s fell to new low of 632,000 in 1968. A significant cause was competition for food from the alewife, which has hampered perch in growing to marketable size.

OTHER LAKES

Lake Erie: U.S. catch in 1968 was only slightly above 1967's all-time low. Canadian 1967 & 1968 landings were among largest on record. This was due primarily to new yellow perch highs. This species ranks first in the commercial fishery on both sides of international boundary.

Lake Huron: U.S. landings were at a new low in 1968, only about half the early 1960s' figures. It was due to declines in some species--chub most noteworthy. Canadian production dropped substantially.

Lake Superior: The U.S. harvest in 1968 was lowest since early 1920s. This was due primarily to steady decrease in catch of lake herring: 3.7 million pounds compared to 10-11 million in 1950s. Canadian catch was highest since 1959.

Lake Ontario: The commercial fishery has remained stable. The annual catch usually amounts to somewhat over 2 million pounds. Canadian fishermen account for major share.

Lake St. Clair: The commercial fishery is limited to Canadian waters, where the harvest remains fairly stable. Walleye landings of 226,000 pounds in 1968 were worth close to half the dollar value of total catch.

FUR SEALS INCREASE AT CALIFORNIA ROOKERY

A new breeding colony of Northern fur seals on San Miguel Island off California has more than doubled since its discovery in July 1968 by scientists from the University of California and the Smithsonian Institution.

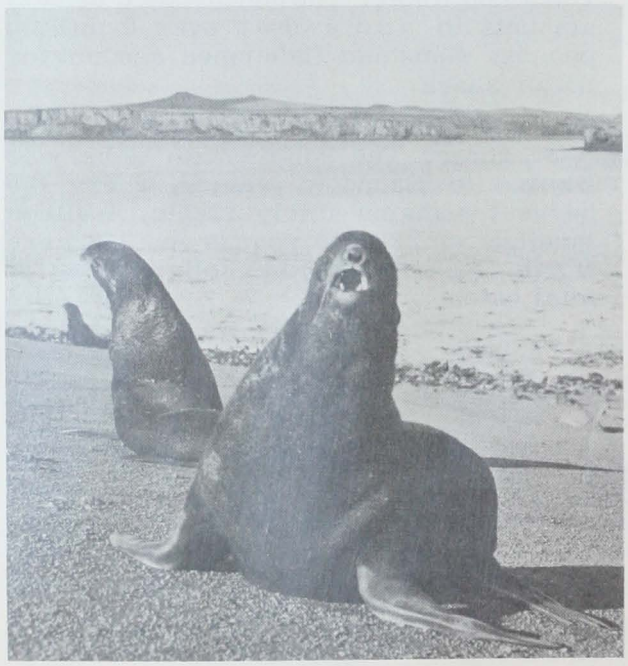
When the colony was found, there was a maximum of 86 fur seals. The herd was ruled by a lone "beachmaster," as a lordly breeding bull is called.

1969 Breeding Season

At the height of the breeding season in summer 1969, about 175 females were on the island. There were 4 adult bulls; 3 of them presided over harems.

There were fewer pups in 1969: only 26 compared with 36 in 1968. Reasons for the decline are unknown and BCF scientists will continue their study of the new colony.

Following their migratory habits, more than half the fur seals had left the island by early October 1969.



Fur seal bulls.

The Northern fur seal has a strong homing instinct. It usually returns to the rookery of its birth each year during the breeding season. Fur seals from other rookery islands were the main source of the increased population in 1969.

Santa Barbara Spill

Dr. Leslie L. Glasgow, Assistant Secretary of the Interior for Fish and Wildlife, Parks, and Marine Resources, said he was gratified to learn of the increased fur seal population. This was because of public concern for marine mammals expressed during the oil spill in Santa Barbara Channel in early 1969.

In June 1969, Interior Department reported no evidence that deaths of seals or sea lions on San Miguel Island could be attributed to oil pollution. In addition to fur seals, the island is inhabited by elephant seals, sea lions, some Stellar sea lions, harbor seals, and an occasional visiting Southern fur seal.

The Navy owns the island. Under an agreement with it, Interior's National Park Service has assumed responsibility for wildlife.

FISH SCHOOLS COUNTED BY SONAR FOR FIRST TIME

Fish schools were counted and measured in a 200,000-square-mile area off California and Baja, California, from BCF's 'David Starr Jordan.' This assessment of fish abundance is the first of its kind using sonar. The technique will yield a more exact assessment of the ocean's fishery resources.

A Million Schools

Data analyses indicate about one million schools of fish in the area. Most were about 66 feet in diameter, although a considerable number were much larger. A 66-foot school would yield an estimated 30 tons of fish. Many schools are probably young fish too small to catch. Other schools are northern anchovy, jack mackerel, bonito, Pacific mackerel and Pacific sardine of commercial size.

WOODS HOLE REPORTS ON 4-YEAR GAME-FISH TAGGING PROGRAM

Woods Hole (Mass.) Oceanographic Institution recently issued the results of a 4-year Cooperative Game Fish Tagging Program. The program's coordinator was Frank J. Mather III, Associate Scientist at the Institution.

Valuable information was provided by sport fishermen "leading to concern for the conservation of certain game fish species, primarily the bluefin tuna."

Biological Information Sought

The program's objectives are to obtain basic biological information that also can be used to manage fisheries. The game fish tagged are primarily tuna, marlin, sailfish, and amberjack. From 1965 until 1969, 18,193 fish were tagged--and 1,972 tags recovered and returned. Tagging exceeded the previous 11-year total of the program that started in 1954.

Mather says that "although the increased number of releases was very encouraging, the fivefold increase in the number of returns is much more important."

Bluefin Tuna

Bluefin tuna accounted for nearly 40% of all fish tagged and produced over 90% of the returns. This high return--plus a decline in commercial tuna catch--indicates bluefin stock is smaller than had been estimated and is being exploited very heavily. Based primarily on this program's results, FAO has recommended conservation of the species. It will discourage commercial fishing of bluefin weighing less than 22½ pounds. The newly formed International Commission for the Conservation of Atlantic Tunas, recognized by 16 nations, will have authority to enforce the measures necessary to conserve tunas and billfishes.

Long Migrations

Two long migrations of giant bluefin were recorded. One tagged in the Bahamas in May 1967 was recaptured 50 days later off Bergen, Norway. This brings to 6 the transatlantic migrations of giant bluefin recorded by the program. Also recorded were 34 migrations of school bluefin tagged off Long Island (N.Y.) and Cape Cod (Mass.) and recovered in the Bay of Biscay. The annual variability of these migrations has a potential effect on western European fisheries. No westerly transatlantic migration of tuna has been recorded.

The longest liberty of a tagged tuna was recorded in August 1968 at Cape St. May's, Nova Scotia: a bluefin tagged south of Nantucket in November 1960. The fish required 8 years to increase from about 100 pounds to

405 pounds. It indicates that Woods Hole estimates of time required to replace stocks of giant tuna (based on growth studies) have been conservative.

White Marlin

Important progress was made in tracing white marlin migrations. "A definite cyclical migratory pattern has been established for those which furnish the summer fishing between Cape Hatteras and Cape Cod." Sufficient white marlin are being tagged in this area, but Woods Hole urges increased tagging in southern waters to clarify population identity and migratory patterns of other stocks. The first two recoveries of tagged blue marlin indicate that these great fish also can be tagged successfully.

Atlantic Sailfish

Atlantic sailfish tagging numbered 3,833; 45 were returned. "Although less dramatic than those for tuna or marlin, the results are of considerable interest." A sailfish marked off Jacksonville, Fla., in June 1969 and recaptured off Fort Lauderdale, Fla., in October 1969 was first direct proof of southward migration. It showed need for increased tagging in northern Florida-to-Cape Hatteras area to supplement these studies.

Striped Marlin

Striped marlin tagging in the Pacific is carried on jointly with the Tiburon Marine Laboratory of the Bureau of Sport Fisheries and Wildlife. A recently recovered WHOI tag indicates one of the longest recorded migrations for this species. A fish tagged off Catalina Island, Calif., was recaptured 2,000 miles away, about 975 miles north of the Marquesas Islands.

Greater Amberjack

Return rates for the greater amberjack have risen within the past 4 years, but fishing pressure does not threaten total population. There were several new record long-distance migrations. The amberjack is a very hardy fish and the death rate due to tagging is low; for this reason, "interesting new results may be expected."

Program Objectives

Objectives of the Woods Hole program center on identifying populations and determining effects of fisheries on them, especially bluefin tuna. "Methods include increased tagging of baby bluefin tuna, particularly in southern waters, increased tagging of white marlin in southern waters, and of sailfish and greater amberjack in the northern parts of their ranges. Harpoon tagging of free-swimming fish appears to offer great possibilities for increased tagging of giant bluefin and swordfish."

FOREIGN FISHING OFF U.S., OCTOBER 1969

NORTHWEST ATLANTIC (Fig. 1)

During October, 256 individual foreign fishing and support vessels were sighted (340 in Sept. 1969; 177 in Oct. 1968). Number decreased from about 240 early in month to about 100 at month's end, a normal decrease for this season.

USSR: 62 medium side trawlers, 34 factory stern trawlers, 2 factory base ships, 6 refrigerators, 2 tankers, and 1 tug. Early in month, about 100 were along 30-fathom curve from 35 miles south of Shinnecock Inlet, L.I., to 30-40 miles south and east of Nantucket. At mid-month, from Cultivator Shoals to Northern Edge, Georges Bank; at month's end, about 60 vessels remained centered south of Martha's Vineyard and Nantucket. Principal catches were herring and mackerel (south of

Fig. 1 - Foreign vessels fishing off southern New England and Georges Bank, October 1969. Number of vessels, country of origin, and species fished.

Nantucket and on Georges Bank), red hake (south of Montauk Point, Long Island), and whiting.

Poland: 32 large side trawlers, 7 stern trawlers, 2 factory base ships, and 3 carriers (50 in Sept. 1969; 23 in Oct. 1968). Along Georges Bank from Cultivator Shoals to Northern Edge, early in month; east and south of Nantucket after mid-month. Moderate-to-heavy catches of herring and mackerel. Some red hake south of Nantucket.

East Germany: 32 factory and freezer stern trawlers, 11 side trawlers, and 2 factory base ships (50 in Sept. 1969; 38 in Oct. 1968). East of Cape Cod and Nantucket to northern slopes of Georges Bank early in month; none sighted late in month. Moderate catches of herring.

West Germany: 28 stern trawlers (29 in Sept. 1969; 35 in Oct. 1968). Fished same areas as East Germans early in month; none sighted late in month.

Spain: 24 stern and side trawlers, pair-trawling early in month; none sighted late in month.

Japan: 2 stern trawlers sighted among foreign fleets on Northern Edge of Georges Bank.

Iceland: 6 herring purse seiners that had been operating out of Gloucester, Mass., departed during first-half October.

Norway: 2 medium purse seiners and 1 large seiner, based at Gloucester, replaced Icelandic seiners. Herring catches were only fair. One large seiner on Georges Bank departed because of poor catches.

GULF OF MEXICO & SOUTH ATLANTIC

No foreign fishing vessels observed in October.

OFF CALIFORNIA

USSR: One medium trawler, about 20 miles out, near Oregon border. Catch: probably black cod or hake.

Japan: One stern trawler underway, not fishing. R/V 'Kaiyo Maru,' en route to Southwest Atlantic, called at San Diego, October 25-30.

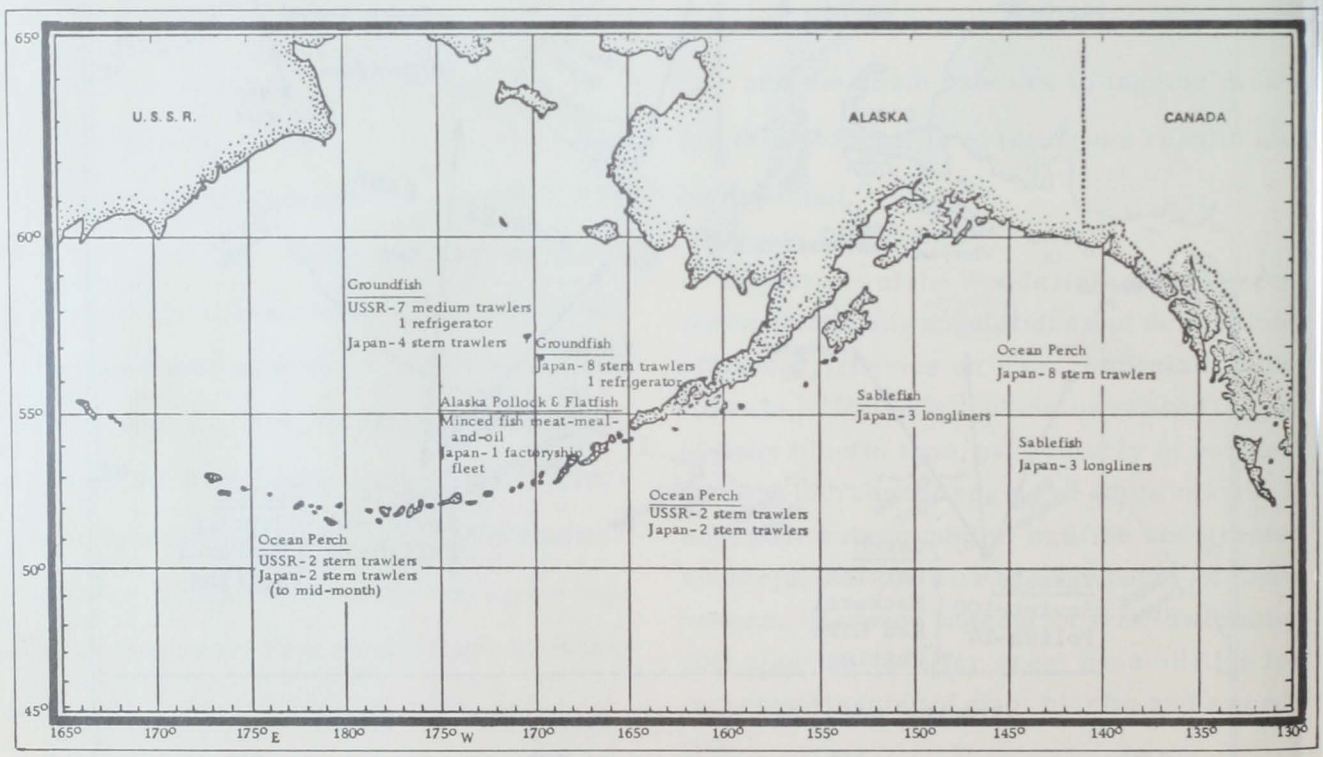


Fig. 2 - Soviet & Japanese fisheries off Alaska, October 1969.

Fig. 3 - Fishermen aboard BCF's 'Miller Freeman' operating in Bering Sea prepare to inspect their experimental drag catch as a Japanese fishing vessel crosses their stern. (BCF-Alaska photo: J. M. Olson.)

OFF PACIFIC NORTHWEST

USSR: 21 large stern freezer and factory trawlers, 1 medium side trawler, 6 support vessels, and 3 research vessels. About 10 stern trawlers 40 miles WNW of Destruction Island and 16-60 miles off Cape Flattery early in month (10-15 believed off Oregon). In 2nd week, 18 vessels between Yaquina Head and Cape Blanco off Oregon, a few off Washington, and a small group south of Vancouver Island on La Perouse Bank. After mid-month, about 25 vessels were off Oregon, and a few were scattered off Washington. Catches: Pacific hake.

The research vessels were from the Pacific Institute for Fisheries and Oceanography (TINRO). One, the SRTM 8437, was equipped with high-intensity lights, and may have been test-fishing Pacific saury.

OFF ALASKA (Fig. 2)

USSR: 12 vessels, less than half the number in October 1968, and as many as in July and August 1969 (17 in Sept. 1969); the fewest since Soviet year-round fisheries began in 1963.

Japan: The decrease that began in August leveled off in early October at about 40 vessels.

South Korea: A stern trawler that had begun fishing Alaska pollock in eastern Bering Sea in late September was joined by another in early October. It is believed both returned home some time after mid-month.