

(R. K. Bright)

NIXON PROPOSES WORLD TREATY TO SHARE SEABED RESOURCES

On May 23, President Nixon issued the following statement on U.S. Oceans Policy:

The nations of the world are now facing decisions of momentous importance to man's use of the oceans for decades ahead. At issue is whether the oceans will be used rationally and equitably and for the benefit of mankind or whether they will become an arena of unrestrained exploitation and conflicting jurisdictional claims in which even the most advantaged states will be losers.

The issue arises now--and with urgency--because nations have grown increasingly conscious of the wealth to be exploited from the seabeds and throughout the waters above, and because they are also becoming apprehensive about ecological hazards of unregulated use of the oceans and seabeds. The stark fact is that the law of the sea is inadequate to meet the needs of modern technology and the concerns of the international community. If it is not modernized multilaterally, unilateral action and international conflict are inevitable.

This is the time then for all nations to get about resolving the basic issues of the future regime for the oceans--and to resolve them in a way that redounds to the general benefit in the era of intensive exploitation that lies ahead. The United States as a major maritime power and a leader in ocean technology to unlock the riches of the ocean has a special responsibility to move this effort forward.

Therefore, I am today proposing that all nations adopt as soon as possible a treaty under which they would renounce all national claims over the natural resources of the seabed beyond the point where the high seas reach a depth of 200 meters (218.8 yards) and would agree to regard these resources as the common heritage of mankind.

The treaty should establish an international regime for the exploitation of seabed resources beyond this limit. The regime should provide for the collection of substantial mineral royalties to be used for international community purposes, particularly economic assistance to developing countries. It should also establish general rules to prevent unreasonable interference with other uses of the ocean, to protect the ocean from pollution, to assure the integrity of the investment necessary for such exploitation, and to provide for peaceful and compulsory settlement of disputes.

I propose two types of machinery for authorizing exploitation of seabed resources beyond a depth of 200 meters.

First, I propose that coastal nations act as trustees for the international community in an international trusteeship zone comprised of the continental margins beyond a depth of 200 meters off their coasts. In return, each coastal state would receive a share of the international revenues from the zone in which

it acts as trustee and could impose additional taxes if these were deemed desirable.

As a second step, agreed international machinery would authorize and regulate exploration and use of seabed resources beyond the continental margins.

The United States will introduce specific proposals at the next meeting of the United Nations Seabeds Committee to carry out these objectives.

Although I hope agreement on such steps can be reached quickly, the negotiations of such a complex treaty may take some time. I do not, however, believe it is either necessary or desirable to try to halt exploration and exploitation of the seabeds beyond a depth of 200 meters during the negotiating process.

Accordingly, I call on other nations to join the United States in an interim policy. I suggest that all permits for exploration and exploitation of the seabeds beyond 200 meters be issued subject to the international regime to be agreed upon. The regime should accordingly include due protection for the integrity of investments made in the interim period. A substantial portion of the revenues derived by a state from exploitation beyond 200 meters during this interim period should be turned over to an appropriate international development agency for assistance to developing countries. I would plan to seek appropriate Congressional action to make such funds

available as soon as a sufficient number of other states also indicate their willingness to join this interim policy.

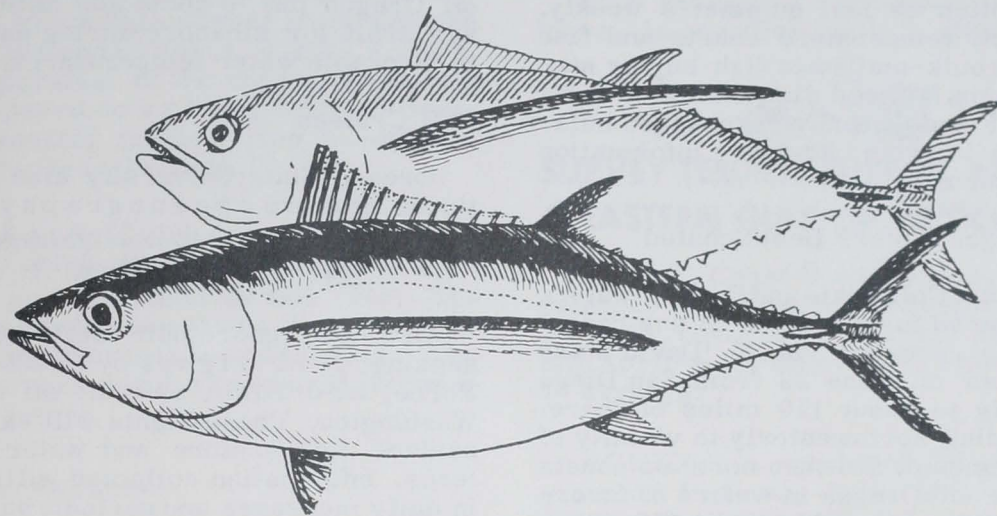
I will propose necessary changes in the domestic import and tax laws and regulations of the United States to assure that our own laws and regulations do not discriminate against U.S. nationals operating in the trusteeship zone off our coast or under the authority of the international machinery to be established.

It is equally important to assure unfettered and harmonious use of the oceans as an avenue of commerce and transportation, and as a source of food. For this reason the United States is currently engaged with other states in an effort to obtain a new law of the sea treaty. This treaty would establish a 12-mile limit for territorial seas and provide for free transit through international straits. It would also accommodate the problems of developing countries and other nations regarding the conservation and use of the living resources of the high seas.

I believe that these proposals are essential to the interests of all nations, rich and poor, coastal and landlocked, regardless of the political systems. If they result in international agreements, we can save over two thirds of the earth's surface from national conflict and rivalry, protect it from pollution and put it to use for the benefit of all. This would be a fitting achievement for this 25th anniversary year of the United Nations.



INFORMATION FOR PACIFIC ALBACORE FISHING MAY BE BEST EVER



Albacore fishermen, buyers, processors, and other interested parties have been notified that advisory information to the albacore fishing industry this season promises to be the best on record. It will include "a forecast and the outlook for the 1970 season, daily broadcasts of albacore information over marine radio bands, temperature charts, fish bulletins, and early and late season scouting and survey cruises."

The information results from the cooperation of BCF Fishery-Oceanography Center at La Jolla, Calif., Oregon State University (OSU), Navy Fleet Numerical Weather Central at Monterey, Fish Commission of Oregon, California Department of Fish and Game, Washington Department of Fisheries, U.S. Weather Bureau, NASA, and albacore fishermen, buyers, and processors.

1970 Issues Forecast

A forecast of the outlook for the 1970 albacore season was issued by BCF in early June. It includes short-term projections of albacore distribution, oceanographic and atmospheric trends, and landings. Much environmental information used by BCF in albacore forecasting operations is made available through cooperation with the Navy at Monterey.

BCF and OSU Albacore Central are cooperating closely in daily broadcast over radio station WWD, licensed to BCF and located on

campus of Scripps Institution of Oceanography at La Jolla, and Astoria Marine Operator (KFX, 2598 Khz). Broadcasts include latest albacore information from research vessels, cooperating fishing vessels, and unloading station operators. Broadcasts contain sea-surface temperature and other oceanographic and weather information that may be useful to albacore fishermen.

15-Day Temperature Charts

BCF is continuing decade-old practice of issuing 15-day sea-surface temperature charts from April 15 to October 31, or until season ends, for area roughly between central Baja California and Vancouver Island out to 135° W. A fish bulletin is issued with each temperature chart. This began about June 15 and will continue to end of season.

These bulletins include: information on oceanographic and atmospheric trends, locations of productive fishing areas, changes in market and unloading conditions that may affect effort.

Also, BCF is publishing a 30-day chart showing barometric pressure and wind direction and speed for the previous 30 days; and a chart showing 10-year average barometric pressure and winds for that month.

In addition, OSU Albacore Central again is issuing fish bulletins and sea-surface tem-

perature charts. These charts concentrate on small-scale features along Oregon coast out to 200 nautical miles as information becomes available. These probably will not be issued as often as last summer's weekly. BCF and OSU temperature charts and fish bulletins are bulk-mailed to fish-buying stations and others for hand distribution to fishermen. BCF and OSU have exchanged bulk-mailing lists to extend advisory information to more fishermen.

Calif. & Oregon Waters Best Scouted

This season, California and Oregon waters are best-scouted for albacore of any recent year. BCF's research vessel 'David Starr Jordan' sailed on June 22 from San Diego southwesterly to about 150 miles offshore. It is proceeding northwesterly to vicinity of San Juan Seamount, and then north up coasts of California and Oregon in waters of favorable temperature, probably about 150 miles off-shore. This track is flexible. It will be altered if necessary depending on early-June conditions. The cruise will end on July 3 in Newport, Oregon. Jordan will sail on for other studies.

Trolling During Cruise

Trolling for albacore during daylight is being carried out along entire track of scouting cruise. Each day's fishing begins where it stopped the day before. The thermo-salinograph is operating continuously. Information on mixed layer depth is obtained from XBT drops. Other oceanographic observations are made at night, including midwater trawl and zooplankton hauls. These will be used to obtain estimates of potential albacore forage; subsurface salinity and temperature observations are being made.

Jordan also will cruise in October to study where albacore exit the Pacific coast fishery--and what environmental condition accompany decay of albacore season.

Oregon Fish Commission Cruise

The Fish Commission of Oregon plans a 10-day charter cruise to scout for albacore in waters of favorable temperature off Oregon

starting about July 1 aboard F/V 'Sunrise'. Between June 19 and July 3, Oregon State University research vessels 'Yaquina' and 'Cayuse' are occupying hydrographic survey lines off Oregon out to about 200 miles. Vessels will troll for albacore during daylight when in favorable water temperatures.

OSU Cruises

Oregon State University also plans additional albacore oceanography cruises on Cayuse off Oregon: July 27-Aug. 2, Aug. 7-12, Aug. 25-Sept. 1, and Sept. 8-14.

OSU will coordinate series of remote-sensing overflights by Coast Guard, Air Force, and NASA aircraft off Oregon and Washington. These flights will examine sea-surface temperature and water color patterns. Information collected will be included in daily messages and periodic bulletins. All fish reports from scouting vessels, negative as well as positive, will be incorporated into daily albacore advisory broadcasts over WWT and Astoria Marine Operator. The Jordan also will transmit her fishing reports to interested boats over normal fishing-boat frequencies. Her call letters are WTDK.

Everybody's Help Needed

The success of the cooperative albacore advisory program depends on the input of timely, first-hand information from fishermen at sea, dock operators, and processors. Insufficient information restricts quality and timeliness of the advisory materials.

Fishermen have been asked to aid the research programs that seek to learn more about the "distribution, abundance and availability of albacore tuna in the northeast Pacific Ocean." Satisfactory measurement of the biological aspects of the albacore tuna populations and the effects of varying economic conditions have lagged far behind progress in monitoring and understanding the environment. Little progress has been made in estimating year-class strength, apparent fish abundance, and fishing effort for albacore. The fishermen can help by keeping log book records.



ALBATROSS IV' SURVEYS GROUND FISH OFF ATLANTIC COAST

BCF's Albatross IV has completed its annual spring groundfish survey from western Nova Scotia to Cape Hatteras, North Carolina. A "quick appraisal of the unprocessed field logs"--compared to spring 1969's--"indicates an expected further drop in haddock abundance on Georges Bank."

On the optimistic side, catches of young silver hake in Southern New England were "definitely greater" than in fall 1969. The fall 1969 catch of young silver hake also was considerably higher than fall 1968 catch. This indicates the hake population should increase in the near future.

New Stations Occupied

In addition to the standard survey stations off Georges Bank, 2 more series of stations were occupied to monitor progress of haddock spawning. The area closed to commercial fishing was included.

Maturity stages of haddock were examined. By mid-April, spawning was well along off Georges Bank--but had not yet begun on Browns Bank.



COAST GUARD-BCF ICNAF RESEARCH CRUISE UNDERWAY

On May 19, USCGC 'Rockaway' departed Norfolk, Va., to conduct an oceanographic survey of coastal waters between Nova Scotia and Cape Hatteras, N.C. It will end June 14. It is eighth in a series to support fishery research program of International Commission for Northwest Atlantic Fisheries (ICNAF).

International Program

This cooperative undertaking involves study of offshore fishery resources fished by U.S. and other member nations. The aim of the international program is to seek an understanding of natural fluctuations in abundance

of commercial fishes and to assess effects of fishing.

BCF Biological Laboratory, Woods Hole, Mass., is coordinating U.S. efforts.



SURVEY TEMPERATURE IN ATLANTIC & EASTERN GULF OF MEXICO

The U.S. Coast Guard Oceanographic Unit extended its Airborne Radiation Thermometer (ART) coverage into Gulf of Mexico during late April-early May 1970 to support EGMEX-70 surveys.

EGMEX is a combined, long-range program of Federal, state, and local oceanographic facilities to study eastern Gulf of Mexico.

During EGMEX-70, scientists and technicians are studying the Gulf Loop Current.

Loop Important

The Gulf Loop Current, a branch of the Yucatan Current, interests marine scientists and sport and commercial fishermen because of its influence on fish distribution. It enters the Gulf of Mexico through the Yucatan Straits, flows north towards Louisiana, bends east towards Panama City, then south along Florida's west coast to the Straits of Florida; there, it joins the eastward-flowing Florida Current.

Monthly ART Flights

The Coast Guard conducts monthly ART flights on U.S. East Coast from Cape Cod to Miami, Florida. Monthly charts depicting surface temperature contours and marine-animal observations are mailed to fishermen, universities, and government agencies on request from: Oceanographic Unit, Bldg. 159-E, Navy Yard Annex, Washington, D.C. 20390.



NEW ENGLAND FISHING FUTURE LOOKS GOOD TO BANK OFFICER

Allen P. Keith Jr., waterfront loan officer for the Merchants National Bank of New Bedford, Mass., says the future of the New England commercial fishing industry looks good to him. "People have to eat. And as long as they do, New England fishermen will be able to sell all the fresh fish they can catch. Fishing isn't an easy business, it never was, but you can still make a doggone good living at it."

Mr. Keith's views appeared in the April 1970 New England Marine Resources leaflet. His bank probably handles more fishing boat mortgages than any other bank in New England. He has specialized in them for nearly 7 years and knows the local fishery intimately.

Foreign Competition

He emphasizes that he does not underrate competition from foreign fleets, but he maintains that "we still have the fresh fish market, and fresh fish will always be preferred. That's what keeps New Bedford going. Our fleet can sell everything they bring in."

Boats & Men Aging

He worries about aging men and boats. "It's too bad that more young men are not following in their dad's footsteps, because once a man goes into fishing, he rarely leaves it."

The age of most commercial fishing vessels is an even greater problem--one that can never be solved without great government aid, he says. He points out that 80% of boats fishing out of New Bedford are "overage"; the situation is even more critical in Gloucester.

Painful Economics

The figures explain why. To replace an average \$30,000 vessel today would cost around \$150,000. Private dollars cannot handle the modernization of entire fleets, Keith points out. He sees U.S. subsidies as necessary to keep industry going.

He and others feel that insurance rates on fishing vessels must be lowered. A boat owner has to pay \$8,000 to \$10,000 a year in insurance before he even brings in his first catch.

His bank handles many loans that are insurance loans. It will finance them up to 75%. For many fishermen, this is a lifesaver.

Boat Mortgage Loans

A larger proportion of his business is in boat mortgage loans. The average one is for a \$150,000 vessel. Interest runs between 8% and 9%. In the first three months of 1970, the bank has had 20 such loan applications; 6 were accepted.

The bank has standards for accepting or refusing a mortgage application. The most frequent refusal is for age of boat. After 7 years, Keith points out, there is always danger of engine trouble, which is expensive. A new engine costs \$40,000 to \$50,000; installation costs another \$8-10,000. Putting a new engine in an old boat is throwing good money after bad, the bank believes. It is reluctant to lend money for a secondhand boat.

Size and design of vessel also are important. The bank won't touch a boat under 60 feet because it would not be practical for winter fishing. And year-round use is a necessity if it is to be profitable.

Design also influences bank's decision: "A boat that can't be converted easily from one kind of fishing to another just isn't efficient."

To get a boat mortgage loan from his bank the applicant's home port must be New Bedford. His boat must be documented there and buy its supplies there, though it may go afield to fish, if necessary. Keith says, "my job is to finance the port of New Bedford."

Personal Criteria

Among personal criteria of loan application which bank makes its decision are age, experience, and character. The youngest captain for whom Keith wrote a loan was 22. Before the bank lends a man money to go to fishing for himself, it wants him to show "a few year's experience, either as a captain or a mate, and to show some indication that he's a 'producer'."



Three mainstays of fishing industry: skilled hands and nylon net. Average age of fishermen continues to rise as too few youths choose the sea. Nylon makes possible large nets and large catches. (Photo: Rex Gary Schmidt)

However, the percentage of capital the applicant must put up that is his own money does influence the bank's decision. The length of mortgage varies from 3 to 5 years on a secondhand boat to 7 years on a new one to 11 years on a subsidy vessel.

Keith Offers Advice

For would-be fishing boat owners, Keith offers other useful tips. "Go to a good, reputable bank for your loan and be sure you go with a concrete, worked-out plan to show them. We few banks do as much boat mortgaging as we do; they're not familiar with the fishing industry and they won't even listen to you if you don't have a firm program to show them."

He also advises anyone planning to acquire a boat to incorporate before he does so. "If you own it as an individual," he explains, and something goes wrong, you can lose your boat and everything else you own."

It is also advisable to apply for a mortgage before starting to build. Government mortgage insurance should be applied for while the boat is still in planning stage. It costs 1% of

mortgage and diminishes proportionately as mortgage is paid.

Ordinarily, the bank does not loan money to fishermen for working capital. But Keith says this isn't a severe handicap because credit for equipment and supplies usually is readily available.

Keith's most valuable advice to young men going into commercial fishing is: "Be adaptable. Don't make up your mind you're going to do just one kind of fishing and have your boat built for that. I know of one new boat that can lobster, crab, seine, bottom trawl and midwater trawl, and she is easy to convert from one kind of fishing to another. That means she is one hundred per cent usable." This same boat, Keith adds, has not suffered, as many in the fleet have, from haddock shortage. It is simply converted to seining for herring, which is immensely popular in Europe, but almost entirely fished out in the North Sea. "They can't fill their foreign orders," he says.

"The fishing industry isn't standing still," Keith concludes. "As long as you keep diversifying, you have some place to go."



'BOWERS' EXPLORES FOR SCALLOP OFF FLORIDA'S EAST COAST

BCF's exploratory fishing vessel George M. Bowers arrived at St. Simons Island, Georgia, on April 27 after 21 days of scallop exploration off Florida's east coast. It was the second in a series of scallop-stock assessments using the Remote Underwater Fisheries Assessment System (RUFAS). The vessel is part of the BCF Exploratory Fishing and Gear Research Base in Pascagoula, Miss. Cruise Purposes

The cruise's principal objectives were to "evaluate the current calico scallop occurrence in the area; locate areas of highest yield potential; provide demonstrations of survey equipment, monitoring procedures and sample dredging operations for industry observers, and to further evaluate the modified survey equipment's capabilities in the time available."

15 Transects

15 transects were run in an easterly or westerly direction covering 156 miles. Transects were established on major loran lines and were run between the 15 and 25 fathom curve. The loran lines covered were from 3H7-1700 (east of Malibar, Florida) to 3H7-3200 (northeast of St. Augustine, Florida).

Bottom visibility with TV camera was exceptionally good. It exceeded 20 feet on many transects. On only one transect (3H7-2200) was visibility less than 5 feet.

Heaviest Concentrations

Preliminary evaluation of the video tapes indicates heaviest scallop concentrations on

this survey were off Cape Kennedy between 3H7-2100 and 3H7-2400 along 19 to 25 fathom curves. Scattered scallops were observed on most other transects. For the most part, scallops were settled individually in small conical depressions in sandy substrate--they were lying singularly or in small groupings at bottom of furrows crossing transects at northwest-southeast direction. When 265 feet of 35 mm film are processed, a more detailed evaluation will be possible.

Sled System Improved

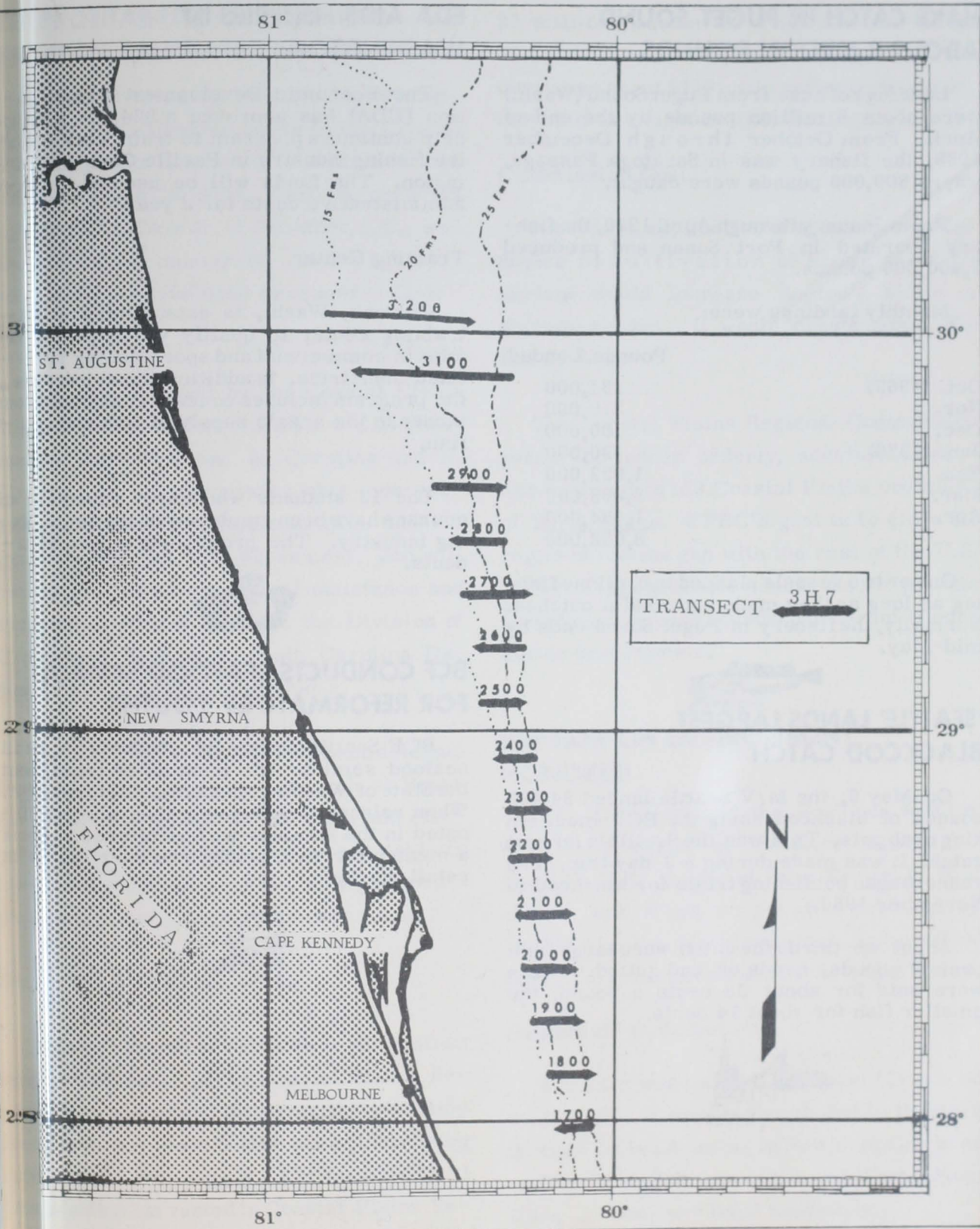
The sled system showed marked improvements over 1969 fall survey. Numerous modifications provided increased maneuverability and improved visual observation. As facility was gained on launch and recovery techniques, procedures became routine, with no noticeable strain to system.

During the day, television monitoring of the sea floor was done without artificial lighting. Two night-time transects, however, required dysprosium light; at times this gave a pronounced back-scattering effect that obscured video image. It was found that guiding the sled very close to the substrate greatly reduced this problem.

A one-day RUFAS demonstration was provided for four industry observers; fishing information and assistance were provided to scallop vessels.

(Map following page





R/V George M. Bowers, Cruise No. 90, April 7-27, 1970.

HAKE CATCH IN PUGET SOUND ABOUT 8 MILLION POUNDS

Landings of hake from Puget Sound (Wash.) were about 8 million pounds by the end of April. From October through December 1969, the fishery was in Saratoga Passage, where 600,000 pounds were caught.

From January through April 1970, the fishery operated in Port Susan and produced 7,400,000 pounds.

Monthly landings were:

	Pounds Landed
Oct. (1969)	134,000
Nov.	370,000
Dec.	100,000
Jan. (1970)	190,000
Feb.	1,922,000
Mar.	3,863,000
Apr.	1,454,000
	<u>8,033,000</u>

One or two vessels planned to continue fishing as long as they made successful catches. Normally, the fishery in Puget Sound ends by mid-May.



'SEATTLE' LANDS LARGEST BLACKCOD CATCH

On May 6, the M/V Seattle landed 24,432 pounds of blackcod using the BCF-modified king crab pots. This was the Seattle's largest catch. It was made during a 9-day trip. The vessel began pot fishing trials for blackcod in November 1969.

About two-thirds the catch were large fish: over 5 pounds, heads off and gutted. These were sold for about 28 cents a pound; the smaller fish for about 14 cents.



EDA AIDS FISHERIES IN WASHINGTON

The Economic Development Administration (EDA) has approved a \$24,900 grant to help continue a program to train workers for the fishing industry in Pacific County, Washington. The funds will be used to help pay administrative costs for a year.

Training Center

Chinook, Wash., is establishing a skill training center to qualify young people for jobs in commercial and sport fishing and related industries. In addition to marine skills, the program includes conservation courses to increase the area's supply of fish and shellfish.

The 13 students who have completed the courses have been employed in the local fishing industry. The program now has 36 students.



BCF CONDUCTS SEAFOOD SEMINAR FOR REFORMATORY YOUTHS

BCF Seattle personnel conducted a retail seafood seminar for meatcutter trainees at the State of Washington Monroe Reformatory. When released, each young man who participated in the seminar will be offered a job as a meatcutter (and seafood counter man) in the retail market.



TEST PROFITABILITY OF FARMING SHRIMP IN SALTWATER PONDS

An attempt to test the profitability of farming shrimp in saltwater ponds in the Coastal Plains Region of eastern U.S. will start soon near Dale, South Carolina. It will be conducted by Walter F. Lubkin Jr. of Beaufort, S.C., who wants to put to commercial use the aquaculture techniques developed by research biologists.

This was reported by the Coastal Plains Regional Commission (CPRC), a U.S. partnership with Georgia, S. Carolina and N. Carolina. It is sponsoring this one-year economic feasibility demonstration under a grantee-against-loss agreement. Job will be conducted with the technical assistance and supervision of biologists of the Division of Commercial Fisheries, South Carolina Department of Wildlife Resources.

Brown and white shrimp have been selected for cultivation because research at Bears Ears Laboratory in South Carolina and elsewhere has shown these species adaptable to ponded conditions. Also, they are available locally and have high market value.

Shrimp No. 1 in Value

Shrimp is the most valuable of all seafood species harvested in the Coastal Plains Region. In recent years, the demand for shrimp (at a price per pound) has been increasing much faster than supply. Between 1967 and 1971, shrimp harvested in Coastal Plains Region of South Carolina, Georgia, and North Carolina jumped from 16 million pounds to

22 million pounds; its value doubled--from \$6.5 million to \$13 million. Although the U.S. consumes about \$400 million of shrimp a year, only half is caught by U.S. fishing fleet.

Commission Goal

Successful application of aquaculture techniques to cultivation of brown and white shrimp would increase Region's share of shrimp market. It would create more jobs and income.

The Coastal Plains Regional Commission seeks "to induce orderly, accelerated economic growth in 159 Coastal Plains counties" of the 3 states. CPRC's goal is to close its region's income gap with the rest of the U.S. "by creating favorable conditions for private investment through a planned program of economic development."



BCF FILM ON ENVIRONMENT HONORED

'The Biologist and the Boy' has won for BCF a certificate of "creative excellence" from the U.S. Industrial Film Festival. It is one of two films on pollution produced by BCF's Elliot A. Macklow, Chief, Audio-Visual Services, in cooperation with the 5 Gulf States.

Nationwide Distribution

The film was recently renamed 'Crisis on the Coasts'. It will be distributed to theaters through United Artists: in New York City area on May 29, in San Francisco and Washington, D.C., in June, and later nationally.



FISH AND WILDLIFE SERVICE EXPANDS ALASKAN ROLE

The Department of the Interior's Fish and Wildlife Service (FWS) is expanding its work in Alaska, Secretary Hickel has announced. This recognizes the State's wildlife and fisheries resources--largest in the Nation--and the need for effective State-Federal cooperation to conserve them, Mr. Hickel said.

BCF has established a fisheries center at Kodiak. A Navy facility is being renovated to house research and office personnel. Located there also will be BCF's Alaska Associate Regional Director for Fisheries, who will supervise BCF research programs throughout the State.

Sport Fisheries Bureau Expands

An Area Office for the Bureau of Sport Fisheries and Wildlife (BSFW) will be established in Anchorage, effective July 1, 1970. It will coordinate and direct BSFW's efforts in Alaska to protect and enhance the important sport fish and wildlife populations.

Charles H. Meacham, FWS Commissioner, said: "Economic changes, population growth and natural resources development have created increasing problems which require additional effort in Alaska. A particular advantage in having an Alaska Area Office is the greater facility for direction and coordination of future BSFW programs and planning with the Alaska Department of Fish and Game. BSFW will now have in Alaska an office with decision-making capability to serve State agencies and the general public."



TAGGED FISH SORTED AUTOMATICALLY

A device to detect and sort out adult migrating salmon that were tagged as fingerlings with coded magnetic wire tags has been operating successfully since late April 1970 in an Ice Harbor Dam Fishway on the Columbia River. By May 14, the device had detected and segregated 109 tagged fish.



LABS COMPARE THEIR ANALYSES OF INSECTICIDE RESIDUES

Several laboratories analyzing insecticide residues in the Great Lakes are participating in an interlaboratory quality-control check sponsored by BCF.

Trout & Salmon Sampled

A lake trout and a coho salmon from Lake Michigan were ground and frozen. Samples were shipped to the laboratories to be tested for insecticide residues. The results will be compared. If there are differences, methods will be checked to determine the reason--and corrections made to insure standard results.



ARMY ENGINEERS TO WEIGH ENVIRONMENT MORE

U.S. Army regulations governing permits for work in navigable waterways will give greater emphasis to environmental values. This was announced May 19.

The impact on the public of the proposed work will be evaluated to include such factors as fish and wildlife, water quality, economics, conservation, esthetics, recreation, water supply, flood damage prevention, ecosystems and, in general, the needs and welfare of the people, as well as navigation.



FIRST WORLD FISH STANDARD DISTRIBUTED FOR ADOPTION

On April 1, 1970, the Directors-General of the Food and Agriculture Organization and the World Health Organization transmitted to the U.S. State Department the first of a series of recommended international food standards for acceptance by member and associate member nations. Among the standards are an International Standard for Canned Pacific Salmon and an International General Standard for Labeling Prepackaged Foods, and International Tolerance for Pesticide Residues.





Ocean-going vessels are used to transport Alaska's fishery products. Seward. (J. M. Olson)

'OREGON' SAMPLES RESOURCES NEAR PROPOSED S.E. ALASKA INDUSTRIAL COMPLEX

The R/V Oregon completed on April 18 the first of several scheduled quarterly cruises in Berners Bay, Southeastern Alaska, "to determine the occurrence and abundance of current and potentially valuable fish and shellfish resources" that may be affected by a proposed plywood-paper industry in Berners Bay.

The vessel is part of BCF's Exploratory Fishing and Gear Research Base in Juneau.

Fishing Gear

The Oregon used:

- A Gulf-of-Mexico-type, 40-ft. shrimp trawl
- Twelve (12) 6' by 6' by 30" king crab pots
- Four (4) standard (42") Dungeness pots
- Four (4) longline strings of 3 Herculite-covered shrimp traps (18" by 18" by 30")
- 1 $\frac{1}{4}$ " stretched mesh monofilament gillnet, 1 $\frac{1}{3}$ fathoms deep by 10 fathoms long

5 Trawl Hauls

Five trawl hauls were made, three within Berners Bay and two in Lynn Canal, immediately adjacent (chart). Hauls were 30 minutes long in 42-82 fathoms within the bay, and 158 to 163 fathoms in Lynn Canal.

Species varied more in trawl catches than in other gear. Commercially important species occurring in highest abundance were sablefish and golden crab in Lynn Canal, hauls 3 and 4, and starry flounder in Slate Creek Bight, haul 5.

King Crab Pots

Thirty king crab pots were set, all within bay, in 28 to 111 fathoms. All pots were fished

24 hours, except 19-24, which were fished 48 hours. Tanner crab was dominant species. Catches ranged from 1 (Pot 5) to 19 (Pot 17). Only one female was captured.

Pots Caught All Halibut

All 32 halibut were captured in king crab pots: 4 in Pot 16, and largest (14.93 kg) in Pot 8. Most halibut were alive and in good condition, except those in pots fished 48 hours. In those, several halibut had been reduced to skin and bones by amphipods.

Golden Crab

Golden crab were taken in two king crab pots: 4 males and one female in Pot 22 and 2 males in Pot 24. Only one king crab was taken, a 3.39 kg male in Pot 2.

Shrimp Sampling Fails

Sampling for shrimp with traps was unsuccessful. Bottom locations where shrimp might be encountered were so precipitous that gear could not be set. Alternative locations caught only snails and amphipods.

Dungeness Crab Pots

Dungeness crab pots were set in Echo Cove, Slate Creek Bight, and off mouth of Berners River. Pot 3 captured 16 male Dungeness crab and Pot 4 captured 8 male and one female; these were set near mouth of Echo Cove in 10 to 12 feet. One Dungeness crab was taken in Pot 1 set at head of Echo Cove in 40 feet. Yellowfin sole and starry crab were only other organisms taken in Dungeness pots.

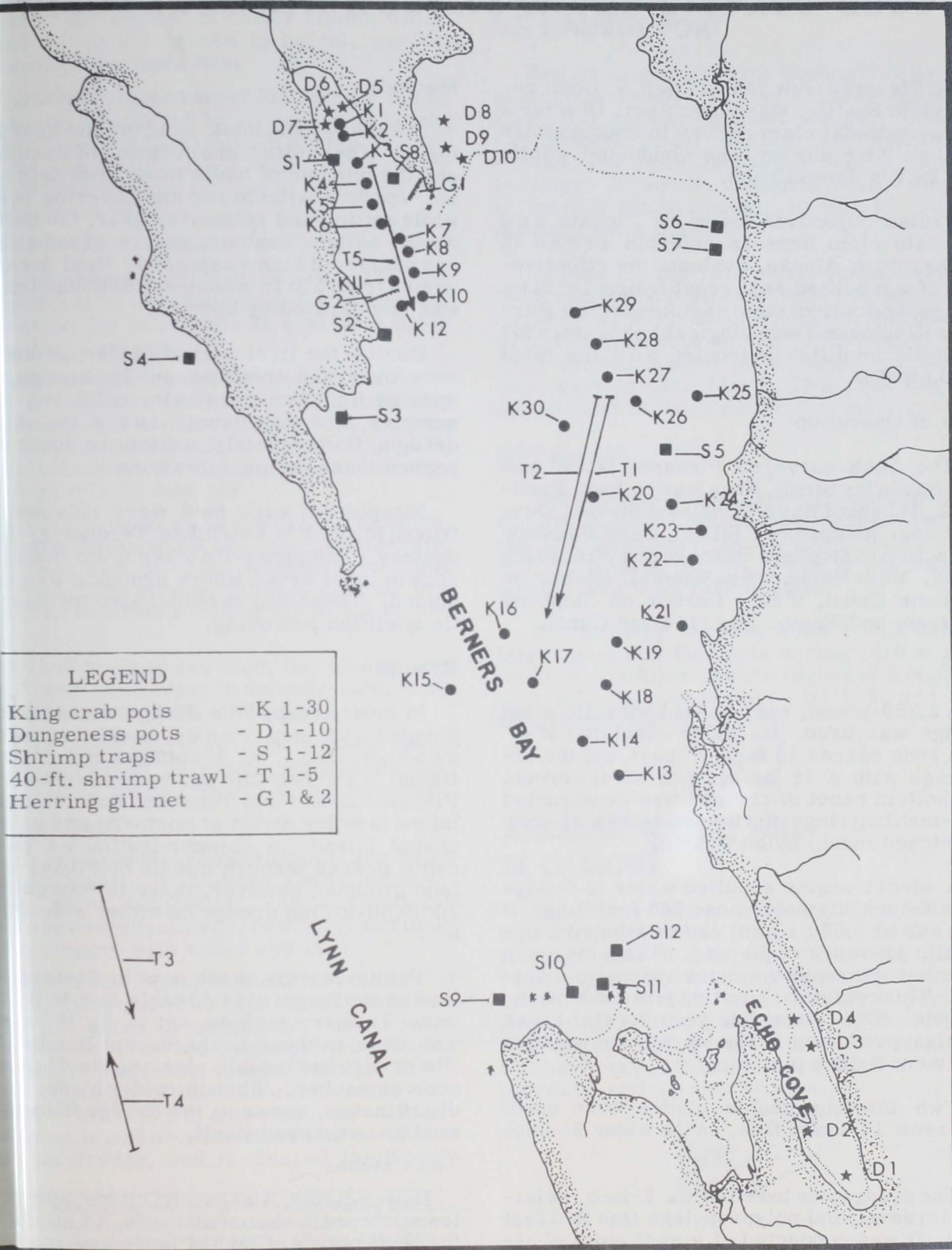
Gillnets Yield Herring

Two gillnet sets in Slate Creek Bight produced 9 herring and 2 capelin.

For further information contact: Base Director, BCF Exploratory Fishing and Gear Research Base, P. O. Box 1668, Juneau, Alaska 99801

(Map following page 15)





LEGEND

King crab pots	- K 1-30
Dungeness pots	- D 1-10
Shrimp traps	- S 1-12
40-ft. shrimp trawl	- T 1-5
Herring gill net	- G 1 & 2

R/V Oregon Cruise 70-1 gear locations.

'COBB' SURVEYS CLAMS IN SOUTHEASTERN ALASKA

BCF's research vessel John N. Cobb returned to Seattle, Wash., on April 16 after a 32-day subtidal clam survey in southeastern Alaska. The survey was conducted jointly with BCF's Juneau base.

Cruise objectives were to: "locate and delineate clam beds in selected areas in southeastern Alaska, evaluate the effectiveness of a modified east coast hydraulic clam dredge, and collect clam samples for the Bureau's Ketchikan Technological Laboratory for paralytic shellfish poisoning and the meat yield studies."

Area of Operation

The Cobb surveyed Pleasant Island and Mud Bay in Icy Strait, Neka Bay in Port Frederick, Tebenkof Bay off Chatham Straits, Duncan Canal in Kupreanof Island, Cape Fanshaw at junction of Stephens Passage and Frederick Sound, Mole Harbor and Windfall Harbor on Seymour Canal, Taku Harbor on Stephens Passage, and Funter Bay off Lynn Canal.

Gear

A 2,250-pound, east-coast hydraulic clam dredge was used. Its sides consisted of $\frac{7}{16}$ -inch rods spaced $1\frac{5}{8}$ inches apart, and the after-coverage with a $1\frac{3}{4}$ by $1\frac{3}{4}$ -inch steel screen. The bottom panel of cod end was constructed of 2-inch hog rings; the top panel was $3\frac{1}{2}$ -inch (stretched mesh) nylon webbing.

A diesel engine supplied water to dredge via a 6-inch-diameter hose 285 feet long. It was run at 1,550 r.p.m. and developed a hydraulic pressure of 80 p.s.i. The water was distributed through the main hydraulic manifold. This contained 7 cutting jets and 3 washout jets. The cutting jets were special brass nozzles producing a flat spray; the washout jets were $\frac{3}{4}$ -inch pipe nipples.

Two interchangeable blades were used: a narrow 18-inch blade, and a wider 36-inch blade.

The dredge was towed with a 2-inch, twisted, three-strand polypropylene line 260 feet long. It was connected at lowest point of attachment next to runners at front of dredge.

Methods

In each bay and inlet, at least one haul was made. The position and duration of each haul and the number of hauls in an area depended on: space available for maneuvering vessel while setting and retrieving gear, the bottom depth, bottom contour, nature of substrate, and number of clams captured. Haul duration varied from 5 to 15 minutes. Each haul catch was enumerated by species.

During the first part of cruise, scuba divers observed trenches cut by dredge, inspected bottom substrate, collected clam samples, and estimated clams missed by dredge. Unfortunately, a diving accident suspended these diving operations.

Samples of each haul were retained and frozen for BCF's Ketchikan Technology Laboratory. Samples were taken from intertidal zone in most areas where dredging was conducted. These will be tested also for paralytic shellfish poisoning.

Results

In most areas, "the dredge would become plugged with mud, rocks, boulders, water-soaked wood, or a combination of these items." The only two productive areas were Pleasant Island and Tebenkof Bay. Pleasant Island is in Icy Strait at northern end of Chichagof Island. A communication or power cable passes through middle of Pleasant Island grounds; however, there is enough area and depth to fish dredge on either side of cable.

Ten hauls were made next to Pleasant Island on southwest side of cable in 6 to 8 fathoms. The narrow blade, set to dig 14 inches was used in these hauls, except Number 3. The dredge had trouble clearing itself of mud and worm tubes. When the wider blade, set to dig 10 inches, was used, the dredge filled with mud and anchored itself.

The Catches

Butter clams, Alaska surf clams, and cockles occurred in almost all hauls. Of all clams the percentages of each of these species were 22, 25, and 10, respectively.

Catch rates of clams varied significantly by haul. The highest of butter clams, which ranged 2.6 to 4.4 inches in height, was 58 clams per 15-minute haul.

The largest catch rate of Alaska surf clam, which ranged from 1.8 to 5.9 inches in height, was 54 clams per 15 minutes of towing. Cockles, ranging from 2 to 4.6 inches wide, were taken in the dredge at rate up to 17 clams per 15 minutes of towing.

Narrow & Wide Blades

On northeast side of cable area, 17 hauls were made in 5½ to 12 fathoms: 6 with narrow blade set to dig 14 inches; 11 with wide blade set to dig 10 inches.

When using narrow blade, vessel had to be taken out of gear to slow it. This indicated narrow blade was not digging into bottom. However, the wide blade seemed to dig well; with full throttle, the Cobb moved the dredge only ¼ mile in 15 minutes.

Another indicator was the catch. Cockles, which are known to be near top of substrate, comprised 43% of catch when narrow blade was used. The largest catch of cockles in a 15-minute haul was 15 clams 2.3 to 4.2 inches wide.

When wide blade was used, the Alaska surf clam, which lies deeper in the substrate, dominated the catch: 90% of total.

Catch rates were as high as 345 clams per haul. About 90 clams made a bushel; their heights ranged from 1.9 to 5.6 inches.

Tebenkof Bay

The bay is located on Kuiu Island and faces Batham Strait. It includes 3 smaller bays: Thelis, Elena, and Petrof. Thelis, relatively deep, was unproductive. The dredge normally was clogged with rocks and mud.

In Elena and Petrof, 9 hauls were made at 10 to 13½ fathoms. The bent-nosed clam was the only clam taken in abundance. Catch rates varied from 17 to 343 clams per 10 minutes of hauling. Specimens ranged from 1.5 to 4.5 inches in height. About 340 clams made up a bushel. The bottom in these two bays apparently is quite soft because there was no resistance on dredge, and it cleared itself very well.

For further information contact: A. T. Pruter, Acting Base Director, Exploratory Fishing and Gear Research Base, 2725 Montlake Blvd. East, Seattle, Wash. 98102. (Phone: 583-7729)



ALASKA'S KODIAK IS LEADING U.S. HALIBUT PORT

Kodiak continues as the leading U.S. halibut port: this season, to May 15, landings were 1,223,000 pounds (dressed weight). This is 73% greater than landings at Petersburg, Alaska, and more than triple Seattle (Wash.) landings. However, Canada's Prince Rupert is leading Pacific coast: to May 15, halibut landings were 2,184,000.

To May 15, the 1970 North Pacific halibut landings from Areas 2 and 3A at U.S. and Canadian ports were about 6 million pounds--up 62% over same date during 1969 season. The 1970 season opened on April 25, 11 fishing days earlier than May 7, 1969, opening for Areas 2 and 3A, the 2 major production areas.

1970 Quotas

The 1970 catch quotas set by International Pacific Halibut Commission for these two areas are 20 million pounds for Area 2 and 30 million pounds for 3A. This is one million pounds less than 1969 quotas.

Preliminary records show total halibut landings at Pacific ports during 1969 season were 58.4 million pounds (dressed weight)--25.1 million pounds taken by U.S. and 33.3 million pounds by Canada.



ALASKAN WATERS WILL BE CHARTED

Six Seattle-based ships of ESSA's Coast and Geodetic Survey (CGS) will chart and map Alaskan waters this year. CGS will gather information needed to prepare up-to-date charts of the waterways leading to ports of Anchorage, Sitka, and Ketchikan; and for detailed maps of the sea bottom of Bering Sea, Norton Sound, and the Gulf of Alaska for exploration and marine studies.



RESEARCHERS PERFECT SURGICAL PROCEDURE FOR FISH

Science will benefit from a fish surgery procedure perfected by researchers of the Bureau of Sport Fisheries and Wildlife (BSFW). The procedure permits scientists to see internally the success or failure of research efforts.

Assistant Secretary Leslie L. Glasgow, who heads Interior's programs for fish, wildlife, and parks, said: "Fish are sensitive indicators of both favorable and harmful elements, and the surgical procedure allows scientists to get first hand views of the effects of the elements on live specimens." The procedure enables researchers to keep fish alive after one or more operations--so they can be used in continuing lab research. More than 98% of the fish operated on recover afterward.

Researchers in medicine, toxicology, pharmacology, veterinary science, and nutrition can benefit from using fish in their experiments, Dr. Glasgow noted.

Background of Research

BSFW researchers developed the technique to inspect damage to fish's diseased organs and to see how therapeutic drugs and special diets help. It is part of the Bureau's research program to develop healthier fish for planting in U.S. waters.

In the late 1940s, Dr. O.H. Robertson of Chicago University pioneered surgery on fish. In the early 1960s, BSFW put together a team headed by Dr. John E. Halver to establish fish surgery as a standard laboratory procedure for test purposes.

By the late 1960s, the technique had been standardized sufficiently for routine use by scientists at BSFW's Western Fish Nutrition Laboratory at Cook, Washington, and its field station at Hagerman, Idaho. The technique helped amass information on fish nutrition, health, and capability of growing or developing in different environments.

In 1968, the technique produced a major success in the cure of hepatoma--a liver cancer in rainbow trout that was threatening to destroy U.S. trout culture. Internal inspection of diseased fish enabled BSFW scientists to isolate a mold in commercial fish feed as the cause. By advising improved preparation

and storage procedures in manufacturing the fish food, BSFW scientists eliminated the disease from trout hatcheries.

The Surgical Technique

At the BSFW laboratory, conventional surgical instruments and sutures are used. The fish receive light and deep anesthesia for the operation, which can last 5 minutes to several hours. Special probing tools inspect the vital organs and can remove diseased tissues for special analysis.

Teams of surgeons operate in a special room to which fish are sent on a conveyor. The fish's head is kept immersed to permit gills to extract vital oxygen during the operation; also, skin is kept moist to prevent injury. Special plastic tags are applied to identify each "patient."

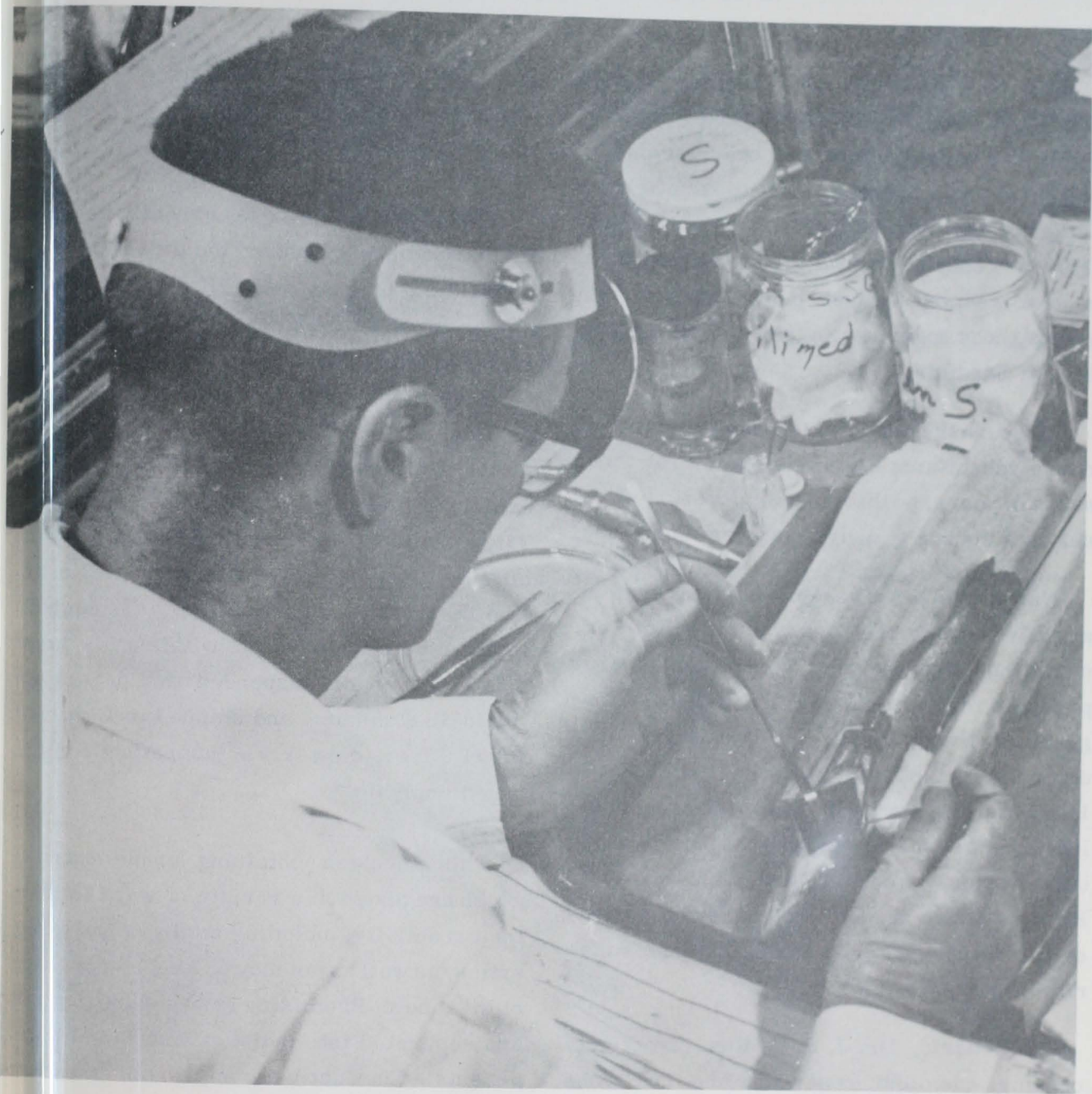
Incisions usually are made on the belly side, but other sites are possible. After internal inspection, an antibiotic is applied to prevent infection, sutures are sewn, and the fish is placed in a special postoperative tank for one to several hours. Then it is placed in a special recovery tank; after 3 days, it is able to accept food.

The procedure permits internal inspections at intervals of 3 or more months. So the scientists are able to see changes for better or worse over a considerable period.

Over 10,000 Operations

Over 10,000 operations have been performed at the BSFW laboratory. Less than 2% of fish have died from either trauma or other postoperative complications. Those that recover show only a slight scar and can be operated on again. Primarily rainbow trout have been used, but researchers have been successful too with salmon, carp, and catfish.

BSFW researchers are convinced that proper diet and selective breeding can produce in fish disease resistance, faster growth, and greater tolerance of unfavorable environmental conditions, such as heat. And, as a result of these factors, healthier fish can be grown for planting.



Surgery is performed on fish under hospital conditions to find out how organs are affected by certain diseases. The fish recover.
(Photo: N. Mariana, BSFW)

DRUGS FROM THE SEA

New healing drugs have long been hunted and often found in the most unlikely places. Penicillin originated on the overripe cantaloupe; chloramphenicol, the most effective drug against typhoid fever, originally came from a Venezuelan soil mold. Cephalothin, a new weapon against penicillin-resistant germs, was found near a sewer outlet in the sea off Sardinia.

Although the medicinal properties of some ocean inhabitants have been known for thousands of years, no thorough exploration of the sea as a source of drugs has ever been made.

Now a number of researchers are systematically seining the oceans with definite expectations that the next generation of drug products may be derived from the natural organisms living there. At least two drug companies, Hoffman-LaRoche and Lederle Laboratories, have undertaken full-scale collecting and research programs. And several universities, including the University of Rhode Island, are involved in investigations of the medicinal properties of various marine organisms.

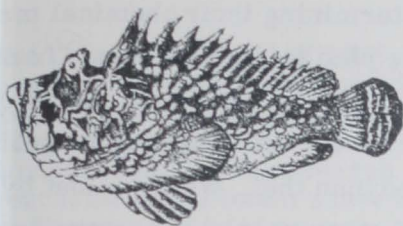
At Lederle, Dr. J. J. Denton, director of organic chemical research, and Dr. John Webb, head of the laboratory's structure and analysis department, explained some of the objectives of their firm's year-old research program. Its prime aim, they say, is to isolate and evaluate marine plant and animal life in order to develop new therapeutic agents. Previous investigators of the sea were usually looking for a specific pharmacological activ-

ity. The present research involves collecting any likely looking specimens and testing them for a variety of properties.

Lederle's collecting is currently centered in the Caribbean, under the direction of its consultant, 66-year-old Dr. Paul R. Burkholder, professor emeritus of Columbia University, famed for his 20-year-old discovery of chloramphenicol. Diving with one or more assistants, Dr. Burkholder, who also teaches at the University of Puerto Rico, has been exploring principally the reefs around the Virgin Islands and Puerto Rico, mostly for corals, sponges, algae, and the bacteria that live in and on them. Whatever is brought up in the collecting sacks is within a few hours dried, frozen or suspended in a preserving liquid like ethanol and shipped to Lederle's Pearl River, New York laboratory for detailed analysis.

This involves obtaining crude extracts which are tested in a variety of ways for biological activity, including antibacterial properties, as well as potency against a wide range of diseases. Promising extracts are purified and separated into individual chemical components. The active components are then identified chemically by various methods, including x-ray crystallography, nuclear magnetic resonance, high resolution mass spectroscopy, etc., to determine accurately their structure for future testing and synthesis. A number of the samples they have received look "extremely promising," the doctors say, but competition in the drug

Marine Specimens that show promise as sources of new drugs:



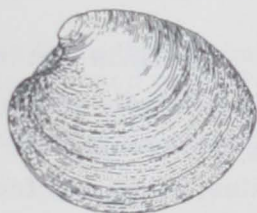
STONEFISH: secretes a potent poison found to reduce blood pressure in animals.



SEA CUCUMBER: an extract from it inhibits tumor growth in mice.

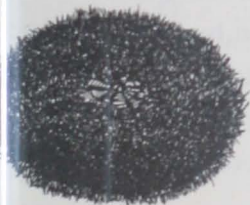


GREEN SPONGE: extracts have been found to have antibiotic capabilities.



QUAHOG:

and show anti-tumor activity.



SEA URCHIN:



CORALS: among organisms currently collected for testing.

industry being the fierce thing it is, they decline to identify them.

Needless to say, research of this sort is not quickly or inexpensively accomplished. The potential drug must be tested on animals to make sure its germ-killing properties outweigh any possible side effects. Finally, if it has not been abandoned by then, it is considered safe and effective enough to be tested on humans. It may take up to seven years between the time a company finds something it thinks is good and the marketing of it. And an application to the Food and Drug Administration to market a new drug can cost as much as seven million dollars, most of it going to develop the required information.

Talking about the program, Dr. Webb emphasized that Lederle is not planning the large-scale manufacture of drugs derived directly from marine organisms. To attempt to harvest the sea in that way would be impractical and wasteful. Instead, the company gathers small quantities of many materials, hoping to discover from them clues to new varieties of pharmacological substances that can be synthesized in the laboratory. This was the same approach that was used in producing many of the earlier drugs from land sources.

Expensive and complicated as this program is, Lederle, and presumably one or more other companies, feel it is worthwhile because the field of terrestrial plants, from which many drugs have been derived, has been pretty thoroughly picked over in the past 20 years. Marine organisms represent practically virgin territory. Also, Dr. Denton points out, the

organisms they are interested in are those of relatively simple structure, which simplifies the task of determining their chemical makeup. "What we plan to do," he says, "is skin the surface and gather up the most easily used organisms. We're not planning to get any more involved than that. We hope that by the time a lot of other people get around to this kind of marine research we will already have been in and out of the sea."

Besides exploring the Caribbean, Lederle plans future underwater investigations of the Pacific, including the Philippine Islands and Australia's Great Barrier Reef. Of the thousands of marine organisms known to contain biotoxic substances, less than one per cent have been examined for biological activity. And of the one per cent studied, only about a dozen have been evaluated to a point where their chemical and pharmacological characteristics are known.

The finds that have been made to date are undoubtedly encouraging: extracts from the greensponge have shown antibiotic capabilities; an extract from a sea cucumber has inhibited the growth of malignant tumors in mice. A poison secreted by the stonefish has been able to reduce blood pressure in animals. Even the common quahog had produced an extract that shows strong anti-tumor activity.

So, if the next skin diver you see has a small mesh bag fastened to his wrist, the chances are he's not just a Sunday snorkeler but a scientist out for big game--the wonder drug of 1980.

(Reprinted from New England Marine Resources Information 11 April 1970.)



TEXAS MARINE RESEARCH STATION IS STEP TOWARD FARMING SEA

The Texas Parks and Wildlife Department has begun a research program "to find a way to increase and use the potential protein production in the sea to meet the increasing world demand for food." The research will be carried out at the Department's new Marine Fisheries Research Station near Palacios on Matagorda Bay. The station is designed to give biologists at least a partially controlled environment for research.

The Research Station

In 1967, the Department bought 40 acres near Well Point on Matagorda Bay because the area had good-quality salt and fresh water, was above storm tides, had watertight soil, and utilities readily available. Construction began on a channel, a small-boat harbor, and ponds one-quarter to 4 acres. A water system pumps salt water from the bay and fresh water from a well. The ponds can be drained completely by gravity flow.

Four ponds have dual water systems for circulating seawater; one pond is paved with asphalt to provide a hard surface for oyster culture.

Electrical outlets are available throughout the area for aeration equipment and recording instruments. Filters can be installed on water lines to prevent introduction of unwanted organisms.

A 3,000-square-foot laboratory building has facilities for chemical and biological analysis, and a wet lab for holding and studying live specimens. Two residences and a garage building also have been built.

What Biologist Seek

The research station can be used for many kinds of studies. It is one of few installations in the world with facilities for adjusting the water's salt content.

The ponds are a large-enough controlled environment to simulate part of the bay. "By observing and analyzing the results of controlled studies, biologists hope to learn more about bay populations and the effects of such factors as salinity, temperature, turbidity and

water condition on fishery ecology, growth and production."

Present Research

Early research aimed at determining methods for holding fish and shellfish in a controlled and limited marine environment. Present research seeks to determine the importance of ecological factors that affect growth and survival of fish and shellfish; to evaluate mortality by fishing gear and fish tags; and to measure effects of various pollutants on fishery ecology.

Research also will consider the feasibility of cultivating bait shrimp for off-season sale, the artificial propagation and selective breeding of selected species, and development of methods to maintain organisms under conditions conducive to reproduction in artificial habitats.

Research at the station will supplement studies on marine species underway in other Texas estuaries. One such project is the development of a disease-resistant oyster to restore oyster beds devastated recently by a disease caused by a slime mold.

Biologists are seeking disease-resistant oysters to be cultivated in the ponds. They hope the seed for restocking will be obtained from these experiments.

Another basic research objective is to provide foundations for fish and shellfish cultures in manmade environments. There is considerable interest in the practicability of farming or raising shrimp, fish, and oysters in manmade ponds. Research could solve, or at least get around, biological and technical obstacles to profitable farming of fish and shellfish in artificial impoundments.

80,000 Brown Shrimp Stocked

In 1969, more than 80,000 baby brown shrimp were stocked in 9 ponds at rate of 20,000 per acre. These shrimp reached marketable size in 65 days when supplemental feed was applied, but the food conversion (pounds of feed needed to get one pound of shrimp) was poor.

Different rates of growth and survival resulted in ponds receiving same amount of food. This suggests that other factors affected the results. Oysters in the ponds grew rapidly. Survival was high when compared to oysters in Matagorda Bay.

1970 Research

In 1970, the effect of high and low salinity levels on growth of shrimp is being studied to provide basic data for freshwater requirements of Texas bays and estuaries. The researchers monitor closely the water chem-

istry and physical factors within each pond during experiments.

Researchers also are studying growth and survival of redfish, speckled trout, and southern flounder in other ponds.

Preliminary findings in the projects have been encouraging. Biologists are confident that resulting data can be applied to setting up a sound management program for some Texas marine resources. This information could provide foundation for raising seafood in man-made ponds.

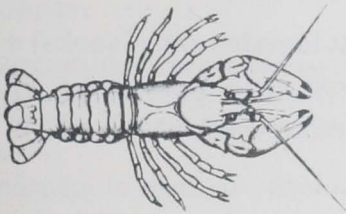


BCF biologists periodically sample shrimp grown in $\frac{1}{16}$ -acre ponds at Galveston, Texas.

CRAWFISH FARMING A TRICKY BUSINESS, SAYS TEXAS AGENCY

Crawfish farming is possible in Texas, advises the State's Parks and Wildlife Department. "But before you look up the recipe for bouffé, bisque or some other cajun culinary treat, consider the difficulties."

Crawfish, resistant to management, are vulnerable to fish and other predators. They spend much of their life in deep underwater burrows, and require for survival a fairly stable body of water with vegetation. They tend to be cannibalistic under some circumstances.



Pays off in Louisiana

Marion Toole, inland fisheries coordinator, says these and other problems have kept crawfish farming from getting much of a start in Texas. It has paid off in Louisiana, where it can be considered an industry. Much of the Louisiana catch is made from swampy areas and rice fields, rather than on "farms."

How to Do It

"To 'farm' the tasty crustaceans, a controlled water supply is needed--a lake that can be drained easily. The reservoir should be drained dry by March to eliminate all fish and other aquatic life from the basin. The pond should remain dry long enough for some vegetation to grow." The field should be flooded in May. The water supply should be

stable enough to prevent a sudden water drop that could damage the crawfish.

If these crawfish were in the impoundment before draining, it might not be necessary to stock the reservoir. However, about 15 pounds per acre sometimes are helpful. After stocking, the water level should be maintained for about three weeks. Then it should be lowered slowly during the next weeks. This allows the female crawfish to burrow into the mud.

During the summer, the female lays eggs and attaches them to appendages on the underside of her tail.

The pond should be flooded during September to furnish growing space for the young. When the juvenile crawfish scatter and begin to grow, the prime considerations are availability of vegetation and oxygen in the water.

"With good management and a little luck," the Texas agency notes, "a good harvest will be the result in mid-winter, beginning around Christmas and continuing through February or March."

Start Small

New crawfish farmers are advised to start small. First determine if the crop will respond to the particular habitat established in the impoundments.

The crawfish can be harvested by seining, which is sometimes difficult, or by special baited traps. The farmer can trap the crustaceans himself, or adopt the Louisiana procedure of farming out the job to others on a fee or percentage basis.

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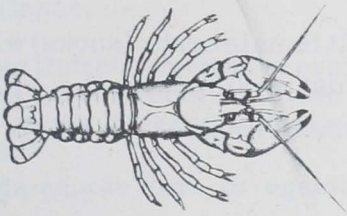


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1970 CHESAPEAKE BLUE CRAB CATCH PREDICTION IS LOWERED

The Chesapeake Bay catch of blue crab for the 12 months ending August 1970 is expected to fall short of the predicted 100 million pounds, reports W.A. Van Engel of the Virginia Institute of Marine Science (VIMS).



Blue Crab

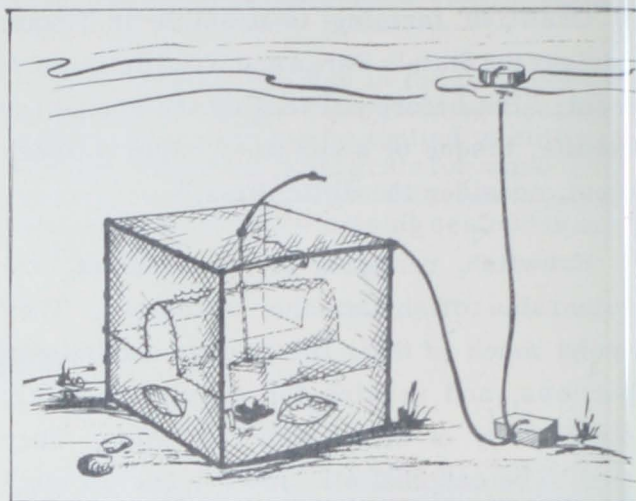
The prediction of 100 million pounds was made in 1969 from estimates of young crabs. Crabs hatched in summer 1968 first appeared on Virginia and Maryland nursery grounds in October 1968. During 1969 they were found in greater numbers than ever before.

VIMS scientists believe that unusual weather during last summer and winter reduced blue crab stocks.

Unfavorable Weather

Crabs have been scarce in the rivers during routine winter and spring surveys. This confirmed fears that freshwater runoff in early August and after Hurricane Camille in late August 1969, and the cold winter, brought about salinity and temperature conditions that many crabs could not tolerate.

Crabs in the James and York rivers were hit hardest by Camille, so crab pot fishermen are likely to find fewer this summer in these rivers than in other years, including 1968 and



Typical Chesapeake Bay crab pot.

1969. Adult female crabs (sooks) will be very scarce. Most available crabs will be large and fat jimmies (males).

Less damage to crab stocks should have occurred in other Virginia rivers and farther up the bay, says Van Engel.

Problems Ahead

The market for crab meat appears good. Crab fishermen are anxious to work, but production of fresh crab meat has been slowed by scarcity of pickers in some houses.

The longer outlook contains more problems. Crab supplies in Virginia from September 1970 through August 1971 are expected to be lower than the previous 10-year average. Van Engel concludes that the 1969 hatch of crabs appears from present surveys to have been light. It is expected to produce a small crab catch: similar to the below-average landings of 1968 and the first two-thirds of 1969.

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ANNUAL RIVER HERRING CATCH BY FOREIGN FLEETS ESTIMATED

Jackson Davis

For the third year, the USSR and Poland have sent fleets of more than 100 trawlers to fish for mackerel and herring off the Mid-Atlantic coast from Cape Hatteras, North Carolina, to Ocean City, Maryland. From information obtained on Coast Guard surveillance flights, in cooperation with the Bureau of Commercial Fisheries (BCF), it has been determined that the number of Soviet vessels has fluctuated between 10 to 110 trawlers, and the size of the Polish fleet has averaged about 10 trawlers during 1970. In 1969, the combined fleet numbered about 150 vessels; in 1968, about 100. Prior to 1968, the foreign fleet fished north of Maryland, for the most part, and only 10 to 30 vessels worked off the Virginia Capes.

Virginia finfishermen have expressed concern about the effects of these harvesting activities on the success of their own fishing operations.

A Visit to Fleet

Under BCF auspices, a 9-man party of Americans, including the author, boarded a Soviet factory ship off the Virginia Capes to talk with the fleet commander, V.A. Zakharov, and his deputies. The commander indicated that the average daily catch of his SRT-class vessels (145-foot side trawlers) was 2 tons of mackerel and 2 tons of herring--a total of 4 tons per vessel per day. He did not state the average daily catch of the larger side trawlers and stern trawlers.

About 30% of the herring catch was sea herring (*Clupea harengus*), also called Labrador herring, and the remaining 70% (2800 pounds per vessel per day) was river herring.

1970 Catch Estimate

If the average daily catch is multiplied by the number of vessels reported operating, an estimate of the smallest probable catch is obtained. Thus, the 1970 catch of river herring by the Soviet fleet probably is not less than 12 million pounds; that of the smaller Polish fleet probably not less than 3 million pounds. Because we do not know the catch-rate of the larger vessels, we are unable to calculate a more accurate estimate at this time. However, our observations of the foreign fleet at sea lead us to guess that their catch of river herring does not exceed 30 million pounds.

Where Caught

These 15 to 30 million pounds were caught south of 38° 30' N latitude (Ocean City, Maryland) and, therefore, represent fish that might have spawned in tributaries of Chesapeake Bay and in other streams up the coast. To put the oceanic harvest by foreign fleets in perspective, one should realize that the annual landings of river herring in Virginia have averaged around 30 million pounds in the last few years.

The Virginia Institute of Marine Science has been collecting data on the ages and spawning history of river herring in the James, York, Rappahannock, and Potomac rivers since 1965. This information is now being interpreted to determine the influence of the foreign fishery on herring stocks. Results will be announced in future issues of the Bulletin.

Dr. Davis is Head, Ichthyology Dept., Virginia Institute of Marine Science (VIMS). Article appeared in 'Bulletin,' May 15, 1970.



FOREIGN FISHING OFF U.S. IN APRIL 1970

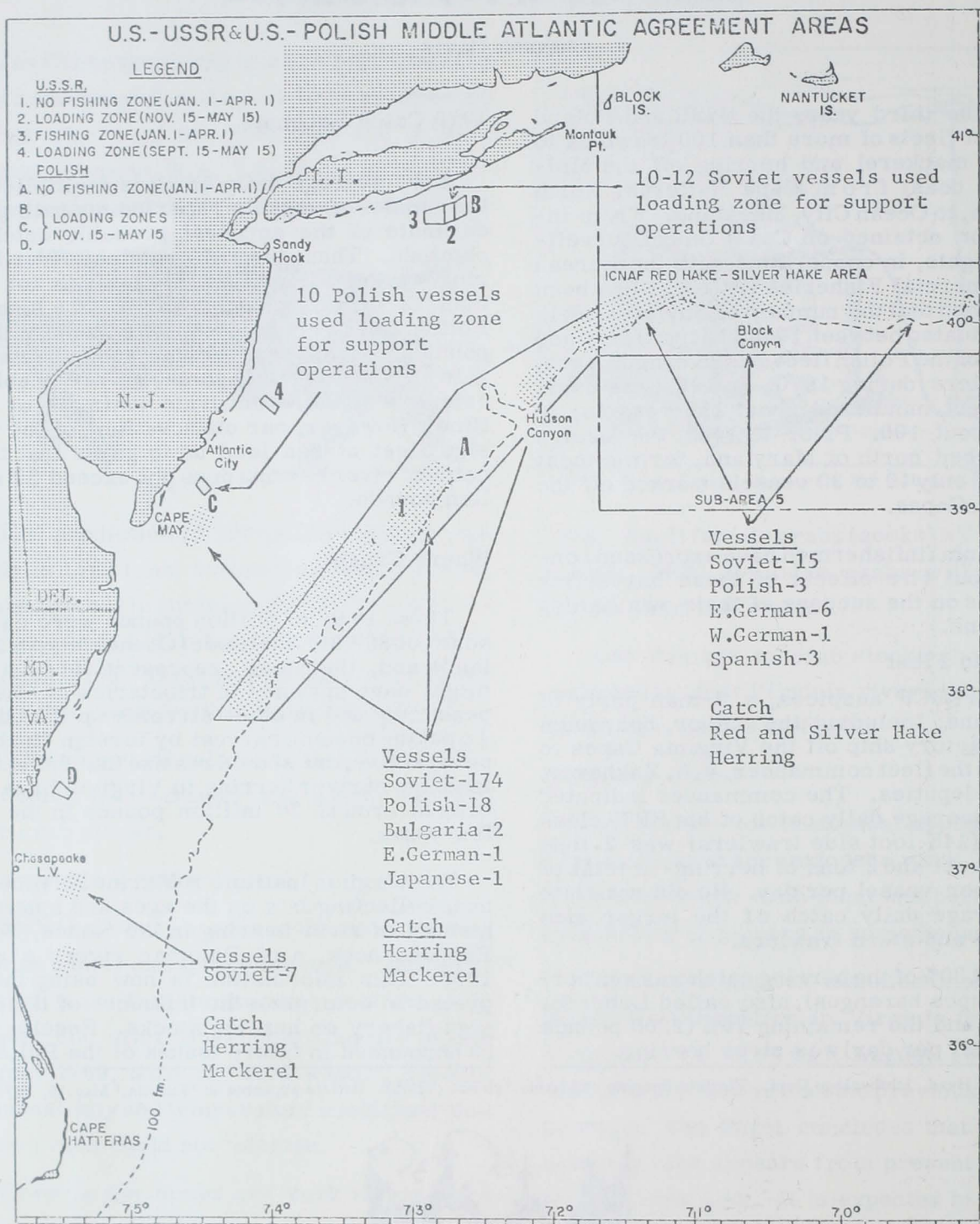


Fig. 1 - Foreign-flag vessels fishing off southern New England and Georges Bank, April 1970 (shows no. of vessels and species fished).

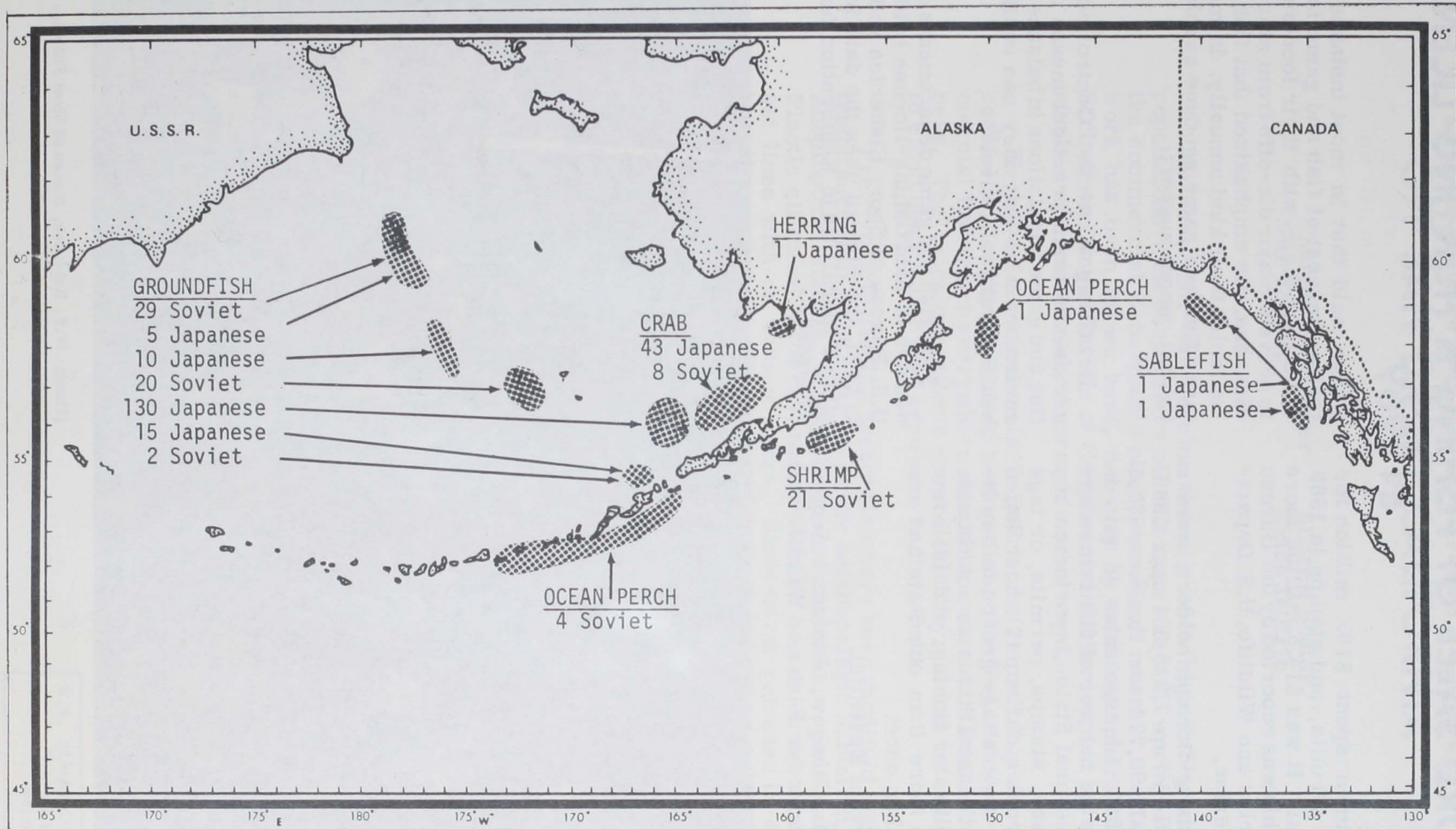


Fig. 2 - Foreign fishing off Alaska, April 1970.

RECORD SALES OF FISHING & HUNTING LICENSES IN 1969

U.S. sportsmen spent \$183 million for licenses, tags, permits, and stamps in 1969 to fish and hunt. It was \$14.5 million more than in 1968. This was reported by the Bureau of Sport Fisheries and Wildlife, U.S. Department of the Interior.

In 1969, fishing-license holders were a record 24,076,148--up 1,015,851 over 1968. They spent \$87,500,774 for licenses--\$7.5 million above 1968. License sales do not reflect accurately the number of fishermen because: (1) in several States, sportsmen buy separate licenses, stamps, permits, or tags for different species of fish; (2) most States do not require several age groups to buy licenses; (3) most coastal States do not require licenses for saltwater fishing; and (4) some persons fish in more than one State and are counted more than once.

Controlled Harvest Essential

Dr. Leslie L. Glasgow, Assistant Secretary of the Interior for Fish and Wildlife and

Parks, said that in most instances the controlled harvest of fish and game is essential to balance them with their food supply--and to prevent major die-offs from starvation and diseases. He emphasized that fish and game replenish their kind annually. In many years, many fish and game produce surpluses the habitat cannot support.

Dr. Glasgow noted: "Controlled harvests are a sensible and practical means of keeping fish and game populations in balance with their environment so that they can continue to be healthy and productive."

State fish and game departments certify the number of paid fishing-license holders to the U.S. Bureau of Sport Fisheries and Wildlife. In turn, the Bureau uses the data in distributing Federal Aid in Restoration funds to the 50 States.



(Photo: W.F. Kubichek, Bureau of Sport Fisheries & Wildlife)