

major data gaps are revealed, NOAA is prepared to undertake "a reasonable effort to close them," White said.

Marine sanctuaries are designated by the Secretary of Commerce, with the approval of the President, under the authority of the Marine Protection, Research, and Sanctuaries Act of 1972. The program is administered by NOAA's Office of Coastal Zone Management, which processes nominations and makes determinations concerning conditions warranting the designation.

The first two marine sanctuaries named under the program have been the *Monitor* Marine Sanctuary, established 30 January 1975 to protect the site of the Federal ironclad vessel *Monitor* off the coast of North Carolina, and the Key Largo Coral Reef Marine Sanctuary off the coast of Florida, established 18 December 1975.

## **Automated Nautical Chart System Contract Awarded**

Award of a \$1,496,442 contract for construction of the final link in an automated nautical charting system designed by the National Oceanic and Atmospheric Administration (NOAA) has been announced by Secretary of Commerce Elliott L. Richardson. Under the contract, Planning Research Corporation's Information Science Corporation<sup>1</sup>, McLean, Va., will prepare an automated information process which will store and retrieve nautical chart information and allow NOAA cartographers to compile charts using computer-generated graphics interacting with a nautical chart data base.

The new charting system, developed by NOAA's National Ocean Survey, is expected to be fully operational by 1980. It will replace the present day manual system, which prints approximately 3 million charts each year for coastal areas, estuaries, harbors, and the Great Lakes.

Allen L. Powell, Director of the National Ocean Survey, said the information system is the final link in NOAA's \$25 million nautical chart automation program that includes the

automated acquisition storage, and retrieval of chart data, compilation of charts, and chart negative production.

"Once the program is fully operational," said Powell, "most data now appearing on nautical charts will be available in digital form for the computer. These data can then be recalled, not only for charts, but for other purposes as well." The computer could provide, for example, a list of wrecks along the coast, including their position, and the depth of the water above them.

Fishers, in the future, also may be able to call upon the National Ocean Survey for a computer-produced list of fish havens; while a request for a list of navigational aids in a specific area could be produced quickly under the automated processes, instead of having it laboriously compiled by hand.

"These are but a few of the examples of what can be accomplished once the automated chart production program is fully operational," Powell said. "We will be able to recall from the digital data files almost everything in the way of nautical data that now appears on our charts."

According to Donald H. Hunt,

### *Foreign Fishery Developments*

## **British Fishing Industry Faces Change**

The following is a condensation of a report by the United Kingdom Whitefish Authority entitled, "The U.K. Fishing Industry: An Account of 1975 and Prospects for 1976." It was prepared by Norman L. Pease, Regional Fisheries Attache, Copenhagen, Denmark.

The year 1975 was a critical year for the U.K. fishing industry since the value of landings fell 5 percent<sup>1</sup> below the 1974 level, while the operating costs increased over 20 percent. However, not all segments of the industry fared alike; late statistics indicate that shellfishers did better in 1975 than in 1974, whereas the herring fishers and deep-sea trawlers' fortunes declined. Real incomes for all fishers were greatly reduced during 1975. Furthermore, it

Director of the NOS Chart Automation Projects Office, data would include soundings (water depths); prominent landmarks and radio beacons which enable mariners to fix their position at sea; channel limits; bottom characteristics (sandy, gravel, clay, mud, etc.); Coast Guard aids to navigation, such as light buoys, lightships, and electronic navigation systems (Loran); underwater cables and pipelines; submerged navigational hazards, such as wrecks, and shoals; restricted regulated areas; safety shipping lanes; and ship traffic separation lanes for ports.

Automation of chart production will also speed up publication of new and revised charts. "It takes us about 6-9 months now to construct new chart negatives from the time we receive the data," said Richard H. Houlder, Chief of the NOS Marine Chart Division. "Under an automated program, we should be able to produce new chart negatives in 4-6 weeks, once documentation is stored and available for recall. For revised charts, those updated to incorporate new data, production time should be reduced to 3 months or less, instead of the 4 months it now takes."

was a time when the industry had to face up to the prospect of a new fisheries environment. The probability of extension of fishing limits combined with the introduction of reduced quotas demanded structural changes within the U.K. fishing fleet. The fear of the repercussions of such changes caused the industry to operate in a much more unified manner. This was particularly evident in the growth of membership of producer organizations.

The year 1975 began with prices on cod running at a level below that for the corresponding months of 1974. This coincided with the drastic increase in fuel, coupled with an inflation rate of 25 percent per year and resulted in a substantial decline in the real income of U.K. fishers. Fuel costs will rise from the \$16 million in 1972 to \$65 million in 1976.

<sup>1</sup>Mention of commercial names or products does not imply endorsement by the National Marine Fisheries Service, NOAA.

<sup>1</sup>*Fishing News* (U.K.) reports a 12.4 percent decline in production.

The situation was temporarily eased to some extent in two ways. First the government announced in February 1975 details of a subsidy scheme. This aid, estimated at maximum cost of \$12.75 million, took the form of flatrate payments, graduated by length of vessel, for each day at sea during the January-June period. Secondly, Norway introduced minimum export prices for its commodities and the EC introduced minimum import prices for third countries.

There was a pronounced decrease in the fleet population during the first 6 months of 1975. Statistics reveal that 44 distant-water trawlers were removed from the registered fleet while an unknown number of unregistered vessels were also lost from the fleet. In addition, many other vessels were tied up, while their owners waited either for fish price increases or until increased government aid was forthcoming. Some vessels also switched to acting as service vessels for the off-shore oil platforms.

In July and September 1975 the government announced extension of their subsidy programs. It was stipulated that the extension would not exceed \$6 million and that this would be the final subsidy as increased fish prices would have to support the fleet. The subsidy rate for vessels over 110 feet in length was significantly reduced in the second half of the year which seemed to indicate that the government had reservations concerning the future role of this class vessel in the U.K. fishing fleet. The latter appeared to underline the implications of extended limits and a restructuring of the U.K. fleet.

On 12 November 1975 the interim agreement with Iceland expired and this date marked another phase of the "Cod War." The cost of chartering the four vessels protecting the U.K. fleet was around \$120,000 per week. (As of 1 June 1976, Iceland and Britain announced a 6-month agreement ending the "Cod War.")

A new development in 1975 was the proliferation of Producer Organizations which operated withdrawal schemes for their members. These are based on an EC withdrawal scheme whereby minimum prices for fish are set. However, if the price offered at auction

does not reach the minimum amount, the fish are withdrawn for human consumption, sprayed with harmless chemical dye, and sold only to fish meal plants. The fisher is reimbursed by the organization for the difference between what the fish meal plant paid and the minimum price. The Scottish Fishermen's Producer Organization increased its membership in 1975 from 175 to 650.

### GROUND FISH

The 1975 cod quota in the Northwest Atlantic was 19,800 tons while catch statistics show that less than 1,000 tons of this were caught. The quota for 1976 is 6,990 tons and it is expected that U.K. vessels will utilize this quota because of restricted landings in Iceland.

The outcome of the Icelandic-U.K. "Cod War" will have a significant effect on total production in 1976. During 1975, production from Iceland slumped to 110,000 tons with cod accounting for 90,000 tons of that figure. Any large decrease in this tonnage will lead either to considerable shortages for the domestic market or a considerable increase in imports.

The U.K. cod catch in the Northeast Arctic was 98,000 tons in 1975 and remains the same for 1976. This area will be a vital source of cod for the U.K. fleet. A quota arrangement with the Faeroe Islands allows the United Kingdom slightly under 20,000 tons of cod per year. In the North Sea, U.K. quotas for 1976 are as follows: cod—84,000 tons, haddock—79,500 tons, whiting—44,000 tons, sole—600 tons, and plaice—27,800 tons. A special clause in the NEAFC agreement permits a 10 percent increase in the catch of any species, provided the total quota is not exceeded. Under this clause, the United Kingdom could obtain an additional 17,800 tons of cod by reducing their whiting catch. The sole quota is not expected to be completely filled in 1976 while the plaice catch should remain steady.

### HERRING

The west-of-Scotland herring quota is 70,000 tons for 1976, or a reduction of 15,000 tons from 1975. Attempts are being made to use a greater percentage of this catch for human consumption rather than for fish meal. In the North

Sea the U.K. quota for the first 6 months of 1976 is 5,300 tons, which under normal conditions, represents less than 2 months fishing effort. The value of herring landings in 1975 was \$22.4 million compared with \$26.4 million in 1974. The present overcapacity of the herring fleet in relation to its reduced quotas for 1976 indicates that a management scheme should be devised relating the number of licenses for herring vessels to the available fish stocks.

### MACKEREL

From a relatively insignificant fishery, mackerel has developed very rapidly over the past 2 years and was worth almost \$3 million to U.K. vessels in 1974. Mackerel landings in 1975 were 45,000 tons, up 51.8 percent over 1974. This fishery has developed as an important alternative to the declining herring fishery and prospects point towards its expansion.

### GENERAL

It appears an extension of fishing limits will favor inshore and near-water vessels while distant-water vessels will be phased out or reduced in accordance with bilateral agreements with other countries. The development of the inshore fleet has expanded during the last decade and this fleet's contribution to landings has risen from about 40 percent in 1964 to 53 percent in 1974. At the end of 1975 the U.K. fleet was as follows: 133—over 140 feet, 144—110 feet-140 feet, 119—80-110 feet, 587—60-80 feet, and 1,422—40-60 feet.

Finally, it is expected that total net earnings will be further depressed in 1976 because of the escalation of costs, primarily oil, and the annual inflation rate. These increased costs will not be offset by commensurate fish price increases, although auction prices will show an upward movement. Given the general economic climate and the uncertainty regarding the implications of limit extensions and the Common Fisheries Policy, there is likely to be little investment in fishing vessels in 1976. The decline of the distant-water fleet will produce serious repercussions in the unemployment rate, particularly in northeast England.

For further information see *Sea*

*Fisheries Statistical Tables, 1974*, a statistical summary of British fisheries, which has recently been published. It contains data in 22 tables on landings (by species, port, grounds, etc.), consumption, fishers, vessels, imports, and exports. Copies may be obtained from the Secretary, Ministry of Agriculture, Fisheries, and Food (Fishery Statistics Section), Great Westminster House, Horse Ferry Road, London, SW1P 2AE, United Kingdom.

## Ecuador's Shrimp Exports Increase

Ecuador enjoyed a banner year for exports of shrimp during 1975, final statistics show, according to the U.S. Consulate in Guayaquil. In 1975, Ecuadorian firms exported 8,341,930 pounds of shrimp compared to 5,855,516 pounds in 1974. This represents a 42 percent increase and a very good year financially for the industry following what was regarded as a poor year in 1974. The 1975 figure also exceeds the 8.2 million pounds of shrimp exported in 1973, but was less than the 9-million pound record exports of 1969. Were it not for the new Ecuadorian requirement that 20 percent of the shrimp harvest must be marketed locally, 1975 would undoubtedly have been a record year for exports.

A total of 18 Ecuadorian firms exported shrimp during 1975, compared to 23 in 1974; of the 1975 total, 81 percent was exported by the following seven firms:

Firm	Pounds
Ipesa	2,013,085
Enaca	1,206,000
Empacadora Shayne	1,002,563
Coposa	949,983
Frigoro	524,682
Esca	524,581
Frimar	510,294
Total	6,731,188

It is estimated that 90-95 percent of the total 1975 shrimp exports went to the United States.

Although it was too early to determine the prospects for 1976, there was a heavy rainfall during January, the first month of the rainy season. If rains continue through the season (expected to end sometime in April), 1976 should be another good year. Usually a good shrimp harvest follows a heavy rainy season.

## Iran-Russia Sign Caspian Anti-Pollution Agreement

Iran and the Soviet Union, on 22 December 1975, signed a protocol for an extension of the efforts undertaken by both countries to prevent further pollution of the Caspian Sea. The protocol, the third signed since the two countries decided to join forces in a massive campaign to minimize pollution some 3 years ago, also provides for the restoration of damage already done to the Sea's unique marine life and ecological system.

Signed by Mohammad Reza Amini and Vladimir K. Papisov, the heads of the Iranian and Soviet delegations, the protocol was concluded after 7 days of talks concerning new methods to widen the scope of the joint anti-pollution campaign and to evaluate the work already done, either jointly or independently.

The protocol said that specialists from each side continued discussions, initiated during the second meeting (in January 1975) of the permanent working group in Moscow, to select and adapt the most efficient facilities for treating bilge water and other wastes from fishing boats and industrial effluents from factories located along the sea or rivers emptying into it.

The Soviet Union announced its willingness to send specialists to Iran to assist in the development of a treatment system for industrial and other effluents. The two countries also discussed problems concerning the exchange of experts and the training of Iranian technicians in the Soviet Union during 1976. The Iranian and Soviet teams further studied a draft program for joint field work to determine the nature and quantity of chemical and industrial pollutants, and methods of reclaiming the sea.

The two teams also drew up future action programs and evaluated the work already done under the joint research project involving a number of Soviet experts and four Iranian specialists on board the Soviet research vessel *Rodon*. The Soviet Union agreed to place the vessel at the disposal of a joint research team, and Iran has agreed to provide several vessels for research purposes. Iran informed the Soviet officials of the steps taken to

purchase an aircraft specially equipped for the joint research project. The vessel and aircraft will also act as part of a massive anti-pollution task-force and emergency warning system to detect oil spills and other serious pollution and to take immediate counter-action.

The Iranian and Soviet official delegates visited the ship and inspected joint hydrological and hydrochemical fieldwork being conducted on board at Bandar Pahlavi. The ship sailed from there to continue its studies in the southwestern parts of the Caspian.

The Soviet side submitted a proposal for a joint preliminary program involving a simultaneous bilateral study of Caspian waters and regular observations of the reproduction of whitefish and sturgeon by Iran and the USSR.

Both sides agreed that Iranian experts should visit the Soviet Caspian coastal regions in the first half of 1976 and discuss aerial photography of the Caspian in the framework of the research and pollution warning projects. Iran and the Soviet Union exchanged information on steps being taken by each side to prevent further pollution, and discussed the progress of joint field work and research regarding the study of fish and their habitats. Source: *Kayhan International*.

## Japanese Develop Fast Freeze Method

Nippon Suisan Company and Toyo Engineering Works have jointly developed a freezing system which uses propylene glycol (PG) instead of ammonia and reduces freezing time by 60 percent.

Fish are immersed in liquid PG or the liquid is sprayed on the fish. This lowers their temperature quickly to -4°C or lower. The PG freezing systems will be installed on Nippon Suisan's fishing vessels beginning in 1976. The company explains that gains in quality brought about by use of the PG method offset its higher unit cost.

Besides using the PG freezing systems on vessels operating in the Bering Sea and in the Pacific off New Zealand, Nippon Suisan will use PG freezing in a \$2 million freezing plant to be built at Hachinohe, in northern Honshu, in 1976. Source: *Japan Economic Journal*.

# Caribbean Spiny Lobster Fisheries Surveyed

Deborah Hale Streeter and Dennis M. Weidner

Spiny lobsters belong to the family Palinuridae, which consists of 7 genera and about 30 species. Among those spiny lobster species commercially valuable to the United States is *Panulirus argus*, or Caribbean spiny lobster. Although spiny lobsters are nearly worldwide in their distribution, *P. argus* is found only in the western central Atlantic, the Caribbean, and, in the Gulf of Mexico, from North Carolina to northeastern Brazil.

Spiny lobsters resemble northern lobster, *Homarus americanus*, but they lack the giant claws and stiff tail fan and are distinguished by numerous spines dotting the body and pointing forward. The most prominent of these spines are two large ones which project forward and curve over the eye stalks. Different species are distinguished principally by the coloration and/or formation of their tails. For example, *Panulirus argus* has a pair of large yellow spots with a dark ring around each on the second and sixth segments of the tail and similar but much smaller spots on the third to fifth segments.

The chief part of the spiny lobster usually eaten is the muscular tail. Spiny lobsters feed on marine worms, mollusks, smaller crustaceans, and fish, using their strong jaws, in the absence of claws, to crack the shells of small animals.

Water temperature, weather, food supply, and reproductive habits cause spiny lobsters to migrate. Most often they migrate between shallow and deep water, moving to deep water during still, calm weather and during continued unseasonable or excessively cold weather. At other times, the search for food and protection afforded by marine growth may prompt them to seek deeper water. During the spawning season they move into shallower water. Spiny lobsters are usually caught at night in traps which they enter while seeking food<sup>1</sup>.

<sup>1</sup>For additional details see: Lola T. Dees, Bureau of Commercial Fisheries, U.S. Department of Interior, "Spiny Lobsters," *Fishery Leaflet* 523, June 1968.

## CATCH

The total catch of Caribbean spiny lobster has increased significantly since 1965. The record 1973 catch of 30,300 metric tons represents an increase of 40 percent over the 1965 catch of 18,100 metric tons (Table 1). The increased catch is principally due to significant increases in the spiny lobster catches in Brazil and the United States. Catches there accounted for 83 percent of the total increase of 12,200 metric tons between 1965 and 1973 (Fig. 1). Brazil harvested more spiny lobster than any other country in 1973; its catch of this species more than tripled between 1965 and 1971, the last year for which reliable catch data are available. Cuba was the second largest harvester of spiny lobster in 1972 with a catch of 9,300 metric tons. The fact that Cuba increased its catch by only 200 metric tons from 1965 to 1972 suggests that the Cubans are harvesting lobster close to the maximum sustainable yield.

The United States is now the third most important harvester of Caribbean spiny lobster, having almost doubled its catch between 1965 and 1973 (Table 1). The 1974 catch of 5,830 metric tons was harvested primarily within U.S. coastal waters. That year, 83 percent of the *P. argus* landed by the United States, or 4,276 metric tons, was caught within 200 miles of the U.S. coast. Most of the domestic catch, or



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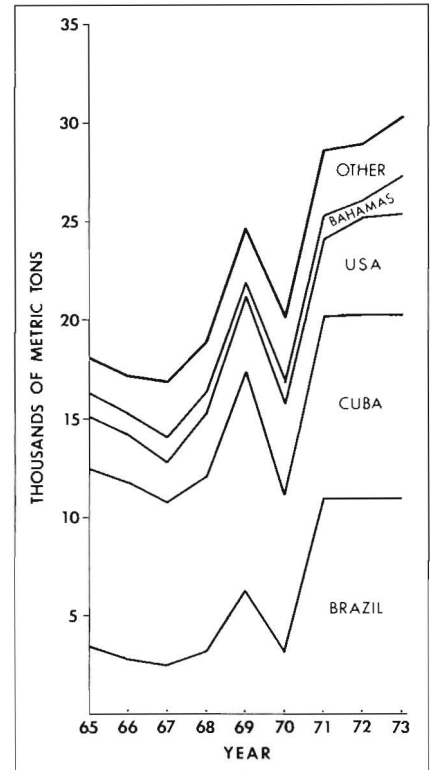


Figure 1.—Worldwide catch of spiny lobster, *Panulirus argus*, 1965-73. Source: FAO Yearbook of Fishery Statistics, 1973.

Table 1.—Worldwide catch of Caribbean spiny lobster, *Panulirus argus*, in thousands of metric tons.

Country	1965	1966	1967	1968	1969	1970	1971	1972	1973
Bahamas	1.2	1.1	1.3	1.1	0.7	1.1	1.2	0.9	1.9
Belize	0.6	0.6	0.5	0.6	0.6	0.6	0.7	0.8	1.9
Bermuda	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1
Brazil	3.4	2.8	2.5	3.2	6.3	3.2	11.0	11.0	11.0
Costa Rica	0.1	0.1	0.1	0.3	0.4	0.1	0.0	0.0	0.0
Cuba	9.1	9.0	8.3	8.9	11.1	8.0	9.2	9.3	9.3
Dominican Rep.	—	—	—	0.1	0.1	0.0	0.0	0.3	—
Grenada	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Haiti	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Honduras	0.1	0.1	0.1	0.2	0.2	1.2	1.0	0.3	0.3
Martinique	0.3	0.3	0.3	0.1	0.0	0.0	0.0	0.0	0.0
Mexico	0.1	0.2	0.2	0.3	0.4	0.3	0.4	0.4	0.6
Nicaragua	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Turks, Caicos	0.0	0.0	0.0	0.3	0.4	0.4	0.6	0.7	0.7
U.S.A.	2.6	2.4	2.0	3.2	3.8	4.6	3.9	4.9	5.1
Venezuela	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Total	18.1	17.2	15.9	18.9	24.6	20.2	28.6	28.9	30.3

<sup>1</sup>Estimated by FAO.

Source: FAO Yearbook of Fishery Statistics, various years.

3,839 metric tons, was harvested within the 12-mile Contiguous Fishing Zone, while a nominal amount, only 437 metric tons, was caught beyond that 12-mile zone. The United States also harvests a significant amount of spiny lobster off foreign coasts. In 1974, 1,544 metric tons of spiny lobster, or 27 percent of the total U.S. catch, was caught in international waters off foreign shores (Table 2), principally on the Bahamas Banks. Lobster harvesting by U.S.-based fishers on the Bahamas Banks has ceased since the Bahamian Government declared the spiny lobster a creature of the continental shelf.

According to a FAO publication by John P. Wise, of the National Marine Fisheries Service, entitled *An Assessment of the Crustacean Resources of the Western Central Atlantic and Northern Southwest Atlantic*, many countries which harvest spiny lobster could "safely" harvest more, the out-

standing examples being the Bahamas and Mexico. It has been estimated that the Bahamas could increase its catch by as much as 50 percent. Mexico has an estimated potential of 3,000 metric tons per year, or 5 times what was actually harvested in 1973. Fishing grounds already fully exploited include Cuba and Florida.

## REGULATIONS

A variety of methods are used to catch *P. argus*, including hand nets, spearing, diving, and traps. The three major producers, Brazil, Cuba, and the United States, mainly use traps to harvest spiny lobster. Increasing concern over preservation of lobster stocks has precipitated a variety of regulations defining and/or restricting the type of gear used, the length of the season during which lobster may be harvested, and the minimum size of lobsters which may be retained<sup>2</sup>. Seasonal closures in most countries occur sometime between February and August, but size limitations vary widely from country to country.

The U.S. Congress is now considering a bill (H.R. 2473) which would require all *Panulirus argus* landed in the United States to meet the conser-

<sup>2</sup>In some cases, deregulation may be imposed to increase the catch. In the Bahamas, for example, the ban on use of lobster pots was lifted in 1973 to stimulate the domestic lobster fishery.

vation requirements of the State of Florida. Florida law prohibits the landing of egg-bearing female spiny lobster or lobsters with a carapace of less than 7.6 cm or a tail of less than 13.8 cm, excluding the protruding muscle tissue<sup>3</sup>. Some U.S. fishers have reportedly landed such lobsters in neighboring states, evading the intent of the Florida law. The bill, if adopted, would also apply to foreign imports of undersized or egg-bearing lobsters.

In Brazil, the Superintendency of Fisheries Development (SUDEPE) recently issued new regulations on the licensing of lobster boats, an attempt to control the recent expansion of the lobster fleet. In addition, a 30-day closed season was declared for 1975. The use of any type of net to harvest lobster is forbidden in Brazil. Other countries impose similar restrictions. Cuba sets seasonal limits on harvesting of spiny lobster and allows a minimum size of 21 cm from the base of the antennae to the end of the "telson" (tail). Nicaraguan regulations prohibit the capture, purchase, possession, processing, storage, transport, sale, or export of egg-bearing lobsters and also prohibit the capture of lobsters measuring less than 20 cm from the base of the antennae to the end of the tail. Conservation regulations limit the

<sup>3</sup>Florida law states that the carapace must be a minimum of 3 inches and the tail must measure at least 5.5 inches.

Table 2.—U.S. commercial landings of spiny lobster, by fishing grounds, 1974.

Area	Metric tons	Percent of total
Caught off U.S. shores		
0 to 3 miles	1,227	21
3 to 12 miles	2,612	45
12 to 200 miles	437	7
Total off U.S. shores	4,276	73
Caught in international waters off foreign shores	1,554	27
Total	5,830	100

Source: U.S. Department of Commerce, "Fisheries of the United States, 1974."

Table 3.—U.S. imports of spiny lobsters, by country, 1960-74 (In metric tons, live weight).

Country	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
Bahamas	2,050	2,300	1,830	1,086	1,150	1,350	760	750	1,010	960	1,090	1,420	1,940	1,680	1,255
Belize	550	390	400	466	400	470	480	310	600	610	370	540	510	410	415
Bermuda	0	3	0	0	0	0	0	0	1	0	1	0	0	0	0
Canal Zone	0	0	0	28	0	10	0	0	0	0	0	0	0	0	0
Colombia	0	10	0	0	10	40	30	10	70	40	100	110	320	70	163
Costa Rica	560	980	150	512	220	500	100	160	150	300	400	80	100	50	223
Cuba	3,900	1,960	130	0	0	0	0	0	0	0	0	0	0	0	0
Dominican Rep.	0	5	2	2	30	40	70	40	120	90	50	80	70	100	11
French Guiana	0	0	0	0	0	0	0	0	80	0	80	0	0	0	0
Fr. W. Indies	0	0	10	0	0	1	0	0	0	40	40	70	0	0	0
Guatemala	0	10	20	14	40	60	20	10	10	5	10	20	20	40	10
Guyana	0	4	0	0	0	0	4	0	0	120	0	0	0	0	0
Haiti	80	100	100	115	170	330	290	330	410	430	300	300	340	210	235
Honduras	20	60	250	57	180	120	110	160	130	200	1,500	800	400	360	999
Jamaica	100	90	110	102	110	160	200	150	330	320	420	780	770	420	336
LWI <sup>1</sup>	40	4	10	2	1	0	50	40	20	10	10	50	100	90	59
Mexico	1,500	2,010	1,960	1,470	2,350	2,210	3,060	2,130	2,680	2,770	2,640	3,170	2,810	2,910	2,935
Neth. Antilles	0	5	70	56	0	0	0	0	0	0	0	4	0	0	0
Nicaragua	20	120	420	724	360	660	430	520	440	480	470	360	540	760	1,336
Panama	10	220	80	109	1	160	60	10	50	100	320	50	150	40	57
Surinam	0	20	0	0	0	0	0	0	0	10	30	0	0	0	0
Trinidad and Tobago	0	0	1	0	0	20	10	10	0	10	20	80	20	20	0
Venezuela	0	0	30	30	3	70	20	20	90	180	110	70	20	80	12
Brazil	3,240	4,910	6,390	5,400	3,930	3,660	3,370	2,810	4,730	8,030	8,130	7,030	8,300	8,070	8,424
Total	12,070	13,201	11,963	10,173	8,955	9,861	9,064	7,460	10,921	14,705	16,091	15,014	16,400	15,310	16,470

<sup>1</sup>Leeward and Windward Islands.

Conversion factors used: tails to live weight: 1:3; canned to live weight: 1:4.63; unspecified to live weight: 1:3.

Source: Bureau of the Census, U.S. Department of Commerce. *U.S. Imports for Consumption and General Imports, TSUSA Commodity by Country or Origin*.

Table 4.—Spiny lobster catch, countries with Pacific and Atlantic coasts, 1971-73 (in thousands of metric tons).

Country	Pacific <sup>1</sup>			Atlantic <sup>2</sup>		
	1971	1972	1973	1971	1972	1973
Costa Rica	—	—	—	0	0	0
Guatemala	0	0	0	—	—	—
Honduras	—	—	—	1.0	0.3	0.3
Mexico	1.7	1.5	1.5	0.4	0.4	0.6
Nicaragua	—	—	—	0.2	0.2	0.2
Panama	—	—	—	—	—	—
U.S.	0.1	0.1	0.1	3.9	4.9	5.1

<sup>1</sup>No *Panulirus argus* exists in the Pacific.

<sup>2</sup>Primarily *P. argus*.

<sup>3</sup>Estimated by FAO.

—Indicates that no spiny lobster is caught.

0 Indicates a negligible amount (less than 100 kg) is caught.

Source: FAO Yearbook of Fishery Statistics, 1973.

size of lobsters caught in Belize to a minimum 8.9 cm carapace<sup>4</sup> or 4-ounce tail, and in Colombia to a 6.5 cm carapace or 3-ounce tail.

### U.S. IMPORTS

The United States imports sizeable amounts of spiny lobster from Brazil, Mexico, and the Bahamas (Table 3). U.S. import data can also be used to evaluate spiny lobster catch data. In some instances the United States is importing more lobster than a number of countries report harvesting. As U.S. import totals include all species of spiny lobsters, it is not possible to determine the precise amounts of *Panulirus argus* imports. Estimates of *P. argus* imports can be obtained only by determining the proportion of the *P. argus* catch to total catch for each exporting country. Imports from countries having only Caribbean or Atlantic coasts can be assumed to be almost entirely *P. argus*, as other spiny lobster species are not common in these waters. The only exception is Brazil, where *Panulirus laevidauda* is estimated to represent approximately 19.2 percent of the catch.

Exporting countries with both Atlantic and Pacific coasts pose more of a statistical problem. FAO data suggests that only Mexico, of all the countries with both Atlantic and Pacific coasts, harvests significant quantities of spiny lobster other than *P. argus* (Table 4). Approximately 75 percent of the total Mexican lobster catch is eastern Pacific spiny lobsters: *Panulirus interruptus*, *P. inflatus*, and *P. gracilis*.

## Trade Negotiators Eye Preference System

Under the multilateral trade negotiations being held in Geneva, Switzerland, the "Tropical Products Group" has developed a Generalized System of Preferences (GSP) to be offered to 98 designated beneficiary developing independent countries plus many non-

independent countries and territories, the NMFS Office of International Fisheries reports. Listed below are 19 fishery items on the GSP list that could be imported duty free from these developing areas if the negotiations are completed.

Item number	Articles	Units	Duty rates
	Fish, fresh, chilled, or frozen, whether or not whole, but not otherwise prepared or preserved:		
	Other than sea herring, smelts and tuna:		
	Whole; or processed by removal of heads, viscera, fins, or any combination thereof, but not otherwise processed:		
110.28	Mackerel, frozen.	lb	0.35¢/lb
	Other than cod, cusk, eels, haddock, hake, pollock, shad, sturgeon, freshwater fish, halibut, salmon, mackerel, or swordfish.	lb	0.5¢/lb
	Scaled (whether or not heads, viscera, fins, or any combination thereof have been removed) but not otherwise processed:		
110.45	In immediate containers weighing with their contents less than 15 pounds each.	lb	6% ad valorem
	Fish, dried, whether or not whole, but not otherwise prepared or preserved, and not in airtight containers:		
111.15	Shark fins (except from Mexico).	lb	0.2¢/lb
111.18	Other than cod, cusk, haddock, hake pollock, and shark fins.	lb	0.1¢/lb
	Fish, salted or pickled, whether or not whole, but not otherwise prepared or preserved, and not in airtight containers:		
	Other than cod, cusk, haddock, hake, pollock, and shark fins, mackerel, or salmon:		
111.56	In bulk or in immediate containers weighing with their contents over 15 pounds each.	lb	0.6¢/lb
	Other than alewives.		
111.92	Fish, smoked or kippered, whether or not whole, but not otherwise prepared or preserved, and not in airtight containers:		
	Other than cod, cusk, haddock, hake, pollock, herring, mackerel, or salmon.	lb	3% ad valorem
	Fish, prepared or preserved in any manner, not in oil, in airtight containers:		
112.03	Anchovies:		
	In containers weighing with their contents over 15 pounds each.	lb	1¢/lb
112.36	Other than anchovies, bonito, yellowtail, herring, pollock, salmon, sardines, or tuna.	lb	6% ad valorem
	Fish, prepared or preserved in any manner, in oil, in airtight containers:		
112.40	Anchovies.	lb	6% ad valorem
112.94	Other than anchovies, bonito, yellowtail, herring, pollock, salmon, sardines, or tuna.	lb	12.5% ad valorem
	Fishballs, cakes, puddings, pastes, and sauces (including any such articles in airtight containers):		
113.01	Pastes and sauces.	lb	4% ad valorem
113.30	Fish roe, fresh, chilled, frozen, prepared, or preserved:		
	Sturgeon roe.	lb	15% ad valorem
	Other fish roe:		
113.40	Other than boiled and in airtight containers.	lb	2¢/lb
113.50	Fish, prepared or preserved, not specially provided for		
	In oil:	lb	12.5% ad valorem
113.60	Not in oil:		
	In immediate containers weighing with their contents not over 15 pounds each.	lb	6% ad valorem
	Shellfish, fresh, chilled, frozen, prepared, or preserved (including pastes and sauces):		
	Clams:		
	In airtight containers:		
114.05	Other than razor clams.	lb	14% ad valorem
	Crabs:		
	Crabmeat:		
114.25	Prepared or preserved (including pastes and sauces):		
	Other than in airtight containers	lb	7.5% ad valorem
114.55	Shellfish juices in airtight containers:		
	Oyster juice (including weight of immediate container).	lb	3¢/lb

## Japanese Fishmeal Plant Slated for Saudi Arabia

Taiyo Gyogyo, Japan's largest fishing company, announced on 13 February its talks with the government of Saudi Arabia on the construction of a

fishmeal plant having a daily capacity of 15-50 tons. Taiyo intends to use trash fish which it will purchase from the Soviet Union as raw material for the fishmeal plant. Saudi Arabia imports about 1,200 head of live sheep from Australia each year. The fishmeal

<sup>4</sup>The Belizian regulation states that the carapace must be a minimum of 3.5 inches.

plant will produce feed for these sheep and for other livestock.

Taiyo signed an agreement on fisheries economics and technical co-operation with Sovrybflot, the Soviet Union's fishing company, in 1973. The agreement included a 5-year exclusive contract for Taiyo to buy all trash fish in Soviet catches which were in excess of the Soviet Union's domestic requirements. Taiyo's vice-president stated that he has explained the Saudi Arabian project to A. A. Ishkov, Soviet Minister of Fisheries, who raised no objection.

Several projects have been under discussion between Taiyo and Saudi Arabia including a joint venture for loading and unloading cargo ships, a cement plant, and the export of pre-fabricated buildings. Source: *Nikkei Sangyo Shimbun*.

## ECUADOR ISSUES NEW FISHING REGULATION

The Government of Ecuador has issued Ministerial Decree No. 12982, which governs fishing by foreign nationals in waters claimed by Ecuador,<sup>1</sup> according to the U.S. Embassy in Quito. The Decree extends the Ecuadorian Exclusive Fishing Zone from 40 to 60 miles for both Ecuadorian fishers and those foreign fishers who have association agreements (joint ventures) with Ecuadorian companies. The Decree also rescinds the ban on vessels with a capacity greater than 600 gross registered tons (GRT) from fishing in Ecuadorian-claimed waters.

Each year the Ecuadorian Subsecretary for Fishery Resources will determine the maximum allowable catch. Foreign vessels will be licensed as long as the maximum allowable catch is not exceeded and as long as Ecuadorian fishers are not adversely affected by the operations of foreign fishers. The new regulations were issued by the Minister of Natural Resources and Energy, Jaime Salazar, on 23 December 1975.

U. S. fishers interested in operating in Ecuadorian-claimed waters must secure both matriculas and licenses.

<sup>1</sup>Ecuador claimed a 200-mile Exclusive Fishing Zone in 1952 and a 200-mile Territorial Sea in 1966. Ecuador also claims a 200-mile Territorial Sea around the Galapagos Islands.

The matricula (registration) cost is US\$750, regardless of the size of the vessel, and is good for one calendar year. The matricula helps Ecuadorian authorities to identify foreign vessels. Ecuadorian licenses cost US\$60 per net registered ton and are valid for 50 days, or until one full load is caught, whichever comes first. Licenses can be obtained by radio if a matricula has been purchased previously.

According to the NMFS Office of International Fisheries, the new decree makes it possible for the large, modern U. S. purse seiners to obtain licenses to fish in Ecuadorian-claimed waters. The U. S. eastern Pacific tuna fleet at the end of 1975 consisted of 142 seiners with an average capacity of 835 GRT per vessel. Some of the most modern U. S. vessels have capacities of over 1,500 GRT and were, before the decree was issued, unable to apply for Ecuadorian licenses.

Preliminary indications suggest that there was significant U. S. interest in tuna operations in Ecuadorian-claimed waters in early 1976. According to the Vice President of the American Tuna-boat Association, Ed Silva, only 3 or 4 vessels of the entire U. S. eastern Pacific tuna fleet are not licensed by Ecuador. This contrasts sharply with January 1975, when Ecuadorian patrol boats seized seven U. S. tuna vessels for fishing within Ecuador's 200-mile limit, held the vessels several weeks, and levied fines and other penalties totaling approximately US\$4.4 million.

The question of foreign-flag fishing was raised in the Ecuadorian press at the end of 1975. In November, the Ecuadorian Government denied reports of illegal foreign fishing by stating that all vessels currently fishing in Ecuadorian-claimed waters had matriculas and licenses. On 10 December, the Ecuadorian Government's licensing of foreign flag vessels was criticized in the press. According to the article, the Ecuadorian Government made more money from fines during tuna "wars" than it did when the U.S. vessels were properly licensed.

The Ecuadorian press has recently published a number of articles criticizing foreign tuna fishing activities in

<sup>2</sup>"Tunamen get licenses to fish Ecuador," *National Fishermen*, March 1976.

Table 1.—Ecuador's tuna fleet as of December 1975.

Type	Vessels		Average capacity per vessel <sup>1</sup>	Per-cent <sup>2</sup>
	No.	Total carrying capacity <sup>1</sup>		
Baitboat	44	1,522	35	0.90
Seiner	17	2,497	147	1.48
Bolichera <sup>3</sup>	3	80	27	0.05
Total	64	4,099	64	2.43

<sup>1</sup>In gross registered tons.

<sup>2</sup>Percentage of gross tonnage of the Ecuadorian tuna fleet, by type, compared to the total gross tonnage of all tuna vessels operating in the Eastern Pacific.

<sup>3</sup>Small seiner.

Source: Inter-American Tropical Tuna Commission.

Table 2.—Ecuador skipjack and yellowfin tuna catch, 1974-75 (in short tons).

Species	1975	1974
Skipjack	17,445	6,581
Yellowfin	11,007	8,527
Total	28,452	15,108

Source: Inter-American Tropical Tuna Commission.

the waters claimed by Ecuador. The press in Manabi Province<sup>3</sup> claimed that more than 150 large foreign vessels were operating in Ecuadorian-claimed waters. Quito's *El Tiempo* published an article on 8 February, which complained that U. S. fishers had found that it is more comfortable, less risky, and economically advantageous to fish with a license: "Our territorial sea has become populated with United States fishing boats, legally protected to carry out their fishery." The columnist continued by criticizing the expeditious way in which permits for foreign vessels were handled and demanded the repeal of the regulations which permit the purchase of licenses by radio. The article was especially critical of the practice of allowing licenses to be purchased by radio since, according to *El Tiempo's* columnist, the practice is disadvantageous to Ecuador as it allows some foreign fishers to delay the purchase of the license until they have actually found tuna. Guayaquil's *El Universo* reported on 9 February that a university student group had criticized issuing licenses to foreign fishers and demanded greater efforts to increase the capacity of the Ecuadorian fleet.

The extension of the zone, reserved

<sup>3</sup>Coastal province in which the Ecuadorian tuna industry is centered.

exclusively for Ecuadorian fishers, to 60 miles from Ecuador's coast is designed to prevent foreign fishing in the coastal areas presently fished by the Ecuadorian fleet. The Ecuadorian tuna fleet in 1975 consisted of 64 vessels with a total gross tonnage of

4,098 tons (Table 1).

The average carrying capacity of the Ecuadorian fleet is only 64 GRT per vessel. The small size of most Ecuadorian tuna vessels effectively limits their range and therefore they cannot operate in distant waters. This explains

the Ecuadorian Government's concern in excluding foreign vessels from coastal waters. Ecuadorian fishers experienced a very successful 1975 tuna season, significantly increasing their catch of both skipjack and yellowfin tuna (Table 2).

## Norwegian Fishery Developments Listed

### NORWAY ESTABLISHES "COD FUND"

The Norwegian Government has established a temporary subsidy for its cod fishery in 1976. The "cod fund" will be in addition to the US\$60 million in direct subsidies and US\$20 million in loans the Government plans to provide to the fishing industry. Total federal aid to Norwegian fisheries in 1975 was estimated at about US\$90 million.

The "cod fund" is financed by a US\$2 million loan and will provide

temporary export credits for cod. Other government assistance measures are being considered. According to the Norwegian Fishermen's Association, fishers have lost almost US\$50 million in income in the first half of 1975, compared with 1974. Sixty percent of this loss came from the cod industry and the remainder from the capelin industry. Per capita aid was estimated at almost US\$4,000, although only a small portion of this went directly to the fisher.

### CATCH STATISTICS, 1972-75

Norway's fishing industry suffered a series of setbacks in 1975, including reduced fish stocks, falling international prices, and bad weather. As a result, the total catch declined approximately 6 percent from 1974 levels (see Table 1). Increasing operating costs made a severe impact in the industry: value of landings declined an estimated 15 percent from 2.2 billion kroner (US\$404 million) in 1974 to 1.9 billion (US\$340.5 million) in 1975. Sources: *Fishing News*, *Fishing News International*, and *Fiskets Gang*.

Table 1.—Fisheries catch by species, quantity, and value (thousand kroner), 1972-75.

Species	1972		1973		1974 <sup>1</sup>		1975 <sup>1</sup>	
	Catch <sup>2</sup>	Value <sup>3</sup>	Catch	Value	Catch	Value	Catch	Value
Eel	433	4,565	412	4,635	368	4,499	402	5,166
Capelin	1,536,369	347,820	1,332,119	422,114	1,029,047	340,743	979,998	270,177
Salmon sea trout	1,867	40,742	1,860	35,228	1,539	23,770	1,550	24,000
Halibut	1,652	12,557	1,463	13,505	1,199	11,120	1,063	10,110
Plaice	709	1,493	695	1,893	615	1,703	545	1,495
Greenland halibut	14,892	30,301	13,136	24,737	7,438	17,047	4,654	10,957
Torsk	13,759	20,973	19,467	47,229	23,492	67,433	14,612	32,235
Haddock	36,974	63,939	62,580	141,966	54,540	135,336	45,856	89,083
Cod	309,367	557,475	217,958	451,673	232,915	694,664	236,895	622,229
Norway pout	181,723	37,860	175,826	67,515	257,763	108,799	308,123	91,523
Polar cod	388	47	2,831	726	76	21	38	7
Pollock	743	1,270	1,065	2,095	1,450	3,617	1,131	2,566
Saithe	122,536	113,001	120,264	122,378	119,610	180,813	101,359	128,089
Blue ling	1,556	2,527	3,952	12,412	2,872	8,340	3,780	10,406
Ling	17,951	39,327	17,845	64,332	17,366	75,001	14,386	56,821
Cod liver	21,482	6,101	11,983	3,915	6,959	3,848	6,107	4,760
Cod roe	5,670	6,341	6,553	7,937	3,347	5,920	2,441	4,193
Winter herring	—	—	6	12	188	455	—	—
Fat herring	10,077	12,972	6,983	13,287	6,316	15,968	3,534	12,036
Small herring	4,516	3,563	1,758	1,490	1,588	1,893	656	551
Fjord herring	4,504	5,678	1,930	3,425	1,875	3,775	1,647	3,597
North Sea herring	136,975	48,971	135,405	86,674	66,254	55,991	32,902	40,769
Icelandic herring	—	—	—	—	—	—	—	—
Sardinella	135,165	20,005	52,862	15,325	21,042	6,312	9,808	3,433
Sprat	18,585	26,552	17,096	23,904	19,489	25,406	166,000	90,678
Mackerel	161,308	76,074	338,989	223,634	287,741	201,933	243,320	165,883
Horse mackerel	65,325	10,151	94,069	30,657	79,697	26,426	12,632	4,786
Young mackerel	285	242	57	105	65	82	45	93
Tuna	355	1,606	328	1,583	641	1,964	772	3,367
Sandeel	18,788	4,190	17,163	6,825	77,965	34,713	54,156	16,324
Redfish	5,784	7,838	4,794	6,873	4,383	7,474	3,162	5,462
Catfish	2,435	3,283	2,722	4,025	2,115	3,623	1,873	3,182
Picked dogfish	21,296	20,630	16,641	19,477	13,645	25,909	11,957	21,943
Porbeagle	292	1,775	161	943	127	724	232	1,210
Crab	2,353	4,637	3,012	5,298	2,616	4,864	2,645	5,323
Lobster	167	5,352	141	5,195	140	4,952	109	4,602
Deep-water prawn	10,516	63,077	12,066	83,056	15,171	103,479	17,110	111,154
Squid	0	1	—	—	—	—	0	0
Other liver	2,606	2,002	3,120	4,686	5,018	8,912	4,838	11,437
Other roe	315	775	782	2,307	698	2,232	570	2,050
Seaweed dried	15,630	5,470	12,208	5,040	14,000	5,000	14,000	5,000
Various	4,892	7,040	7,855	10,535	8,863	10,644	11,776	8,646
Total	2,910,220	1,618,223	2,720,157	1,978,646	2,390,233	2,235,405	2,311,684	1,885,343
Of which								
Herring and sprat	309,822	117,741	216,040	144,117	116,752	109,800	214,547	151,064
Cod with byproducts	336,907	571,606	236,494	465,340	243,221	706,779	245,481	631,182
Other kinds	2,243,511	928,876	2,267,623	1,369,189	2,030,260	1,418,826	1,851,692	1,103,097

<sup>1</sup>Figures for 1974-75 are preliminary.

<sup>2</sup>In metric tons.

<sup>3</sup>5.336 Norwegian kroner = US\$1.00.

Source: *Fiskets Gang*.



## DANISH FISH MEAL PRODUCTION DROPS

Prospects for a decline in Danish fish meal and oil production and exports should have a favorable impact on world demand for oilseeds and oilseed products. Whereas Denmark produced 285,000 metric tons of fish meal (and exported 248,000 metric tons) in 1974, production was expected to be off 10 percent in 1975. The present outlook is that output may be off again in 1976 and that it will further decline in the longer term.

The Danish fishing industry has been in turmoil during the past year because of over-expansion, lower meal and oil prices, rising costs, and increasing international pressure to conserve depleting fish stocks. These problems came to a boil in November when the Government banned herring fishing for the remainder of 1975. In protest the fishers went on strike and blockaded landings of foreign fishing vessels, causing Danish fish reduction plants to close down.

Of additional long-term concern is the contagious extension of 200 mile economic zones, which, if continued on a national basis, could leave Denmark with little water in which to fish. Denmark's ability to continue its fish meal production will depend on the goodwill of those countries which will assume control of those waters traditionally fished by Danes.

Mounting difficulties in the Danish fishing industry reached a crisis stage when, on 6 November the government banned further fishing of North Sea herring until the end of December. The immediate cause of the ban was that the herring quotas set by the Danish Government for the second half of 1975—15,000 MT of table herring and 30,000 MT for reduction—had been exceeded. To protest the ban, and to underline their demands for government subsidies and for limitations on landings by foreign boats, the fishers struck. The fishers also sporadically blockaded landings by foreign boats.

One immediate result of the ban and the strike was a shut down of the 14 Danish fish reduction plants as of mid-November. While the strike was now largely over and the plants resumed limited processing in December, the total catch of reduction fish in 1965 probably did not exceed 1,450,000

metric tons, compared with 1,571,000 metric tons in 1974—and fish meal production will likely be down to around 260,000 metric tons from 285,000 metric tons in 1974.

The long-term outlook is for a continuing decline in Danish fish meal output and exports. Denmark has been under increasing international pressure to accept international quotas set by the Northeast Atlantic Fishery Commission (NEAFC) which have been more stringent than the national quotas set by Denmark. In a London NEAFC meeting in November, the Danes agreed to a compromise for some international quotas for 1976 (and presumably beyond). The NEAFC herring quota set for Denmark for the first half of 1976 is 28,000 metric tons (including 5,000 metric tons for the Faeroe Islands). The 28,000 metric ton quota compares with a 54,000 metric ton herring quota Denmark had set for itself for the second half of 1975. The Danes will also reduce the amount of herring they take as by-catches from 30 percent to 15 percent for the first quarter of 1976 and to 10 percent in the second quarter. However, Denmark did not accept the international quota proposed by NEAFC for sprat and no national quota has yet been set; therefore it is assumed their catch this year may about equal last year's.<sup>1</sup>

An additional threat to Danish fishing and fish meal production is the move toward extended fishing zones by other countries. An extension to 200 miles by Denmark's neighbors would reduce Danish North Sea fishing grounds to a narrow area of poor fishing, which the industry estimates would cut the catches to 25 percent of the 1974 level and to an even lower level for reduction fish. Consequently the Danes would be anxious to join other EC countries in any such extension so that they could share in an "EC Sea."

Danish fishing and fish meal production expanded rapidly in recent years, spurred by the exceptionally high protein prices of the early 1970's

<sup>1</sup>Denmark has objected to both the NEAFC sprat and herring quotas. The United Kingdom has also filed a reservation to its sprat quota. See also "Objections Raised to NEAFC Quotas," in this issue.

and favorable Danish tax policies. The 285,000 metric ton 1974 production of fish meal compares with a level of about 210,000 metric tons in the late 1960's. From 1970 to 1975 the Danish fishing fleet grew from 80,000 gross registered tons to 118,000.

With fish meal prices still high in terms of the intrinsic value of the protein in comparison to soy meal, the prospective decline in fish meal production should cause a corresponding increase in world demand for oilseed meals. Denmark in 1974 consumed about 30,000 metric tons of fish meal and exported 248,000 metric tons. It is assumed that virtually all of this could be replaced by a protein equivalent amount of oilseed meal, although traditional preferences may have to be overcome for some feed rations. Source: U.S. Embassy, Copenhagen.

## Twelve Nations OK Mediterranean Sea Anti-Pollution Pact

The first treaty to control pollution of the Mediterranean Sea was signed by twelve states bordering that sea at a conference held in Barcelona, Spain, 2-16 February 1976, reports the U.S. Embassy in Paris. Sixteen states participated in the conference convened by the United Nations Environment Program (UNEP), including Cyprus, Egypt, France, Greece, Israel, Italy, Lebanon, Libya, Malta, Monaco, Morocco, Spain, Syria, Tunisia, Turkey, and Yugoslavia.

The Soviet Union, United Kingdom, and the United States were represented by observer delegations as were the Arab League, the OECD, and the Commission of European Communities. Algeria and Albania were invited but did not attend. All the participants signed the Final Act of the convention and protocols except Libya, Syria, Tunisia, and Yugoslavia.

Signatory states agreed to take all appropriate measures to prevent and combat pollution of the Mediterranean Sea caused by dumping from ships and aircraft. The protocol on dumping control is similar to the 1972 London Convention which prohibits the dumping of certain substances. In addition to the items on the prohibited list of the London Convention, low- and medium-

level radioactive matter is banned, as are acid and alkaline compounds in amounts that would pollute the sea.

The states also agreed to cooperate in developing pollution monitoring systems and to exchange scientific and technological information. The twelve nations signing the treaty hailed the agreement as a step forward in international cooperation, even though the treaty lacks enforcement powers. The treaty puts much of the burden for financing the control programs on UNEP and the participating Mediterranean governments.

## **Canadian Fish Industry Gets \$44 Million in Aid**

Romeo LeBlanc, Minister of State for Fisheries, announced on 5 March 1976, a C\$44 million temporary assistance program for Canada's troubled fishing industry<sup>1</sup>. The new program took effect on 1 April 1976.

This assistance for fisheries rehabilitation provides direct payments to inshore and offshore fishers owning vessels. Groundfish fishers who own vessels will receive deficiency payments on first quality food fish. This is designed to maintain operations of fishing enterprises facing the problem of low resource availability and rising costs.

The new assistance program will also provide conditional grants to groundfish plants on fillet products produced from first quality groundfish. Assistance to processors will be conditional upon their maintaining July 1974 prices to fishers as a minimum.

Payments will be subject to quarterly review and adjustment by species based on resource management considerations, landing levels, and fishing and processing costs. Payments will be conditional upon the submission of cost and earnings information.

"The cutback in fishing effort agreed to last September by foreign nations fishing the northwest Atlantic will reduce the decline in catches that contributed to this industry's problems. The government is fully conscious of the groundfish industry's importance: with 20,000 fishermen and 12,000 plant workers, it is the main employer in the

<sup>1</sup>C\$1.00 = US\$1.0006.

Atlantic fishing industry and the main support of hundreds of communities. Other programs for the growth and development of our fishing industry on both coasts are being formulated. As these programs are implemented, we will have a stronger and better industry returning more benefits and security to fishermen," LeBlanc said. Source: Environment Canada.

## **OBJECTIONS RAISED TO NEAFC QUOTAS**

Poland has filed an objection with the Northeast Atlantic Fisheries Commission (NEAFC) to the cod quota it was allocated at the November 1975 meeting of the Commission. This means that Poland will not have to abide by its 3,000 metric ton quota, and that the period during which objections can be filed has been extended to 2 May 1976.

## **WORLD FISHERY ACTIONS NOTED**

The division of International Fisheries Analysis, which follows trends in world fisheries for the National Marine Fisheries Service (NMFS), has prepared the following summary of recent world fisheries developments.

**Mauritania's domestic marine fisheries** catch in 1974 has been estimated at between 25,000 and 30,000 metric tons. Estimates of the total catch of foreign vessels fishing off Mauritania are as high as 300,000 metric tons in 1974.

**The Inter-American Development Bank** is sponsoring a \$19.4 million fisheries development project in Costa Rica. The Bank's share of the loan is \$13.6 million. The project entails the building of a fisheries complex at Punta Arenas, including port facilities and cold storage. The project also includes the purchase of five shrimp trawlers to replace older vessels, five vessels to fish "langostino," and five trawlers for finfish.

**Costa Rican tuna regulations** have been enacted, regulating fishing by foreign vessels within the 200-mile Patrimonial Sea claimed by that country.

**Brazil has developed hamburger and sausage products** made with sardines and beef. The School of Food Technology in Campinas is test-marketing

Denmark has objected to its 1976 sprat quota which limits its 1976 catch to 40 percent of each country's 1975 catch above 50,000 metric tons. Denmark caught about 300,000 metric tons in 1975, and would be restricted to a catch of 200,000 metric tons in 1976 under the above formula.

The United Kingdom has filed a reservation to its sprat quota and Denmark has also objected to the NEAFC ban on industrial fishing for herring. The Danes are not objecting to the ban itself, but rather to the fact that any herring caught incidentally while fishing for other species are to be included in the totals counted against the quotas for herring for human consumption. Denmark has promised to limit its herring by-catch to 15 percent between January and March 1976, and to 10 percent between April and June 1976. Source: U.S. Embassy, Copenhagen.

the product. The sausage contains 50-75 percent sardine flesh and the hamburger 25 percent sardine flesh.

**Brazilian fishery imports exceed exports** despite the fact that Brazil harvests the third largest fisheries catch in Latin America. In 1974, Brazil imported over \$10 million more of fishery products than it exported.

**Brazil's major fisheries import commodity** is bacalau (dried cod and cod-like species). In 1974, bacalau represented nearly 50 percent of all foreign fishery imports by quantity, or 24,500 metric tons. Brazilian bacalau imports declined 35 percent in 1974 and new Brazilian trade regulations may cause a further reduction.

**Mexico's total tuna catch** increased slightly in 1975. The catch of yellowfin was 16,900 short tons, only 100 tons more than in 1974. The catch of skipjack increased 38 percent from 5,000 short tons in 1974 to 6,900 tons in 1975.

**Bermuda's tuna fleet, operating in the eastern Pacific in 1975,** consisted of five purse seiners with a total carrying capacity of 2,396 GRT. That was 1.4 percent of the gross tonnage of the entire eastern Pacific tuna fleet.

**Cuban fishery schools will train 40 Jamaican students,** starting in Sep-

tember. The course of study will last 3 to 5 years.

**Albania has extended its territorial sea to 15 nautical miles from 12 miles, a distance it has claimed since 1970.**

**Iceland's general strike and the trawlermen's strike ended on 28 February.** Meanwhile, there was progress in the fisheries dispute between Iceland and the United Kingdom and a

6-month agreement was signed on 1 June 1976.

**The Scottish Highlands and Development Board is funding a \$750,000 study on the blue whiting stocks of the Western Isles to determine if stocks can support a fish meal industry.** Preliminary tests indicate that 500,000 metric tons of blue whiting could be caught each season.

#### *Fishery Notes*

## **Sharks Score Well in Texas Taste Surveys**

Shark meat fared well when compared with accepted seafoods like redfish, according to a shark meat taste test and attitude survey conducted for the Texas Parks and Wildlife Department (TP&WD). Although all data were not yet analyzed, tentative results indicated that Texans were willing to accept shark meat as a seafood.

Four tests were conducted, two each in Arlington and the north Dallas areas. In the first taste test, 128 persons were served four pieces of broiled, unseasoned fish. The four fish tested were redfish, used as the control piece, bonnethead, sharpnose and blacktip sharks. Respondents were asked to score the fish on flavor, taste and overall satisfaction on a range of one to seven. On that basis, redfish scored an average of 4.3, as did sharpnose. Bonnethead scored 3.9, while blacktip averaged a 3.6 grading. Overall, the testers preferred the taste of sharpnose, one of the smaller-sized sharks.

"This doesn't mean the lowest score indicates the taste of blacktip was not liked," said Bill Schwartz of the TP&WD. "The scores were used to rank one species in relation to the others. Even though blacktip scored lowest in this test, 23 persons said they liked the taste of it the best."

The second test involved 80 testers, and all were served four pieces of blacktip shark. They were given a small and a large piece of fish as in the first test, plus two more pieces, large and small, that had been soaked in water for 1.5 hours. Soaking the shark meat in water prior to cooking is thought to remove a bitter taste. Results, however, showed the large, unsoaked piece of meat was rated

highest, 4.5, while the small treated piece was rated lowest at 3.5.

For the third test, the shark meat was breaded and fried. Some 80 testers were given three bite-sized pieces of fish: 1) redfish; 2) sharpnose soaked in water before cooking; 3) untreated sharpnose. Here, the redfish control and the soaked piece of shark meat scored identically, 5.4. The untreated sharpnose scored slightly lower, 5.2.

In the fourth test, 64 testers were given identical pieces of blacktip shark. "The only difference was we told them that one piece of meat was shark, but we did not say the other piece was also shark," Schwartz said. Surprisingly, the piece identified as shark received a higher rating than the unidentified piece of fish. Of the 64, only four said they could not distinguish between the two pieces. There was, in fact, no difference, since both portions were blacktip shark.

"These results surprised us somewhat," Schwartz noted, "but it shows a general indication of positive reaction, as far as taste is concerned. The public in our samples thinks shark meat tastes good, and most of the shark meat got basically the same scores as redfish, which is an accepted good-tasting fish."

Regarding all four tests, Schwartz indicated much of the data have not been cross-referenced, nor has an analysis been completed. Several computer tests remained to be applied to the data before a definite analysis could be drawn and results defined. Still, Schwartz added, "We do know that women are more averse to eating shark than men, and we do know that all species of shark do not taste the same. The differences in taste, however slight, are real."

On the attitude survey, individuals were asked their reaction if they ate a piece of good-tasting fish and were then told it was shark meat. Out of 199 respondents, 144, or 72 percent, said they would be pleasantly surprised and continue eating. Only 23 persons, 11 percent, said they would be upset at being told it was shark meat and stop eating.

"Our data thus far indicate shark is not all that different in taste from other types of fish and what differences there are are in the shark's favor. Its meat is of firmer texture, and won't flake apart, 65 percent of the animal is edible and there are no bones in the flesh," Schwartz noted. More than 20 species of shark are found in the Gulf of Mexico, and Schwartz feels the shark supply is available in enough quantity to be marketable if people accept it as a source of food.

## **Texas Calls Black Drum Underutilized Species**

More than a million pounds of black drum are harvested commercially every year in Texas, but Texas Parks and Wildlife Department fisheries biologists still feel it is one of the most underutilized food fish on the Texas Gulf coast. Although plentiful, drum are not the most sought-after fish, ranking far below popular game fish such as speckled trout, flounder, and redfish.

Known under a variety of names, including Texas drum, sea or saltwater drum and tambor, this member of the croaker family is a commercial fishing mainstay, but it has never been fully accepted by sport fishermen. It is most abundant along the lower coastal areas and is found in almost all bay and inshore Gulf waters. Its name comes from the fish's ability to produce croaking or drumming sounds with its air bladder. Small drum of a pound or so sometimes are called butterfly drum, while the larger size of 30 pounds or more are known as bull drum.

The species can thrive as easily in shallow, warm water as it can in 100-foot-deep, cold water, and also survive freezing weather better than any other fish. Their adaptability makes the black drum available to a greater number of anglers than any

other bay fish. Drum are chunky, high-backed, and vary from jet black to silver or bronze in color.

Drum spawn in either bay or Gulf or in connecting passes during late winter between February and April by random release of eggs. By early summer, one-half- to one-inch juveniles are common in shallow creeks and boat basins.

The drum grows to good size, reaching 16 inches in three years, and growing an average of two inches a year thereafter. The largest black drum on record weighed 146 pounds; the Texas angling record is 78 pounds. Most drum caught in Texas weigh 30-40 pounds.

Tagging studies conducted by P&WD biologists have recorded drum migrations of 245 miles in one year, but distances of 10 miles or less are average for spawning migrations or movements to freshwater flows.

Drum are rarely taken on artificial bait since they feed by feel and smell. Cut shrimp, squid, or fish are preferred baits. Since drum feed along the bottom, the basic fishing technique is to put a baited hook on the bottom and wait for the drum to swallow it. Schools of drum feed in shallow water and when drum runs occur, anglers by the score gather at intracoastal canals. Drum seldom jump or make long runs but they are powerful fighters.

During the period December through March, with a peak in February, the bull drum move from the Gulf into the bays and congregate along channels and turning basins. These annual runs result in the most notable sport harvests.

### **Efforts to Restore Lake Trout to Lake Michigan Continue**

Upwards of 958,000 lake trout are being planted in the Wisconsin waters of Lake Michigan this year, with a special attempt to stock 280,000 at two historic lake trout spawning reefs, according to the Wisconsin Department of Natural Resources (DNR).

Ron Poff, DNR Great Lakes fishery supervisor, said that, "We are going to plant 70,000 lake trout at Horseshoe reef in Green Bay and 210,000 at Milwaukee reef in Lake Michigan. Horseshoe reef is located in Green Bay

off Door County and historically produced significant numbers of lake trout. Milwaukee reef, located in midlake Ozaukee and Sheboygan counties, historically contributed significant numbers of lake trout to the southern half of Lake Michigan."

To date, biologists have failed to find any natural reproduction of lake trout in Lake Michigan even though lakers have been stocked since 1965. Lake trout originally reproduced in Lake Michigan until the sea lamprey entered the lake and completely eliminated the lake trout population. "Reef planting is part of a continuing effort by the Department to reestablish lake trout populations," said Poff, "with other efforts including a reduction in the sport fishing daily bag limit to 3 and continued closure of the commercial fishery for lakers. Hopefully these steps will provide more spawners.

#### *Publication*

### **International Navigation Aid Literature Published**

The U.S. Coast Guard, in the interest of promoting marine safety through broader understanding of aids to navigation, is distributing informational literature concerning International Association of Lighthouse Authorities (IALA) publications. IALA is a non-government association of services or organizations responsible for the provision or maintenance of lighthouses and other aids to marine navigation. The Coast Guard, as the U.S. Government organization responsible for provision of aids to navigation in the United States, is a member of IALA. The Commandant of the Coast Guard is an ex-officio permanent member of the Association's Executive Committee.

In order to promote the improvement and effectiveness of aids to navigation, IALA has prepared several publications for the use of both providers and users of aids to navigation. Two such IALA publications are: "International Dictionary of Aids to Marine Navigation"; and the "Manual on Radio Aids to Navigation." The "Manual on Radio Aids to Navigation" (Chapters 1-4) is for sale at 30 Swiss francs per copy. It discusses: 1) General Review (of radio navigation

Ultimately our objective is to re-establish a self-sustaining stock of lake trout." Poff added that there have been some encouraging signs, including high survival rates of fish planted in Lake Michigan and that wounding rates from sea lampreys are relatively low, indicating some success in controlling the sea lamprey.

Lake trout planted in Lake Michigan are descendents of lake trout originally from Lake Michigan, which should increase their probability of survival and reproduction. Other species being stocked in Lake Michigan this year include: 1.2 million chinook salmon, 550,000 coho salmon, 23,000 "tiger" trout, 959,950 rainbow trout, 150,050 brown trout, and 27,500 brook trout. Plantings in Lake Superior will include: 18,000 splake, 585,000 lake trout, 145,000 rainbow trout, 24,000 brown trout, and 31,050 brook trout.

aids); 2) Direction Finding; 3) Consol; and 4) Decca. The IALA dictionary is published in English, French, German, and Spanish. Its nine chapters are being published as separate booklets with an alphabetical index in each. The following have been printed: Chapter 1, General Terms, 12 francs; Chapter 2, Visual Aids, 35 francs; Chapter 3, Audible Aids, 9 francs; and Chapter 4, Radio Aids, 25 francs. Orders must specify the language desired.

In addition to these publications, IALA publishes the quarterly IALA Bulletin, which contains articles on technical and operational aspects of aids to navigation, plus information about Association activities. The Bulletin is available from the IALA Secretariat at an annual subscription price of 100 Swiss francs.

Orders for IALA publications must be placed with the Secretariat of the Association. They are not available from the U.S. Coast Guard. Orders should be addressed to: IALA Secretariat, 43, Avenue du President Wilson, 75775 PARIS CEDEX 16, France. Orders must be accompanied by an international money order for the full amount of the order. Publications are mailed postpaid.