1976 Fisheries Publication Award. The paper appeared in Volume 72, Number 4 of the *Fishery Bulletin,* pages 915-1031. Hobson is with the Tiburon Laboratory, Southwest Fisheries Center, NMFS, NOAA, Tiburon, Calif.

Hannum Joins NOAA's Washington Staff

William B. Hannum, Jr., former President and Chairman of the Board of Sea Farms, Inc., Key West, Fla., has been named Staff Assistant in the Living Resources Office of the Associate Administrator for Marine Resources, National Oceanic and Atmospheric Administration (NOAA).

Hannum founded Sea Farms, Inc., and for more than 10 years guided its activities in operating fishing fleets; producing, processing, and selling sea foods; and, developing aquaculture in the United States and Central and South America. Earlier, while employed as District Manager of *Chemical Week* magazine, he developed a process for raising shrimp that is now in broad use. His many years in the seafood industry and allied areas will support efforts being made by the Department of Commerce in maintaining an ecological balance between marine life and human needs.

In his new Marine Resources position in Washington, D.C., Hannum will be responsible for reviewing and evaluating policies and procedures which relate to the seafood industry and to marine environment.

Originally from Philadelphia, Pa., Hannum attended Pennsylvania State College and Drexel Institute, and has held numerous offices and memberships in nationally recognized fishery associations. He was a member of the Marine Fisheries Advisory Committee of the National Marine Fisheries Service and of NOAA's Coastal Zone Management Advisory Committee. Hannum is married to the former Louise McKee, also of Pennsylvania. They have two children: William B. Hannum, III, and Barbara H. Mount, and two granddaughters. The Hannums now live in Gaithersburg, Md.

Foreign Fishery Developments

Canada: Extended Fisheries Jurisdiction Enforcement Plans, and New Fishery Budget

The Canadian Government announced on 4 June that it would unilaterally extend its fisheries jurisdiction to 200 nautical miles not later than 1 January 1977. The action was unexpected, as Canada has consistently spoken against unilateral actions before the U.N. Law of the Sea Conference is concluded.

External Affairs Minister MacEachen, in announcing the new fisheries limits, cited Canada's need to protect its resources and its fishers, as well as recent U.S. and Mexican extensions of fishery jurisdictions. (The United States will extend to 200 miles on 1 March 1977; Mexico did so on 31 July.) MacEachen said: "There will be no fishery resource left to protect if action is not taken now because the fish stocks will be so depleted as to disappear as a resource of commercial significance. Not only the fish, but our Canadian fishermen, too, are an endangered species."

BILATERAL AGREEMENTS

Canada continued to press for an international solution to fisheries management at the U.N. Law of the Sea Conference in New York but had already signed bilateral fishery agreements with Spain, Portugal, Norway, Poland, and the Soviet Union, nations which fish heavily in Canadian waters, in anticipation of extended jurisdiction. Foreign fleets will be allowed to fish within the new limits for stocks that are surplus to Canadian fishing capacity. Catch quotas for foreign fishermen, however, had not been set by early summer.

The United States and Canada have a reciprocal fisheries agreement which was extended through April 1977, but further negotiations on mutual fishing rights in each other's extended jurisdictions will take place.

In a related development, Minister of Fisheries Roméo LeBlanc also announced that Canada intended to withdraw from the International Commission for the Northwest Atlantic Fisheries on 31 December 1976. The Canadian Government will not necessarily leave the organization, but is retaining its option to do so if future multilateral agreements are not satisfactory to the Canadians. The United States has also announced its intention to withdraw from ICNAF on 31 December. (Source: U.S. Embassy, Ottawa; and the *Washington Post.*)

ENFORCEMENT PLANS

Fisheries patrols are being doubled this year and this increased level will ensure Canada's capability to control fishing activity throughout its new 200-mile fishing zone, according to Minister of State for Fisheries Roméo LeBlanc.

Fisheries and Marine Service of Environment Canada, now carrying out 90 percent of Canada's fisheries patrol work in offshore waters, will call more extensively on ships and aircraft from the Department of National Defence (DND), Environmental Canada reports. DND already provides substantial support to fisheries patrols. In addition, vessels from the Ministry of Transport fleet will become available on a regular basis. The Fisheries and Marine Service will retain overall responsibility for fisheries surveillance and enforcement.

In 1976 the number of sea-days on patrol by vessels on both coasts will roughly double to about 2,000. Offshore patrols will increase on the Pacific coast to about 500 sea-days, and will double on the Atlantic coast to about 1,500 sea-days. The number of boardings of fishing vessels at sea by Canadian inspectors will increase to between 1,200 and 1,400 per year permitting at-sea inspection of at least one-third of the foreign fleet and one-sixth of the Canadian fleet every month.

The number of aircraft hours spent locating and identifying fishing vessels will more than double to over 4,000 per year. Except for some previous charters of private aircraft by the Fisheries and Marine Service, DND Tracker and Argus aircraft have provided all air

Canada's Fisheries and Marine Service fleet[1].

Type of vessel	Atlantic Coast	Inland waters	Pacific Coast
Fisheries Conservation and Protection vessels			
Over 100 feet			
Now operating	4	—	3
Being prepared	4	—	—
From 20-100 feet	43	6	51
Fisheries and Oceanographic/Hydrographic Research and survey vessels			
Over 100 feet			
Now operating	6	2	4
From 20-100 feet	46	57	44

[1] The total Fisheries and Marine Service fleet, about 600 vessels, ranges from small boats and launches to deep-draft, ocean-going ships, and employs approximately 1,200 people. It is the second-largest civilian-manned government fleet in Canada. (Source: Environment Canada.)

surveillance. Air patrols by DND will now increase sufficiently to locate and identify every fishing vessel in Canada's offshore zone at least once per week, and will keep an even closer watch over key areas where fishing boundary lines cross rich fishing banks.

Canadian vessels also will maintain a special presence in these parts of the fishing grounds. Fisheries and Marine Service vessels will carry out about 56 percent of sea patrols, DND vessels about 31 percent, and MOT vessels about 13 percent. Increased operational and maintenance costs of air and sea fisheries patrols for all departments will be covered by a special Fisheries and Marine budget of $4 million in 1976-77.

"We anticipate smooth and effective extension of jurisdiction," LeBlanc said. "We have already signed agreements with major fishing nations off our coast, confirming that in the new zone they'll accept our authority immediately. We will be able to say who fishes what, where, when, and how much. We will have the power to license foreign vessels, to restrict foreign vessels to certain areas, to impose reporting requirements, to lift their licenses if need be, to seize ships for violations of regulations, and to impose fines and sentences in our own courts."

LeBlanc also praised the work of Fisheries and Marine Service vessels under extraordinary demands last year. "In increasing the number of patrols after the temporary port closure to some foreign fishing vessels last fall, I even diverted fisheries and oceanographic research vessels temporarily into fisheries patrols. I was pleased to find their crews shared with some other arms of the Fisheries and Marine Service an interest and expert knowledge at this work. Fisheries and oceanographic research, management, and enforcement relate closely to one another; this helps lower the cost of effective surveillance. For example, our knowledge of fishing patterns helps us calculate foreign catches in relation to quotas. We have built up coordination and cooperation between our vessels and the fishing fleets; we can easily extend this same coordination to fleets of other federal departments. The government's decision to let us call on the aircraft and ships of other departments will ensure adequate surveillance and enforcement."

The regular fleet of fisheries patrol vessels built for the purpose will also gain strength, said LeBlanc. A new vessel, the *Cape Roger* (see box below), will carry a helicopter for more effective surveillance and coordination with other elements of the fisheries surveillance fleet. Two high-speed, aluminum, 120-foot patrol vessels are also under construction for use on the Atlantic coast. One will be in service before the end of the year. In addition, Fisheries and Marine Service expects to acquire another vessel suitable for ocean-going patrol work in the near future.

Canada Builds Biggest Fishery Patrol Ship

The largest fisheries patrol vessel ever built in Canada—the 205-foot *Cape Roger*—was launched from Pictou, Nova Scotia, on 12 June. To be based at St. John's Nfld., the $12 million vessel is scheduled to join the Fisheries and Marine Service's patrol fleet in mid-1977.

Besides fishery surveillance, the *Cape Roger* is equipped to conduct fisheries, oceanographic, and hydrographic research. It will have special deicing equipment installed on the superstructure. A maximum speed in excess of 16.5 knots, together with launching facilities for a Bell "Jet Ranger"-type helicopter, will permit continuous surveillance of large areas of the fishing grounds. The *Cape Roger* will have crew accommodation for 42, including up to 6 scientific personnel and 2 helicopter pilots. (Source: Environment Canada.)

Canadian inspections under ICNAF Joint Inspection Scheme[1], 1975.

Nation	Inspections	Violations
West Germany	5	0
Poland	10	1
Spain	59	14
USSR	274	18
Norway	5	1
Japan	4	2
East Germany	8	1
United States	14	5
Bulgaria	1	1
Cuba	1	0
France	3	1
Iceland	1	1
United Kingdom	1	1
Mexico	1	0
Portugal	28	12
Romania	2	0
Total foreign	417	48
Canadian vessel inspections	57	

[1] Besides the infringements by individual fishing vessels noted above, Canadian patrols detected other offenses on a fleet-wide scale. (Source: Environment Canada.)

"Our agreements with foreign countries, and our strengthened patrols, indicate that when we extend jurisdiction we'll do it effectively," LeBlanc said. "In the meantime, our patrols will continue to operate under the ICNAF (International Commission for the Northwest Atlantic Fisheries) Joint Enforcement Scheme." LeBlanc also reminded Canadian fishers that they are still expected to cooperate with fisheries inspectors, whether Canadian or foreign, who may board their vessels under that scheme. (Source: Environment Canada.)

NEW FISHERY BUDGET

The Canadian budget for the Fisheries and Marine Service in 1976-77 is estimated to be approximately C$261 million[1], a 25 percent increase over 1975-76 planned expenditures of C$208 million[2]. The budget for the Fisheries and Marine Service now represents 52 percent of the entire Department of Environment budget, a small percentage increase over last year's allotment. Total employment estimates have been set at 4,904 man-years, an increase of 143 positions from 1975-1976.

Capital spending comprises over 22

[1] US$1.00 = C$1.0006.
[2] Canada's fiscal year is from 1 April to 31 March.

percent of the budget with most of the C$59 million allocated for vessel and harbor construction and for research projects. Operating expenditures will account for more than 59 percent of the budget (C$155 million) with C$133 million allocated for fisheries management and research and C$42 million for activities in aquatic and ocean sciences. Economic assistance to the groundfish industry and other depressed sectors of the fishing industry amounts to over C$40 million, or 15 percent of the total fisheries budget.

In anticipation of extended jurisdiction effective 1 January 1977, Canada has provided C$9 million for patrol ship construction and C$10 million for a helicopter-equipped patrol vessel now under construction. For a six-page expanded summary of the Canadian budget, write R. V. Arnaudo, Office of International Fisheries, F41, NMFS, NOAA, Department of Commerce, Washington, DC 20235.

EC Drafts 200-Mile Limit Position Paper

The European Communities (EC) Commission drafted its position on EC fisheries policy and forwarded it to the EC Council on 26 February 1976. It is entitled "Problems which the Introduction of Economic Zones of 200 Miles Poses for the Community in the Sea Fishing Sector." The paper calls for Community control of fisheries within 200 miles of EC-members' borders, and establishes the principle that conservation of fish stocks is a collective Community responsibility, and not the sole concern of any one Member State.

The Council, acting on the advice of the Commission, would establish annual catch rates for selected species within Community waters to be based on the principle of optimal sustainable yield and as determined by the Council. A Scientific and Technical Committee for Fishing is to be established to estimate stocks and recommend measures for their conservation, as well as to prepare "periodic" reports on the status of the fishery.

Member states will be authorized to extend their coastal fishing zones from 6 to 12 miles. The resources within the zone of 12 to 200 miles, however, will be managed by the EC Commission, with quotas allocated to countries on the basis of past catches. Quotas assigned can be exchanged among Member states.

The paper makes reference to "vessels which fish traditionally" in the new 6 to 12 mile zone, asking that "fishing rights . . . should be gradually eliminated in these new reserved zones." In other words, the phase-out of traditional foreign fisheries within 12 miles of EC coastal states is foreseen and the adjacent state will eventually have exclusive fishing rights in that area. The paper suggests that "The member state affected by this gradual elimination of fishing rights could, in this particular case, benefit from compensation in the form of . . . aid measures." The Commission paper also suggests that negotiations should begin with non-member countries which fish in EC waters, "on the assumption of a general extension of fishing limits to 200 miles." These negotiations need not concern only reciprocal fishing rights or trade concessions, "but also any other subject which could yield balanced results." Finally, the Commission notes that its proposals are closely related to the position the Community should adopt at the UN Law of the Sea Conference. It proposes that the Community should be a contacting party to the Convention. (U.S. EC Mission, Brussels.)

According to the NMFS Office of International Fisheries, the proposal submitted by the EC Commission to the EC Council will undoubtedly undergo many changes before it becomes official EC policy. The United Kingdom and Ireland, for example, have already expressed interest in larger individual fishing zones than the 12 miles called for in the paper.

Additionally, the issues of negotiations with third countries, subsidies to Member states which are to be phased out of traditional grounds, and the reference period from which quotas will be allocated, are expected to produce a vigorous debate.

MEXICO CLOSES TOTOABA FISHERY

The Mexican Government, alarmed by declining totoaba (*Cynoscion macdonaldi*) catches, has proclaimed a 2-year ban on fishing for the species, the NMFS Office of International Fisheries reports. The ban applies to sport and commercial fishing and violations carry penalties of up to US$4,000. The totoaba, or MacDonald weakfish, is found only in the China Sea and in the northern Gulf of California near San Felipe (see map).

Totoaba is popular in seafood restaurants in Southern California. The fishing ban, however, will not affect the San Diego market as much as some people have predicted. "Some restaurants in Southern California have been serving other Gulf of California fish instead of totoaba for some time, and most customers could not tell the difference," an official in the Mexican Fisheries Subsecretariat stated.

The totoaba spawns in the shallow marshes at the mouth of the Colorado River. Mexican biologists have been warning that overfishing and the diversion of the Colorado River into the Mexicali Valley after the Morelos Dam was built, would drastically reduce the totoaba catch. After the river was diverted into the Mexicali Valley, the marshes began drying up and the totoaba's spawning grounds have been significantly reduced. Another report indicates that the totoaba may also have been affected by insecticides used by U.S. and Mexican farmers along the Colorado River.

According to the NMFS Office of In-

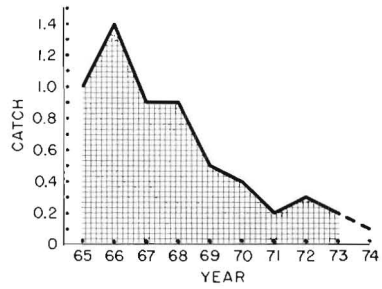

Figure 1.—Mexico's totoaba catch, 1965-73, in thousands of metric tons. Data for 1974 is estimated. (Source: "FAO's Yearbook of Fishery Statistics," various years.)

ternational Fisheries, catches of totoaba in excess of 2,000 metric tons were reported in the early 1940's. Since 1966, however, these catches continued to decline sharply and amounted to only 200 metric tons in 1973 (Fig. 1). Unconfirmed reports suggest that the 1974 catch was only approximately 100 metric tons. Over half of the totoaba catch formerly was exported to the United States.

Prior to the Mexican Government's declaration of the totoaba fishing ban, several limited measures had been taken to protect the fishery. A refuge was established in the northern Gulf of California where totoaba fishing was prohibited. A seasonal closure of totoaba fishing in the entire Gulf of California was enforced from 1 April to 15 May. Apparently these measures were not adequate to allow the recovery of totoaba stocks and the government felt that a complete closure of the fishery was necessary.

The totoaba was endangered once before in the late 1950's. After fluctuating wildly in the late 1930's, the annual catch of totoaba began to decrease constantly in 1942 from a level of 2,250 metric tons and by 1957-58 only about 250 metric tons were caught each year. Various conservation measures brought the annual catch back to almost 1,500 metric tons in 1966. However, the totoaba catch has since declined steadily (Fig. 1). In view of the past successes, it is hoped that the new stringent conservation measure will effectively protect Mexico's totoaba resource.

BRAZILIAN SHRIMPING CONTINUES TO EXPAND

The Brazilian shrimp fishery has expanded significantly since 1967 when the shrimp catch amounted to 37,160 metric tons. By 1974, this catch had increased to an estimated 57,190 metric tons or by nearly 54 percent (Fig. 1, Table 1). The pattern of increase over this 8-year period was not steady, but fluctuated due to declining catches in 1969 and 1973.

The fluctuations in the shrimp catch are, in great part, due to the conditions of the central and southern fishing areas, where Brazilian fishermen catch most of their shrimp. Northern Brazil offers rich opportunities for shrimping, especially in the area near the mouth of the Amazon, where the river's rich nutrients flow into the ocean. Foreign fishermen have operated in the north for years. In 1975, Brazil concluded fisheries agreements on shrimp with the United States, Surinam, Barbados, and Trinidad and Tobago[1] (Fig. 2). These agreements permit the following numbers of foreign shrimp vessels to operate in the shrimp agreement area during 1975: Barbados, 22; Surinam, 23; Trinidad, 28; and the United States[2], 160.

In 1967, the Food and Agriculture Organization (FAO) of the United Nations, in cooperation with the Brazilian Government, published a report on the shrimp fisheries of central and southern Brazil. Their findings showed that the shrimp stocks were underexploited and that harvesting equipment and methods in these fisheries were inefficient. Other problems cited were inadequate fishing ports, poor unloading methods, insufficient storage and transportation facilities, and lack of processing plants and qualified crews.

In an effort to deal with these problems, the President issued Decree Law[3] 221 in February 1976, which

Table 1.—Brazil's shrimp catch and exports to the United States, 1967-74 in thousands of metric tons.

Year	Catch	Exports to U.S.	Percentage
1967	37.16	0.11	0.29
1968	47.07	0.16	0.33
1969	44.00	0.18	0.40
1970	43.68	1.18	2.70
1971	44.36	2.00	4.51
1972	56.76	4.05	7.41
1973	53.86	1.93	3.58
1974	57.19 (est.)	1.35	2.36

Sources: *Revista Nacional da Pesca*, and the U.S. Department of Commerce, *Fisheries of the United States*.

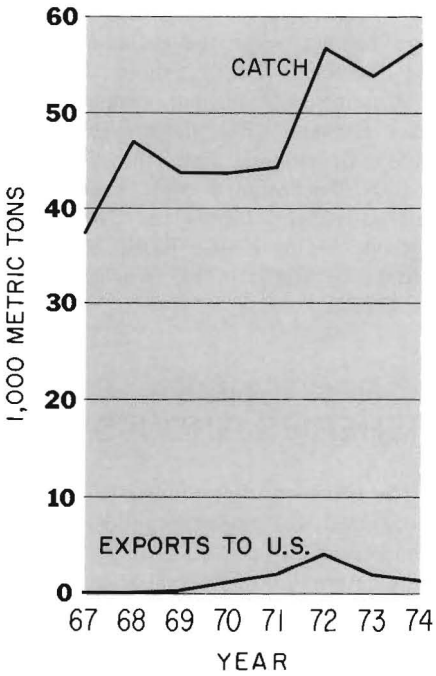

Figure 1.—Brazil's shrimp catch and exports to the United States, 1967-74, in thousands of metric tons.

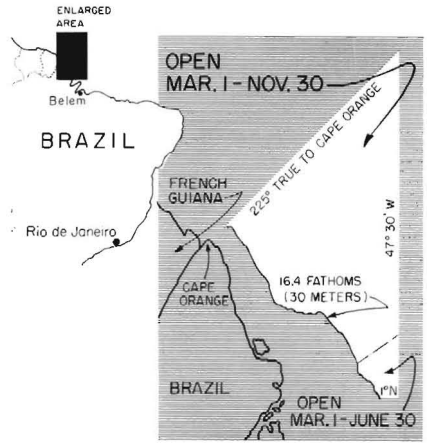

Figure 2.—The Brazilian shrimp fishing agreement area.

[1] On 29 October 1975 four U.S. shrimp trawlers were seized for shrimping outside the agreement area and for failing to maintain proper documentation.

[2] According to the text of the shrimp agreement between the United States and Brazil, a maximum of 160 shrimp vessels are allowed to operate at any one time in the agreement area.

[3] "Decreito-lei" or Decree Law refers to a legislative act which originates in the executive branch.

Table 2.—Major importers[1] of Brazilian shrimp, 1972-73.

Country	Shrimp imports[2] 1972	1973
South Africa	103	21
Argentina	139	36
Belgium	10	—
Canada	7	—
Spain	25	31
United States	4,130	1,925
France	159	—
Italy	1	—
Japan	2,088	594
Netherlands	18	6
Portugal	—	5
United Kingdom	22	4
Total	6,702	2,622

[1]Source: *Revista Nacional da Pesca.*
[2]Quantities listed in thousands of metric tons.

provided fiscal incentives to assist the expansion of fish-processing plants through investment tax credits and sought to encourage the use of tax incentive funds to establish new fishing companies. This program has since been expanded to encompass additional goals. For example, in 1972 funds were appropriated to improve fishing port facilities, establish research projects, set up training programs for fishermen, diversify fish exports, initiate educational campaigns on human dietary requirements, provide economic and social assistance to colonies of artisanal fishermen, improve law enforcement and conservation practices, and expand aquaculture and the production of fishmeal. The fiscal incentives supplied an impetus for the growth of the Brazilian fishing industry. The total fisheries catch increased from 420,000 metric tons in 1967 to an estimated 590,000 metric tons in 1973.

The introduction of fiscal incentives in the fishing industry significantly affected the Brazilian shrimp industry. The expanded commercial fishing fleet resulted in overfishing of shrimp in southern Brazil[4] in 1968, depleting the adult shrimp stocks. For example, the harvest of pink shrimp (Camarao de Rosa) in the south declined by more than 47 percent between 1969 and 1971, from 4,612 to 2,430 metric tons. The overall Brazilian shrimp catch, reflecting the results of overfishing in the south, declined to 44,000 metric tons in 1969 and remained below 45,000 metric tons until 1972. By 1974, Brazil's shrimp stocks had recovered and a record catch, estimated at 57,200 metric tons, was harvested. The 1975 catch estimates suggest that a new record may have been set.

Shrimp is now one of Brazil's major fishery exports, although the vast proportion of the shrimp catch is consumed domestically (Fig. 1). About two-thirds of Brazil's shrimp exports go to the United States; however, significant amounts are also shipped to Japan (Fig. 3).

In 1972 shrimp exports to the United States and Japan amounted to 6,200 metric tons or 96 percent of all Brazilian shrimp exports. In 1973 shrimp exports declined along with the catch; however, the United States and Japan still imported 2,500 metric tons, which accounted for 93 percent of all shrimp exports (Fig. 3). In 1974, U.S. imports of Brazilian shrimp continued to decline even though the shrimp catch increased (Fig. 1). Most of Brazil's shrimp exports come from the southern ports which supplied 6,000 metric tons, or 90 percent of all shrimp exports in 1972, and 1,800 metric tons, or 74 percent in 1973 (Table 3). (Sources: U.S. Consulate, Rio de Janeiro, and U.S. Embassy, Brasilia.)

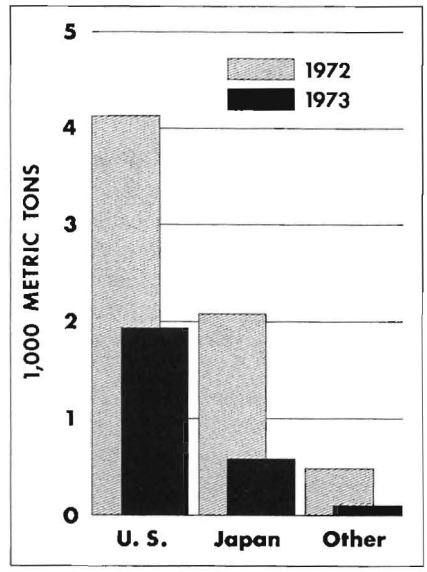

Figure 3.—U.S. and Japanese imports of Brazilian shrimp, 1972-73, in thousands of metric tons.

Table 3.—Brazilian shrimp exports, by point of departure, 1972-1973.

Port	Shrimp exports 1972	1973
South		
Rio de Janeiro	93	67
São Paulo	3	—
Santos	2,496	1,174
S. Sebastião	348	63
Paranagua	841	275
Itajai	405	117
S. Francisco	257	43
Porto Alegre	22	—
Rio Grande	1,411	10
Urugaiana	124	36
Total	6,000	1,785
North		
Belem	702	673
Fortaleza	—	—
Recife	—	1
Total	702	674
Grand total	6,702	2,459

Source: *Revista Nacional de Pesca.*

Leaflet Reports Danish Fisheries

Foreign Fisheries Leaflet 75-2, "Fisheries of Denmark, 1974," has been prepared by the Division of International Fisheries Analysis and is available for distribution. The 11-page leaflet contains information on landings, foreign trade, the reduction and cod fisheries, fleet, fishery limits, government assistance programs, Denmark and the EEC, fishery commissions, Greenland, and the Faeroe Islands. To obtain a copy, send two self-addressed labels to: Services Branch, D825, ESIC, EDS, NOAA, Commerce Department, Washington, DC 20235.

EC RECOGNIZES 44 FISHERIES GROUPS

The European Community (EC) has recognized 44 fishery producers' organizations from 26 January 1971 (when Article 6 of Council Regulation (EEC) No. 170/71 was published) to 1 July 1975. These producers' organizations are either existing fishery marketing cooperatives or new fishery marketing cooperatives that have organized or were organized to handle

[4]"Southern Brazil" refers to the area south of Rio de Janeiro.

the local operations of the EC common organization of the market in fishery products.

Recognized producers' organizations receive grants and reimbursements for carrying on price support activities and diversion programs to obtain the objectives of the EC common organization of the market in fishery products. The number by country and activity are listed in the following table. Names

Country	Activity	No.
Belgium and Luxembourg	Middle-water, near-water, and inshore fishing	1
Denmark	Middle-water, near-water, and inshore fishing	2
Germany	Middle-water fishing	2
	Near-water fishing	9
	Inshore fishing	4
France	Distant-water fishing	2
	Middle-water fishing	6
	Near-water fishing	5
	Inshore fishing	3
	Specialized fishing	3
Netherlands	Middle-water, near-water, and inshore fishing	2
United Kingdom	Distant-water, middle-water, near-water, and inshore fishing	3
	Inshore fishing	2
Total		44

and addresses of these producers' organizations are available from Fred Olson, Office of International Fisheries, NMFS, NOAA, Washington, DC 20235.

USSR Forms New Joint Fisheries Ventures

Representatives of the Soviet Ministry of Fisheries and the French firm Casacruz signed an agreement on 14 October 1975 creating FRANSOV, a joint-stock association, according to the NMFS Office of International Fisheries. The Soviets and the French (Casacruz and two other shareholders) will each provide 50 percent of the financing.

Under the management of FRANSOV, Soviet vessels will fish in the eastern Pacific and south Atlantic oceans. Casacruz will be responsible for negotiating and reviewing fishing licenses in areas where the coastal states require them[1]. The number of vessels fishing will be limited by the licensing nations, not by FRANSOV.

According to a representative of Casacruz, the agreement will not be detrimental to the French fishing industry. Fishery products caught and processed by FRANSOV vessels will not be sold on the French market, but will be exported to Canada and various Asian countries. Profits obtained from these sales will be reinvested in vessels, gear, and equipment manufactured and purchased in France. A projected Casacruz plan to build and equip tuna vessels for the USSR is an example of how FRANSOV would operate. Profits earned by the tuna vessels fishing off Africa would be reinvested by the company to purchase goods and services from French firms.

SPAIN

The Soviet Union and Spain have also agreed to establish a joint fisheries venture. The new firm, called PESCONSA, will reportedly be managed by the Spanish International Export/Import Company, and by SOVHISPAN, a company which represents the Soviet fishing fleet in Spain. PESCONSA offices will be located in Madrid and Las Palmas, Canary Islands. Two Soviet and two Spanish fishing vessels are already under the management of the new company.

According to the NMFS Office of International Fisheries, little is known thus far about this latest venture, but it seems likely that the formation of PESCONSA is related to a recently-announced joint Spanish-Soviet project. SOVHISPAN, with the approval of the Spanish government, is planning to build a US$1.8 million complex in the Canary Islands to service Soviet fishing vessels based there. PESCONSA vessels will probably also be serviced by the new facility.

SOVHISPAN itself is a joint Soviet-Spanish company formed in Barcelona, Spain, in July 1971. The main purpose of the company is to develop the Canary Islands as a supply, crew rotation, and transshipment base for the Soviet fishing fleet. SOVRYBFLOT, the foreign trading branch of the Soviet Ministry of Fisheries, provided 50 percent of the original financing, while two Spanish firms, Tabacos de Filipinas and Vapores Suardiez, provided the remaining 50 percent. At the time of the agreement, relations between Spain and the Soviet Union had been broken for 32 years; SOVHISPAN, therefore, was the first officially sanctioned Spanish-Soviet joint commercial venture since the Spanish Civil War.

CSFR Violation Trips Soviet Stern Trawler

The *Anton Tammsaare*, a Soviet large freezer stern trawler, was seized by U.S. Coast Guard inspectors on 9 March 1976 for a Continental Shelf Fisheries Resource (CSFR) violation according to the NMFS Office of International Fisheries. Inspection of the vessel uncovered 18 lobsters weighing a total of 61.6 pounds. The lobsters were concealed in three holds of the *Anton Tammsaare*, wrapped in paper and burlap sacks, and stashed in empty fish boxes. At the time of the seizure, the vessel was located approximately 120 miles east-southeast of Nantucket Island. Subsequently, it was brought into Boston Harbor under the escort of the U.S. Coast Guard cutter *Vigorous*.

On 11 March 1976, a criminal complaint was filed in Boston against Valentin Eliseev, Master of the *Anton Tammsaare*, and a civil complaint was filed against the vessel. However, the case did not go to trial, but was settled with the payment of a $410,000 penalty. The *Tammsaare* was released on 31 March.

The NMFS Office of International Fisheries reports that the *Anton Tammsaare* is a *Maiakovskii*-class large freezer stern trawler constructed in the Soviet Union in 1962. The vessel, which carries a 90-member crew, is owned by the Western Administration of the Soviet Ministry of Fisheries (Zapryba). Its home port is in Tallinn, Estonia.

The *Anton Tammsaare* is the second Soviet vessel to be seized for a CSFR violation. The first vessel, the *Zaraisk*, was seized off New Jersey on 17 August 1975 with 25 pounds of red and stone crabs on board. That vessel was released with a $100,000 fine.

Seizures for CSFR violations normally are not brought to trial, although a judgement is entered by the court, and settlement is made through the payment of fines. If the case does go to

[1]Fishing licenses are negotiated in hard currency, with the licensing nation determining the fee according to the amount of the catch taken, the value of the vessels, or the value of the catch.

court, under the Bartlett Act (16 U.S. Code 1081-1086), a vessel seized for a CSFR violation is subject to forfeiture together with its gear and catch. In addition, the captain of the vessel can be personally fined up to $100,000, be imprisoned for up to one year, or face both fine and imprisonment.

Peru's 1975 Anchovy Catch Below Average

The Peruvian anchovy catch amounted to 3.1 million metric tons in 1975. This was considerably below the Peruvian Government's forecast of 6 million tons and a decline of 14 percent from the 3.6 million metric tons caught in 1974. Most of the 1975 fishing took place before 15 May 1975 when a seasonal closure was imposed (Table 1).

Peruvian January 1976 stocks of both fish meal and fish oil were considerably smaller than were such stocks in January 1975 (Table 2). The 1976 forecast is an anchovy catch of 4 to 4.5 million metric tons, the production of 0.9 to 1.0 million metric tons of fish meal, and 160,000 to 200,000 metric tons of fish oil. Estimates of 1976 fish meal and fish oil exports are not yet available. However, an increase in fish meal exports is expected. Peru consumes about 80,000 to 100,000 metric tons of fish meal, primarily in the poultry sector. If Peru maintains stocks at the 31 January 1976 level, some 800,000 tons of fish meal could be exported in 1976, or about 50,000 tons more than in 1975. (Source: U.S. Embassy, Lima.)

Table 1.—Anchovy catch, fish meal and fish oil production, and fish meal exports, 1975, in metric tons.

Month	Anchovy catch	Production		Fish Meal exports
		Meal	Oil	
Jan.	249,693	53,656	12,279	48,981
Feb.	348,374	77,153	24,749	34,036
March	897,918	195,031	62,482	44,327
April	881,096	196,349	63,844	20,034
May	568,929	129,003	42,225	84,569
June	13,773	3,104	865	101,110
July	1,485	305	55	104,969
Aug.	1,726	345	33	128,912
Sept.	667	139	3	54,127
Oct.	33,569	7,780	1,437	95,061
Nov.	43,963	10,682	1,850	23,227
Dec.	56,437	12,723	1,418	8,274
Total	3,097,630	686,270	211,240	747,627

Source: U.S. Embassy, Lima.

Table 2.—Stocks of fish meal and fish oil in 1,000 metric tons: 31 Jan. 1976 and 31 Jan. 1975.

Inventories	Fish meal	Fish oil
31 Jan. 1976	92,129	15,554
31 Jan. 1975	216,289	35,512

According to the NMFS Office of International Fisheries, the Peruvian anchovy catch continues at levels significantly below the all-time record of 12.3 million tons reached in 1970 (Fig. 1, Table 3). The precipitous catch decline in 1972 occurred as the result of a weather-related phenomenon, known in Peru as el Niño, which disrupted the normal flow of the Humboldt Current. The last el Niño, which began in April 1972, was one of the most severe ever recorded. The Peruvian fishing industry was hard hit by the scarcity of anchovy and nearly 30,000 people were reportedly out of work. As a result of the crisis, the Peruvian Government nationalized the entire fish meal industry on 7 May 1973. In 1973, the anchovy catch continued to decline reaching a low of 1.8 million metric tons, a decline of 86 percent from the 1970 catch. The 1975 catch, while greater than the disastrous 1973 catch, is still only 25 percent of the 1970 record catch.

Because of the large anchovy fishery, Peruvian fishers caught a greater quantity of fish than any other country's fishers from 1962-1971. As a result of the greatly reduced Peruvian anchovy catch, Japan, the Soviet Union, China[1], Norway, and the United States reported larger fishery catches in 1973.

As would be expected, with the declining anchovy catches the production and exportation of fish meal has also declined from a peak reached in 1970 when 2.25 million metric tons were produced and 1.87 million metric tons were exported (Fig. 1).

The 1975 fish meal production of 690,000 metric tons was only 31 percent of the record 2.3 million metric tons produced in 1970. Fish meal ex-

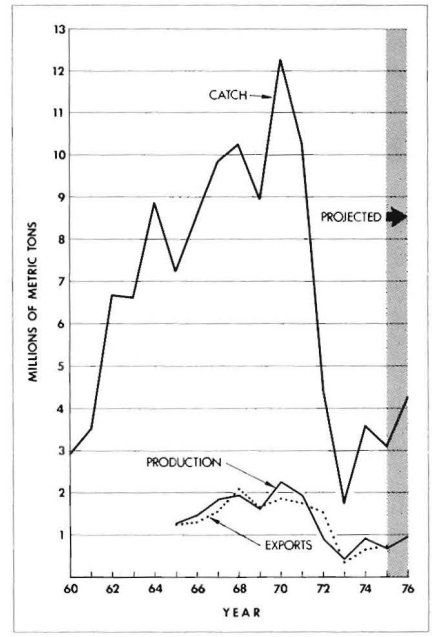

Figure 1.—Anchovy catch, 1960-76, and fish meal production and exports, 1965-76.

Table 3.—Anchovy catch (1960-76) and fish meal production and exports (1965-76) in millions of metric tons.

Year	Anchovy catch	Fish meal	
		Production	Exports
1960	2.94		
1961	3.52		
1962	6.69		
1963	6.63		
1964	8.86		
1965	7.24	1.28	1.26
1966	8.53	1.47	1.30
1967	9.82	1.82	1.56
1968	10.26	1.92	2.08
1969	8.96	1.61	1.66
1970	12.28	2.25	1.87
1971	10.28	1.93	1.75
1972	4.45	0.90	1.53
1973	1.77	0.42	0.35
1974	3.58	0.91	0.63
1975	3.10[1]	0.69[1]	0.75[1]
1976	4.0-4.5[2]	0.90-1.00[2]	N.A.

[1]Preliminary.
[2]Projection.
Sources: FAO Yearbook of Fishery Statistics (1960-73 data). U.S. Department of Agriculture World Agricultural Production and Trade: Statistical Report, August 1975 (1974 data). U.S. Embassy, Lima (1975-76 data).

Table 4.—Fish meal exports by country, 1973-75, in 1,000 metric tons.

Country	1975[1]	1974	1973
Socialist countries	296.5	291.8	108
Federal Republic of Germany	159.3	108.0	76
United States	62.2	32.9	22
Latin America	59.6	25.8	25
Cuba	43.7	17.0	8.5
Netherlands and Belgium	30.1	49.6	30
Italy	25.6	12.4	25
Other	70.6	94.0	56
Total[2]	747.6	631.5	351

[1]Preliminary.
[2]Totals may not agree due to rounding.
Source: *Oil World Weekly.*

[1]Based on FAO data which are at best guess-estimates. The People's Republic of China does not publish its fishery catch statistics.

ports of 750,000 metric tons were only 40 percent of the 1.91 million metric tons exported in 1970. The largest share of Peruvian fish meal exports is shipped to the socialist countries which accounted for nearly 300,000 metric tons or 40 percent of total fish meal exports in 1975. The Federal Republic of Germany, the United States, and Cuba also imported significant quantities of Peruvian fish meal in 1975 (Table 4).

Iceland, United Kingdom Reach Fishery Agreement

Iceland and the United Kingdom have signed a six-month fisheries agreement ending the so-called "Cod War" over British fishing rights in Icelandic waters. Meetings leading to the agreement were held in Oslo, Norway on 30-31 May, after Britain had withdrawn its frigates and trawlers from the disputed waters at Iceland's insistence. On 1 June, British Foreign Secretary Crosland and Icelandic Foreign Minister Augustsson announced that an agreement had been reached. It became effective on 2 June and will last until 1 December 1976.

Iceland extended its fisheries jurisdiction from 50 to 200 miles on 15 October 1975, and the dispute with Britain began on 13 November 1975, when a two-year fisheries agreement between the two nations expired (Fig. 1). Britain sent naval frigates and other vessels into Icelandic-claimed waters to protect British trawlers, which were being harassed by Icelandic gunboats. During the seven months of the "Cod War," British frigates and trawlers clashed more than 40 times with the Icelandic Coast Guard patrol vessels which were trying to enforce a 200-mile fishing limit. The dispute eventually led to the breaking of diplomatic relations in February 1976, the first such event between two members of the North Atlantic Treaty Organization (NATO) since the founding of that body in 1947.

The agreement limits the number of British trawlers fishing within the Icelandic 200-mile fisheries zone to an average of 24 vessels per day. This number will be counted on a monthly basis, but not more than 29 trawlers will be allowed to fish on any given day. Britain is required to provide the names of all trawlers operating off Iceland, and to fish no closer than 20 to 30 miles from the coast, depending on the limits in specific fishing areas. The British are required to report the positions and catches of their trawlers to the Icelanders, who have the right to stop them and investigate alleged violations. Additionally, the United Kingdom has promised to observe certain "no fishing" zones where Iceland prohibits its own vessels from fishing.

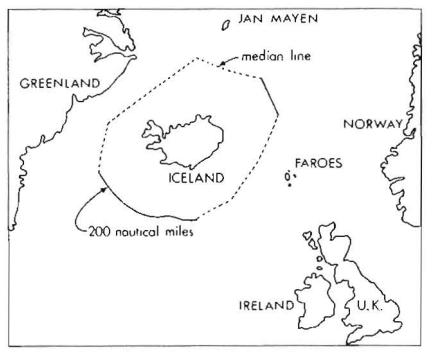

Figure 1.—Iceland's fishery limits.

The United Kingdom has also promised to ask the European Economic Community (EEC) to implement its 1972 agreement with Iceland which lowers tariffs between Iceland and the EEC, and which would apply to significant fishery exports from Iceland to EEC. Britain, however, will advise the EEC that the agreement should last for only 6 months, unless a permanent agreement is reached.

While no catch quotas were announced, Iceland expects British trawlers to land approximately 30,000 metric tons of fish (85 percent cod, 15 percent other species) during the next six months. The United Kingdom landed over 130,000 metric tons from Icelandic waters in 1975 and consistently refused Iceland's offer of an annual quota of 60,000 metric tons, but apparently reduced its demands because of growing pressures from both Iceland and NATO. Negotiations for a permanent agreement to follow this one are expected to begin after the return of the Icelandic ambassador to London and the resumption of diplomatic relations. Iceland, however, can be expected to continue to restrict British fishing in its waters, and will reportedly seek to limit the catch to 35,000 metric tons annually. (Source: U.S. Embassy Oslo, and others.)

The NMFS Office of International Fisheries reports that Iceland's Foreign Minister Augustsson pointed out at a press conference that British vessels will fish in Iceland's waters "only to the extent provided for in arrangements agreed (upon by) the Government of Iceland," and called this British recognition of Iceland's 200-mile limit. Britain's Foreign Secretary Crosland called the agreement a victory for common sense, but newspapers in the United Kingdom regarded it as more of a victory for Iceland. Industry reacted strongly: A spokesman for the British Trawlers' Federation was quoted as saying, "We expected the worst. This is the worst." Both Augustsson and Crosland praised Norway's Foreign Minister Frydenlund and NATO Secretary General Luns for their help.

The British would have probably received better terms if they had settled in November 1975 without sending in the Royal Navy. The bitterness generated by this third "Cod War" will have a detrimental effect on future negotiations. Certain political factions in Iceland will attempt to curtail Britain's fishing entirely when this agreement expires in December.

When negotiations began, 42 British trawlers were operating off Iceland, but as many as 140 had fished there at one time during 1975. The reduction to 24 vessels per day will have a serious effect on the British deep-sea fleet, and the British Government has promised to compensate fishers affected by the reduction of fishing effort.

World Fisheries Developments 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 the significant developments in world fisheries.

The U.S. Coast Guard boarded a Danish vessel east of Georges Bank on 14 May and cited it for violation of an ICNAF High Seas Abstention Area. The vessel was longlining for sharks

and had 100 tons of headless frozen shark.

Russia has formally protested U.S. legislation establishing a 200-mile fishery zone. In a note to the U.S. Department of State, the Soviets indicated that they view the unilateral action by the United States as a hindrance to the U.N. Law of the Sea Conference.

Thursdays have been declared "no-meat" days in the USSR to increase per capita consumption of fish and dairy products. Soviet meat reserves have been low due to a large-scale slaughtering of livestock following last summer's drought and subsequent feed shortage.

Russia is producing artificial caviar which reportedly tastes "just like the real thing." The caviar, made from milk albumin, casein, oils, fish, fats, salt, and water, is produced by a machine with a capacity of 400 pounds a day.

Britain's Minister of State at the Foreign Office Roy Hattersley told the European Communities (EC) Council of Ministers on 5 May that any EC common fisheries policy must allow the United Kingdom a fishing zone with limits of up to 50 miles.

Publications

Russian-English Marine Glossary and Electrical Fishing Volumes Published

The Russian-English Glossary of Fishing and Related Marine Terms was compiled in 1975 by Menakhme Ben-Yami for Keter Publishing House, Ltd., Jerusalem, Israel. It is arranged alphabetically by Russian terms and contains an English index, a list of Russian abbreviations, several drawings and photographs of fishing gear and other equipment for which no counterparts exist in the West, and an extensive bibliography. The majority of the terms were compiled by Ben-Yami, Chief, Fisheries Technology Unit, Israeli Department of Fisheries, over a period of 14 years. Milton M. Rose, Chief, Language Services Division, and Jerry E. Jurkovich, Gear Research Unit, Northwest Fisheries Center, both of NMFS, NOAA, and T. S. Sealy, Director, MARTRAN, Ltd., United Kingdom, aided in the compilation. The 182-page glossary is available from Halstead Press, John Wiley and Sons, 605 Third Avenue, New York, NY 10016, at $18.00 per copy.

Electrical Fishing: Theory and Practice, by V. Sternin, I. Nikonorov, and Yu. Bumeister, "Pishchevaia promyshlennost" Publishers, Moscow, 1972. This Russian book was recently translated in Israel under the auspices of the U.S.-Israel Binational Science Foundation. The book is made up of two parts. The first part deals with the electric field of currents in electrical fishing. The subject matter includes electrical conductivity of natural waters, electrochemical phenomena on the surface of electrodes, electrical field of point and line current sources, electrical field of current between electrodes with simple geometric shapes, electrical conductivity between electrodes, and electrotechnical calculations for alternating and pulsating current. The second part deals with biotechnical foundations of electrical fishing. The book is available on loan from F43, Language Services Division, Office of International Fisheries, NMFS, NOAA, Washington, DC 20235.

Texas A&M Prints Shrimp Thermal Tolerance Study

A study of the thermal tolerance and acclimation rate of postlarval shrimp has been published by Texas A&M University. Entitled **"Thermal Resistance and Acclimation Rate in Young White and Brown Shrimp,** *Penaeus setiferous* **Linn. and** *Penaeus aztecus* **Ives,"** it was written by Larry M. Wiesepape of the University's Department of Wildlife and Fisheries Sciences.

Brown shrimp postlarvae, acclimated at 24, 29, and 34°C, were tested for thermal resistance at five lethal temperatures for each acclimation temperature (34-38°C, 35-39°C, and 36-40°C). White shrimp postlarvae acclimated at 29°C and 34°C were tested for thermal resistance at six lethal temperatures for each acclimation temperature (35-40°C and 36-40°C). The temperature which caused 50 percent mortality at 10,000 minutes was between 35°C and 36°C for postlarvae acclimated at 24°C and between 36°C and 37°C for those acclimated at 29°C and 34°C. Twenty-four-hour LC_{50}'s were 36.3°C, 37.5°C, and 38.3°C respectively, and 38.3°C and 38.9°C for white shrimp postlarvae acclimated at 29°C and 34°C respectively. Postlarval brown shrimp were reported more resistant at most lethal temperatures than were 30-mm brown shrimp. Postlarval and 30-mm white shrimp had similar resistance times, which were greater than those of 50-mm white shrimp.

Separate groups of white and brown shrimp postlarvae were acclimated at six temperature and salinity combinations (29°C and 34°C; and 25, 35, and 45 parts per thousand) and were tested for thermal resistance at each of these and two lethal temperatures. Thermal resistance was greatest at a test salinity of 25 parts per thousand. However, acclimation to a higher or lower salinity gave maximum protection against heat death at that salinity and at all salinities closer to 25 parts per thousand.

The 196-page paperbound volume has 69 figures and 10 tables. It is available from the Center for Marine Resources, Texas A&M University, College Station, TX 77843 for $4.00 each. Orders should include the publication number, TAMU-SG-76-202.

British Books Describe Small-Scale Fishing Gear, Eel Industry

"Eel Capture, Culture, Processing, and Marketing" by David M. Forrest examines virtually all facets of the eel industry, as its title suggests. Interest in eeling and eel farming is growing, says the author, who has worked extensively with eel capture, processing, and marketing in Europe, Japan, Taiwan, and Australia. Eel markets are reportedly worth over $150 million overall.

Nontechnical, the book provides a general overview of eels, eeling techniques, and eel culture and marketing in Europe, America, New Zealand, and parts of Asia. Most emphasis, though, is on Europe, Taiwan, and Japan where eels are most popular. Five distinct areas of eel operations are