

SEAFOOD PRODUCTION, MARKETS, AND POLICIES:

BELGIUM

FEDERAL REPUBLIC OF GERMANY

IRELAND

THE NETHERLANDS

THE UNITED STATES

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## PREFACE

During the 1979 meetings of the American Agricultural Association, a workshop, attended by several fishery economists, was held to discuss approaches to the study of factors affecting international trade in seafoods. This and several subsequent workshops were funded by the Oregon State University and the University of Alaska Sea Grant College Programs and led to the decision to form a team of researchers from several countries in the world. Since then, economists from several seafood-trading countries have combined efforts to explore trade issues.

Coming from universities, government bodies, and private industry, the researchers are brought together by a common interest in fisheries issues and a willingness to try a team approach to research. The present volume, the first in a series, describes aspects of fisheries in five countries. It is designed to serve as a basis for communication among researchers, familiarize readers with aspects of seafood distribution in these countries, and provide an indication of the kinds of data available and their compatibility across countries.

The report is descriptive. Future reports will be a mixture of description and analysis. This is the beginning of an experiment in international cooperation whose long-range consequences will, we hope, be far-reaching.

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## BELGIUM

Rebecca J. Lent and W. Van Roose

### Overview of Fisheries

#### Domestic Production

Historical Overview. Total Belgian landings of fish and shellfish have been gradually declining over the past decade (Table 1). Stricter international regulations and declining stocks have reduced the domestic supply of fish. While landings in 1978 were higher than in the previous two years, the bulk of this increase was cod. These cod were small, adding to the fishery managers' concern that cod stocks were overfished and will soon be subject to stringent regulations. 1979 landings fell to 33,561 metric tons, the lowest level recorded.

The Belgian fleet has historically depended upon distant fishing waters and thus is vulnerable to territorial restrictions. From 1971-75, only 14 percent of the fleet's landings came from Belgium's own coastal waters. An average of 43 percent of the catch over that period came from EEC communal fishing grounds, predominantly those off the coast of Great Britain. Britain's attempt to establish her own 50-mile Fishery Conservation Zone could, if successful, severely curtail the catch of the Belgian fleet.

Belgium was the only EEC country to reach an agreement with Iceland allowing vessels to fish in Icelandic waters. This arrangement, which provided an average of 15 percent of landings over the 1971-75 period, will end around 1985 as the vessels involved in the treaty deteriorate and drop out of the fleet.

The future of the Belgian fleet is uncertain. The possibility of restrictions on fishing in British waters, the decline in stocks and the abolition of their Icelandic fleet all point to a declining domestic catch.

Table 1. Catch of the Belgian Fleet, 1950-79.

Years	Groundfish			Pelagic Fish			Crustaceans & Shellfish			Total	
	Metric Tons	1,000 BF	Average Price*	Metric Tons	1,000 BF	Average Price*	Metric Tons	1,000 BF	Average Price*	Metric Tons	1,000 BF
1950	37,634	335,050	8.9	13,492	42,203	3.1	2,054	45,070	21.9	53,180	422,323
1955	45,323	427,640	9.4	21,319	75,167	3.5	2,862	59,289	20.7	69,504	562,096
1960	41,530	479,028	11.5	4,373	19,108	4.3	1,666	37,797	22.6	47,569	535,933
1961	40,130	488,141	12.1	4,097	17,385	4.2	2,145	45,397	21.1	46,372	550,923
1962	43,925	527,252	12.0	2,520	16,688	6.6	1,441	42,691	29.6	47,886	586,631
1963	45,831	592,657	12.9	3,936	15,900	4.0	1,886	47,285	25.0	51,854	655,842
1964	37,913	535,505	14.1	7,841	19,995	2.5	1,911	44,252	23.1	47,665	599,752
1965	44,268	622,427	14.0	2,141	12,120	5.6	1,669	55,392	33.2	48,078	689,939
1966	43,234	612,342	14.1	2,100	10,141	4.8	1,970	61,240	31.1	47,304	683,723
1967	48,519	712,342	14.7	1,000	5,458	5.4	2,122	64,734	30.5	51,641	782,534
1968	53,386	724,209	13.6	663	3,533	5.3	1,867	70,812	37.9	55,916	798,554
1969	46,566	737,695	15.9	1,065	6,801	6.4	2,327	76,376	32.9	49,958	820,872
1970	42,529	837,301	19.7	1,343	8,095	6.0	2,520	80,263	31.9	46,392	925,659
1971	47,322	916,165	19.4	907	6,999	7.7	1,941	73,585	37.9	50,170	999,749
1972	44,773	934,624	20.9	1,608	12,203	7.6	2,086	77,699	37.2	48,467	1,024,526
1973	37,747	1,048,063	27.8	2,325	22,784	9.8	2,902	116,352	40.1	42,974	1,187,199
1974	35,318	1,074,004	30.5	813	11,091	13.6	2,830	121,602	42.3	38,961	1,206,697
1975	32,321	1,035,545	32.0	2,556	24,769	9.7	3,440	152,162	44.2	38,317	1,212,476
1976	30,303	1,220,756	40.3	1,699	17,744	10.4	3,633	147,732	40.7	35,635	1,386,232
1977	32,570	1,274,595	39.1	118	1,313	11.1	2,726	157,803	57.8	35,414	1,433,711
1978	36,770	1,465,833	39.9	26	270	10.4	2,515	147,527	58.7	39,311	1,613,630
1979	31,240	1,465,275	46.9	31	407	13.1	2,290	131,394	57.4	33,561	1,597,076

Source: Conseil Professionnel de la Pêche  
 BF = Belgian Francs \*In thousands of Belgian Francs per metric ton

Current Production. 1979 landings of the Belgian fleet were 33,561 metric tons. The species composition of this catch is as follows:

	% of Volume	% of Value
Groundfish		
Cod: Icelandic	2.1	1.4
Other	28.5	19.4
Haddock	2.7	1.7
Sole	10.2	36.8
Other Groundfish	49.5	32.5
Pelagic Fish	0.1	0.03
Crustaceans and Shellfish	6.8	8.2

Groundfish landings constitute over 90 percent of the 1979 catch, with cod and plaice taking the lead in species landings. As shown in Table 2, sole are the highest priced species in the catch; while landings are 10.2 percent of the total Belgian catch, sole provide 36.8 percent of the total ex-vessel revenue to the fleet. Herring landings (pelagic fish) have fallen dramatically since the ban on herring fishing in the North Sea. Norway lobster is the second-highest priced species landed, with an average ex-vessel price of 132.52 Belgian Francs (BF)/kilo, followed by shrimp and prawns.

Plaice is the second highest species landed, by volume, with 1979 landings of over 4,467 metric tons. Cod and plaice are important species for Belgium in terms of volume landed while sole also provide substantial revenues to the fleet. Thus the general belief by scientists that stocks of cod, plaice and sole are severely overfished may indicate a bleak future for Belgian domestic landings as international quotas restrict fishing effort on these species.

#### Domestic Fleet

The Belgian fishing fleet has gradually been declining in numbers; some vessels have simply worn out, others have gone to other countries. A "scrapping" premium was in effect from August 1976 to December 1977,



Table 2. Belgian landings by species, 1978-1979.

Species	1978			1979		
	Quantity Kg	Value BF	Average Price BF/Kg	Quantity Kg	Value BF	Average Price BF/Kg
<u>Bottomfish/Groundfish</u>						
Cod:						
Icelandic	976,146	28,074,681	28.76	705,668	22,481,456	31.86
Other	14,213,249	373,935,722	26.30	9,564,192	310,410,047	32.46
Haddock:						
Icelandic	615,978	16,099,945	26.14	494,881	15,108,290	30.53
Other	947,834	23,134,295	24.41	426,276	11,281,463	26.47
Saithe/Hake	932,361	23,590,816	25.30	643,571	16,949,669	26.34
Whiting	2,894,038	53,495,384	18.48	3,503,819	61,675,871	17.60
Plaice	3,972,864	100,110,768	25.19	4,467,282	116,974,234	26.18
Red Fish	1,468,830	49,315,887	33.57	1,241,670	43,281,316	34.86
Ray	1,398,060	53,397,648	38.19	1,440,309	55,352,714	38.43
Others	6,711,907	315,614,213	47.02	5,314,654	224,629,839	42.27
Total	34,131,267	1,036,769,359	30.37	27,802,322	878,144,899	31.59
Soles	2,638,620	429,063,727	162.60	3,437,182	587,130,440	170.82
Total Groundfish	36,769,887	1,465,833,086	39.86	31,239,504	1,465,275,339	46.90
<u>Pelagic Fish</u>						
Herring	1,407	43,150	30.67	2,489	79,080	31.77
Total	26,035	269,793	10.36	31,232	407,181	13.04
<u>Crustaceans &amp; Groundfish</u>						
Shrimp/Prawns	613,848	56,121,788	91.42	908,800	63,026,578	69.35
Norway Lobster	568,251	59,234,830	104.24	299,806	39,731,064	132.52
Total	2,515,038	147,527,001	58.65	2,290,353	131,393,642	57.37
GRAND TOTAL	39,310,960	1,613,629,880	41.04	33,561,089	1,597,076,162	47.99

Source: Conseil Professionnel de la Pêche

BF = Belgian Francs    Kg = Kilogram

also resulting in a reduction of fleet size. New vessel construction is down since 1970 after a surge in the 1960s. The rising price of a new boat, increasing fuel prices, the decline in the Icelandic fishery, and uncertainty about the future due to the absence of an EEC common fishery policy are all forces behind the slowdown in vessel construction. However, the improvement in catches and increased profitability over the past few years have increased confidence in the future of the fisheries, with a subsequent increase in new vessel construction activity. Six vessels were under construction in 1978.

Table 3 illustrates the composition of the Belgian fishing fleet for various years between 1950 and 1978. Vessels in Class I have declined from 42.7 percent to 13.4 percent of the fleet, perhaps reflecting new technology and greater use of distant fishing grounds. There has been a substantial increase in the share of vessels in Classes III and IV.

A 1966 OECD study (Organization for Economic Cooperation and Development, 1966) classified the Belgian fishing fleet into six classes of vessels, based on their power and areas fished. These are as follows:

Average Gross Tonnage

I	17	Shrimp boats, engines less than 80 hp, fish within 15 miles offshore.
II	25	Coastal trawlers, engines between 80 and 120 hp, fish less than 30 miles offshore, between Cap Gris-Nez and Hook of Holland.
III	55	Small trawlers for water of medium depth, 120-240 hp, fish southern and central areas of the North Sea, English Channel and Bristol Channel.
IV	100	Large trawlers for fishing waters of medium depth, 240-350 hp, fish in south central and northern areas of North Sea, English Channel, Bristol Channel, south and east Irish Sea.
V	160	Small trawlers for deep sea fishing, engines 350-500 hp, fish south, central and northern areas of the North Sea, south and east Irish Sea and off of Iceland.
VI	450	Large trawlers for deep sea fishing, internal combustion engines over 500 hp or steam engines over 800 hp, fish in southern North Sea, waters off Iceland or Greenland and the White Sea.

Table 3. The Belgian fishing fleet, 1960-1978.

Vessel Class	1950	1960	(% of fleet)	1965	(% of fleet)	1970	(% of fleet)	1975	(% of fleet)	1977	(% of fleet)	1978	(% of fleet)
I													
5-35		176	(42.7)	118	(31.5)	68	(21.6)	37	(14.5)	30	(13.7)	29	(13.4)
gross tonnage		12,593		10,407		8,165		5,253		4,555		4,380	
		3,682		2,572		1,656		983		831		796	
II													
35-70		105	(25.5)	109	(29.1)	95	(30.2)	67	(26.3)	60	(27.4)	60	(27.8)
gross tonnage		15,135		17,170		18,799		14,289		12,869		12,788	
		5,342		5,507		4,934		3,418		3,009		3,009	
III													
70-180		118	(28.6)	135	(36)	139	(44.1)	129	(50.6)	106	(48.4)	104	(48.1)
gross tonnage		35,083		45,829		50,102		54,394		45,677		45,042	
		13,660		15,804		14,517		14,114		11,666		11,436	
IV													
180-400		7	(1.7)	11	(2.9)	10	(3.2)	20	(7.8)	21	(9.6)	21	(9.7)
gross tonnage		4,595		7,260		6,403		16,080		17,595		17,595	
		1,931		2,599		2,234		4,420		4,527		4,527	
V													
400-1,000		6	(1.5)	2	(.5)	3	(40)	2	(0.8)	2	(0.9)	2	(0.9)
gross tonnage		6,210		2,200		3,550		2,550		2,550		2,550	
		3,306		969		1,387		969		969		969	
TOTAL		444		375		315		255		219		216	
gross tonnage		58,968		82,866		87,019		92,566		83,246		82,355	
		23,722		27,451		24,728		23,904		21,002		20,737	

Source: Conseil Professionnel de la Pêche

Belgium's fishing fleet is small compared to those of other EEC countries. For example, in 1976, there were 89 vessels of 100 or more GRT in Belgium, while the U.K. had 630; France, 607; and Holland, 389.

In 1978 the Belgian fishing fleet belonged to 187 owners of which 126 were family or individual enterprises, 13 were partnership-type arrangements, 45 were companies and 3 were corporations. The principal form of ownership is that of the family, small-scale type; 164 vessel-owning enterprises in 1978 consisted of only one vessel in 1978. There appears to be no foreign ownership of Belgium's fishing vessels.

The total number of fishermen declined from 2,271 in 1955 to 1,275 in 1978 (see Table 4), a 56.1 percent decrease. Over the same period, the number of vessels declined by 51.6 percent. Thus some of the reduction in the number of fishermen may be attributable to labor-saving technological advancements of the fishing boats.

The average age of fishermen in Belgium is 30. After that age, many fishermen seek other, sea-related employment.

Secondary employment is significant in the fishing industry. The Conseil Professionnel de la Pêche estimates that between 4,000 and 5,000 persons are employed in industries related to or dependent upon the fishing sector. These include persons working at the auctions, as seafood wholesalers or retailers, in seafood processing, and in teaching, research and management of the fisheries.

Seasonal variations in employment in the fish processing industry have been somewhat curtailed recently as efforts are made to keep frozen stocks of raw, unprocessed seafoods on hand. In addition, attempts have been made to diversify species in production and to use imports.

#### Major Ports

Approximately 85 percent of Belgium's landings are in three ports. Ostende is Belgium's number one port in terms of volume of seafood landed (see Figure 1). The major species coming into this port are cod, haddock, whiting, redfish and herring. Zeebrugge, to the north of Ostende, takes

Table 4. Total number of fishermen in Belgium.

<u>Year</u>	<u>Total Number of Fishermen</u>
1955	2,271
1960	2,168
1965	1,901
1970	1,643
1971	1,633
1972	1,607
1973	1,548
1974	1,483
1975	1,439
1976	1,415
1977	1,326
1978	1,275



Figure 1. Belgium and her Fishing Ports

the country lead in annual ex-vessel value of fish and shellfish. Major species landed in Zeebrugge include sole, shrimp and Norway lobster - the three highest priced species harvested by the Belgian fleet. Nieuport in the south is the third major seafood port in Belgium; however, the decline in number of smaller vessels in the fleet has reduced the importance of this port.<sup>1/</sup>

Auctions are held at Ostende, Zeebrugge and Nieuport, as required by law for all fresh fish. A Dutch auction system is used with the starting price given by the fisherman. EEC minimum pricing schemes are in effect for the eleven species common to member countries. The vessel owners' association (Centrale Des Amateurs) establishes minimum prices for non-EEC species.

Auction facilities usually include offices and/or individual processing areas for the buyers. After preparation - deheading, gutting, filleting or other methods - the fish are transported by truck to the next step in the market.

### Markets for Seafood

#### Characteristics of Domestic Markets

Fresh and frozen seafood still plays the major role in the Belgian seafood diet; it accounted for 49 percent of total seafood consumed in 1978. With a population of 9,841.7 thousand, Belgium's per capita consumption of seafood was 15.1 kilograms in 1978, a level which has held steady for 20 years and which is one of the highest of all EEC countries.

Cod is a favorite species in Belgium; not only is it the major species landed, it also is one of the greatest imports. Plaice and sole are also popular in the Belgian seafood market. Mussels, imported primarily from the Netherlands, combined with other shellfish result in an annual per capita consumption of 4.2 kilograms of crustaceans and shellfish.

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<sup>1/</sup> Some Belgian vessels land in U.K. and other non-Belgian ports.

Table 5 shows the composition of the seafood diet in Belgium. Seafood market analysts believe that in Belgium, as in many other developed countries, the increasing number of homemakers entering the job market will result in a decline in the popularity of fresh fish. Frozen and prepared seafood products appear to be gaining in their share of the market. Increasing affluence in Belgium, however, may result in a decrease in consumption of certain types of canned fish.

Ex-vessel prices of seafood have been discussed in the previous section. Retail prices of various fresh, frozen and processed seafood products, collected at several fish shops in Knokke, Belgium, in the summer of 1980 are presented in Table 6.

#### Market Structure

In 1978, Belgium's seafood processing industry included 15 smoking/pickling/conserving factories, one canning factory, one drying factory and two freezing firms. These figures do not include firms with fewer than five workers. The continued predominance of fresh seafood in the Belgian market undoubtedly accounts for the existence of many fresh seafood companies with fewer than five workers.

Recent INS statistics indicate a decline in the amount of raw seafood processed in Belgium. The annual average, having oscillated around 27,000 metric tons over the past ten years, fell in 1977 to 16,900 metric tons (15,100 metric tons fish, 900 metric tons salted fish and 900 metric tons crustaceans and shellfish) with a total value of 852 million Belgian Francs.

This raw material was processed into 13,600 metric tons of finished product, some of which was exported. The final retail value was 1,400 million BF. The Conseil Professionnel de la Pêche expects that 1978 statistics and the years beyond will show a gradual resurgence in seafood processing after more concentration and reorientation in some seafood enterprises.



Table 5. Composition of Belgian seafood diet, 1977-1978.

Category	1977		1978	
	Metric Tons	%	Metric Tons	%
Fresh and Frozen Fish	74,700	50	72,200	49
Crustaceans and Molluscs	41,900	28	41,100	28
Canned and Preserved Seafood	28,700	19	30,400	20
Salted, Smoked, Dried and Pickled Seafood	4,300	3	4,600	3
Total	149,600		148,300	

Table 6. Retail prices of various seafood products, Knokke, Belgium (collected summer of 1980).

Product	Price per Kilogram (Belgian Francs)
Cod Fillets	290.0
Small Whole Trout	240.0
Turbot	760.0
Whole Sole	590.0
Scallops	800.0
Mussels, in shell	60.0
Ray Fillets	350.0
Cod Steaks	240.0
Smoked Eel, Whole	800.0
Norway Lobster, in shell	350.0
Shrimp, in shell	300.0
Smoked Sprats	160.0
Canadian Salmon Steaks	600.0 (species unknown)
Smoked Keta Salmon sliced and packaged	673.0
Smoked Kippers	35.2
Frozen Chicken (for comparison)	49.5

Canning, pickling and smoking factories are having to rely less on domestic catch and more on imports. Quotas and other restrictions in Europe have forced some of these processors to import from other continents. This has resulted in a diversification of seafood products processed by these firms.

There are approximately 300 wholesalers in Belgium dealing in seafood. Their importance in the frozen seafood market is increasing with the use of refrigerated vans (ambulants) for direct sale to consumers. These wholesalers are also playing a greater role in the institutional market for seafood. The major seafood wholesalers in Belgium include several multinational companies. Iglo-Ola (Unilever), Findus-Nestle, Universal Foods, Artic-Groko and Sopralex are major wholesalers as well as great importers of fish food. General Electric is involved in frozen seafoods.

#### International Trade

Since 1969 over 80 percent of seafood consumed in Belgium has been imported (see Table 7). Declining stocks and restrictions on the Belgian fleet have kept domestic landings down. Consumers have maintained their relatively high per capital consumption by importing fish and shellfish, 66 percent of these from EEC countries in 1978. (Holland provided 33 percent, Denmark 14 percent, West Germany 8 percent and France 7 percent of total seafood imports.) Thus the possibility of stricter controls and lower quotas for the EEC common fishery stocks implies that Belgium will need to establish new sources of supply in order to continue current consumption levels of seafood.

Imports of seafood (Table 8) have been holding steady at around 100 thousand metric tons for 15 years. Crustaceans and shellfish, particularly mussels, have accounted for a growing proportion of imports. The value of imports into Belgium has steadily increased, reflecting not only the greater share of such highly priced products as mussels but also rising prices of almost all species. Belgium also imports approximately 40,000 metric tons of fish meal annually, half of which is re-exported.

Table 7. Belgium: seafood consumption (domestic disappearance), 1950-1978.

Year	Metric Tons			= Total Domestic Disappearance (Imports as % of Domestic Consumption)
	Imports - Exports	+ Landings		
1950	52,921	53,180	106,101	(55.72%)
1955	46,914	69,504	116,418	(56.83%)
1960	66,816	47,569	114,385	(69.75%)
1961	73,549	46,372	119,921	(72.28%)
1962	68,656	47,886	116,542	(73.35%)
1963	68,808	51,654	120,462	(70.86%)
1964	76,832	47,665	124,497	(75.11%)
1965	78,100	48,078	126,178	(77.60%)
1966	77,484	47,304	124,788	(81.16%)
1967	69,105	51,641	120,746	(72.25%)
1968	69,888	55,916	125,804	(78.24%)
1969	73,862	49,958	123,820	(81.27%)
1970	71,995	46,392	118,387	(85.32%)
1971	72,328	50,170	122,498	(83.71%)
1972	75,700	48,467	124,167	(83.40%)
1973	72,467	42,974	115,441	(85.49%)
1974	81,549	38,961	120,510	(86.27%)
1975	72,710	38,317	111,027	(83.72%)
1976	83,453	35,635	119,088	(87.62%)
1977	82,043	35,414	117,457	(87.89%)
1978	77,678	39,311	116,989	(85.80%)

Source: Conseil Professionnel de la Pêche: Note import/export figures exclude freshwater fish and fish meal.

Table 8. Belgium: Imports of seafood, 1950-1978\*.

Year	Fresh & Frozen Fish		Prepared Fish		Crustaceans & Shellfish		Prepared, Canned Crustaceans		Total			
	Metric Tons	1,000 BF	Metric Tons	1,000 BF	Metric Tons	1,000 BF	Metric Tons	1,000 BF	Metric Tons	1,000 BF		
1950	9,047	70,234	13,832	106,957	19,796	106,519	15,256	424,404	1,189	49,408	59,120	757,522
1955	11,962	152,941	14,589	118,312	23,176	185,458	14,875	416,561	1,480	58,235	66,157	931,507
1960	22,087	315,326	13,327	149,848	26,176	276,421	16,406	504,191	1,791	85,214	79,787	1,331,000
1961	24,457	353,509	14,575	161,632	27,062	318,256	18,743	613,468	1,842	97,864	86,679	1,544,729
1962	24,547	386,933	17,328	210,236	26,653	325,051	19,732	468,229	1,675	85,374	85,480	1,475,823
1963	27,631	417,969	12,440	156,184	24,652	327,829	18,782	584,994	1,859	111,002	85,364	1,597,978
1964	30,398	472,022	12,011	158,025	29,267	398,735	19,732	623,683	2,099	141,129	93,507	1,793,594
1965	34,597	567,319	11,207	174,454	28,594	446,923	21,447	726,565	2,067	144,386	97,912	2,059,647
1966	37,996	591,760	14,128	219,667	26,847	483,979	20,054	709,157	2,255	168,641	101,280	2,173,204
1967	34,171	541,853	13,281	205,166	24,948	493,898	19,540	705,569	2,545	218,484	94,485	2,164,970
1968	37,351	595,887	12,165	182,013	27,938	547,581	18,651	717,267	2,457	198,588	98,562	2,241,336
1969	40,727	703,413	11,142	179,213	26,934	614,421	19,445	808,380	2,386	239,469	100,634	2,544,896
1970	41,703	853,284	15,310	234,245	25,326	757,306	16,698	728,402	1,965	231,725	101,002	2,804,962
1971	42,128	1,041,685	12,271	242,974	26,047	837,784	19,556	978,540	2,541	315,025	102,543	3,416,008
1972	41,122	1,144,252	9,736	238,556	29,862	1,005,671	20,481	983,398	2,352	278,790	103,553	3,650,667
1973	40,917	1,260,817	7,388	246,216	25,903	1,140,234	21,444	1,177,691	3,043	454,341	98,695	4,279,299
1974	41,665	1,557,793	6,550	278,457	30,260	1,320,105	22,760	1,556,055	2,729	497,602	103,964	5,210,012
1975	38,212	1,434,421	5,724	313,239	28,465	1,488,660	17,630	1,235,279	2,924	500,026	92,955	4,971,625
1976	43,139	1,903,427	5,262	370,773	30,299	2,052,434	22,658	1,701,944	2,988	541,558	104,346	6,570,136
1977	39,909	2,159,317	4,175	397,294	35,322	2,366,395	20,356	1,628,060	3,470	641,913	103,232	7,192,979
1978	35,937	2,179,139	4,118	432,215	35,279	2,530,268	21,587	1,759,155	3,457	702,660	100,378	7,630,437

\*Source: Conseil Professionnel de la Pêche: Excludes freshwater fish and fish meal.

Table 9. Belgium: exports of seafood, 1950-1978\*.

Year	Fresh & Frozen Fish		Prepared Fish		Crustaceans & Shellfish		Prepared, Canned Fish		Prepared, Canned Crustaceans		Total	
	Metric Tons	1,000 BF	Metric Tons	1,000 BF	Metric Tons	1,000 BF	Metric Tons	1,000 BF	Metric Tons	1,000 BF	Metric Tons	1,000 BF
1950	4,200	61,597	480	7,381	123	3,914	1,388	36,515	8	609	6,199	110,016
1955	15,232	135,025	2,403	36,510	878	9,905	686	16,411	44	2,739	19,243	200,589
1960	9,304	155,107	2,042	40,477	514	8,537	1,078	20,248	33	2,298	12,971	226,667
1961	8,865	146,738	3,083	63,251	352	11,479	800	19,053	31	2,096	13,130	242,617
1962	9,837	177,799	6,187	128,492	137	10,085	611	15,791	52	7,086	16,824	339,253
1963	12,943	281,863	3,071	69,056	160	12,286	320	10,097	62	6,589	16,556	379,891
1964	11,790	268,395	4,333	95,771	160	11,593	277	10,166	115	12,347	16,675	398,222
1965	15,130	356,670	4,031	103,158	93	8,616	253	8,923	35	3,314	19,812	480,681
1966	15,287	324,236	8,101	188,601	109	10,642	268	10,699	31	3,903	23,796	538,081
1967	17,587	406,303	7,301	177,408	126	9,322	328	12,302	38	5,999	25,380	611,334
1968	19,330	425,350	8,935	211,180	112	8,857	256	10,918	41	6,248	28,674	622,553
1969	18,461	456,349	7,762	181,393	172	16,383	317	17,313	60	6,846	26,772	678,284
1970	20,918	595,933	7,391	182,580	312	19,452	334	18,464	45	5,282	29,007	819,711
1971	23,046	660,786	6,538	195,225	198	21,673	366	22,472	67	13,480	30,215	913,636
1972	19,916	632,620	6,286	201,071	549	58,297	1,052	62,499	50	7,239	27,853	961,726
1973	18,889	757,997	3,802	141,605	665	70,808	2,683	169,088	189	37,671	26,228	1,177,169
1974	16,157	735,952	2,766	143,557	476	59,621	2,826	214,089	190	37,636	22,415	1,190,855
1975	14,200	655,879	2,358	124,503	814	87,719	2,622	197,601	251	51,455	20,245	1,117,179
1976	14,851	846,501	2,578	145,969	804	106,558	2,395	197,246	265	54,609	20,893	1,350,883
1977	15,277	823,521	1,248	83,794	2,372	285,344	2,023	187,675	269	67,506	21,189	1,447,840
1978	16,821	904,749	996	71,222	2,600	336,275	2,081	176,783	202	56,705	22,700	1,545,734

\*Source: Conseil Professionnel de la Pêche: Excludes freshwater fish and fish meal.

Table 10. Belgium: imports by species

	1979			1978			1977		
	Metric Tons	Thousand BF	Average Price*	Metric Tons	Thousand BF	Average Price*	Metric Tons	Thousand BF	Average Price*
<b>I. Fresh or Frozen</b>									
<b><u>Saltwater Fish</u></b>									
Herring	7,651	281,684	36.82	8,038	303,125	37.71	8,435	268,695	31.85
Sprat	1,221	19,994	16.38	1,362	21,987	16.14	1,188	18,188	15.31
Mackerel	1,304	20,043	15.37	1,161	16,349	14.08	2,094	27,614	13.19
Tuna	661	8,362	12.65	35	1,623	46.37	90	5,338	59.31
Cod	6,812	445,758	65.44	6,272	400,376	63.84	6,716	403,425	60.07
	441	23,597	53.51	359	17,366	48.37	310	13,804	44.53
Plaice	849	39,044	45.99	853	36,687	43.01	939	34,513	36.76
Sole	1,428	304,105	212.96	1,081	202,577	187.40	958	181,651	189.61
Others	8,097	604,619	74.67	7,402	503,267	67.99	8,941	478,118	53.47
Fillets, Fresh: Cod	1,264	109,424	86.57	759	62,376	81.18	855	72,965	85.34
Others	991	89,655	90.47	643	63,439	98.66	807	68,774	85.22
Fillets, Frozen: Cod	5,290	388,010	73.35	4,494	336,856	74.96	4,777	371,051	77.67
Others	3,782	232,533	61.48	3,442	209,898	60.98	3,797	214,353	56.45
Livers, roes, milt	56	5,197	92.80	36	3,213	89.25	2	828	414.00
(I Subtotal)	(39,847)	(2,572,025)	(64.55)	(35,937)	(2,179,139)	(60.64)	(39,909)	(2,159,317)	(54.11)
<b>II. Processed and Prepared Fish</b>									
<b>Salted, Dried or in Brine:</b>									
Herring	1,235	65,580	53.10	1,851	97,048	52.43	2,146	89,477	41.69
Others	1,142	77,120	67.53	1,351	79,018	58.49	959	59,840	62.40
Smoked: Salmon	424	223,750	527.71	385	181,359	471.06	356	171,856	482.74
Others	536	83,658	156.08	521	73,431	140.94	565	62,808	116.16
Livers, roes, milt	4	562	140.50	10	1,359	135.90	149	13,313	89.35
(II Subtotal)	(3,341)	(450,670)	(134.89)	(4,118)	(432,215)	(104.96)	(4,175)	(397,294)	(95.16)
<b>III. Shellfish and Crustaceans</b>									
<b>Lobsters, Crayfish and Crab</b>									
Crab	1,473	447,527	303.82	1,194	371,672	311.28	1,030	343,996	333.98
Shrimp in Shell	3,830	589,493	153.91	3,081	397,106	128.89	2,733	413,593	151.33
Shelled Shrimp	5,316	921,055	166.98	4,678	892,755	190.84	4,431	800,434	180.64
Mussels	21,795	501,550	23.01	22,020	350,968	15.94	23,994	369,039	15.38
Others	5,415	599,170	110.65	4,306	517,767	120.24	3,134	439,333	140.18
(III Subtotal)	(38,029)	(3,058,795)	(80.43)	(35,279)	(2,530,268)	(71.27)	(35,322)	(2,366,395)	(66.99)
<b>IV. Prepared, Canned Fish</b>									
Salmon	4,187	411,393	98.25	4,487	444,426	99.05	3,460	384,736	111.20
Sardines	1,932	149,299	77.28	2,168	164,337	75.80	2,527	177,835	70.37
Tuna & Bonita	4,475	377,995	84.47	4,437	393,102	88.60	4,172	365,701	87.66
Mackerel	3,469	249,232	71.85	3,496	258,933	74.07	3,642	264,503	72.63
Others	6,979	541,279	77.64	6,999	498,357	71.20	6,555	435,285	66.41
(IV Subtotal)	(21,042)	(1,729,798)	(82.21)	(21,587)	(1,759,155)	(81.49)	(20,356)	(1,628,060)	(79.98)
<b>V. Prepared, Canned Crustaceans and Shellfish</b>									
	3,898	994,014	255.01	3,457	702,660	203.26	3,470	641,913	184.99
<b>VI. Freshwater Fish</b>									
Trout	4,933	442,536	89.71	4,722	388,269	82.23	4,033	364,530	90.39
Salmon	2,618	599,013	228.81	1,877	377,072	200.89	1,989	402,925	202.58
Eels	1,654	229,613	138.82	1,899	249,180	131.22	1,851	236,623	127.84
Others	1,791	152,042	84.89	1,592	138,015	86.69	1,024	110,873	108.27
(VI Subtotal)	(10,996)	(1,423,204)	(129.43)	(10,090)	(1,152,536)	(114.23)	(8,897)	(1,114,951)	(125.32)
<b>VII. Fish Meal</b>									
	35,127	454,373	12.94	31,298	473,715	15.14	33,715	590,199	17.51
<b>GRAND TOTAL</b>	<b>152,280</b>	<b>10,682,879</b>	<b>70.15</b>	<b>141,766</b>	<b>9,229,688</b>	<b>65.11</b>	<b>145,844</b>	<b>8,898,129</b>	<b>61.01</b>

Source: Conseil Professionnel de la Pêche, Ostende, Belgium.

\*Measured in thousands of Belgian Francs (BF) per metric ton.

The volume of Belgium's seafood exports (see Table 9) has been around 20,000 metric tons for the past five years, having reached a peak of 30,000 metric tons in 1971. In 1978, fresh and frozen fish accounted for over 74 percent of Belgium's total volume of seafood exports and 58.5 percent of the total value. High priced crustaceans and shellfish held an 11.5 percent share of the export volume but provided 21.8 percent of export revenues. Exports in 1978 were destined primarily for EEC countries; 78.5 percent of total exports went to EEC members (34 percent to Holland, 25 percent to France and 13 percent to the United Kingdom).

Tables 10 and 11 provide a more detailed species breakdown of Belgium's imports and exports of seafood products. The following discussion focuses on those species which appear to have the most importance to Belgium in terms of weight or volume.

#### Belgian Imports - Discussion and a Closer Look

Mussels are clearly the number one import in terms of weight, with 21,795 metric tons imported in 1978 at an average price of 23.01 Belgian francs per kilo. Where do these come from? Table 10a contains data on mussel imports, by country of origin for 1979.

Table 10a. Belgium: imports of mussels by country of origin, 1979

Country of Origin	Metric Tons	Value (Thousand BF)	Average Price*	% of Volume
Holland	21,455	495,498	23.09	98.44
West Germany	186	2,613	14.05	0.85
France	91	2,347	25.79	0.42
Denmark	62	810	13.06	0.28

\*Measured in thousands of Belgian francs (BF) per metric ton.

As can be seen in Table 10a, over 98 percent of Belgium's mussel imports come from Holland. It is interesting that these are among the higher-priced mussels.

Shrimp - in the shell and shelled - accounted for over 14 percent of the value of Belgian seafood imports in 1978. The following tables (10b and 10c) illustrate the sources of supply for shrimp.

Table 10b. Belgium: unselled shrimp imports by country of origin, 1979

Country of Origin	Metric Tons	Value (Thousand BF)	Average Price*	% of Volume
Holland	1,381	169,786	122.94	37.89
Faroe Islands	357	31,895	89.34	9.79
Indonesia	333	81,392	244.42	9.14
India	311	64,458	207.26	8.53
France	309	82,686	267.59	8.48
Bangladesh	211	45,084	213.67	5.79
Denmark	198	19,345	97.70	5.43
West Germany	149	8,784	58.95	4.09
Others (< 100+)	396	48,822	123.29	10.86
TOTAL	3,645	552,252	151.51	

\*Measured in thousands of Belgian francs (BF) per metric ton.

Table 10c. Belgium: shelled shrimp imports, 1979

Country of Origin	Metric Tons	Value (Thousand BF)	Average Price*	% of Volume
Holland	2,236	479,186	214.31	40.90
Malaysia	1,850	161,505	87.30	33.84
West Germany	514	147,756	287.46	9.40
Taiwan	203	37,434	184.40	3.71
United Kingdom	143	12,673	88.41	2.62
France	111	21,673	195.25	2.03
Indonesia	89	10,033	112.73	1.63
Canada	88	12,993	147.65	1.61
Others	233	30,449	130.68	4.26
TOTAL	5,467	913,672	167.12	

\*Measured in thousands of Belgian francs (BF) per metric ton.



Table 11. Belgium: exports by species

	1979			1978			1977		
	Metric Tons	Thousand BF	Average Price*	Metric Tons	Thousand BF	Average Price*	Metric Tons	Thousand BF	Average Price*
<b>I. Fresh or Frozen</b>									
<b><u>Saltwater Fish</u></b>									
Herring	318	10,138	31.66	194	8,236	42.45	177	5,145	29.07
Sprat	168	2,835	16.88	25	607	24.28	35	614	17.54
Mackerel	135	1,966	14.56	81	1,125	13.89	760	9,806	12.90
Tuna	17	1,017	59.82	6	559	93.17	20	1,631	81.55
Cod	3,557	119,043	33.47	7,319	196,135	26.80	4,040	107,971	26.73
	126	3,833	30.42	330	9,215	27.92	392	10,114	25.80
Plaice	1,419	41,147	29.00	1,005	29,843	29.69	1,187	26,029	21.93
Sole	2,064	358,066	173.48	1,702	282,813	166.17	1,830	286,448	156.53
Others	3,434	135,246	39.38	3,071	112,826	36.74	3,730	128,957	34.57
Fresh Fillets: Cod	85	7,048	82.92	209	15,189	72.67	81	5,678	70.10
Others	123	13,223	107.50	31	2,541	81.97	39	2,407	61.72
Frozen Fillets: Cod	1,449	130,961	90.38	1,428	126,382	88.50	1,487	123,260	82.89
Others	1,477	106,778	72.29	1,418	117,717	83.02	1,495	114,185	76.38
Livers, roes, milt	10	1,438	143.80	2	1,561	780.50	4	1,276	319.00
(I. subtotal)	(14,382)	932,734	64.85)	(16,821)	904,749	53.79)	(15,277)	823,521	53.91)
<b>II. Processed and Prepared Fish</b>									
<b>Salted, Dried, in Brine:</b>									
Herring	7	197	28.14	1	108	108.00	18	1,249	69.39
Cod	24	2,190	91.25	6	980	166.33	8	772	96.50
Cod fillets	28	2,308	82.43	45	2,865	63.67	18	1,148	63.78
Others	682	40,372	59.20	652	39,317	60.30	912	51,816	56.82
Smoked fish: Herring	75	5,261	70.15	80	5,137	64.21	92	7,473	81.23
Salmon	13	7,693	591.77	12	7,088	590.67	11	6,056	550.55
Others	139	11,500	82.73	200	15,711	78.56	183	15,280	80.85
(II. subtotal)	(968)	69,521	71.82)	(996)	71,206	71.49)	(1,248)	83,794	67.14)
<b>III. Shellfish and Crustaceans</b>									
Shrimp in shell	1,197	140,078	117.02	550	71,055	129.19	632	74,736	118.25
Shelled shrimp	1,056	142,009	134.48	1,714	215,839	125.93	1,341	172,997	129.01
Oysters	10	2,417	241.70	8	1,228	153.50	3	549	183.00
Mussels	8	258	32.25	2	130	65.00	115	570	38.00
Others	347	47,486	136.85	326	48,023	147.31	381	36,492	95.78
(III subtotal)	(2,618)	332,248	126.91)	(2,600)	336,275	129.34)	(2,372)	285,344	120.30)
<b>IV. Prepared, Canned Fish</b>									
Salmon	217	25,996	119.80	258	33,332	129.19	139	21,980	158.13
Herring	127	12,387	97.54	135	9,768	72.36	317	26,701	84.23
Others	1,621	128,929	79.54	1,688	133,683	79.20	1,567	138,994	88.70
(IV subtotal)	(1,965)	167,312	85.15)	(2,081)	176,783	84.95)	(2,023)	187,675	92.74)
<b>V. Prepared, Canned Crustaceans and Shellfish</b>									
	500	157,805	315.61	202	56,705	280.72	269	67,506	250.95)
<b>VI. Freshwater Fish</b>									
Trout	911	89,935	98.72	830	80,866	90.86	494	51,003	103.24
Salmon	159	54,810	344.72	194	55,030	283.66	136	40,887	300.64
Carp	313	18,964	60.59	277	15,305	55.25	155	8,518	54.95
Others	213	53,070	249.15	393	83,976	213.68	327	71,916	219.93
(VI subtotal)	(1,596)	216,779	135.83)	(1,754)	235,177	134.08)	(1,112)	172,324	154.97)
VII. Fish Meal	11,592	148,327	12.80	12,987	171,854	13.23	6,518	88,560	13.59
GRAND TOTAL	33,621	2,024,726	60.22	37,441	1,952,749	52.16	28,819	1,708,724	59.29

Source: Conseil Professionnel de la Pêche, Ostende, Belgium.

\*Measured in thousands of Belgian francs (BF) per metric ton.

Tables 10b and 10c show that Holland is Belgium's greatest supplier of shrimp, with Malaysia providing a sizeable proportion of the shelled shrimp imports.

Belgian Exports: Discussion and a Closer Look

One of Belgium's most important seafood exports - and one of its major imports - is cod. The greater part of cod imports comes from Denmark, while Belgium's cod exports are destined primarily for France and the United Kingdom in fresh form (see Table 11a).

Sole, the most valuable species landed in Belgium, accounts for 17.7 percent of the total value of Belgian seafood exports. The majority of sole exports are sent to France and Holland, as shown in Table 11b.

Table 11a. Belgium: cod exports by country of destination (fresh), 1979

Country of Destination	Metric Tons	Value (Thousand BF)	Average Price*	% of Volume
France	2,428	79,225	32.63	68.74
United Kingdom	924	29,683	32.12	26.16
Holland	178	8,053	45.24	5.04
West Germany	2	58	29.00	0.06
TOTAL	3,532	117,019	33.13	

\*Measured in thousands of Belgian francs (BF) per metric ton.

Table 11b. Belgium: fresh and frozen sole exports, by country of destination, 1979

Country of Destination	Metric Tons	Value (Thousand BF)	Average Price*	% of Volume
France	985	161,223	163.68	45.04
Netherlands	685	115,600	168.76	32.30
Canada (all frozen)	149	31,192	209.34	8.71
West Germany	112	23,237	207.47	6.49
USA (all frozen)	78	14,843	190.29	4.15
Other	56	11,840	211.43	3.31
TOTAL	2,065	357,935	173.33	

\*Measured in thousands of Belgian francs (BF) per metric ton.

Public Policy: Regional, National, International

Fishery Management

Belgium is a member of the EEC and thus subject to common fishery management schemes adopted by the EEC Council of Ministers. There is as yet no common fishery policy for the EEC except for emergency regulations such as the total ban on the North Sea herring fishery. However, informal "agreements" among EEC members are in effect, causing much confusion and dispute.

Great Britain, the last member to join the EEC, is attempting to establish jurisdiction over a 50-mile coastal zone. With the great proportion of Belgian fishing effort occurring in Britain's coastal waters, even the possible compromise of a 25-mile FCZ would greatly reduce domestic landings in Belgium. Once the EEC members agree upon territorial stipulations, management will focus on conservation measures for common stocks. Stricter quotas on various species will be enacted in accordance with scientists' belief that the North Sea is overfished.

A fisheries minimum pricing scheme is in effect in EEC countries for 11 common species at the ex-vessel level. If at the auctions a fisherman cannot get the minimum price for his catch, the fish is taken

off the market and turned into meal. The fisherman receives the price of the meal (less than the minimum price) and FEOGA, an EEC funded organization, pays the fisherman some percentage of the difference between the minimum price and the meal price. For non-EEC species, minimum prices are established by the vessel owners' association (Centrale Des Amateurs).

### Trade Policies

As an EEC member, Belgium applies no import duties on seafood coming from other EEC countries. Import duties for fish products originating in non-EEC countries are subject to tariffs which are common to all EEC countries. Table 12, reproduced from the Bulletin International des Douanes, lists EEC import duties on various seafood products. The "conventional" rate of duty applies to those countries of origin falling under the General Agreement on Tariffs and Trade (GATT), such as the USA and Canada. The autonomous rate applies to all other (non-EEC) countries. Tariffs are usually advalorem and applied to the CIF value of the seafood imported.

Belgium also imposes a value added tax, levied on all fish sales, of six percent assessed on the CIF value. Certain products are also subject to non-tariff barriers, such as an eight percent ad valorem tax on a limited quota of cod. In addition, certain fishery products such as herring, pollock and mackerel are subject to a minimum import price. When the price of the imported fishery product falls below a given reference price, charges may be levied or imports suspended or restricted.

Belgium and other EEC countries are protected by Community anti-dumping duties. If imports (from any country) threaten a community industry or an industry in a GATT country, they are subject to anti-dumping duties. Export prices which are less than the fair market price in the country of origin may be considered evidence of dumping. Subsidization by the government in the country of origin on exported goods also subjects imports to anti-dumping tariffs.

Table 12. European economic community (EEC) - import duties.

Note: This chapter does not cover:

(a) Marine mammals or meat thereof;

(b) Fish (including livers and roes thereof), crustaceans and molluscs, dead, unfit, or unsuitable for human consumption by reason of either their species or their condition; or

(c) Caviar or caviar substitutes.

Description	Rate of Duty	
	Autonomous % or Levy (L)	Conventional %
Fish, fresh (live or dead), chilled or frozen:		
A. Freshwater fish:		
I. Trout and other salmonidae:		
a) Trout	16	12
b) Salmon	16	3.8
c) Lake white fish	Free	8
d) Other	Free	10
II. Eels	10	4.8
III. Carp	10(a)	8(a)
IV. Other	Free	(g)
B. Saltwater fish:		
I. Whole, headless or in pieces:		
a) Herring:		
1. From 15 February to 15 June:		
aa) Fresh or chilled	Free	Free
bb) Frozen	Free	Free
2. From 16 June to 14 February:		
aa) Fresh or chilled	20(a)(b)	15(a)(c)
bb) Frozen	20(a)(b)	15(a)(c)
b) Sprats:		
1. From 15 February to 15 June	Free	Free
2. From 16 June to 14 February	20(b)	13
c) Tunny:		
1. For the industrial manufacture of products falling within heading No. 16.04 (d):		
aa) Whole:		
II. Yellow-finned tunny:		
aaa) Weighing not more than 10 kg each	25(b)(a)	22(a)(e)
bbb) Other	25(b)(a)	22(a)(e)
22. Long-finned tunny	25(b)(a)	22(a)(e)
33. Other	25(b)(a)	22(a)(e)
bb) Gilled and gutted:		
II. Yellow-finned tunny:		
aaa) Weighing not more than 10 kg each	25(b)(a)	22(a)(e)
bbb) Other	25(b)(a)	22(a)(e)
22. Long-finned tunny	25(b)(a)	22(a)(e)
33. Other	25(b)(a)	22(a)(e)

Table 12. (continued)

Description	Rate of Duty	
	Autonomous % or Levy (L)	Conventional %
cc) Other (for example, "heads off"):		
11. Yellow-finned tunny:		
aaa) Weighing not more than 10 kg each	25(b)(a)	22(a)(e)
bbb) Other	25(b)(a)	22(a)(e)
22. Long-finned tunny	25(b)(a)	22(a)(e)
33. Other	25(a)	22(a)(e)
2. Other		
d) Sardines ( <i>Clupea pilchardus Walbaum</i> ):		
1. Fresh or chilled	25	23
2. Frozen	25	23
e) Sharks	15	8(f)
f) Redfish ( <i>Sebastes marinus</i> ):		
1. Fresh or chilled	15	8
2. Frozen	15	8
g) Halibut ( <i>Hippoglossus vulgaris</i> , <i>Hippoglossus reINHARDTIUS</i> )		
h) Cod ( <i>Gadus morhua</i> or <i>Gadus callarias</i> ):		
1. Fresh or chilled	15	14.6
2. Frozen	15	14.6
i) Coalfish ( <i>Pollachius virens</i> or <i>Gadus virens</i> ):		
1. Fresh or chilled	15	15
2. Frozen	15	15
k) Haddock:		
1. Fresh or chilled	15	15
2. Frozen	15	15
l) Whiting ( <i>Merlangus merlangus</i> ):		
1. Fresh or chilled	15	15
2. Frozen	15	15
m) Mackerel:		
1. From 15 February to 15 June:		
aa) Fresh or chilled	Free	Free
bb) Frozen	Free	Free
2. From 16 June to 14 February:		
aa) Fresh or chilled	20	20
bb) Frozen	20	20

(a) Subject to compliance with the reference price. A countervailing tax is provided for in the case of non-compliance with the reference price.

(b) Total suspension for an indefinite period.

(c) Duty exemption within the limits of an annual tariff quota of 34,000 tons to be granted by the competent authorities and subject to compliance with the reference price.

(d) Entry under this subheading is subject to conditions to be determined by the competent authorities.

(e) Duty exemption in respect of tunny intended for the canning industry, within the limits of an annual tariff quota of 30,000 tons to be granted by the competent authorities and subject to compliance with the reference price. Qualification for this quota is governed by conditions to be determined by the competent authorities.

(f) Duty rate reduced to 6% in respect of piked dogfish (*Squalus acanthias*) within the limits of an annual tariff quota of 5,000 tons to be granted by the competent authorities.

(g) See annex.

Table 12. (continued)

Description	Rate of Duty	
	Autonomous % or Levy (L)	Conventional %
n) Anchovies ( <i>Engraulis</i> spp):		
1. Fresh or chilled	15	15
2. Frozen	15	15
o) Plaice:		
1. Fresh or chilled	15	15
2. Frozen	15	15
p) Sea-bream of the species <i>Dentex dentex</i> and <i>Fagellus</i> :		
1. Fresh or chilled	15	15
2. Frozen	15	15(c)
q) Other		
a) Fillets:		
a) Fresh or chilled	18	18
b) Frozen:		
1. Of cod ( <i>Gadus morhua</i> or <i>Gadus callarias</i> )	18	15(d)
2. Of coalfish ( <i>Pollachius virens</i> or <i>Gadus virens</i> )	18	15
3. Of haddock	18	15
4. Of redfish ( <i>Sebastes marinus</i> )	18	14,6
5. Of tunny	18	18
6. Of mackerel	18	18
7. Other	18	15
c. Livers and roes	14	10
Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process:		
A. Dried, salted or in brine:		
I. Whole, headless or in pieces:		
a) Herring	12	12
b) Cod	13(a)	13(b)
c) Anchovies ( <i>Engraulis</i> spp)	15	10
d) Common halibut ( <i>Hippoglossus vulgaris</i> )	15	--
e) Salmon, salted or in brine	15	11
f) Other	15	12
III. Fillets:		
a) Of cod	20(a)	20
b) Of salmon, salted or in brine	18	15
c) Of lesser or Greenland halibut ( <i>Hippoglossus reinhardtius</i> ), salted or in brine	18	15
d) Other	18	16
B. Smoked, whether or not cooked before or during the smoking process:		
I. Herring	16	10
II. Salmon	16	13
III. Lesser or Greenland halibut ( <i>Hippoglossus reinhardtius</i> )	16	15
IV. Common halibut ( <i>Hippoglossus vulgaris</i> )	16	16
V. Other	16	14
C. Livers and roes	15	11
D. Fish meal	15	13

Table 12. (continued)

Description	Rate of Duty	
	Autonomous % or Levy (L)	Conventional %
Crustaceans and molluscs, whether in shell or not, fresh (live or dead), chilled, frozen, salted, in brine or dried; crustaceans, in shell, simply boiled in water:		
A. Crustaceans:		(a)
I. Crawfish of the genera <i>Palinurus</i> , <i>Panulirus</i> and <i>Jaanus</i>	25	
II. Lobsters ( <i>Homarus</i> spp):		
a) Live	25	9.8
b) Other:		
1. Whole	25	12.4
2. Other:		
aa) Frozen	25	19.5
bb) Other	25	20
III. Crabs and freshwater crayfish:		
a) Crabs of the species <i>Paralithodes cambraticus</i> , <i>Chionoetes</i> spp and <i>Callinectes sapidus</i>	18	14.1
b) Other	18	15
IV. Shrimps and prawns:		
a) Prawns ( <i>Pandalidae</i> spp)	18	12
b) Shrimps of the genus " <i>Crangon</i> " spp:		
1. Fresh, chilled or simply boiled in water	18	18
2. Other	18	18
c) Other	18	18
V. Other (for example, Norway lobsters)	14	12
B. Molluscs:		
I. Oysters:		
a) European flat oysters weighing not more than 40 g each	Free	Free
b) Other	18	18
II. Mussels	10	10
III. Snails, other than sea snails	6	Free
IV. Other:		
a) Frozen:		
1. Squid:		
aa) <i>Ommastrephes sagittatus</i> and <i>Loligo</i> spp	8	6
bb) Other	8	8
2. Cuttlefish of the species <i>Sepia officinalis</i> , <i>Rossia macrozona</i> and <i>Septiotele</i>	8	8
3. Octopus	8	8
4. Other	8	8
b) Other:		
1. Squid ( <i>Ommastrephes sagittatus</i> and <i>Loligo</i> spp)	8	6
2. Other	8	8

(a) Total suspension for an indefinite period.

(b) Duty exemption within the limits of an annual tariff quota of 25,000 tons to be granted by the competent authorities.

(c) Duty rate reduced to 8% for silver hake (*Merluccius bilinearis*) within the limits of an annual tariff quota of 2,000 tons to be granted by the competent authorities.

(d) Duty rate reduced to 8% within the limits of an annual tariff quota of 10,000 tons to be granted by the competent authorities.



Table 12. (continued)

Description	Rate of Duty	
	Autonomous % or Levy (L)	Conventional %
Meat extracts, meat juices and fish extracts, in immediate packings of a net capacity of:		
A. 20 kg or more	Free	Free
B. More than 1 kg but less than 20 kg	9	6.6
C. 1 kg or less	24	20
Prepared or preserved fish, including caviar and caviar substitutes:		
A. Caviar and caviar substitutes		
I. Caviar (sturgeon toe)	30	30
II. Other	30	30
B. Salmonidae:		
I. Salmon	20	6.8
II. Other	20	7
C. Herring:		
I. Filets, raw, coated with batter or breadcrumbs, deep frozen	18	15
II. Other	23	20
D. Sardines	25	25
E. Tunny	25	25
F. Bonito ( <i>Sarda spp.</i> ), mackerel and anchovies	25	24
G. Other:	25	(a)
I. Filets, raw, coated with batter or breadcrumbs, deep frozen	18	15
II. Other	25	20
Crustaceans and molluscs, prepared or preserved:		
A. Crabs	20	16
B. Other	20	20

Source: Bulletin International des Douanes.

### Distribution Channels

Figure 2 illustrates the possible distribution channels for both domestic and foreign landings of cod. Belgian landings of cod all pass through an auction at one of the three ports. Ex-vessel buyers may be smaller, fresh fish dealers. These companies would do a minimal amount of processing - gutting, heading, steaking, icing. Larger buyers, such as supermarket representatives, may process and package the cod or else send it on to a processor. Foreign landings which are imported fresh must be sold at the auction. Frozen imports may bypass this, going directly to the wholesale or retail markets.

Diamond shaped steps in the market channels described in Figure 2 are those which may be bypassed. For example, a small auction buyer may sell directly to local restaurants, or an importer may bypass the broker and sell directly to fish shops.

Figure 3 demonstrates the possible routes undertaken by frozen Pacific salmon (U.S., Canadian, Japanese) on its way to the consumer. The frozen salmon may be directly imported by a wholesaler, processor or importer. Brokers appear to play a strong role in the Belgian market for Pacific salmon; some take a commission from the packers in the country of origin in exchange for exclusive representation.

Some processed salmon, for example smoked salmon, may be re-exported. As shown in Table 6, Pacific salmon is found in smaller retail fish shops, often steaked and/or thawed out by the dealer. With lower prices on certain species of Pacific salmon over the past few years, some are channeled into the institutional market, such as company cafeterias. Whole or half frozen salmon may be found in the frozen section of modern supermarkets.

Again, note that diamond-shaped steps in the market chain may be bypassed. A large supermarket chain, for example, may directly import Pacific salmon. A smoking firm may directly sell its product to supermarkets.

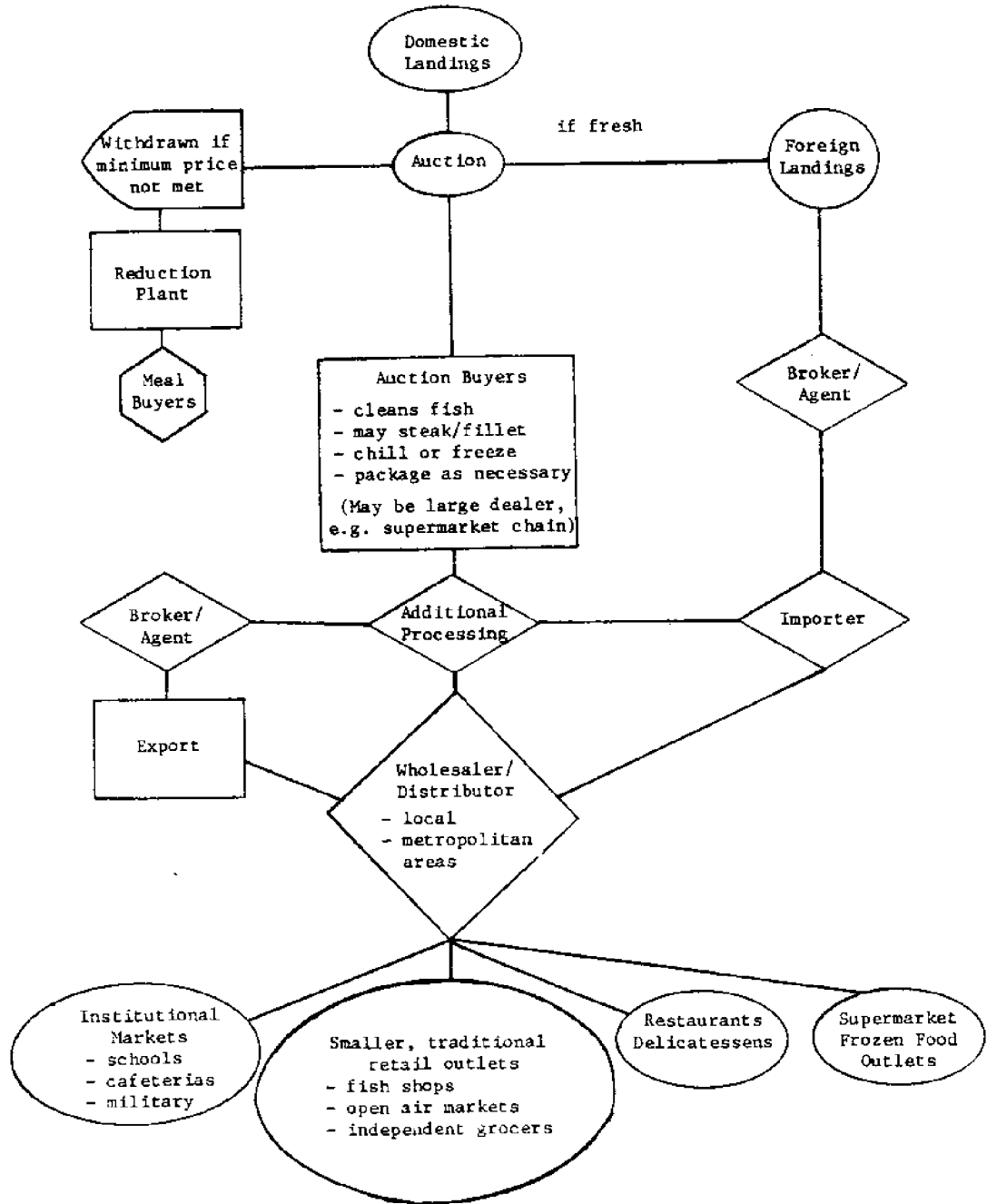


Figure 2. Flow of Cod Products in Belgium

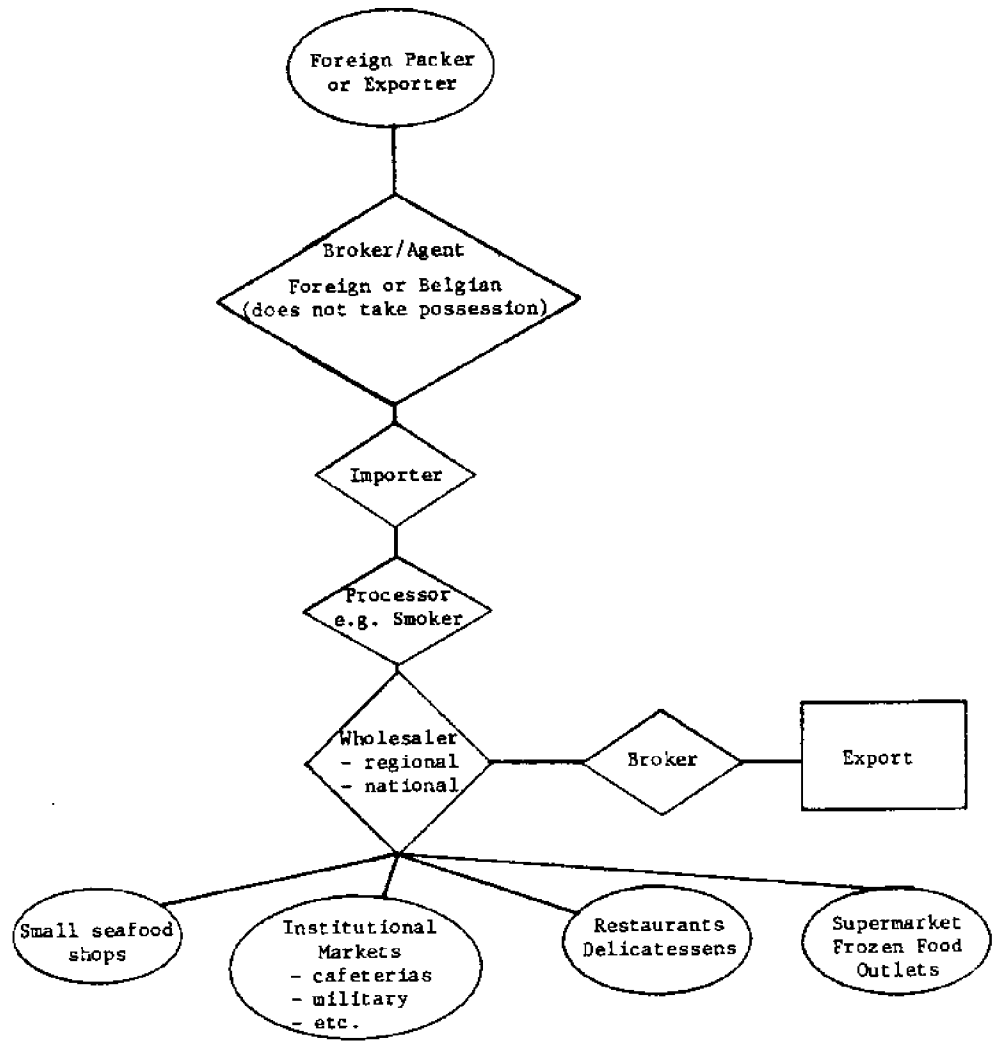


Figure 3. Flow of Pacific Salmon Imports in Belgium

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## THE FEDERAL REPUBLIC OF GERMANY

Dr. U. Sommer

### Overview of Fisheries

Changes in the conditions for deep-sea fishing (200 mile zone, quotas and overfishing of important fish stocks) have hit the German fishing industry harder than others because the Federal Republic of Germany, with its short coastline, depended on a modern deep-sea fishing fleet for 70 percent of its landings. Little by little fishing in most of the productive fishing grounds has been forbidden to these factory stern trawlers. This has led to great structural changes within the fishing fleet, the wholesale and retail markets and the processing industry. It has also led to a large reduction in landings.

#### Fleet

The German fishing fleet is divided into the luggerfleet, the large deep-sea fishing fleet, and the small deep-sea and coastal fleet.

The luggerfleet, which was built for the herring fishery, consisted, in 1970, of 14 ships with an average size of 350 BRT<sup>1/</sup> (Table 1). As the herring stocks in the eastern North Atlantic declined, the luggerfleet was reduced and, in more recent years, has also been used to catch fresh fish. Since 1979 the catches of the four remaining luggers have declined.

The large deep-sea fishing fleet is divided into fresh fish trawlers and factory trawlers. In 1970 the total fleet consisted of 110 trawlers (43 factory trawlers and 67 fresh fish trawlers) with 125,372 BRT. They were stationed in Bremerhaven (61), Cuxhaven (21), Hamburg (14), and Kiel (14). (See Figure 1). Since then the size of the fresh fish fleet has been influenced by the uncertainty surrounding long-term fishing possibilities. Therefore only three new fresh fish trawlers have been

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<sup>1/</sup> Registered tonnage.

Table 1. Fishing Fleet 1970-1979, Germany

	1970		1974		1978		1979	
	Number	GRT <sup>1/</sup>	Number	GRT	Number	GRT	Number	GRT
Large deep sea fleet	110	117,147	74	124,006	62	107,641	47	91,961
Fresh fish trawlers	67	49,357	42	40,305	35	32,261	21	18,867
Factory trawlers	43	67,790	32	83,701	27	75,380	26	73,094
Full freezers	36	61,512	32	83,701	27	75,380	26	73,094
Part freezers	7	6,278						
Luggers	14	5,393	7	2,069	5	1,474	2	574
		<u>Gr. cbm<sup>2/</sup></u>		<u>Gr. cbm</u>		<u>Gr. cbm</u>		<u>Gr. cbm</u>
Small deep sea and Coastal fishery	958	83,142	794	83,440	667	74,293	710	74,226
Coastal fishing boats (with motor)	712	.	724	.	413	.	358	.

Source: Jahresbericht über die Deutsche Fischwirtschaft.

<sup>1/</sup> GRT = Gross Registered Tonnage

<sup>2/</sup> Gr. cbm = Gross Cubic Metre

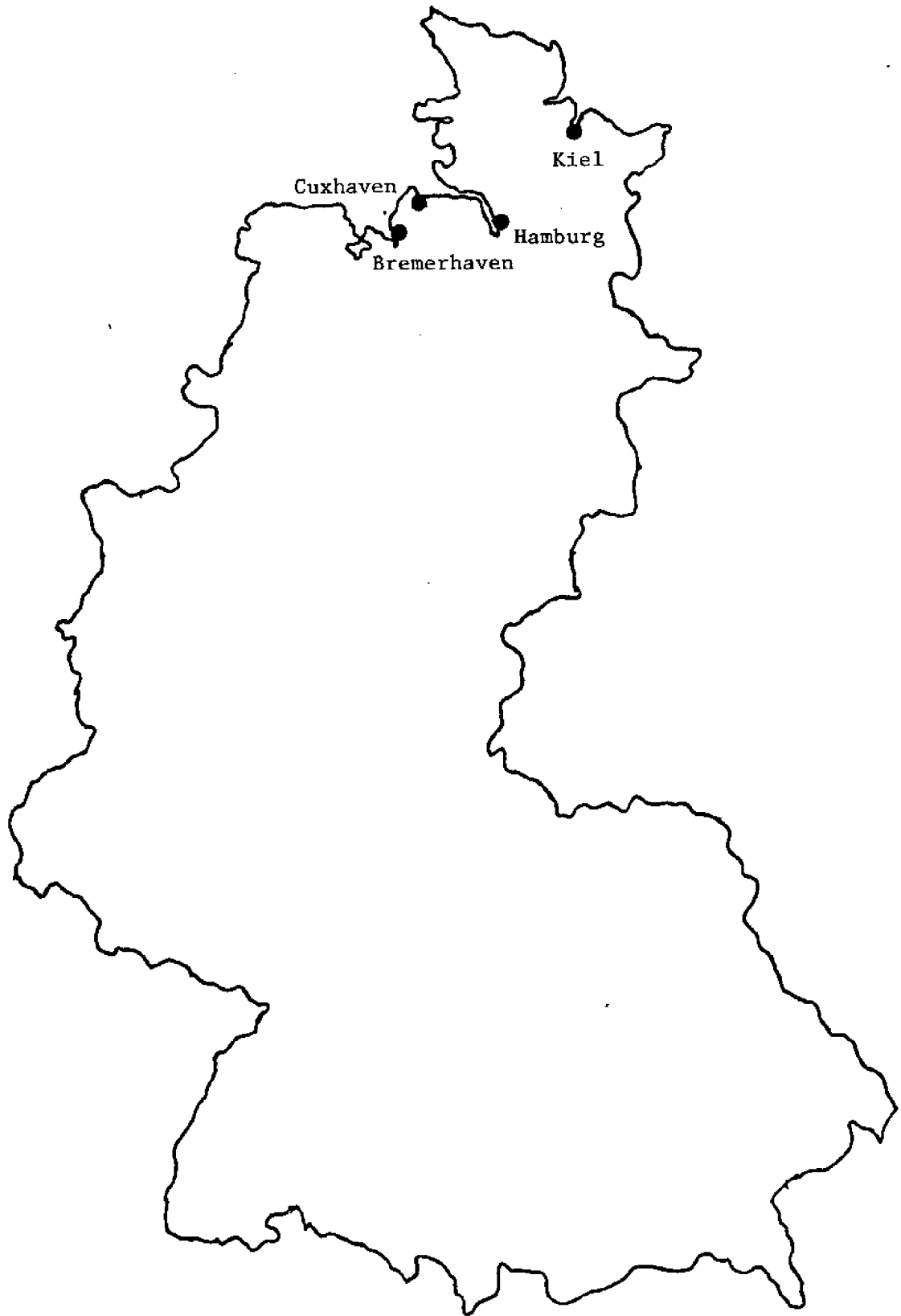


Figure 1. The Federal Republic of Germany

● Denotes major ports



built and the rest of the fleet is completely obsolete. At the end of 1980 there were still 13 trawlers, 10 of them in Bremerhaven and 3 in Cuxhaven.

In contrast to this, the factory trawler fleet has been recently renovated and now has supermodern factory stern trawlers with on-board deep freezers. At the end of 1979 there were 26 of these ships: 14 are stationed in Cuxhaven, 8 in Bremerhaven and 4 in Hamburg. The average age of the factory ships is about 10 years. In 1980 nearly 25 percent of the factory stern trawlers lay idle for some months because contracts to fish on the fishing grounds of third countries (i.e., non-EEC countries) were blocked by the EEC's failure to agree on a common fishery policy. In the EEC 200-mile zone, quotas are not large enough to keep the German factory trawlers fully employed.

Future developments in the deepfreezing sector are dependent on the levels of the quotas allocated to nations fishing in the EEC 200 mile zone, on agreements with third countries and on possible joint-venture arrangements and other bilateral contracts. However, even under favorable circumstances it is likely that the fleet will be reduced further.

The situation is the same for the fresh fish trawler fleet. If changes are not made in fishing opportunities (presently unforeseen), the fleet may be reduced to the three trawlers which have been built in the last five years.

The fleet of the small deep-sea and coastal fishery consists of motorcutters and open coastal fishing boats. The number of fishcutters has been reduced from 550 in 1970 to 390 in 1978, that of shrimpcutters from 410 to 270. The catching capacity has not been reduced in the same proportion since the majority of new cutters are larger than the old ships. This is indicated by the changes in the structure of boat sizes. In 1970 there were only 22 cutters with a length of at least 24 meters. Currently, there are 160 cutters in this category. Therefore, the size of the fleet has only been reduced by 10 percent, from 83,000

Gr. cbm<sup>2/</sup> to 74,000 Gr. cbm, while the number of boats has been reduced by 30 percent. The greater catching capacity of these boats can also be attributed to larger motors. The average motorpower increased from 143 HP (1970) to 205 HP (1978).<sup>3/</sup> In 1979 this described development continued; however, Table 1 does not show this because of modifications in the classification system. These changes classified nearly 50 coastal boats as motorcutters.

The number of open coastal boats with motors decreased in the same period from 712 to 352.

### Landings

Total landings of the German sea fishing fleet (fish and shellfish) show a reduction during the 1970-1979 period from about 591,000 t (live weight) to about 330,000 t (live weight). (See Table 2.) This high reduction is a direct result of the lower landings of the large deep-sea fishing fleet associated with the loss of the Icelandic fishing grounds (especially for the fresh fish trawlers) and by catch quotas or prohibitions on fishing, as for herring. Adapting to these changed conditions will be accomplished only with long delay while at the same time the fleet must catch fish of some kind to cover part of its expenses. The consequence of these awkward circumstances is a reduced landing combined with structural changes in the composition of the catch (Table 2).

In 1970 the (large and small) deep-sea fleet caught 166,000 t of herring (including industrial herring). Since then the large deep-sea fleet has retired from the herring catch after having spent some time producing a deep frozen herring. The small deep-sea coastal fishing fleet caught nearly 52,000 t in 1970 compared with 8,000 t in 1979. For some years the cutterfleet will only be allowed to catch herring in the

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<sup>2/</sup> Gr. cbm = gross cubic metre

<sup>3/</sup> HP = horsepower

Table 2. Total landings of the German fishing fleet, 1970-1979 (live weight)

	1970		1974		1978		1979	
	t <sup>1/</sup>	1,000 DM	t	1,000 DM	t	1,000 DM	t	1,000 DM
Herring	166,285.7	72,808.0	57,633.5	46,553.1	8,202.5	6,847.9	7,825.3	5,088.6
Cod	165,719.4	103,022.7	152,668.3	197,349.3	72,815.6	76,744.2	50,904.2	55,369.7
Redfish	65,761.0	58,806.6	57,794.8	73,279.9	52,836.4	78,026.3	47,752.3	60,151.1
Saithe	59,052.2	35,015.2	78,249.7	79,394.2	44,246.7	48,712.1	34,620.8	40,704.9
Haddock	7,515.8	4,959.7	23,416.0	28,040.9	3,352.4	3,818.9	3,068.9	3,603.8
Crustaceans	11,421.1	15,508.2	30,317.2	22,200.2	16,819.5	32,097.1	19,571.1	29,968.9
Other fish	115,655.9	55,116.2	92,890.0	75,013.9	190,427.4	148,778.4	166,455.4	148,535.0
Total	591,411.1	345,236.6	492,969.5	521,831.5	394,700.5	395,024.9	330,198.0	343,422.0

Source: Statistisches Bundesamt, Wiesbaden, Fachserie 3, Land- und Forstwirtschaft, Fischerei, Reihe 4,5.

<sup>1/</sup>t = metric tons

Baltic Sea. Catch conditions there are so bad that only a portion (8,000 t) of the quota (nearly 13,000 t) can be harvested.

1979 landings of the most important fish of the German fishing industry, cod, were only 30 percent of the 1970 catch. For redfish, the deep-sea fleet was able to go to the fishing grounds of Greenland when it had to leave the Icelandic grounds. Thus, the reduction in the catch of redfish was smaller than that of the other fishes. However, since the fishing grounds near Greenland are further from the German harbors, the very sensitive redfish reached the German market with lower quality than those from Iceland. Moreover, the larger percentage of small fish in the Greenland stocks resulted in a smaller yield of fillets.

Assisted by the Federal Republic's subvention program which started July 1, 1978, the reduced fishing opportunities of the main fish species led to the catch of blue whiting, black halibut, mackerel, coryphaenoides rupestris and other fishes less used in the past. Thus the share of other fishes (i.e., those other than cod, saithe, redfish, haddock and herring) has risen from nearly 10 percent of the total catch (1970) to more than 50 percent today.

There are also changes in the production of fresh and frozen fish as a consequence of developments in the fresh fish sector. In 1970 the proportion of fresh to frozen fish (except herring) was 1 to 0.8. But in 1979 20,000 t more frozen fish was produced than fresh fish, turning that proportion around. It may be projected that this development will continue as the large, deep-sea, fresh fish fleet becomes more obsolete, except for the three new ships. No additional new vessels will be built in the near future if the catch conditions do not change.

Landings of the large deep-sea fishing fleet are concentrated in Bremerhaven and Cuxhaven. Kiel has not received deliveries for several years. Three factory trawlers land their catch in Hamburg because the shipowner is situated there.

The small deep-sea and coastal fishing fleet lands a large share of its catch in Bremerhaven, Cuxhaven and Hamburg and in many small harbors

along the Baltic and North Sea coast in the countries of Schleswig-Holstein and Niedersachsen.

### Prices

The first-hand sale prices for most fish species have risen sharply since 1970, except for a slump in 1975 (Table 3). The highest increase (to 250%) has occurred for frozen cod fillets without skin and bones. The prices of fresh fish have not increased as much as those of frozen fish products. The 1978 prices of fresh redfish and cod were 70 percent higher than those of 1970, and saithe prices have risen by 105 percent.

During the year there are price fluctuations which depend on landings and demand. While the prices of deep frozen fish do not fluctuate very much because they are set for a fixed period by the only producer organization for deep frozen fish (SVG = Seefrost-Vertriebs-Gesellschaft), those of fresh fish show great seasonal fluctuations. During the months of high consumption (Easter and the turn of the year) they are, on average, nearly 50 percent higher than in the summer months of July and August. For some species (e.g., plaice) they may increase by 90 percent. These fluctuations have been intensified during the last decade.

As a consequence of the rapidly increasing prices, the total value of landings in the year 1979 reached the 1970 level of 345 mill. DM despite a 45 percent decrease in landings. However, the value had been much higher during the intervening years.

These price increases have not been enough to offset increases in the cost of fishing - mainly wages and fuel. Evaluation of fishing accounts of the large and small deep-sea fishing fleet has shown a steady decrease in remuneration.

### The Markets of Fish and Fish Products

The greater part of the landings of the German sea fishery (about 85%) is used for human consumption. The industrial catch has been abolished



for some years except for the catch of fodder shrimps. This has lost its primary relevance and today landings are one fifth of those in 1970. Fishmeal is produced from fish not sold in the auction, offals and the by-catch of the factory trawlers.

Total supply in the raw ware<sup>4/</sup> markets of the Federal Republic of Germany (landings and imports) of fish and fish products (without meal and oil) in 1979 was about 730,000 t (live weight). The share of national landings differs in the particular markets.

Since 1977, about 95 percent of the quantity of fresh and frozen herring demanded has come from imports. Total supply in the German market is about 150,000 t (live weight), which are processed into canned products, marinades, and other products (Table 4).

In the market for fresh fish, imports are also of growing importance (Table 5). In 1970 the import share was 30 percent of the total market and by 1979 it had increased to 50 percent. This is a direct consequence of decreasing national landings of the total fishing industry. From 1978 to 1979 alone, imports increased by 15 percent. The main species of fresh fish sold in the German market are redfish, cod, saithe, blue ling and sole. In all specific markets there is the same tendency as in the total market: landings decrease and imports increase to satisfy demand. Supply scarcities have led to price increases of nearly all fish products in the retail trade. In 1979 the average price of redfish fillets was 12 percent higher than that of pork chops.

In 1979, total supply in the German market was about 36,000 t of fresh cod (whole or fillet, live weight), 36,000 t of redfish and 47,000 t of saithe. Compared with 1970 this is a reduction of 25 percent for cod, 40 percent for redfish and 25 percent for saithe.

Exact data on the market for frozen fish is not available for the years from 1978 to 1980 so a detailed analysis cannot be done.

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<sup>4/</sup> Fresh and frozen herring and other fish (whole or fillet) used directly for human consumption or for further production.

Table 4. German market of herring, fresh and frozen (consum herring), 1,000 t (live weight)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Total sale	250.2	226.3	198.9	267.3	224.1	218.3	194.7	155.1	146.1	150.0
Large deep sea fishery	92.2	51.1	36.8	56.4	44.7	38.7	16.1	0.2	0.3	0
Herring, frozen	76.5	46.6	36.6	56.2	44.7	38.7	16.1	0.2	0.3	0
Herring, fresh	14.7	4.5	0.2	0.2	0	-	0	0	-	-
Small deep sea fishery	13.0	10.7	9.0	7.2	8.2	9.5 <sup>1/</sup>	6.3	6.8	6.9	6.7
Import (only raw ware)	145.9	164.5	153.1	203.7	171.2	170.1	172.3	148.1	138.9	143.3
Export (only raw ware)	10.2	15.0	19.1	12.8	19.0	19.7	16.8	10.4	3.4	2.6

Source: Jahresbericht über die Deutsche Fischwirtschaft.

Table 5. German market of fresh fish (consum fish), 1,000 t (live weight)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Total sale	257.4	272.8	254.9	236.8	226.5	200.1	219.8	238.1	214.2	195.0
Large deep sea fishery	127.5	138.6	112.3	102.4	103.0	88.1	81.7	87.5	75.7	68.4
Small deep sea fishery	51.3	67.8	72.8	60.0	50.4	47.8	61.8	62.7	56.1	35.0
Lugget fishery	4.9	4.8	4.9	5.9	4.6	3.4	4.9	4.7	3.4	<sup>1/</sup>
Import (only raw ware)	73.7	61.6	64.9	68.5	68.5	60.8	71.4	83.2	79.0	91.6
Export (only raw ware)	40.0	27.8	31.7	29.5	23.9	20.9	24.8	29.8	31.5	20.1

Source: Jahresbericht über die Deutsche Fischwirtschaft.

<sup>1/</sup> Included in large deep sea fishery.



Information is available on the sale of deep frozen products in the retail trade and has been divided into household and convenience packs (Table 6). According to these data total sales have grown by nearly 40 percent from 1970 to 1979, from about 39,000 t to 54,000 t. In the last four years there were only a few changes, mainly structural shifts, between the particular product groups. In 1979 demand increased for dishes on a whole fish basis (+11%) and other sea products, including shellfish (+37%), while fewer fish fillets, pure (-10%) and crumbed (-7%), were consumed than in 1976.

Imports in the shellfish markets have doubled to 17,000 t in the last two years (Table 7). Until 1977 total supply was determined by national landings, and slowly increasing imports only compensated for the high fluctuations in national landings - mainly in the production of mussel. This indicates that German demand for shellfish is increasing and that the consumer is not satisfied with the available supply. Fish traders seem to have analyzed this and are trying to satisfy consumers.

#### Market Structure

As a consequence of the decreasing national landings, the number of wholesalers and retailers in the fish trade has fallen considerably. In 1978 there were 467 wholesalers of fish and fish products, with a 2.1 mrd. DM (billion Deutschemarkes) turnover. Of these, 247 were situated in the coastal states and about 80-90 percent of those can be allied to the coastal wholesalers. The other 220 wholesalers are distributed throughout the Republic. The number of these inland wholesalers has remained constant since 1970, while the number of coastal wholesalers has declined from 331 (1970) to 248 (1978). Many of the bigger wholesale companies engage in import and export trade in addition to their inland wholesale businesses. There is seldom an exact separation between inland and external trade.

Within the inland wholesalers a group of nearly 40 branch-establishments of the "Deutsche See" Fischhandelsgesellschaft (fish trading company), represents the center points of the cooperative sales

Table 6. Retail sale of deep frozen products, Germany, t (product weight)

Products	Household-packs					Convenience-packs					Total			
	1970	1974	1978	1979	1979	1970	1974	1978	1978	1979	1970	1974	1978	1979
Fillet not crumbed		7,427	7,125	6,978			3,888	4,578	4,607		16,945	11,315	11,703	11,585
Crumbed <sup>1/</sup>	12,865	14,476	15,433	16,942		4,080	8,887	10,181	9,537			23,363	25,614	26,479
Dishes on Fishbasis <sup>1/</sup>	14,154	6,281	7,965	8,518		4,561	2,102	1,385	1,416		18,715	8,383	9,350	9,934
Other Products (including shellfish)	640	618	747	1,180		2,645	2,932	4,423	4,816		3,285	3,550	5,170	5,996
Total	27,659	28,802	31,270	33,618		11,286	17,809	20,567	20,376		38,945	46,611	51,837	53,994

Source: Jahresbericht über die Deutsche Fischwirtschaft.

<sup>1/</sup> fishshare: 70%.

Table 7. German market of shellfish (consum ware), 1,000 t (live weight)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Total sale	24.8	18.3	22.8	25.6	36.2	39.5	51.5	32.7	38.5	43.0
Large deep sea fishery	-	-	-	0.9	-	-	1.2	1.4	1.0	3.2
of which: squid	-	-	-	0.9	-	-	1.2	1.3	1.0	3.2
Small deep sea fishery	21.0	13.5	17.2	18.6	30.0	31.6	41.3	22.8	27.3	23.0
of which: shrimps for human consumption	11.4	7.9	9.1	8.0	11.2	10.4	15.9	9.2	10.9	14.5
of which: mussels	9.6	5.6	8.1	10.6	18.7	21.1	25.4	13.6	16.3	8.5
Import (only raw ware)	3.8	4.8	5.6	6.1	6.2	7.9	9.0	8.5	10.2	16.8
Export (only raw ware)	9.1	3.5	5.4	8.3	17.5	12.2	23.5	8.2	9.7	10.0

Source: Jahresbericht über die Deutsche Fischwirtschaft.

of the "Nordsee-Gruppe." This group supplies its own retail chain stores as well as other retailers and large-scale consumers.

The special fish retail trade sells those products which need special storage and handling such as fresh fish, smoked fish, marinades, and salads. The number of those retailers was reduced sharply between 1970 and 1978, from 2,500 to 1,900. The turnover in 1978 was 0.6 mrd. DM.

The concentration of fish retailers is higher in the northern states of Niedersachsen, Schleswig-Holstein, Hamburg and Bremen than it is in the southern states of the FRG. This corresponds to the north-south-drop in fish consumption. Nearly 50 percent of the fish retailers are situated in the northern states. About 30 percent of the coastal retailers are traveling salesmen with sales routes of nearly 300 km.

Besides these special retailers the total fish assortment is sold in special fish branches in large supermarkets. Canned food and deep frozen products are also sold by the general food trade, which is today completely equipped with freezers.

In addition, large-scale consumers that are involved with fast food restaurants and canteens are of growing relevance because increasing numbers of people are eating outside the home. Recent studies have shown that nearly 13-14 million people regularly eat in canteens and restaurants.

#### International Trade

The development of international fishing regulations has not only influenced the quantity and structure of national landings of most fishing nations, but has led also to structural changes in international trade. Certainly trade flows of the hitherto main fishes have been increased and switched. This development is especially easy to see in the international trade of the Federal Republic of Germany.

As mentioned before, since 1977 more than 95 percent of the herring supply of Germany comes from imports. The main importers of fresh herring are the European countries with Denmark in the lead (Table 8). However, allowance must be made for the fact that a high percentage of

Table 8. German imports of herring and fresh fish by species and countries (product weight)

	1970			1974			1978			1979		
	t	1,000 DM		t	1,000 DM		t	1,000 DM		t	1,000 DM	
<b>Herring, fresh, frozen</b>												
whole	93,690.5	88,882	90,688.0	116,098	28,549.4	43,688	27,708.2	42,246				
Denmark	56,936.1	64,812	55,844.5	81,969	8,114.1	13,200	10,649.7	16,511				
Canada	315.7	259	3,044.7	3,006	8,075.7	10,831	7,318.7	10,687				
other	5,520.8	6,395	22,916.8	36,088	60,683.0	148,701	64,002.5	136,154				
Denmark	1,198.3	1,437	1,235.6	1,668	26,716.4	65,243	29,800.6	66,583				
Canada	464.6	551	5,919.6	9,658	21,216.9	51,189	13,026.9	26,008				
fillet	.	.	.	.	1,362.2	3,571	826.9	2,379				
Ireland	.	.	.	.	321.3	983	444.2	1,148				
United Kingdom	.	.	.	.	74.7	178	109.8	1,416				
<b>Fish, fresh, chilled</b>												
cod	11,136.2	11,197	6,260.9	11,837	4,823.0	12,000	5,539.5	13,604				
whole	5,926.9	7,461	3,126.9	7,578	2,724.8	8,596	1,415.8	4,587				
Denmark	4,189.4	2,911	2,002.3	2,529	1,225.2	1,718	562.0	1,154				
Iceland	49.4	118	354.4	1,334	1,025.6	4,678	2,138.8	9,536				
fillet	25.8	50	228.5	865	1,955.7	3,763	1,955.7	8,634				
Denmark	16.4	42	72.1	250	159.8	754	173.2	849				
Netherlands	.	.	.	.	.	.	.	.				
saithe	.	.	21,401.2	25,590	17,642.8	28,213	14,518.7	22,348				
whole	.	.	4,220.1	5,345	6,651.1	10,555	5,720.3	8,415				
France	.	.	3,392.7	4,465	3,117.0	5,294	3,285.3	5,763				
Denmark	.	.	.	.	3,386.6	11,746	4,912.0	16,972				
fillet	.	.	.	.	2,424.6	8,161	4,149.7	14,189				
Denmark	.	.	.	.	408.9	1,584	377.5	1,522				
Netherlands	.	.	.	.	.	.	.	.				
redfish	.	.	2,055.9	2,428	3,607.4	5,993	7,606.7	11,904				
whole	.	.	1,865.4	2,174	2,190.0	3,343	5,220.6	7,783				
Iceland	.	.	.	.	180.2	316	1,184.1	1,636				
Faroe Isles	.	.	.	.	100.3	461	509.2	2,355				
fillet	.	.	.	.	.	.	267.9	1,214				
Denmark	.	.	.	.	.	.	139.0	562				
Faroe Isles	.	.	.	.	.	.	.	.				
other fish	49,498.8	48,164	21,803.2	42,570	25,824.7	67,737	25,752.9	75,302				
whole	633.1	1,575	2,272.5	7,002	2,722.1	6,982	3,829.7	9,743				
fillet	.	.	.	.	.	.	.	.				
total	60,635.0	59,361	51,521.6	82,425	51,897.9	113,963	53,417.8	123,158				
whole	20,752.8	15,078	8,963.1	30,456	6,980.7	17,673	10,151.3	15,017				
Iceland	15,237.5	19,398	14,568.4	27,392	17,524.1	40,073	19,631.1	46,518				
Denmark	13,842.6	14,781	15,071.4	25,495	6,980.7	17,673	4,485.7	14,931				
Netherlands	4,493.6	3,966	2,474.5	3,917	475.7	1,804	439.9	1,947				
Bel./Lux.	1,626.9	2,301	1,433.3	3,447	1,783.5	4,036	2,250.8	4,939				
Norway	682.5	1,693	2,626.9	8,316	7,234.6	23,867	11,389.7	18,606				
fillet	69.2	166	1,090.1	2,972	5,357.3	15,958	9,480.0	30,393				
Denmark	594.7	1,468	878.6	3,468	957.8	4,386	1,081.5	5,119				
Netherlands	.	.	624.0	1,769	785.9	3,038	453.7	1,497				

Source: Stat. Bundesamt, Wiesbaden, Außenhandel, Reihe 2.

Danish exports come from Swedish direct landings in Denmark. Frozen herring imports from Canada and the USA are also increasing.

The Federal Republic is the most important trade partner of the western European market for herring. On the average, in the last five years, the German processing industry has bought more than 50 percent of the total imports of the EEC-9 - with reference to the "transitware" from Sweden.

In the fresh fish market too, the importance of imports has grown (Table 8). After a 15 percent increase in imports (whole fish basis) from 1978 to 1979 there was a further increase of 7 percent in whole fish (including direct landings) in 1980 and a more than 12 percent increase in the importation of fish fillets. These increasing imports have come mainly from Denmark (cod fillets) and from Icelandic, Norwegian and Faroese direct landings of redfish. While on the average about 2,000 t of cod fillets were imported in 1978-79, this quantity increased to 2,800 t in 1980 with 95 percent coming from Denmark. About 3,600 t of redfish, which is caught in ever decreasing quantities, was imported in 1978, about 7,600 t in 1979 and, in 1980, about 11,300 t had been imported. Iceland's share of these imports rose continuously from 60 percent in 1978 to 70 percent in 1979 and to 85 percent by 1980.

The exports of fresh fish are small in comparison with the imports (Table 9). The most important fish is cod (whole fish or fillets) with an export share of 75 percent. Whole fish is exported mainly to the United Kingdom, France, the Netherlands, and Denmark while France is the primary market for fillets.

Most exports are carried out through direct landings of German cutters. The direct landings have been influenced by higher product prices but often by lower prices for fuel in those countries.

The international trade for frozen fish products has also increased during the last years (Table 10). The import of frozen fillets, which doubled from 1970 to 1979, had a further increase in 1980 by 50 percent to 52,000 t (including crumbed fillets). This is the result of imports

Table 9. German exports of fish, fresh and chilled by species and countries (product weight)

cod	1970			1974			1978			1979		
	t	1,000 DM		t	1,000 DM		t	1,000 DM		t	1,000 DM	
<u>Fish, fresh, chilled</u>												
whole	4,633.5	5,148		3,034.9	5,497		12,926.2	19,546		6,681.0	10,788	
United Kingdom	.	.	.	.	.	.	2,964.8	4,739		3,345.4	5,668	
Denmark	.	.	.	.	.	.	3,118.6	4,470		1,182.5	1,698	
fillet	6,639.7	16,245		3,158.8	13,611		2,811.9	12,224		2,150.1	10,082	
France	2,530.9	6,280		1,609.6	6,841		1,783.9	7,350		1,378.7	6,287	
Austria	1,374.1	3,312		866.9	3,820		383.3	1,789		339.5	1,640	
saithe	.	.		.	.		.	.		.	.	
whole	.	.		619.0	724		310.6	419		515.9	781	
Netherlands	.	.		153.2	305		106.5	171		82.2	139	
Denmark	.	.		.	.		171.8	207		.	.	
fillet	.	.		.	.		143.4	496		216.8	738	
France	.	.		.	.		34.1	116		102.7	355	
Austria	.	.		.	.		64.6	222		43.9	156	
other fish	.	.		.	.		.	.		.	.	
whole	.	.		133.6	238		320.5	375		345.3	750	
Belg./Lux.	.	.		104.8	185		162.9	335		325.1	705	
fillet	.	.		.	.		515.1	3,337		478.9	3,114	
Belg./Lux.	.	.		.	.		294.9	1,946		287.7	1,877	
Netherlands	.	.		.	.		115.1	803		91.7	662	
other fish	.	.		.	.		.	.		.	.	
whole	2,466.4	4,152		1,013.3	2,231		1,714.3	5,266		1,177.9	3,388	
fillet	2,046.6	5,446		1,894.6	6,654		473.2	2,032		467.3	1,686	
total	7,099.9	9,300		4,800.8	8,690		15,271.6	25,806		8,720.1	15,707	
Netherlands	3,001.4	6,483		1,739.9	3,436		5,106.7	9,879		1,341.9	2,650	
Belg./Lux.	2,111.7	1,990		719.7	864		959.5	1,639		693.8	1,175	
France	1,432.6	1,720		1,929.8	3,491		1,607.5	2,488		1,452.2	2,433	
Denmark	225.7	227		36.1	46		3,975.3	5,260		1,365.8	2,002	
fillet	8,686.3	21,691		5,053.4	20,265		3,943.6	18,069		3,313.1	15,620	
France	2,817.9	6,882		1,881.3	7,777		2,036.6	8,299		1,729.9	7,362	
Belg./Lux.	2,437.6	6,479		642.7	2,996		523.8	3,078		439.3	2,611	
Austria	1,681.1	4,070		1,215.7	5,135		668.4	3,004		585.2	2,879	
Netherlands	1,565.0	3,704		1,055.8	3,312		380.3	1,998		230.8	1,284	

Source: Stat. Bundesamt, Wiesbaden, Außenhandel, Reihe 2.

Table 10. German imports of frozen fish by species and countries (product weight)

	1970		1974		1978		1979	
	1,000 DM		1,000 DM		1,000 DM		1,000 DM	
	t	€	t	€	t	€	t	€
<b>cod</b>								
whole	1,619.8	1,517	1,180.6	2,706	717.1	1,074	498.8	1,394
Denmark	60.5	60	213.9	423	275.6	591	119.3	463
Iceland	984.3	958	796.7	1,958	166.5	535	103.8	318
fillet	11,372.3	26,003	2,649.9	11,660	2,048.4	8,992	2,684.0	11,268
Norway	5,354.3	12,635	717.8	3,214	1,124.6	5,097	938.8	3,994
Denmark	3,158.2	6,935	1,672.9	7,398	362.9	1,417	608.2	2,700
<b>redfish</b>								
whole	.	.	679.6	657	554.9	1,082	622.9	1,193
Denmark	.	.	43.9	95	112.2	270	199.1	429
Norway	.	.	138.7	244	191.8	396	176.4	328
fillet	.	.	.	.	691.1	2,966	644.5	2,622
Iceland	.	.	.	.	519.4	2,298	290.7	1,206
Faroe Isles	.	.	.	.	24.6	87	193.5	689
<b>saithe</b>								
whole	.	.	193.4	335	1,558.0	2,912	701.1	1,031
Faroe Isles	.	.	.	.	225.4	548	415.4	585
France	.	.	.	.	807.6	1,494	160.6	247
fillet	.	.	2,848.6	7,615	7,013.1	22,308	9,328.5	28,142
Faroe Isles	.	.	.	.	2,258.2	7,476	5,225.6	15,603
Denmark	.	.	1,170.8	3,405	1,946.0	6,193	1,546.4	4,786
<b>hake</b>								
whole	.	.	.	.	543.2	1,350	846.0	1,610
Argentina	.	.	.	.	221.8	317	574.3	805
Italy	.	.	.	.	220.8	736	182.3	632
fillet	.	.	.	.	8,235.5	18,774	10,084.3	22,239
Argentina	.	.	.	.	7,379.4	16,403	9,541.7	20,724
Poland	.	.	.	.	476.6	1,256	184.7	432
<b>mackerel</b>								
whole	.	.	6,195.7	5,788	18,072.7	15,170	16,807.0	14,328
Denmark	.	.	592.0	558	3,950.9	3,427	4,632.3	3,841
Netherlands	.	.	747.0	585	7,922.9	6,401	5,647.3	4,611
<b>other fish</b>								
whole	18,991.4	26,055	15,684.2	33,749	28,760.3	56,458	22,841.2	50,570
fillet	6,407.8	13,703	12,657.7	35,507	9,658.6	37,887	11,962.2	42,194
<b>total</b>								
whole	20,611.2	27,572	23,933.5	43,435	50,206.2	78,846	42,317.0	70,076
Norway	7,574.7	11,917	7,943.9	17,557	6,457.4	11,338	4,153.9	7,206
Denmark	2,471.7	3,405	2,553.8	4,227	7,910.8	11,469	7,154.5	11,691
Iceland	1,671.3	1,481	1,156.1	2,837	1,635.9	3,852	707.6	1,576
Italy	1,138.6	1,747	2,689.7	5,030	2,356.1	5,152	2,273.8	5,252
fillet	17,780.1	39,706	18,136.2	54,782	27,646.7	90,877	34,703.5	106,465
Norway	7,690.5	17,878	2,028.6	7,109	2,834.8	10,855	3,032.5	10,747
Denmark	4,088.3	9,299	4,176.3	16,631	3,957.3	14,582	4,765.1	16,513
Netherlands	808.7	2,858	1,642.1	7,742	3,609.2	18,522	3,656.8	19,088
Poland	991.4	1,432	586.5	1,423	476.6	1,256	184.7	432
fillet, raw, crumbed <sup>1/</sup>	.	.	2,417.9	9,561	5,589.6	22,911	5,948.1	24,211
France	.	.	44.8	133	1,377.1	3,902	1,477.8	4,084
Netherlands	.	.	1,165.4	5,364	2,853.9	13,422	2,924.3	13,890

Source: Stat. Bundesamt, Wiesbaden, Außenhandel, Reihe 2.

<sup>1/</sup> Included in total fillet.

of hake fillets from Argentina and of saithe fillets from the Faroe-Isles, Iceland, Norway and Denmark and of cod fillets from Denmark and Canada. Hake and saithe are mainly used for processing. Hake is used in the production of fishsticks because it is relatively inexpensive. Saithe fillets are generally sold canned in oil. About 50,000 t of whole frozen fish were imported in 1980 compared with 42,000 t in 1979. The most important exporters are the Netherlands, Norway and Denmark. In view of the smaller supply and, therefore higher prices, of herring, the processing industry is using mackerel for the production of canned foods. Imports of mackerel multiplied nearly fourfold to 42 percent of the total from 1975 to 1980.

The German deep-sea fishing fleet seems unable to catch canned food quality mackerel. No other interpretation can be found for the exportation of nearly the entire German production of mackerel, which is subsidized by a special program (the "Sofortmaßnahmeprogramm zur Kapazitätsanpassung," s. fishery policy). The German export of mackerel goes into the eastern nations of Czechoslovakia and Yugoslavia and to Nigeria (Table 11).

Other kinds of whole frozen fish are exported only in small quantities. In 1979 nearly 1,100 t of cod were exported to Western European nations and 2,000 t of redfish to the Mediterranean countries of Israel, Cyprus, Italy, Greece and Spain. The "new fishes" - blue whiting and horse mackerel - caught with subsidies of the "Sofortmaßnahmeprogramm" (s. fishery policy) are also exported because there is no demand for them in Germany. Like mackerel they are exported to the eastern and African nations.

An intensive trade is done with frozen fillets in the form of raw ware as well as in the form of crumbed fillets. The most important products are made from cod, saithe, hake and redfish.

On the average, during the last four years, cod has had a 65 percent share of the total fillet export. Most of this goes to the Western European countries of France, the United Kingdom, Belgium and Austria. Ninety percent of other fish fillet exports goes to Western Europe.



Table 11. German exports of frozen fish by species and countries (product weight)

	1970			1974			1978			1979		
	t	1,000 DM	t	t	1,000 DM	t	t	1,000 DM	t	t	1,000 DM	
<b>cod</b>												
whole	2,230.5	2,516	175.2	353	1,703.5	5,337	1,147.2	3,353	1,147.2	3,353		
United Kingdom	.	.	.	.	1,175.7	3,725	720.2	2,226	720.2	2,226		
Belg./Lux.	.	.	.	.	273.0	1,031	171.2	620	171.2	620		
fillet	22,642.2	58,183	8,414.9	39,008	14,593.6	68,980	23,549.8	105,806	23,549.8	105,806		
United Kingdom	74.3	131	19.2	64	2,489.9	10,640	7,217.6	30,649	7,217.6	30,649		
France	4,836.6	11,773	2,007.9	8,758	5,146.3	23,389	8,289.2	35,230	8,289.2	35,230		
<b>redfish</b>												
whole	.	.	59.8	101	2,416.0	3,757	2,004.9	3,359	2,004.9	3,359		
Italy	.	.	.	.	221.2	348	323.5	499	323.5	499		
Israel	.	.	.	.	333.1	599	939.8	1,590	939.8	1,590		
fillet	.	.	.	.	231.4	1,023	801.1	2,755	801.1	2,755		
France	.	.	.	.	53.9	212	323.6	1,106	323.6	1,106		
Italy	.	.	.	.	.	.	139.2	522	139.2	522		
<b>saithe</b>												
whole	.	.	87.2	126	597.6	1,446	186.9	365	186.9	365		
Belg./Lux.	.	.	.	.	355.4	998	58.1	162	58.1	162		
United Kingdom	.	.	.	.	175.4	292	75.1	134	75.1	134		
fillet	.	.	3,664.7	10,537	3,573.9	12,216	3,800.1	12,597	3,800.1	12,597		
France	.	.	426.3	1,319	1,671.8	5,731	1,071.0	3,464	1,071.0	3,464		
Belg./Lux.	.	.	842.1	2,256	1,008.3	3,162	1,095.3	3,279	1,095.3	3,279		
<b>hake</b>												
whole	.	.	.	.	661.0	1,021	10.0	23	10.0	23		
Italy	.	.	.	.	174.0	154	.	.	.	.		
United Kingdom	.	.	.	.	462.8	796	.	.	.	.		
fillet	.	.	.	.	2,020.6	6,794	3,989.2	12,344	3,989.2	12,344		
France	.	.	.	.	748.9	2,094	1,913.1	5,040	1,913.1	5,040		
Austria	.	.	.	.	627.7	2,475	1,040.1	4,016	1,040.1	4,016		
<b>mackerel</b>												
whole	.	.	123.3	137	21,434.6	23,432	17,710.6	19,023	17,710.6	19,023		
USSR	.	.	.	.	10,684.3	12,611	14,804.6	15,712	14,804.6	15,712		
Yugoslavian	.	.	.	.	2,845.0	2,709	1,039.1	1,312	1,039.1	1,312		
<b>other fish</b>												
whole	3,477.4	4,844	4,072.0	6,662	4,429.2	7,378	4,739.8	8,589	4,739.8	8,589		
fillet	16,232.1	37,424	17,759.0	70,452	14,783.9	68,588	15,649.3	70,815	15,649.3	70,815		
<b>total</b>												
whole	5,707.9	7,360	4,517.5	7,379	31,241.9	42,371	25,799.4	34,722	25,799.4	34,722		
USSR	.	.	258.5	358	14,869.5	17,757	14,804.6	15,712	14,804.6	15,712		
Italy	1,820.9	2,274	212.9	566	1,264.7	2,692	1,149.0	3,880	1,149.0	3,880		
United Kingdom	.	.	.	.	2,066.0	5,066	1,602.6	3,341	1,602.6	3,341		
Denmark	1,164.0	758	1,294.3	1,238	711.5	1,367	1,145.0	1,105	1,145.0	1,105		
Jugoslavian	164.0	126	.	.	3,102.2	3,190	1,299.5	1,555	1,299.5	1,555		
fillet	38,874.3	95,607	29,838.6	119,997	35,203.4	157,601	47,789.5	204,317	47,789.5	204,317		
France	11,720.0	27,648	4,054.1	16,751	9,268.8	39,146	13,717.1	54,221	13,717.1	54,221		
Belg./Lux.	5,113.9	11,666	6,106.1	26,326	5,501.1	26,163	7,438.9	33,174	7,438.9	33,174		
Italy	7,634.1	21,212	7,650.0	33,700	7,979.6	39,641	7,661.9	38,234	7,661.9	38,234		
United Kingdom	98.1	175	19.2	64	2,489.9	10,640	7,634.1	31,694	7,634.1	31,694		
Netherlands	4,734.9	11,542	3,516.9	16,508	4,044.2	19,914	4,862.0	22,689	4,862.0	22,689		
fillet, raw, ctumbled <sup>1/</sup>	.	.	11,219.6	51,459	13,262.5	62,520	13,215.9	63,050	13,215.9	63,050		
Italy	.	.	6,574.8	30,205	6,944.7	34,746	6,207.2	31,831	6,207.2	31,831		
Netherlands	.	.	1,759.0	7,856	1,802.9	9,228	2,002.8	9,443	2,002.8	9,443		

Source: Stat. Bundesamt, Wiesbaden, Außenhandel, Reihe 2.

<sup>1/</sup> included in total fillet.

Crumbed frozen fillets were exported between 1976 and 1979 at nearly the same yearly level of 13,200 t. In 1980 there was a slight decrease to 12,400 t. Raw fillets are also exported into countries with high gross national products such as France, Belgium, the Netherlands, and Austria.

The result of an analysis of the international trade of the Federal Republic of Germany in fish and fish products (herring, whole fish, fish fillet) is the following: the share of imports in the national market has grown and it is expected that, in the future, this share will become still more important since the catch opportunities of the German deep-sea fleet are not expected to improve. It seems likely that the catch capacity of the large deep-sea fleet will decrease because a productive catch will be possible only within limits.

Frozen cod, as well as whole fish, fillets, and crumbed fillets, caught by the German fleet is largely exported because demand for processed products of cod is low in the German market. Demand is highest for redfish, saithe and Argentine hake (for the production of fishsticks and other cheap fish products).

### Fishery Policies

The introduction of the EEC-market and structural policy orders for fish and fish products has meant that a national fishery policy could only be developed within limits.

Substantial elements of the national fishery market systems have, however, been included in the market order so that extensive adaptations are not required. Unfortunately, the structural policy order detracts considerably from the support policies of individual member states. Because of this, in 1973 the Commission proposed that direct support measures be allowed up to a certain amount. This order has not yet been implemented.

In 1980, the Commission established guidelines for the member states which limited national subsidies. In particular, the member states are allowed to give subsidies, loans, interest reductions and guaranties as

a means of raising productivity. They are also allowed to adjust the production and marketing conditions and improve the living standards of those dependent on the fishing industry for their livelihood.

Any time a member state plans to implement any of these support measures it is required to notify the Commission which then must approve the proposal. There have been problems in controlling these national measures because the Commission is not always notified about proposed plans and sometimes there is disagreement about the interpretation and application of proposed measures.

The market order for fish and fish products regulates prices and trade practices and establishes common rules for competition. It promotes the establishment of producer organizations and pays limited subsidies as a means of adapting the supply of fish to market requirements. And, while producer organizations are not compelled to follow the rules of the market order, they are encouraged to do so. They can only receive subsidies from the EAGGF (European Agricultural Guidance and Guarantee Fund) if all members:

1. offer the fish at the auction for human food;
2. classify the fish as prescribed in the market order;
3. make use of the common minimum price during the whole duration of validity;
4. take care that the products taken out of the market are used for purposes other than human consumption or are sold so that the normal sales will not be hindered (distribution of unprocessed fish to social institutions is allowed).

The producer organization of the large deep-sea fishery for fresh fish (SAG = Seefisch-Absatz-Gesellschaft) has fixed its own minimum prices for redfish for some periods in order to get higher than the common prices in the market. In addition, the fish not sold on the auction is sold for human consumption and does not have to go into fish meal production.

The government of the Federal Republic follows EEC policy mainly in the structural amendment of the fleet. In particular, grants and

interest reductions are given for the building and purchase of new fishing boats for the small, deep-sea fishing fleet. With these measures three new trawlers of the large deep-sea fleet were also supported in 1976-77. In addition, subsidies are paid for a structure and consolidation program designed to modernize and break up ships in the small and large deep-sea fishery.

Short-term subsidies are also given to the production sector to help with problems caused by exceptional circumstances that cannot be managed by the fishing industry itself. This happened in 1974 and 1975 when the effects of the drastic rise in fuel prices and rising equipment costs hit the fishing industry in all EEC-member countries. At that time, the Federal Republic granted assistance for modernizing, repairs, purchase of equipment, reduction of liabilities and, in the cutter fishery, also provided for conversion of debts.

For similar reasons, a program was adopted in the second half of 1978 to help the fishing industry adapt to changing external conditions such as the 200 mile limit, quotas, and the overfishing of certain fish stocks. Developed in accordance with EEC regulations, it consisted of measures to help the fishing industry search for new fishing grounds and process previously underutilized fish species. In addition, subsidies were paid for reducing the size of the fleet. The cost of this program was about 11.5 million DM which was spread out over a three year period from 1978 to 1980.

The protection against potential competition-distorting disturbances of supplies by non-EEC countries is regulated by a reference price system. This system can be only slightly influenced by the national fishery policy. If the import price of fish products, which is determined at the representative import places, is lower than the fixed reference price, a tax (difference between import price and reference price) must be paid for herring and tuna imports. The import of other fish products can be stopped or limited to certain qualities or uses if the importing country applies for it. In addition to this reference system the common tariff is used.

For some fish products that do not compete with domestic products, the common tariff is not used.

The export of some fish products is subsidized to make the Common Market products more competitive in world markets. This export subsidy varies according to products and import countries.

### Distribution Channels

During the last ten years the distribution channel of fish and fish products has changed in many respects. This is due to the quantitative size of the trade flows between the various trade levels and also to the trade institutions involved. The most important reasons for these changes are national landings, decreasing fish demand combined with changes in the consumption structure, supply modifications of some products, and the introduction of the EEC-market organization.

Nearly all fresh fish from national landings is sold in the daily auctions in Bremerhaven and Cuxhaven and, when there are landings, also in Hamburg. The fish is offered by the producer organization. Only fishermen who are not members of a producer organization can sell their fish directly at the auction, to the coastal wholesaler, or to other buyers. Producer organizations are obliged to sell the fish of their members at auction under the rules of the Common Market in order to get subsidies from the EAGGF. This has resulted in an increase in auction sales of fish because nearly all fishermen are members of a producer organization and very few producer organizations (like the SAG) sell or have sold fish outside the rules of the Common Market.

The fresh fish which is bought at auction and primarily filleted by the coastal wholesalers is sold to the inland wholesalers or, in some cases, directly to retailers or the processing industry. In addition to the coastal wholesalers there are also some retailers who buy directly in the auction. (See Figure 2).

There are also small processing establishments or cutter cooperatives who buy in the auction if there is a lot of fish and they can buy it at

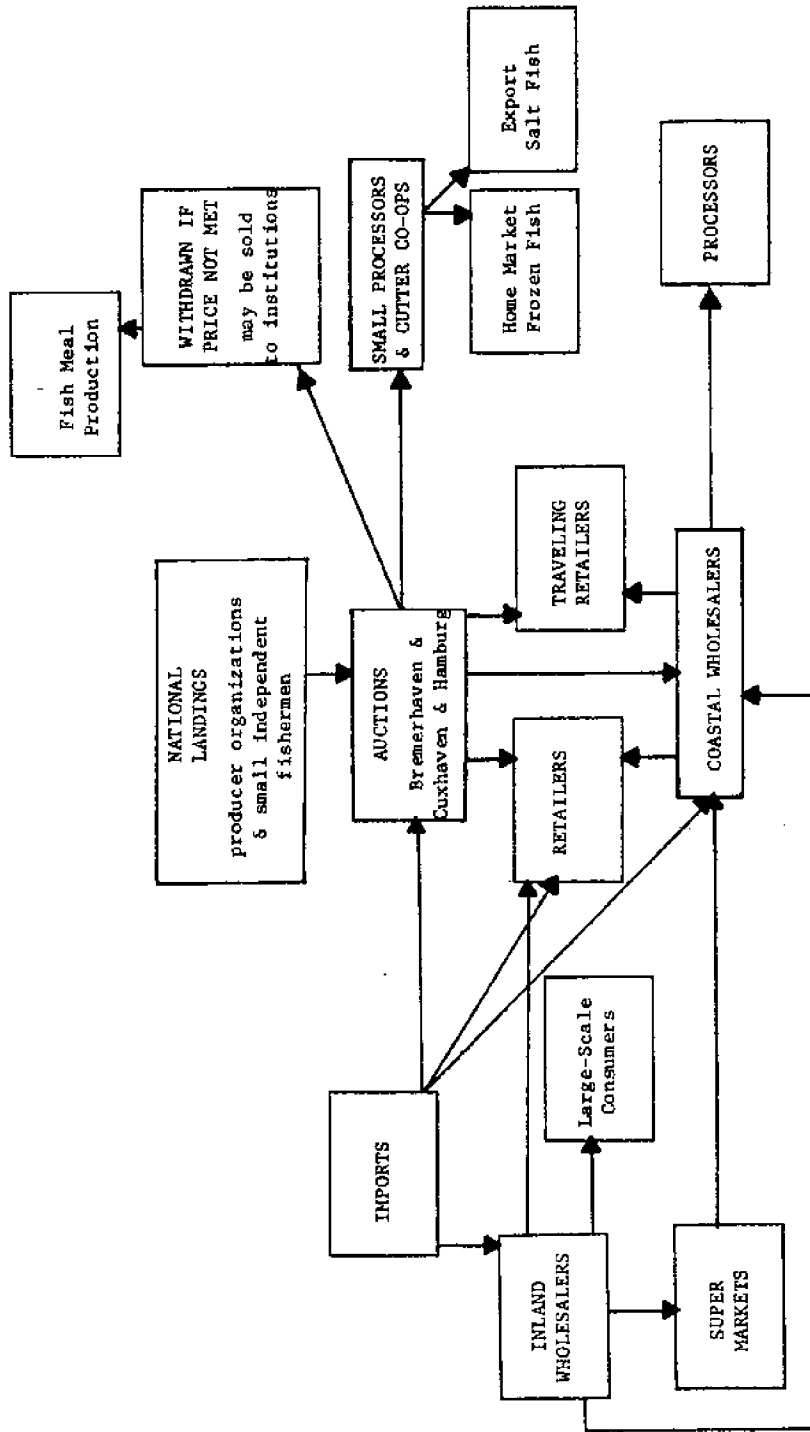


Figure 2. Internal Market for Fresh Fish in the Federal Republic of Germany.

the common minimum price. These institutions produce deep frozen or salted fish from cod or saithe. The deep frozen fillet is sold normally in the home market while the salted fish is sold with export-subsidies to African countries.

From the inland wholesaler the fresh fish goes to retailers, large-scale consumers and special branches in supermarkets. Because there are often special offers in the supermarkets one can assume that these institutions often buy their fish directly from coastal wholesalers, thus avoiding the inland wholesalers and their share of the total margins.

Traveling retailers buy directly from coastal wholesalers or through an agent at the auction. Their share of the total market is certainly not unimportant. It can be assumed that it will grow since the number of fish retailers in the outskirts of the large towns and in the open country is decreasing. These regions are the favored markets of the traveling salesmen.

Imported fish, which is landed directly by foreign fishing boats, goes, normally, through the same distribution channels as national landings.

Other imports are usually sold by the import and coastal wholesalers because they are also active in the export trade and have contracts with foreign wholesalers. Transportation costs could be significantly lowered if trucks were loaded traveling both directions. An exception to these commercial relations has always been the traditional imports from Belgium and the Netherlands into the populous Nordrhein-Westfalen where there are direct contacts between inland wholesalers and exporters. These trade relationships have also become more and more important to imports from other European countries, especially Denmark, because the Danish harbors are only slightly further from the consumption centers than the German fishing harbors.

Herring from national landings is sold either by auction or by means of contracts to the processing industry. Imports of herring are bought directly by the fish processing industry. The sale of products which

can be stored without difficulty is arranged, for the most part, by the general food wholesale and retail trade whereas the less storable products are sold by the special fish traders.

Frozen fish products from national landings are not sold in the auction but are offered by the SVG (the only producer organization for frozen fish) at fixed prices. All factory shipowners belong to the SVG, so that it is the only purchase source for frozen fish from national production, apart from small quantities produced by the cutter cooperatives from cutterfish. This advantage in the market is not as important as it may seem to be, because the import share in the market of frozen fish is very high and consists partly of fish species which the German factory fleet is not able to land.

Small processing establishments are supplied mainly by imports, either from wholesalers or directly from the importers. The two big producers of deep frozen food (Langnese-Iglo and Dr. Oetker) are directly aligned with the factory shipowners. This does not, however, exclude them from using imported fish. A third shipowner (Pickenpack in Hamburg) also has his own deep freezing factory. He, too, uses large quantities of imported fish products.

Most of the remaining nationally produced and imported frozen food is sold through the general food trade channel. Small quantities are sold by the special fish retailers.

A small part of frozen fish is not passed to the processing industry but is thawed and sold as part of the fresh fish assortment by the fish retailers.

The market for deep frozen fish products in the Federal Republic of Germany is dominated by Unilever (Langnese-Iglo) and Dr. Oetker. The other small producers are only of regional importance.

There is no information about the quantitative size of the distribution channels. It is known that, in the north of Germany, the sale of fresh fish is higher than that of frozen fish and vice-versa in the southern regions. Furthermore, there is information available about



the sale of deep frozen fish to households and large-scale consumers. This information shows the growing importance of convenience food in Germany. In 1970 about 30 percent of the deep frozen fish (11,000 t) was sold to canteens and other large consumers compared to about 40 percent (20,500 t) in 1979. It is assumed that in the future this development will be uninterrupted but strongly influenced by the movement of deep frozen fish prices compared with prices for other food substitutes.

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## IRELAND

Robert O'Connor and John Devereux

### Overview of Fisheries

#### Domestic Production

The fish catch in the Irish Sea is very small by EEC standards; in 1978 it was less than 2 percent of the total EEC landings, the second lowest catch in the Community after Belgium. Table 1 shows that Irish landings of fin fish in 1979 were 86,000 tons. This represents a 4 percent increase over the 1977 figures but a 13 percent decline from the 1978 total. In the five years prior to 1978, total landings were either stagnant or declining. The main expansion in Irish landings occurred in the decade 1963-1973 when total amounts increased by almost 240 percent. This rapid expansion was based mainly on herring which increased from 8,000 tons in 1963 to 47,000 tons in 1972. However, herring landings at this level could not be maintained, and after 1973 they fell rapidly.

The decline in herring catches was counterbalanced by a very rapid increase in mackerel landings from 5,000 tons in 1972 to over 32,000 tons in 1978, followed by a decline to 24,000 tons in 1979. There has been no significant increase in white fish landings in the 1970s except for whiting which rose from about 4,000 to 8,000 tons between 1971 and 1979 and cod which increased from 2,500 to 5,500 tons.

In 1979 (see Table 1) the total value of landings was IR£25 million. This is a modest figure by EEC standards. However these landings account for 0.3 percent of Ireland's Gross Domestic Product. Within the EEC, this places Ireland second only to Denmark (at 0.7 percent) in terms of fishing's contribution to the domestic economy. Herring is by far the most valuable species caught by Irish fishermen and has maintained its relative importance despite the decline in landings since 1972. Shellfish, also very important to the Irish fishing industry, accounted for nearly 30 percent of the value of landings in 1979. Currently, the most important

Table 1. Quantity and value of fish landed into Irish ports, <sup>a/</sup> by Irish fishermen for selected years, 1972-1979

Species	Quantity			Value		
	1972	1977	1979	1972	1977	1979
	Tons					
<u>Wet Fish</u>						
Herring	47,836	23,129	27,383	2,116	6,033	7,863
Mackerel	4,635	22,695	24,217	147	1,747	1,792
Cod	2,798	4,280	5,519	323	1,606	2,470
Whiting	3,935	7,746	8,309	196	1,590	1,894
Plaice	1,399	1,596	1,562	269	730	870
Sole	175	207	201	128	358	440
Ray/skate	1,312	1,401	1,331	184	367	499
Other wet fish	13,643	9,712	6,062	538	1,257	1,676
Total wet fish	75,733	70,766	74,584	3,900	13,688	17,504
	IR£'000					
<u>Shellfish<sup>b/</sup></u>						
Crabs	962	997	1,464	67	160	243
Dublin Bay prawns	1,836	2,804	4,259	340	1,059	3,744
Lobster	262	338	295	374	1,409	1,457
Scallops	1,574	346	285	80	168	210
Mussels	4,023	3,486	2,939	48	103	152
Oysters	262	924	331	60	779	541
Periwinkles	2,186	2,190	1,190	126	437	326
Other shellfish	614	637	351	322	894	728
Total shellfish	11,719	11,722	11,114	1,417	5,009	7,401
Total all fish	87,452	82,488	85,698	5,316	18,689	24,905

Source: Sea and Inland Fisheries Reports for various years. Dublin: Stationery Office.

Notes: <sup>a/</sup> Landings into foreign ports by Irish fishermen excluded.

<sup>b/</sup> Figures for value for shellfish landings for 1972 estimated by O'Connor, et al. (1980).

shellfish species in value terms are Dublin Bay prawns, lobsters, and oysters.

Table 2. Average price per ton of certain principal species of fish for selected years since 1962 with percentage change

Species	1963	1972	1977	1979	Percentage change 1963-1979
			IR£ per ton		%
Sole	350	624	1,732	2,188	525
Plaice	152	192	457	557	266
Ray/Skate	72	138	262	375	421
Cod	111	116	375	447	303
Whiting	40	49	195	228	470
Herring	23	44	261	287	1,148
Mackerel	17	32	77	74	335
Haddock	72	63	327	273	279
Hake	146	129	456	570	290
Sprat	9	11	32	67	644

Source: Sea and Inland Fisheries Reports for various years. Dublin: Stationery Office.

Table 2 gives the average landing prices for the principal species of fish for selected years. Sole was the highest priced variety taken by Irish vessels in 1979, followed by hake and plaice. Comparing the 1979 with 1963 prices, the largest percentage price increase has been in herring, which was 1,148 percent. However, if species are ranked in terms of price there has been little ranking change since 1963.

#### Source of Catch

EEC landing statistics show that in 1977, 72 percent of the total Irish catch was taken within Ireland's 12-mile zone, a very high figure by international standards. Countries such as Belgium, Denmark and West Germany obtained only 12 to 15 percent of their catch within their 12-mile

zones. A survey by O'Connor, et al. (1980) confirms this basically inshore pattern of Irish fishing. It estimated that 87 percent of all Irish vessels fished within Ireland's 12-mile zone and only 50 percent of boats over 24 meters fished outside the 20-mile zone. Apparently most of the large boats built in recent years have chosen to fish the already crowded coastal waters.

These findings go a long way in explaining why the rapid increase in landings of the 1960s has not been sustained, despite a great increase in the number and tonnage of Irish vessels. The large price increases for certain inshore fish (herring, etc.,) have probably compounded this problem. Another factor is that in the short run, Irish fishermen face great difficulties in establishing themselves in offshore fisheries because of existing overfishing by foreign boats and lack of knowledge about seasonal migration patterns.

#### Salmon Landings

The late 1960s and early 1970s saw a major expansion in salmon landings (see Table 3) from 1,570 tons in 1963 to 2,188 tons in 1975. The value of the catch increased from IR£0.8 million to IR£3 million

Table 3. Estimated catch of salmon by Irish fishermen for selected years, 1963-1979

Year	Drift net	Other commercial	Rod and line	Total	Value of total catch
					IR£'000
1963	390	1,025	155	1,570	835
1972	1,065	524	85	1,674	2,140
1975	1,482	654	52	2,188	3,025
1977	981	286	38	1,305	4,582
1978	843	305	31	1,179	3,987
1979	883	150	40	1,073	5,154

Source: Sea and Inland Fisheries Reports for various years. Dublin: Stationery Office.

during the same period. Drift netting accounted for all of this increase, while the yield of other commercial and rod and line fishing actually declined. Since then the overall salmon catch has fallen dramatically, and, by 1979, total landings were well below their 1963 level, probably as a direct result of overfishing by drift net fishermen. Very stringent controls were introduced in 1979 in an attempt to protect salmon stocks.

#### The Domestic Fishing Fleet

In terms of numbers, Ireland has one of the smallest motor boat fleets in Europe. In terms of average size, Irish vessels are also small by European standards. In addition, there are fewer vessels in the different size classes.

The Irish fleet consists mainly of inshore and middle distance vessels which rarely stay at sea for more than a few days at a time. In 1977 there were 2,677 vessels in the fleet, of which 899 were wholly engaged and 1,799 were partially employed in fishing. Of the total fleet less than half were motor vessels, the remainder being sail or outboard engine craft. Recently, there has been a trend towards larger and more sophisticated vessels. There are now about 40 boats over 24 meters in length and of these, about two-thirds are under 6 years old. As many as 70 percent of the under 6 meter boats fish for shellfish. The pelagic species, herring and mackerel, are caught by both the larger and smaller boats. But the demersal fish are confined almost entirely to the larger vessels.

#### Fishing Gear

O'Connor et al. (1980) have published the results of a survey of the Irish fleet's gear. The study found that the larger and newer boats tend to have the most sophisticated equipment and to employ more than one type of fishing gear. The smaller boats have little, if any, equipment and tend to have one type of gear only. The most common fishing gear is the lobster pot used by over 60 percent of boats under 12 meters in length. Drift nets are also a common type of gear, used by over half the boats



between 6 and 18 meters. Trawl nets are confined mainly to the larger boats. Tangle nets are carried by about 15 percent of all boats, but only about 3 percent of the boats have seine nets.

Practically all the boats over 12 meters have echo sounders and power winches, while most of those over 18 meters have radio VHF, radio RT, navigational RDF and power blocks. About one-quarter of those over 24 meters have refrigerated holds. Very few smaller boats have such holds. One-third of the boats smaller than 9 meters have manual winches.

### Major Ports

The Irish government lists 874 natural inlets along the coastline which are used as fishing harbors. This number can be divided into two groups; the largest group, numbering 678, provides only piers and slipways. The second group of 196 harbors can handle vessels of more than 8 meters. However only about 25 of these have any developed facilities. Figure 1 shows harbors at which landings of sea fish exceeded IR£150,000 in 1977.

The development of Irish fishing ports is based on the provision of fully developed harbors at a small number of locations around the coast. The harbors earmarked for development are Killybegs, Rossaveel, Castletownbere, Dunmore East and Howth. Together these harbors accounted for more than 90 percent of Irish sea fish landings in 1977. Between 1966 and 1977 the government invested IR£7.75 million in harbor facilities. Of this amount, IR£4.56 million was spent to develop four of the five Fishery Harbor Centers in Killybegs, Rossaveel, Castletownbere and Dunmore East; 72 other harbors and landing places were developed to lesser degrees. Current plans call for an expenditure of IR£16 million (1979 dollars) over the next three to four years on port development.

The O'Connor et al. (1980) report concluded that the present facilities are adequate for the existing Irish fleet. The principal problems which it identified are a lack of sufficient space and inadequate dredging. All long-range investment plans are heavily dependent on the yet undecided Common Fisheries Policy of the EEC. Until catch targets are set it will be impossible to plan either the required size or the

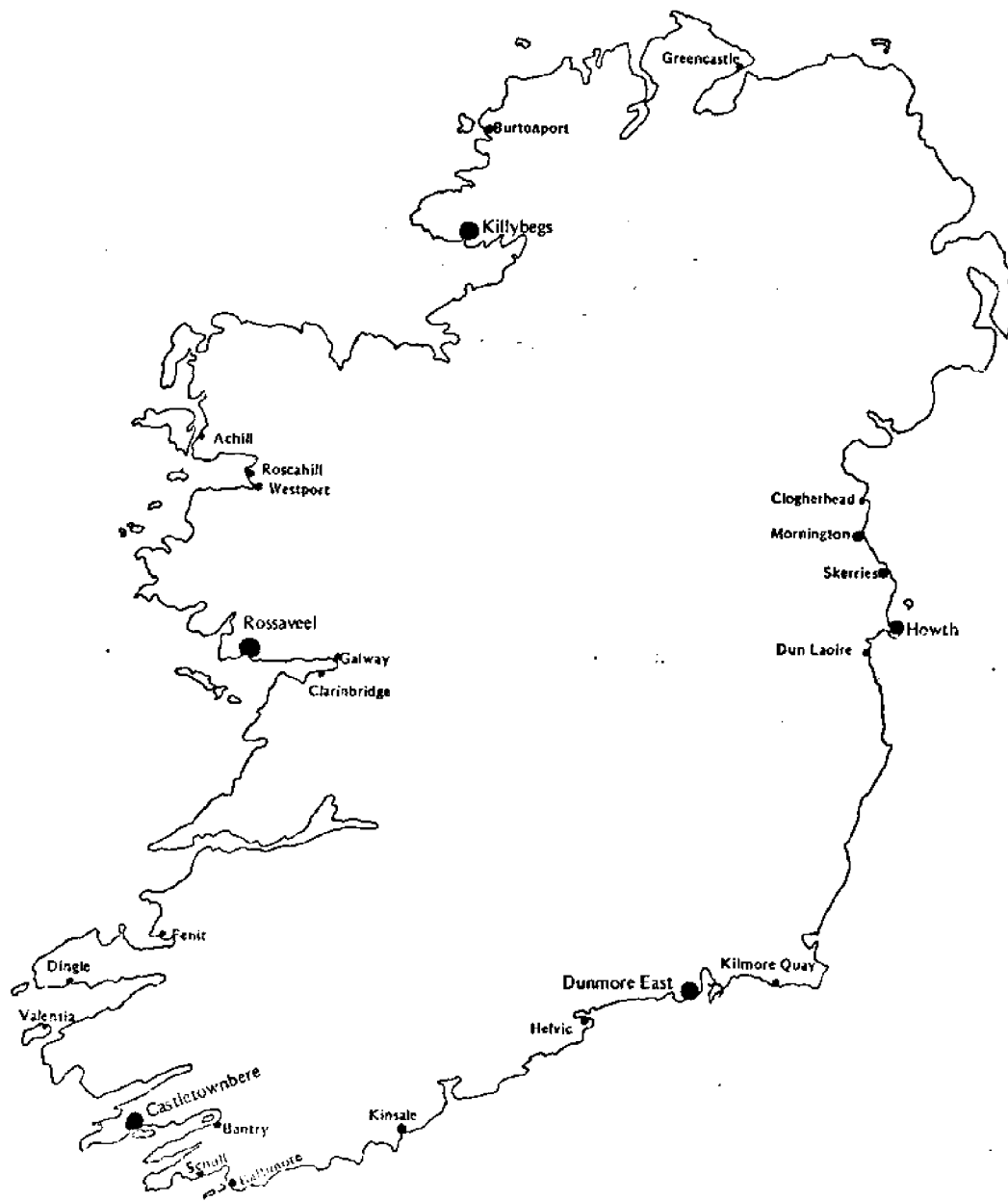


Figure 1. Map of Ireland showing the ports where landings of sea fish (excluding salmon), exceeded IR£50,000 in 1977\*

\* ● Denotes major Fishery Harbor Center

geographic location of the Irish fleet. Without this knowledge no long-term harbor investment program can be made.

### Public Policy

State services to the marine fishing industry are mainly provided by two organizations, the Department of Fisheries and Bord Iascaigh Mhara (The Irish Sea Fisheries Development Board).

The functions of the Department are mainly administrative. It handles all fisheries legislation and licenses vessels, exporters, etc. It also has the important responsibility of EEC negotiation in all matters relating to fishery policy. Bord Iascaigh Mhara (BIM) is the development body for the Irish sea fishing industry with responsibility for encouraging investment (through providing grants for boats and equipment) and developing markets as well as providing advisory and other educational services.

Another semi-governmental organization involved in the fishing industry is the National Board for Science and Technology (NBST). This board is the principal source of advice to the government on policy and planning for science and technology. The board operates an intensive program of support for the marine services, including the funding of research and planning related to a maricultural program and the funding and operation of a research vessel.

State grants for capital investment in the fish processing industry are given by the Industrial Development Authority and, in the Gaeltacht areas, by Gaeltarra Eireann (now Udaras na Gaeltachta). All such grants are given only after consultation with BIM and the Department of Fisheries and Forestry.

### Legislation Governing the Irish Sea Fishing Industry

Many pieces of legislation governing the sea fisheries industry have been passed for various purposes since the foundation of the Irish state. The first of these was the Sea Fisheries Act, 1931 (No. 4 of 1931) which dealt mainly with fish sales, licenses to sell fish and hygiene of

fish retail outlets. This was followed by the Fisheries (Revision of Loans) Act, 1931 (No. 33 of 1931). This act provided for the newly formed Sea Fisheries Association to issue loans and gear (previously, a service of the Department of Fisheries) in the form of hire purchase transactions. This act was followed by the Sea Fisheries Protection Act, 1933 (No. 53 of 1933), restricting foreign sea fishing boats within the state fishery limits and prohibiting certain methods of trawling within these limits. It also provided extensive powers of search, apprehension of offenders, and prosecution.

The protection of undersized and immature sea fish from destruction by ordinary methods of fishing became increasingly urgent by the mid-1930s and led to the enactment of the Sea Fisheries (Protection of Immature Fish) Act, 1937 (No. 33 of 1937). This act enabled regulations to be made by order, specifying the minimum size of fish that could be landed and the minimum size of mesh permitted in trawl nets. Under the enabling conditions of this act and the Fisheries (Consolidation) Act, 1959 (No. 14 of 1959), orders have been made and updated, as occasion has required, prescribing minimum catch sizes of wet fish and shellfish and minimum net sizes. The Undersized Sea-Fish Order, 1978 (SI No. 175 of 1978) sets the minimum catch sizes for 13 species of fish.

Important sea fisheries legislation is contained in the Fisheries (Amendment) Act, 1962 (No. 31 of 1962). This act, though mainly concerned with inland fishery problems, contained two provisions important to the regulations of sea fisheries. Section 29 lays down conditions for controlling salmon fishing at sea. The powers included in this section could serve as useful guidelines for the control of all sea fishing. Section 35 provides for the control, by order, of fishing in the interests of conservation and rational exploitation, where such measures are shown to be necessary. Some 17 orders, chiefly to control fishing for herring in specified sea areas, have been made pursuant to the latter provision. The series also includes order number 5 of 1978, which includes in its provisions the exclusion of factory ships from the exclusive fishing

limits, the order that no salmon, sole, plaice, etc., be taken outside certain limits, and size limits for mackerel and herring landings.

The Fisheries (Amendment) Act of 1978 (No. 16 of 1978) was introduced for the purpose of consolidating existing legislation and bringing enactments up-to-date. This act stipulates substantially increased fines for foreign vessels fishing illegally in Irish waters and for all vessels breaking conservation regulations. It also provides a legal basis for setting fishing limits.

The Fisheries Act of 1980 (No. 1 of 1980), though dealing mainly with inland fisheries, contains in Section 51 specific arrangements with regard to marine aquaculture. This enactment makes it an offense to engage in aquaculture of any kind except in accordance with a fish culture license, an oyster bed license or an oyster fishery order under the Fisheries Consolidation Act, 1959. The act also prescribes fines of up to IR£500 for engaging in aquaculture without a license. Section 52 of this act enables authorized officers to take a boat suspected of containing unlawfully captured salmon to port and to detain the boat and its occupants until it is searched.

Other legislation relevant to sea fisheries is contained in the Maritime Jurisdiction Acts which provide for the drawing of base lines and give authority to management agencies to extend fishing limits by order. This legislation is now superseded by EEC law.

#### Price Controls

Most retail prices in Ireland are subject to statutory control by the National Prices Commission, but the legislation setting up this body explicitly excluded from its jurisdiction the ex-vessel price of fish. In practice the NPC makes little or no attempt to control retail prices.

#### Health Standards

No special health standards exist for retail fish sellers. These outlets are covered by general hygiene regulations, but unlike butchers

and poulterers they are not required to register with the government. Like all Irish establishments they are, of course, liable to spot health checks. Shellfish fishing is subject to very strict health controls.

#### The European Perspective

Since Ireland joined the EEC in January 1973, her sea fishing industry cannot be considered in isolation; it must now be treated in a European perspective. The Common Fisheries Policy (CFP) of the European Community is contained in two basic regulations, 100/76 and 101/76, relating to structures and marketing, complemented by a number of subsidiary regulations relating to resources. The areas covered by these regulations include:

- (1) Structural policy, particularly equal access to the shoreline for all vessels belonging to member states.
- (2) The establishment of Producers' Organizations with the objective of ensuring rational operation of the fishing industry and of improving selling conditions for the industry's products.
- (3) Marketing regulations which require the main varieties of fresh fish for human consumption to be graded by size and freshness.
- (4) The alignments of tariffs on the imports of fish and fishery products from third countries, and the removal of import duties on intra-Community trade.
- (5) The availability of Community aid from the Guidance Section of the European Agricultural Guidance and Guarantee Fund (FEOGA) to finance the withdrawal of fish from the market, grants for boats, etc.

The basic principle of the original policy was equal conditions of access for all Community fishermen to each member state's territorial waters. A five-year exemption from this principle was permitted, however, in a three-mile coastal zone, where the local population was heavily dependent on inshore fishing for its livelihood. In cases where equal access led to overfishing, the Council of Ministers was empowered to

adopt the necessary conservation measures. This it continues to do, and, each year specifies Total Allowable Catches (TACs) for different species in the different fishing zones, and bans fishing for over-exploited species, such as herring, in certain areas.

In January 1979 member states agreed to a system of quotas. The quotas have been allocated between countries largely on the basis of their historical catch records. More recently the Council of Ministers have formulated a system requiring fishermen to record catches in log books.

In negotiating treaties of access in 1972 for the three new member states, the UK, Denmark and Ireland, an exemption was provided whereby, for a 10-year period until the end of 1982, all member states were entitled to reserve fishing in a six-mile zone off their coasts exclusively for vessels which traditionally fish in those waters and which operate from local ports. Off sections of the coasts of Denmark, Greenland, France, Ireland, and the UK, this six-mile zone was later increased to 12 miles. However, the rights which other member states enjoyed in the outer 6 miles of the 12-mile bands, by virtue of a 1964 European Fisheries Convention and Bilateral Agreements, were preserved. The powers of the Council of Ministers to regulate fishing were also retained from the original policy. It was provided that, from 1978 at the latest, the Council was to determine conditions for fishing with a view to ensuring protection of the fishing grounds and conservation of the biological resources of the sea. These functions were not limited, as they were in the original policy, to member states, territorial seas and exclusive fishing zones, but were intended to include the regulation of fishing on the high seas.

It was also decided that the Council would determine the policy to be adopted after the expiration of the 10-year exemption on the basis of a report from the Commission to be made before the end of 1982. Despite intensive negotiations, a definitive policy has not yet been established and great uncertainty continues to prevail within the industry.

### The Fish Withdrawal System

Since February 2, 1976, a withdrawal system has been used to support the prices of Irish fish as required by the Common Fisheries Policy of the EEC. In the period of transition after Ireland's entry into the EEC, separate withdrawal prices were determined for Ireland and the other new entrants, but from January 1, 1978 the same prices have applied throughout the whole Community.

Each year the Council of Ministers fixes guide prices for a number of fish species. From these prices the Commission derives withdrawal prices. Guide prices are set for seven species relevant to Irish fishermen; herring, haddock, whiting, cod, mackerel, plaice, and saithe. Member states may include species not on the EEC list but they will receive no EEC funds for such species.

The guide price is not a guaranteed price but rather a price the Commission expects to be reached. The withdrawal price is, in effect, a minimum price below which fish cannot be sold for human consumption. If the price of fish at a recognized auction falls below this minimum, the fish is withdrawn and sent for processing. Sometimes it may even be dumped. Fishermen, however, rarely receive the full withdrawal price. The purpose of withdrawing it at this price is an attempt to stabilize the fishermen's incomes by putting a lower limit on fish prices.

The Irish withdrawal system has been operated by the Irish Fish Producers' Organization (IFPO) since the beginning of 1978. A second producers' organization has been recently set up to administer the withdrawal system in Donegal.

The fixed withdrawal price varies according to standards laid down by the EEC in regard to grading, freshness, size and presentation. The EEC will contribute to the cost of withdrawing fish only if the fish is properly graded, if it is one of the designated species to which the withdrawal system applies, and if the official EEC withdrawal price is used.

The funds used by the IFPO to finance the withdrawal system come from three sources:



- (a) Money received by the IFPO from the sale of the withdrawn fish (for fishmeal, etc.).
- (b) A certain amount from EEC funds. At the beginning of each year the EEC decides on the proportion of the withdrawal price which must be paid (the compensation price). Standard or "notional" prices are then fixed for the different methods of disposal. The withdrawal agency is expected to obtain these standard prices for any fish withdrawn and disposed of in the different ways. The only EEC funds that the IFPO actually receives, therefore, are the differences between the compensation price and the standard price.
- (c) The IFPO adds to (a) and (b) from its own funds obtained from a levy on its members' sales.

For example, in 1978 the withdrawal price of mackerel was IR£72 per ton. IR£52 per ton was paid by the IFPO for withdrawn fish. This amount comprised:

- (i) A standard value of IR£29 per ton for withdrawn mackerel sold to a fishmeal plant,
- (ii) An EEC contribution of IR£14.20 per ton, and
- (iii) An IFPO contribution of IR£8.80 per ton.

The sum of (i) and (ii), IR£43.20, which was the EEC compensation price in that year, was 60 percent of the withdrawal price (i.e.,  $IR£72 \times 60\% = IR£43.20$ ). The IFPO contribution was decided on the basis of the funds available from its levies. In addition to this payment, the IFPO had to pay transport and other costs of sending the withdrawn fish from point of withdrawal to fishmeal plant.

To summarize this section we can say that there are five different designated prices in the withdrawal process.

- (1) The guide price, which is the price the EEC expects to receive.
- (2) The withdrawal price, which is a proportion of the guide price, and is the price below which a designated species cannot be sold for human consumption. However, fishermen do not necessarily receive this price.

- (3) The compensation price, a proportion of the withdrawal price, is the minimum which fishermen may receive. They can, however, receive more from their producers' association out of levies paid on all fish sold.
- (4) The standard price is the amount which the withdrawal agency is expected to receive for fish disposed of in a specific way. If it does not receive this amount it will have to make up the difference out of its own funds. If it receives more the excess can be retained in its own funds.
- (5) The actual price paid to producers for withdrawn fish is either the compensation price or a greater amount made up from levies paid on previous sales. If the amount of fish being withdrawn is small, funds may be available to raise the actual price to the withdrawal price. If the market is depressed and a large amount of fish is being withdrawn, additional funds may not be available and the actual price will be the compensation price.

#### Magnitude of Irish Withdrawal

From the inception of the withdrawal scheme in early 1976 until the end of 1979, the IFPO withdrew 32,000 tons of fish of all kinds, valued at IR£1.7 million. This is equivalent to 11 percent of total fin fish landings in the period. Mackerel accounted for most of the withdrawals in each year (see Table 4).

The present system only influences the price of a small number of varieties of fish, mainly mackerel. By increasing the price of mackerel the withdrawal system could possibly hinder the development of a mackerel processing/exporting industry by making such activities uneconomic. However, arrangements have now been made with Eastern European ships to take up surplus mackerel caught by Irish ships, at prices which are about 60 percent higher than those received under the withdrawal scheme. This arrangement began in September, 1979, and has considerably reduced the quantities of mackerel withdrawn. In 1980-81 more whiting than mackerel had to be withdrawn.

Table 4. Quantities and values of fish withdrawn from the market by species, 1976-1979

Species of Fish	Quantity					Value						
	1976	1977	1978	1979	1976	1977	1978	1979	1976	1977	1978	1979
	Tons											
Mackerel	5,396.1	4,754.9	10,752.9	7,669.3	244,562	262,323	543,730	399,745				
Whiting	931.9	34.1	125.2	636.7	62,936	3,004	15,889	69,772				
Herring	343.9	19.0	189.2	280.1	20,659	1,509	24,241	4,532				
Haddock*	35.3	-	8.0	43.0	2,324	-	973	4,532				
Plaice	1.6	-	0.9	0.3	164	-	190	136				
Prawns*	-	-	5.9	-	-	-	3,006	-				
Sprat*	-	-	108.1	-	-	-	2,393	-				
Ray	-	-	2.3	0.6	-	-	516	145				
Saithe	26.2	-	0.2	10.4	2,070	-	31	1,343				
Hake	15.1	1.6	-	2.7	4,351	534	-	1,207				
Other	1.6	-	0.2	3.1	169	-	41	513				
<b>Total</b>	<b>6,751.1</b>	<b>4,809.6</b>	<b>11,191.9</b>	<b>8,646.2</b>	<b>337,235</b>	<b>267,379</b>	<b>591,010</b>	<b>481,925</b>				

Sources: Department of Fisheries' statistics and issues of the Irish Statistical Bulletin, Dublin: Central Statistics Office.

Notes: \*Species not included in EEC scheme.

\*\*Value is the amount received by fishermen from withdrawal agency.

## Markets for Seafood

### Characteristics of the Domestic Market

Up to and including 1974, per capita fish consumption in Ireland was the lowest in the EEC; her relative position in this respect has since improved. In 1976, Italy and West Germany had lower consumption figures than Ireland. Denmark has had the highest level of consumption in recent years with an average of about 28 kg per person (live weight), compared with an Irish figure of about 10 kg.

Over the period 1963 to 1979 consumption of fish per person in Ireland increased by almost 60 percent and by a greater proportion than any of the meats, except chicken. In the period 1963 to 1973 beef prices rose faster than fish prices. In the period 1973 to 1979 this pattern was reversed (see Table 5). In more recent times beef prices have risen faster than fish prices.

Despite these recent rapid price increases, the price of fish per kg is still much less than that of red meat. Hence, in future years, the poorer sections of the community may be forced to obtain a higher proportion of their protein requirement from fish. This price effect, together with improvements in the distribution of fish and in the promotion efforts by BIM, should bring about some increase in fish consumption in the future. If consumption follows European patterns, however (see Table 6), then the increased demand will be for the more processed and packaged fish products. Given the dominance of multi-nationals in packaged frozen foods, and the weakness of the Irish processing sector, most of the increase will probably come from imports.

A National Prices Commission study (NPC, 1978) indicates the problems of the fish processing industry, which faces constant uncertainty because of wide fluctuations in the supply of its raw materials. This variability, resulting from seasonality in weather conditions, availability of fish, conservation measures, and other factors, makes efficient operation difficult to achieve or maintain. The uncertainty about supplies and prices, for example, inhibits long range planning, reduces

Table 5. Relationship between prices and consumption of meat and fish, 1963-1979

Period	Price Change			Consumer Price Index (CPI)	Change in Consumption		
	Fish <sup>a/</sup>	Beef	Pork		Fish	Beef	Pork
	Percentage				Percentage		
1963/73	132.6	257.9	179.1	95.2	44.1	30.8	30.8
1973/79	155.1	148.8	129.1	131.0	8.2	26.0	-9.6
1963/79	493.9	790.4	539.6	341.7	55.9	38.6	18.1

Source: Various issues of the Irish Statistical Bulletin, Dublin: Central Statistics Office.

<sup>a/</sup> Simple average of the prices of whiting and cod for 1963/73 and 1963/79. For 1973/79 simple average of prices of cod, whiting, plaice and kippers, as reported by the Central Statistics Office.

Table 6. Average distribution of fish consumption between fresh, processed and shellfish in all EEC countries, 1972-1976

Country	Fresh and frozen	Salted, dried or smoked	All other fish products	Shellfish
	Percentage			
West Germany	41.4	15.2	37.4	6.0
France	49.3	6.3	15.6	28.8
Netherlands	44.4	14.3	14.3	27.0
Italy	51.2	16.5	15.7	16.6
Belgium/Luxembourg	35.3	12.9	20.1	31.7
United Kingdom	71.2	5.7	12.4	10.7
Ireland	63.6	8.1	9.1	19.2
Denmark	54.0	9.3	18.7	18.0
All Countries	54.0	9.3	18.7	18.0

Source: Eurostat: Fisheries, fishery products and fishing fleet, 1976-1977. Statistical Office of the European Communities, 1979.

customer loyalty because supplies cannot be assured, complicates development of distribution facilities to serve inland towns, and handicaps the export trade. Other difficulties include: a domestic market which was formerly concentrated on Friday's and which still is influenced by the potential connotations of fish; and a fishing fleet which cannot take full advantage of the opportunities off Irish shores because its boats are too small to compete with far ranging vessels of other nations. Hence, the trade lacks a regular supply of white fish, is hampered by inadequate facilities at some of the major ports, and faces the ever present problems of a perishable product.

Data are not available on the consumption of individual fish species. The 1975 National Prices Commission survey of retail fish outlets found that only six species received extensive retail distribution. In general order of importance they are herring, haddock, whiting, cod, plaice and prawns. However, information is available on the distribution of consumption between fresh/frozen, processed and shellfish. From Table 6 it is clear that the Irish consumer buys only a very small amount of highly processed fish (canned, marinated, etc.,). It also shows that the Irish pattern of fish consumption is much closer to that of the UK than to any other European country.

#### Wholesale Fish Operations

At any port in Ireland, fish can be initially disposed of in two ways. It can be sold locally or sent to the Dublin Fish Market. At the ports, the catch is sold by auction or private agreement. It is bought by wholesalers, processors (mainly for eventual export), and retailers for resale locally. Some of the catch (mainly white fish) may be sent direct to the Dublin Fish Market. However, the bulk of the landings of herring, cod and salmon are disposed of at the local port auctions. The Dublin Fish Market is supplied mainly by Howth and Skerries, otherwise it receives only the fish which cannot be sold at the port of landing. Fish landings follow a relatively simple pattern of distribution. Once the fish is sold by the fisherman it is a straight-forward path to the

consumer via the retailer. Figure 2 provides a graphic representation of this distribution chain.

Most of the local port sales are handled by cooperatives. With the rapid growth in fish landings, and because of official support by BIM, such auctions have steadily increased in importance. The proportion of landings handled by them increased from 56 percent in 1971-72 to 80 percent in 1977-78. In fact, 95 percent of the total pelagic catch is sold in such auctions.

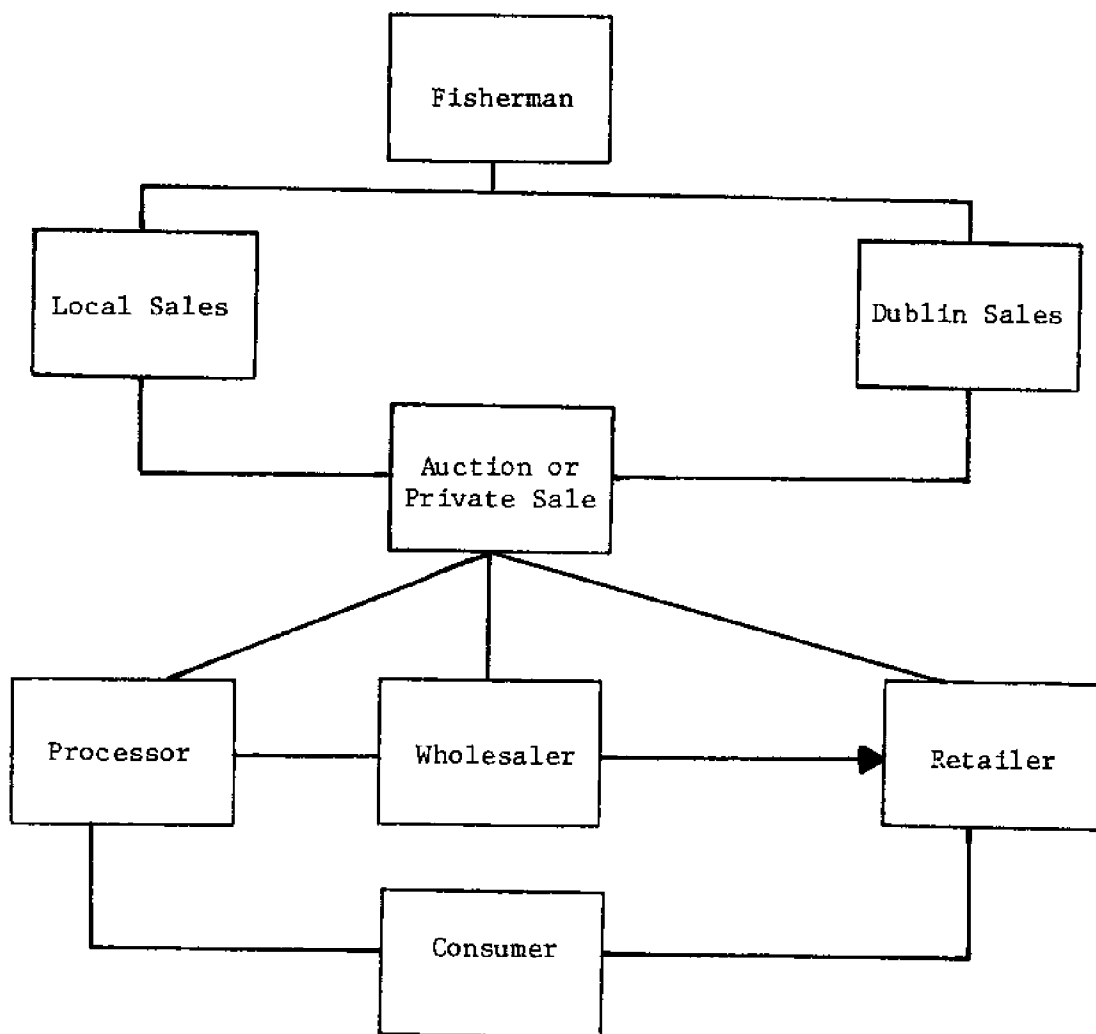


Figure 2. Structure of seafood distribution in Ireland.

Source: National Prices Commission, 1978. "A Study of the Distribution of Fresh, Cured and Frozen Fish," Dublin: N.P.C. Commissioned Report (Unpublished).

The Dublin Fish Market is a wholesale market mainly for white fish and is the most important single wholesale market in Ireland. However, it has lost its former dominance as a center of initial sales because more and more wholesalers are buying their supplies at portal auctions. Indeed, trading volume in this market has fallen steadily in recent years. It fell by 38 percent between 1968 and 1978, from 240,000 boxes to 200,000 boxes.

The wholesaling sector of the Dublin Fish Market consists of 11 firms of "auctioneers," who are also involved in processing and exporting. Each auctioneer supplies marked boxes to various skippers. However as skippers can readily shift from one auctioneer to another, auctioneers can be said to compete for available fish.

Auctioneers are obliged by custom to accept all the fish from those to whom they supply boxes. Market tradition further dictates that fish supplies should not be returned unsold, or sold at unsatisfactory prices. Consequently when the market is slow the auctioneer sets a reserve price below which he will not sell. Thus, there is always the possibility that the auctioneer may be left with unsold fish on his hands (which usually can be utilized in processing or exporting outlets).

There are four main ways by which fish are actually sold on the Dublin Market (NPC, 1975).

- (1) Through a pure auction, where fish are offered openly for sale. The method is usually used only when a particular species, or fish as a whole, are in short supply.
- (2) When fish are plentiful, the auctioneer sets a reserve, or minimum price, below which he will not sell. Once bidding progresses this reserve may be lowered, but this rarely occurs.
- (3) Private deals may be made during auctions, particularly if trade is slow. For example, if the reserve price is IR£25 per box the auctioneer may make a private deal for IR£20.
- (4) When supplies are plentiful, buyers may agree to take a consignment at the market price which will be established later by auction.



Supplies to the market are very unpredictable and vary not only seasonally, but from day to day, causing tremendous fluctuations in price. Such instability results from a number of factors; two of the more important are:

- (a) Supplies are strongly influenced by prevailing weather conditions because most of the boats are not large enough to deal with difficult weather conditions. The increasing size of vessels in the Irish fleet may help to moderate this problem.
- (b) In the herring season many of the boats which normally engage in procuring white fish turn their attention to herring.

Allegations have occasionally been made that the Dublin Market was operated by a ring of price fixers, O'Connor, et al. (1980) but the 1975 National Prices Commission Report found little evidence to support this complaint.

#### Retail Distribution of Fish

According to BIM figures in 1978, 439 firms were engaged in fish retailing, 104 of them in the Dublin area. Many of these shops were selling fish only to a very limited extent. In the 1975 National Prices Commission survey of 45 fish retailers (35 in Dublin) only one engaged exclusively in selling fish.

In Dublin, fish supplies are obtained almost entirely from the Dublin Fish Market. Retailers transport the fish to their premises and then prepare the fish for sale, usually by cleaning and filleting them. Retail stores in country areas obtain their fish from the Dublin Market or from local parts.

There are three main sources of supply for retailers located in Leinster outside Dublin: the Dublin Fish Market, a locally based distributor/retailer, or a general distributor. Supplies in the majority of cases are obtained from general distributors. Only two or three species receive a general distribution outside the major urban areas. In western and southern regions supplies came directly from the ports. Retailers may rely directly on port sales or on portal wholesalers.

However, as in Leinster, whiting and herring are the most popular species, eaten mainly on Fridays.

In urban areas, while many separate varieties of fish are sold, only six varieties receive an extensive retail distribution: herring, whiting, haddock, cod, plaice and prawns. In 1975 the National Prices Commission estimated that the white fish market was shared by:

Whiting	40%
Cod	30%
Haddock	20%
Plaice	10%

The retailers surveyed in this report claimed that the price of fish at the retail level was determined by supply. This is marked by extreme fluctuations in quantity and price, causing them tremendous problems. When prices are set, the retailers attempt to leave them unchanged for as long as possible in order to maintain stable prices for the consumer. In practice, prices could seldom be fixed for more than a week because of supply changes. The large price fluctuations at the wholesale level are usually passed on to the consumer in small increments over a period of a few weeks.

#### Retail Margins

From accounts supplied, the National Prices Commission investigated retail margins and found that retailers, on average, set a higher percentage margin on the lower priced fish (i.e., whiting) and a lower margin on the more expensive varieties such as plaice. Retail margins were found to be higher in the Dublin area for haddock, plaice and cod; the opposite was true for herring and whiting. Table 7 is reproduced from their report and compares the margins for selected varieties of fish with those of other food products. As is well known, direct comparison of margins is made difficult because the amount of processing, etc., varies widely. With the exception of filleted herring, the margins on fish are usually less than those on loose bacon, pork and beef, but higher than those on prepacked bacon, potatoes, carrots and tomatoes. The National

Prices Commission concluded that, given the data available, margins on fish at the retail level were not substantially different from the margins obtained on a number of comparable food items. In general the report found that competition was very strong in the retail fish area with no evidence of any unusual restrictions to entry that would permit excess profits.

However, outside the major population centers the report concluded that fish retailing was very poorly developed, reflecting a traditional lack of consumer interest in these areas, coupled with transport, storage and other marketing problems. Since then, only slight progress has been made in combating these problems.

Table 7. Retail fish margins compared with margins on other food products

Products	Margin (percentage on cost)	Degree of processing at retail level
<u>Fish</u>		
Herring, filleted	121	Relatively high
Whiting	34	Relatively high
Haddock	42	Relatively high
Plaice	26	Relatively high
Cod	38	Relatively high
<u>Pigmeat</u>		
Prepared bacon	17	Very low
Loose bacon	66	Relatively high
Fresh pork	38	Relatively high
<u>Beef</u>	51	Relatively high
<u>Fruit and Vegetables</u>		
Potatoes	24	Very low
Carrots	27	Very low
Tomatoes	27	Very low
Apples	26	Very low
Bananas	37	Very low

Source: National Prices Commission, Monthly Report No. 39, April 1975.  
Dublin: Stationery Office, Prl. 4496, p. 30.

The Fish Processing Sector

A general picture of the Irish fish processing industry can be obtained from Table 8 showing how the catch in 1977 was marketed.

Table 8. Utilization of catch, 1977\*

How marketed	Percentage of total landings
Whole, fresh/chilled	22.3
Whole, frozen	17.0
Fillets, fresh/chilled	11.5
Fillets, frozen	13.5
Whole fish, dried/salted/brine	12.2
Fillets, dried/salted/brine	2.0
Smoked	1.7
Prepared/preserved	5.2
Fishmeal, etc.	14.6
Total	100.0

\*These figures are estimated and exclude landings at foreign ports, and landings of salmon and freshwater fish.

Source: Bord Iascaigh Mhara.

The Irish fish processing industry is in a very underdeveloped state. Nearly all the processing is primary (very rudimentary processes such as chilling, freezing, filleting, etc.) which adds little value. The amount of secondary processing (smoking, canning, prepared portions) is minimal, currently comprising about 9 percent of the catch.

Prior to 1970, fish processing was limited to that undertaken by BIM in its factories at Killybegs, Schull, and Galway and a number of the established family firms in Dublin. But since 1970 there has been a slow but significant development in the industry. Overall investment in the industry between 1970 and 1977 was IR£6.7 million (compared with IR£31.9 million in the fishing fleet over the same period). There were over 60 firms engaged in fish processing by 1978 with a total employment force of 1,550. From Table 9 it can be seen that most firms are extremely small, only two having more than 100 employees.

Table 9. Numbers employed in the fish processing industry, 1977

Number of employees	Number of firms
5-14	30
15-29	18
30-49	7
50-99	3
100+	2

Source: Bord Iascaigh Mhara

The only source of detailed information on the industry is an Industrial Development Authority survey carried out in 1975. The survey found that only 14 of the 29 firms in their sample employed professional people (either managerial, or technical). Operatives received very little training, and few firms made any significant attempt to market output abroad. The survey concluded that the firms were too small and lacked the sophisticated management needed to produce high value-added products.

The survey also investigated the financial status of the industry, using a sample of 17 companies' accounts from firms operating mainly in the export field. Average profits were estimated at 5 percent of sales and 9 percent of capital employed, comparing quite favorably with the rest of Irish manufacturing industry. Overall the industry seemed to be in a sound financial position.

Considerable future development of the fish processing industry was planned in 1978. In that year, the Minister of Fisheries announced that 20 processing proposals were being considered by his department that comprised both the expansion plans of existing firms and establishment of new undertakings. They had a predicted capital investment of IR£5.7 million (1978 prices) and a potential for 610 extra jobs. The present depression has not helped these expansion plans and a number of them have had to be abandoned or deferred.

On the demand side, the structure of Irish and European fish markets is rapidly changing to a situation where fish is increasingly sold in branded and packaged forms. It will be increasingly difficult for the

small sized, limited line Irish processing industry to compete on this increasingly sophisticated market.

On the supply side the Irish catch remains small and irregular (particularly the white fish catch) making it difficult for the Irish industry to reach the level of efficiency of their EEC competitors. Thus, while processing may continue to expand, growth will probably be concentrated in primary processing activities supplying raw materials to be finished and marketed by foreign firms.

#### International Trade

Table 10 classifies Irish exports and imports by species and shipping form for 1972 and 1979. The total volume of imports has risen from 4,500 tons in 1972 to 8,440 tons in 1979, a rise of 88 percent. The main increase came in the prepared/preserved category. The cost of imports rose from IR£2.3 million in 1972 to IR£12.7 million in 1979, the largest part of this increase was accounted for by prepared or preserved fish which increased in value from IR£936,000 to IR£7.3 million.

In contrast to imports, total exports fell slightly in volume terms from 47,000 tons in 1972 to 46,000 tons in 1979. Most of this decline was in the category of smoked, dried and salted fish products because of the sharp fall in herring exports in this category. Despite this fall in volume, large increases in the prices of herring and salmon caused their total export value to increase from IR£7.76 million in 1972 to IR£32.5 million in 1979. In regard to the structure of exports it is noticeable that only a very small proportion were in the high value-added prepared/preserved category.

Table 11 looks at the composition of exports and imports and unit values for 1972 and 1979. The overall unit value of imports increased from IR£517 per ton in 1972 to IR£1,507 per ton in 1979 (i.e., an increase of 191 percent). However, in the same period the overall unit export values increased by 332 percent from 165 to 713. The lower overall unit values of exports in both periods reflects the underdeveloped nature of the Irish processing industry.

Table 10. Irish exports and imports of fish classified by species and form in which shipped, 1972 and 1979.

Description	Imports			Exports		
	1972	1979	1972	1979	1972	1979
	Tons			Tons		
	Tnf'000			Tnf'000		
<u>Fresh, chilled, frozen</u>						
Plaice	129	78	31	77	1,108	571
Herring	50	542	8	200	19,325	21,133
Cod	71	387	42	589	89	182
Salmon	11	159	12	525	92	72
Other	931	844	515	941	2,607	6,053
<u>Smoked</u>						
Cod, coley, tusk	1,187	1,371	313	1,517	26	74
Kippered herring	8	66	2	63	17,850	8,716
Other	161	9	72	30	458	1,881
<u>Dried or salted</u>						
<u>Prepared/preserved</u>						
Salmon	795	677	654	1,455	134	98
Sardines	311	307	13	377	179	303
Pillets, portions, etc.	39	3,217	130	5,128	2,446	1,948
Other	258	260	139	375	830	1,151
<u>Shellfish: fresh, frozen</u>						
Crawfish	n.a.	162	n.a.	622	667	265
Lobsters	n.a.	28	n.a.	84	351	351
Periwinkles	486	94	358	341	226	226
Mussels	19	94	26	262	43	43
Oysters					66	66
Other shellfish and preserves					153	350
<u>Prepared or preserved fish</u>						
Herring					667	2,242
Other					185	596
<u>Shellfish: prepared/preserved</u>					890	187
Total	4,946	8,440	2,324	12,723	47,049	45,557
					7,758	32,465

Source: Bord Iascaigh Mhara data and Trade Statistics of Ireland, December issues, Central Statistics Office, Dublin.

Note: \* less than 1,000 kilograms.

Table 11. Unit values and proportions of different categories of Irish imports and exports of fish, 1972 and 1979

Description	Percentage of total quantity		Unit value	
	1972	1979	1972	1979
	Percent		IR£/ton	
<u>Imports</u>				
<u>Wet Fish</u>				
Fresh, frozen, chilled	26.5	23.8	510	1,160
Smoked, salted, dried	31.0	18.9	284	1,098
Prepared/preserved	31.6	51.9	676	1,644
<u>Shellfish</u>				
Fresh, frozen, salted, dried	10.8	4.4	737	3,462
Total Imports	100.0	100.0	517	1,507
<u>Exports</u>				
<u>Wet Fish</u>				
Fresh, chilled, frozen	49.4	61.4	179	548
Smoked, dried, salted	39.0	23.4	89	670
Preserved/processed	9.4	1.7	721	1,258
<u>Shellfish</u>				
Fresh, frozen, salted	2.3	13.5	273	1,473
Total Exports	100.0	100.0	165	713

Source: Trade Statistics of Ireland, Dublin: Central Statistics Office.



### The Influence of International Trade on the Domestic Price of Fish

It is not possible to directly relate exports in any year to landings in that year. However, examining the export statistics (Table 10) and comparing them with landing figures (Table 1), it would seem that a very high proportion of the pelagic catch is exported, while nearly all of the white fish landed is consumed domestically.

There can be little doubt that price for species such as herring, salmon, lobsters, where most of the catch is exported, depends largely on the export market. However, for white fish, the influence of foreign prices is not so direct. It could be argued that the prices of white fish still remain closely linked with export prices. White fish can always, for example, be imported directly if domestic prices get out of alignment with world prices.

### Foreign Trade by Country of Origin

Volume and value of imports by country of origin are shown in Table 12. For 1979 Great Britain was the largest supplier of fish to Ireland, followed by Canada, Northern Ireland and Japan. In 1979 these four countries accounted for nearly 85 percent of the cost of Irish fish imports.

From Table 13 we can see that the Netherlands is the largest customer for Irish fish, importing 12,000 tons in 1979. Great Britain leads in terms of value. EEC countries account for almost all Irish exports.



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## THE NETHERLANDS

J.G.P. Smit

### Overview of Fisheries

#### Current Conditions of the Industry

Despite catch restrictions imposed over the past few years, the volume of Dutch landings has increased. The middle-water fleet<sup>1/</sup> has been the most affected by quotas, the 200 mile zone, and depleted fish stocks, with the primary change occurring in the composition of its catches. As revealed by Table 1, white fish continue to account for the bulk of the Dutch landings when measured in monetary terms. The most noticeable difference is in the herring and mackerel landings. The average value of the herring catch in 1973-1976 was 19 percent of the total landings while the mackerel catch averaged only 2 percent of the total. By 1979 these percentages had nearly reversed with the herring landings at 2 percent of the total value and mackerel accounting for 12 percent.

Of the three types of fisheries in Holland, the near-water and coastal fisheries did considerably better than either the middle-water fisheries or the fresh-water fisheries. Excluding the shrimp fishery, the coastal fleet showed a net gain of 28 million guilders in 1979. Its total landings were 135 million kg. as opposed to the 105 million kg. landed by the stern-trawler fleet.

In 1979, the coastal fleet consisted of 368 vessels with a total crew of 1,860 men. The shrimp fishery had 132 vessels with a crew of 320. Net earnings of the shrimp fishery were 0 in 1979.

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<sup>1/</sup>The Middle-water fleet is the same as the stern-trawler fleet. The expression middle-water fleet (fishing on the central and southern North Sea and around the British Isles, etc.) is used as a counterpart to the coastal fishery and the deep-water fishery (exploiting northern Atlantic and Arctic fishing grounds).

The fresh-water fishery had 120 vessels and employed 360 men. Its gross earnings in 1979 were 18 million guilders.

The other fishery industry which reported a net increase for 1979 was the mussel cultivation industry. An important industry in Holland, it employed a total crew of 275 men on 85 vessels and had net earnings of 12 million guilders.

### Major Ports

The four most important fresh-fish auctions are held at the ports of IJmuiden, Urk, Schevenigen and Den Helder (see Figure 1). Their 1978 total sales are, respectively, 105 million guilders, 69 million guilders, 47 million guilders and 37 million guilders.

All Dutch landings, except sea-frozen fish, are auctioned by a descending bidding system. Mackerel, horse mackerel and herring, which are frozen at sea, are marketed and distributed by integrated companies which can best be described as the "herring industry." These frozen products are landed and sorted at the ports of Scheveningen and IJmuiden.

The major ports for shrimp landings are Den Oever and Lauwersoog. Mussels are only landed at Yerseke.

### Wholesale Markets

In the Netherlands, there are a number of marketing channels for fish and fish products depending on the type of product and its destination. The primary channels are those for the herring industry, the industrial fish processing industry and two groups of traditional traders: one dealing with exports and the other with the domestic market. In 1976, the total sales of wholesalers and processors were 1,270 million guilders with 50 percent of these sales made by 6 percent of the companies.

The herring industry consists of the most developed and advanced group of wholesalers. At the time of abundant herring catches, these companies built up a high degree of integration. They are often involved in fishing operations and have direct connections with the retail market

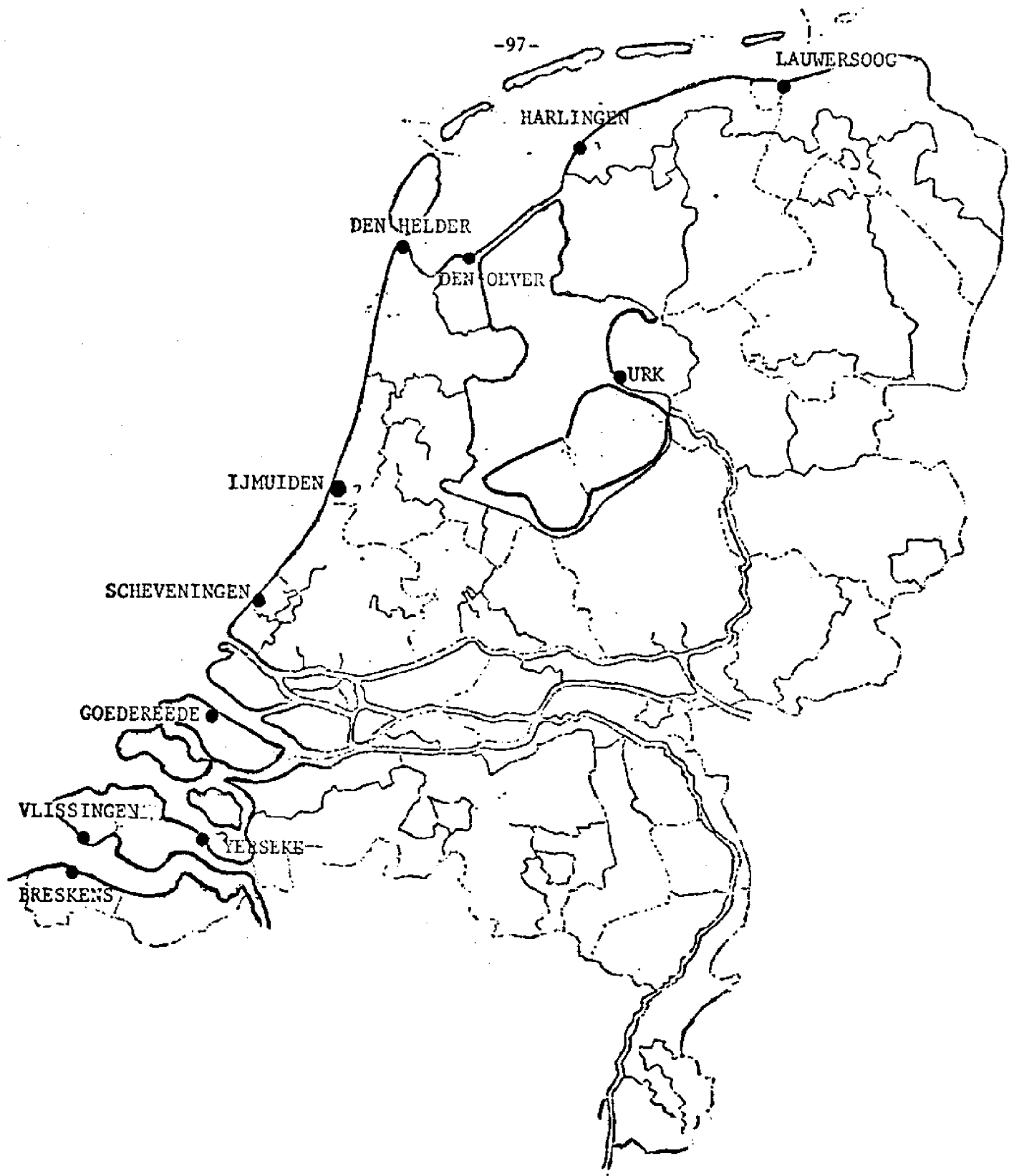


Figure 1. Major Fishing Ports in the Netherlands

as well. In recent years, concentration has diminished the number of companies to 10 and these have survived major upheavals in their industry. During the transition period from herring to mackerel, upon which the fleet now depends, the herring market was maintained at the old level as far as possible. Insufficient herring landings were supplemented to a large extent by imports from Denmark (29 million guilders in 1978) and Canada (19 million guilders) and to a smaller degree from the British Isles (9 million guilders) and Ireland (7 million guilders), when supplies were available.

The second market channel that should be mentioned is that of the traditional fish merchants. They make up a large group of merchants and have connections in all the wholesale markets from Denmark to France and the United Kingdom. Several of these men act partially as commissioned agents for fish processing companies even though they are not involved with any processing activities themselves. They simply buy the fish where it is cheap and sell it where they can get the best price.

Domestic wholesalers are very similar to the traditional fish merchants. However, they have different problems and characteristics since they have more direct connections with the retail market. That being the case, this market channel is characterized by rapid transmission of information. Occasionally, for instance when stormy weather results in poor landings, these inland wholesalers can cause a sharp rise in auction prices by bidding them up in an attempt to supply their customers.

The last group of wholesalers is made up of the industrial fish processing industry (except for the herring industry). This is a relatively new part of the Dutch fishery industry and consists of about 10 modern and expanding companies. Most of them specialize in filleting and deep-freezing flatfish for export markets (Italy). In 1978, some 60 percent of the Dutch plaice landings were processed and distributed in this way. The growth of this industry will lead to a further decline in the traditional fish trader's share of the market.

This group of companies is responsible for expanding the assortment of fish species offered for sale as well as introducing different

processing methods for some species in order to expand the number of products being offered.

It should also be mentioned that the Netherlands does not have public inland wholesale markets as in France (Rungis) and England (Billingsgate). The auction markets are the only direct meeting points for the various types of wholesalers. Inland retailers are supplied directly by these wholesalers who make delivery to them. In the coastal areas, retailers procure their merchandise from the wholesalers who set up their businesses in or near the auction hall.

#### Retail Market

Because of the structure of the retail market, fresh fish is the most important form for domestic consumption. Specialized fish shops have maintained their position despite the expanding supermarkets and the concentration tendencies in the food market. The process of decline in the retail industry has stopped in recent years and, due to large investments by a number of retailers, sales appear to be increasing.

Currently, the number of fish shops is 1,980, including 1,000 itinerant fish traders. The number of retail outlets displaying fish products is estimated to be 15,000. Supermarkets in the Netherlands do not deal with fresh fish products. The increasing numbers of itinerant traders is important to the Dutch retail fish industry. These traveling retailers are a primary outlet in inland areas where they appear at public markets or in small villages at fixed times. Figures 2 and 3 illustrate the distribution of white fish and herring, respectively, in the Netherlands.

The yearly per capita consumption of fish products in the Netherlands was estimated to be 12 kilograms in 1978. White fish, especially cod, plaice and haddock, accounted for 5.2 kg. The remainder included 1.7 kg of herring (down from 2.6 kg, in 1975), 3.3 kg. of shellfish, 1.6 kg. of canned fish, and 0.3 kg. of fresh water fish. As mentioned before, there is a strong preference for unprocessed fish. For example, consumption of fish sticks is still smaller than that of fresh or frozen haddock.



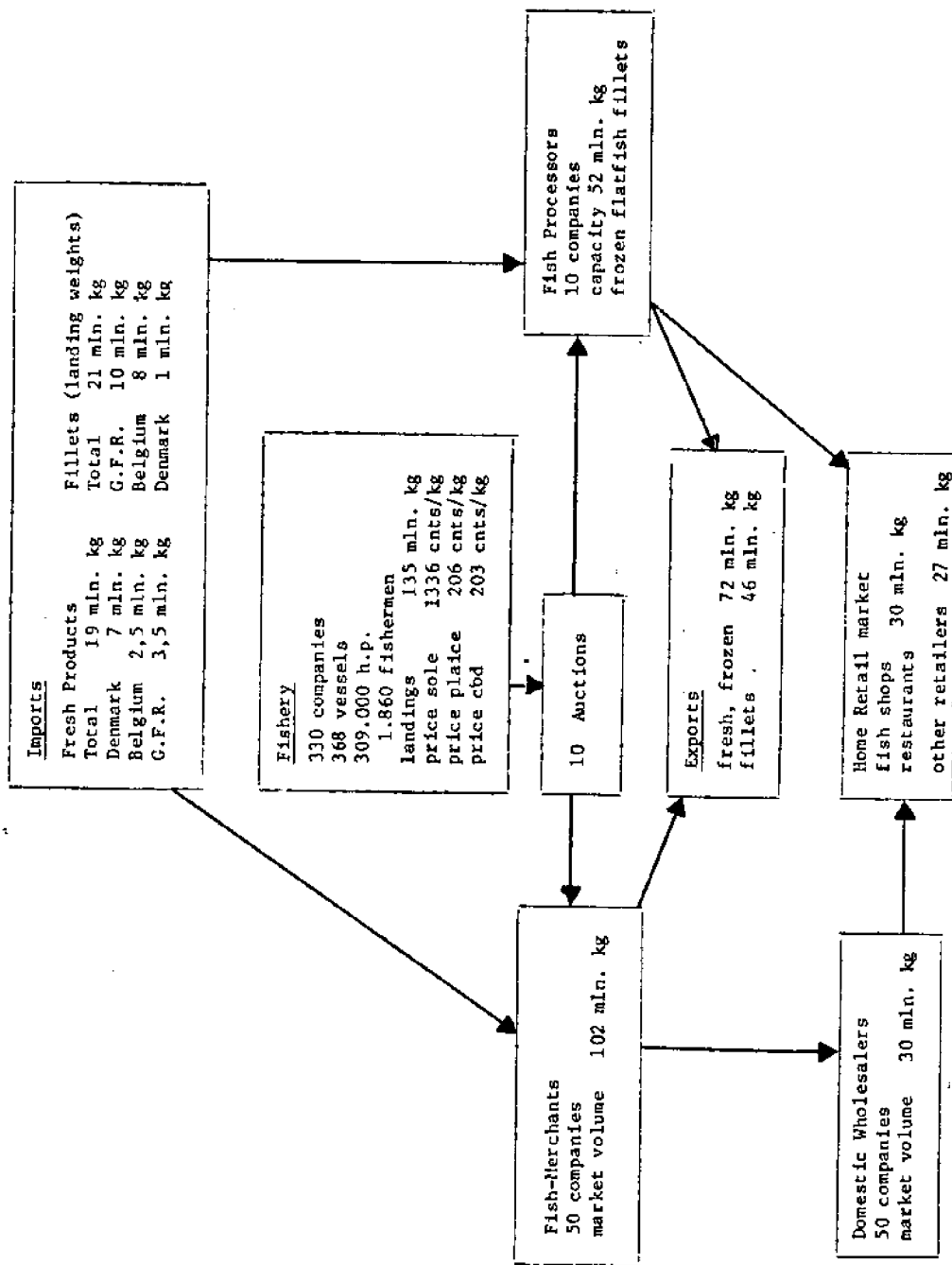


Figure 2. Diagram of the Dutch White Fish Market, 1979 (quantities in landing-weights).

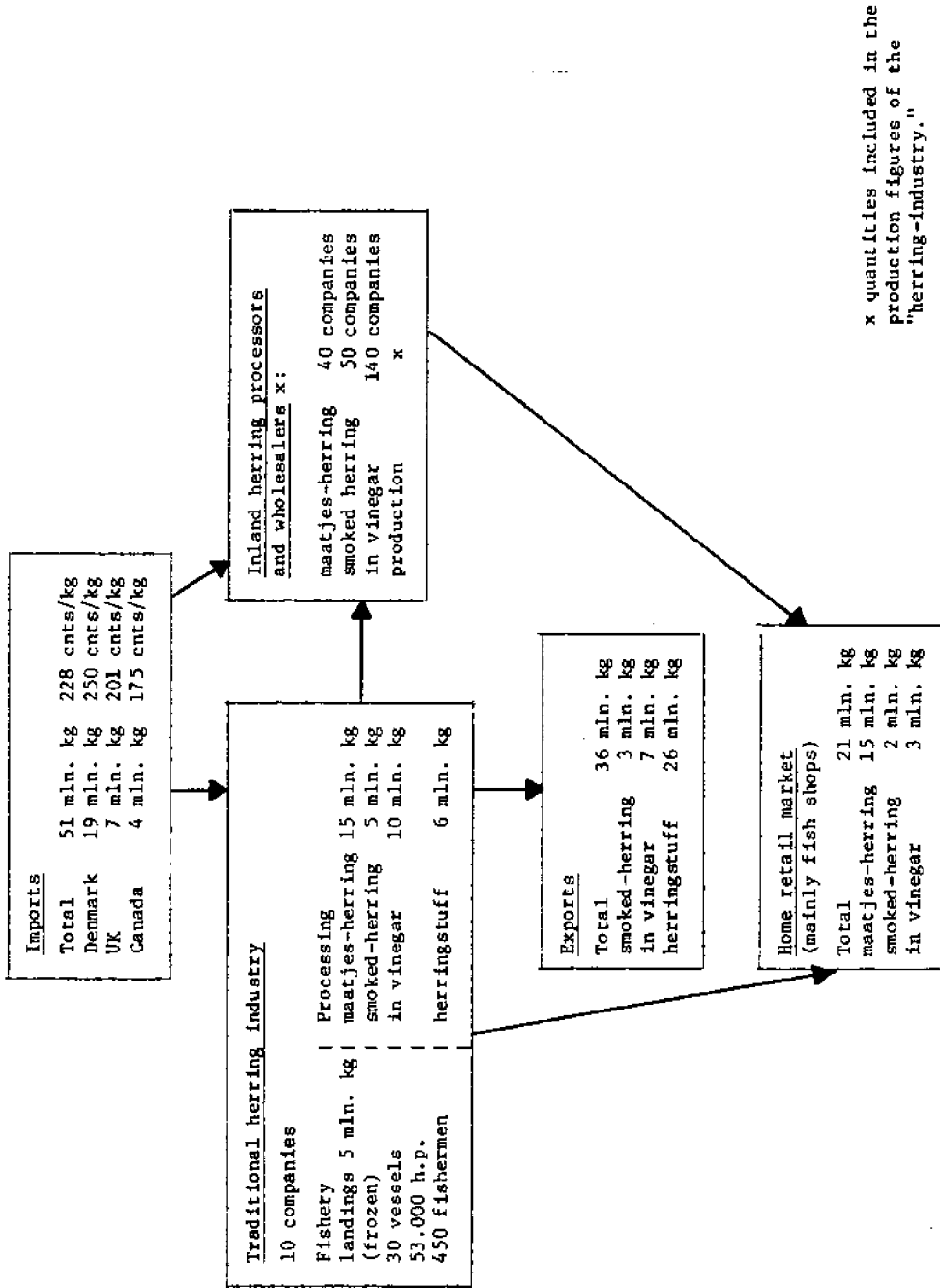


Figure 3. The Dutch Herring Market, 1979 (all quantities in landing-weights).

Other fresh fish products sold in fish shops are light salted herring, a number of more expensive flatfish species such as sole, turbot and brill, smoked fish and some shellfish such as shrimps and mussels. Increasing amounts of the fresh fish sold in fish shops are filleted or otherwise prepared by the fishmonger. These fishmongers also sell a significant amount of fried cod, whiting and plaice.

The frozen fish displayed in supermarkets and greengrocers are often retail-packed fillets of cod, haddock and saithe. Fish sticks are also usually available. It should be noted that almost all of these products are imported from the Federal Republic of Germany (in 1978 imports totaled 13 million guilders) since the Netherlands has never had a deep-water fishing industry like the Humber area in the United Kingdom or Bremerhaven/Cuxhaven in West Germany. For this reason there is no domestic processing of frozen fish blocks.

#### Public Policy

In order to meet the EEC fishery quotas, restrictions are implemented through closed seasons for the middle-water fisheries and by annual vessel quotas for the coastal fleet's flatfish fishery. The shrimp and fresh-water fisheries and mussel cultivation are controlled by national license systems.

The auction markets for herring, plaice, cod, haddock, whiting, saithe and shrimp adhere to the EEC withdrawal system order. Fish that cannot be sold at a set minimum price must not be sold for human consumption. In Holland, the level of common withdrawal prices as set by EEC agreement happens to be in accordance with market prices.

Health standards for the fishery industry are set by national legislation (warenwet) and conform to standards operative in countries to which Holland exports fish. Controls are set by the Haring Controle Dienst, or H.C.D., a department of the Ministry of Agriculture, Keuringsdienst van Waren, a department of the Ministry of Public Health.

Additional legislation in the field of fisheries, landings and processing may be enacted by the Commodity Board of Fisheries (Produktschap voor Vis en Visprodukten). Quality and health certificates can be obtained from the H.C.D., 2 Zeesluisweg 6, Den Haag.

Table 1. Sea and coastal fisheries; value of landings (million guilders) 1973-1979.

	<u>Average</u> <u>1973/76</u>	<u>1978</u>	<u>1979</u>
White Fish	294	372	404
Herring	77	26	11
Mackerel	7	40	60
Shrimps	20	19	16

Table 2. The mid-water fleet as at 1979.

Number of vessels	30
Total horsepower	53 000 hp
Crew	450 men
Landings	105 mln kg
Gross earnings	93 mln guilders
Costs (excl. wages)	63 mln guilders
Income (excl. interest)	30 mln guilders
Wages	31 mln guilders
Net result	- 1 mln guilders

Table 3. The coastal fleet as at 1979 (excl. shrimpfishery)

Number of vessels	368
Total horsepower	309 000 hp
Crew	1,860 men
Landings	135 mln kg
Gross earnings	404 mln guilders
Costs (excl. wages)	244 mln guilders
Income (excl. interest)	160 mln guilders
Wages	132 mln guilders
Net result	28 mln guilders

Table 4. Shrimpfisheries as at 1979

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Number of vessels	132
Total horsepower	23 000 hp
Crew	320 men
Landings	6 mln kg
Gross earnings	16 mln guilders
Costs	9 mln guilders
Income (excl. interest)	
Wages	7 mln guilders
Net result	0 mln guilders

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Table 5. Mussel industry as at 1979

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Number of vessels	85
Total horsepower	23 000 hp
Crew	275 men
Landings	100 mln kg
Gross earnings	50 mln guilders
Costs	30 mln guilders
Income	20 mln guilders
Wages	8 mln guilders
Net result	12 mln guilders

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Table 6. Other shellfish activities (cockles and oysters)

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Number of vessels	36
Crew	100 men

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Table 7. Freshwater fisheries

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Number of vessels	120
Crew	360 men
Gross earnings	18 mln guilders

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AVAILABLE INFORMATION

Detailed costs/earnings studies are available for the middle water fleet, the coastal fleet, shrimp fisheries and mussel cultivation. This research is based on a permanent documentation system (about 30 percent of the vessels). Publications include the following:

- Visserij in Cijfers (most recent year 1980). Contains provisional figures of the Dutch fishery.
- Bedrijfsresultaten van de Grote Zeevisserij (1978 and 1979), final results of the middle water fishery.
- Bedrijfsresultaten van de Kleine Zeevisserij (1978 and 1979), final results of the naerwater and coastal fishery.
- Bedrijfsresultaten van de Garnalenvisserij (1979), final results of the shrimp fishery (crangon crangon).
- Bedrijfsresultaten Mosselkwekerijen (1977/1978), final results of the mussel cultivation.
- Financiële positie van de Kottervisserij (1978), ways and means of the coastal fishery.

Marketprofiles are available for shrimps and mussels (*mytilus edulis*). Contents: pricing systems, withdrawal systems, types of market participants, simple price/demand relationships, market structure. Publication: - Marktverkenning Mosselen (LEI-Rapport No. 5.60)  
- Marktprofiel Garnalen (LEI-Med. 232)

Addresses

Ministry of Agriculture and Fisheries, Directorate of Fisheries.  
P.O. Box 20401  
2500 EK DEN HAAG

Domestic Production

Visserijhuis P.O. Box 5016  
2508 AA DEN HAAG

Commodity Board

Produktschap voor Vis en Visprodukten, Javastraat 2B  
2585 AM DEN HAAG

Export-Certificates

Haring Controle Dienst,

2 Zeesluisweg 6,  
DEN HAAG

Economic Research

LEI (Agricultural economic research institute)

P.O. Box 29703  
2502 LS DEN HAAG

Mussel Cultivation and mussel processing

Mosselkantoor,

Stationsstraat 17  
4611 CB BERGEN OP ZOOM

Herringmarket

Nederlandse Redersvereniging

P.O. Box 5016  
2508 AA DEN HAAG

Flatfish export

Nederlandse Vereniging voor Diepvriesvisindustriën

P.O. Box 177  
LEIDEN



## THE UNITED STATES

James R. Wilson

### Overview of Fisheries

#### Domestic Production

The U.S. fishing industry consists of firms which concentrate on industrial fish production as well as those which concentrate on food fish production. Industrial fish production is directed primarily at menhaden, which, in 1979, accounted for over 41 percent of the total landings by weight (Table 1). Preliminary estimates indicate that the 1980 U.S. menhaden catch totaled 2.6 billion pounds valued at \$109.4 million (Current Fishery Statistics, 1980). Most of this catch was reduced to meal, solubles and oil, which is used to feed livestock or produce pet food.

Production in the food fish industry is based on a large number of different species. The most important of these in terms of volume and value, are listed in Table 1.

In terms of value the four most important seafood species groups have been salmon, tuna, shrimp, and crab. Except for shrimp, each group's ranking in terms of value changed between 1977 and 1979. Shrimp remained the number one cash harvest despite a decline in harvest volume in 1979.

A number of different species of shrimp are harvested off the U.S. coast. Catch areas include the temperate zone of the Gulf of Mexico and the Atlantic, the tropical zone of the Gulf, Caribbean and off Mexico, the north Atlantic and along the Pacific Coast from California to the Aleutians.

The 1979 decline in the U.S. shrimp landings has been partially attributed to the oil spill off Campeche Bank in Mexico. During the summer of 1979, the spill threatened the Gulf Coast fishery along the Texas Coast (Current Fisheries Statistics, 1980). In addition, Alaska,

Table 1. Some major fish and shellfish landings and total value, 1977-1979.

Species	1977 Landings (1,000 lb)	1977 Value (1,000 \$)	1978 Landings (1,000 lb)	1978 Value (1,000 \$)	1979 Landings (1,000 lb)	1979 Value (1,000 \$)
<b>Alwives</b>						
Atlantic and Gulf	13,816	627	12,696	556	9,691	639
Great Lakes	39,246	609	42,279	702	23,871	501
Total	53,062	1,036	54,975	1,258	33,562	1,140
<b>Anchovies</b>	231,932	17,683	35,380	5,545	117,403	9,895
<b>Cod</b>						
Atlantic	75,533	17,095	86,737	21,516	99,352	28,632
Pacific	10,948	1,781	10,710	2,258	12,382	2,639
Total	86,481	18,876	97,447	23,774	111,734	31,271
<b>Flounders</b>						
Atlantic and Gulf						
Blueback	34,932	12,542	25,300	10,990	24,810	9,868
Fluke	19,562	10,170	18,692	11,790	30,721	15,977
Yellowtail	36,457	17,092	25,372	15,165	35,246	17,679
Other	26,180	9,988	48,746	21,433	50,254	22,386
Pacific	52,472	9,685	62,810	13,384	68,257	16,835
Total	169,603	59,477	180,720	72,762	209,288	62,745
<b>Haddock</b>	28,430	9,270	39,488	12,669	41,882	17,705
<b>Heke</b>						
Pacific (Whiting)	3,600	70	7,267	188	30,750	2,057
Red	3,866	349	4,841	538	7,040	953
White	10,894	1,394	10,909	1,697	8,881	1,470
Total	18,360	1,813	23,017	2,423	46,671	4,480
<b>Hallibut</b>	17,688	17,340	17,677	18,527	21,385	34,618
<b>Sea Herring</b>						
Atlantic	111,612	4,967	111,310	6,724	143,372	8,395
Pacific	44,235	6,642	43,087	10,505	65,658	38,351
Total	155,847	11,609	154,397	17,229	209,030	46,746
<b>Jack Mackerel</b>	110,246	5,512	68,000	3,740	35,150	2,525

Table 1. Some major fish and shellfish landings and total value, 1977-1979 (continued)

Species	1977 Landings (1,000 lb)	1977 Value (1,000 \$)	1978 Landings (1,000 lb)	1978 Value (1,000 \$)	1979 Landings (1,000 lb)	1979 Value (1,000 \$)
Mackerel						
Atlantic	1,003	525	3,558	776	4,463	1,059
King	8,460	3,654	5,528	3,505	4,859	3,503
Pacific	10,246	512	24,563	1,351	59,005	4,208
Spanish	12,021	2,559	7,297	1,367	6,450	1,431
Total	33,730	7,250	40,946	6,999	74,777	10,201
Menhaden						
Atlantic	809,641	28,374	786,466	20,233	886,238	36,004
Gulf	986,474	39,155	1,808,547	78,039	1,718,243	73,426
Total	1,796,115	68,129	2,595,013	98,272	2,604,481	109,431
Rockfish	43,512	7,462	59,409	12,760	68,010	15,285
Sablefish	25,376	4,747	29,188	8,337	48,441	14,827
Salmon, Pacific						
Chinook (King)	32,676	44,961	29,776	39,828	33,008	57,270
Chum (Keto)	57,398	24,103	50,485	30,885	45,784	26,363
Pink	125,644	50,790	194,873	64,496	226,830	92,059
Red (Sockeye)	89,932	69,806	98,707	82,978	190,727	180,404
Silver (Coho)	29,992	32,201	30,648	36,350	39,767	56,680
Total	335,642	221,863	404,489	254,537	536,116	412,776
Tuna						
Albacore	31,687	18,598	37,308	22,598	15,418	9,972
Bigeye	1,280	1,046	1,283	630	2,934	2,301
Bluefin	16,969	6,602	13,690	6,853	14,897	8,800
Little	115	27	150	70	126	56
Skipjack	91,403	33,006	151,596	60,980	120,104	44,876
Yellowfin	202,834	76,393	203,594	85,665	210,227	92,294
Unclassified	941	113	1,257	153	770	88
Total	345,229	135,785	408,878	176,969	364,476	158,387

Table 1. Some major fish and shellfish landings and total value, 1977-1979 (continued).

Species	1977 Landings (1,000 lb)	1977 Value (1,000 \$)	1978 Landings (1,000 lb)	1978 Value (1,000 \$)	1979 Landings (1,000 lb)	1979 Value (1,000 \$)
Clams						
Hard	15,433	28,234	13,295	29,738	12,058	33,720
Ocean Quahog	18,549	5,524	22,965	6,707	34,724	10,233
Soft	10,683	14,009	10,091	13,486	8,585	13,776
Surf	51,036	26,442	39,237	20,901	34,912	19,273
Other	459	74	2,123	3,299	1,771	2,203
Total	96,160	74,283	87,711	74,131	92,050	79,205
Crab						
Blue, Hard	128,860	27,454	138,230	28,180	152,830	31,424
Dungeness	60,375	25,790	39,231	28,448	38,690	31,019
King	99,449	111,742	130,238	168,066	154,589	148,550
Snow (Tanner)	98,329	30,823	129,306	52,556	131,393	64,834
Other	11,526	6,698	11,917	7,782	11,682	8,416
Total	398,539	202,507	449,142	285,032	489,184	284,243
Lobster						
American	31,708	57,715	34,419	64,645	37,184	72,298
Spiny	5,483	9,607	4,629	9,709	6,301	12,765
Total	37,191	67,322	39,048	74,354	43,485	85,063
Oysters	46,026	52,537	50,983	60,897	48,081	65,612
Scallops						
Bay	1,703	4,426	1,371	4,166	1,774	6,798
Calico	1,111	1,026	948	1,301	863	1,846
Sea	25,012	40,548	30,976	76,346	31,466	103,206
Total	27,826	46,000	33,295	81,813	34,103	111,850
Shrimp						
New England	840	459	7	1	1,072	338
South Atlantic	17,997	24,852	20,138	30,878	32,295	65,273
Gulf	265,903	296,785	248,327	319,590	206,564	377,642
Pacific	191,905	33,031	154,403	35,017	96,019	28,300
Other	9	31	6	21	6	20
Total	476,654	355,158	422,881	385,507	335,956	471,573

Source: Fisheries of the United States, 1978 and 1979.

a major producer of cocktail-size shrimp, has experienced a series of unexplained depletions of the resource which cannot be completely attributed to overfishing.

The crab fishery, ranked third in terms of value in 1977, experienced an explosive growth in 1978, becoming second in total value terms. Increases in landings during 1979 decreased the total value, thus moving crab back to third place, after salmon. Although the Blue crab fishery on the Atlantic Coast also experienced moderate increases in landings and value since 1977, the major source of increased landings came from Alaska. The Alaskan king crab fishery and the Tanner crab fishery have both experienced explosive growth trends because of a large number of entrants into these fisheries. In contrast, total landings of Dungeness crab have decreased, even though there has been an increase in total harvest value.

The tuna species group was fourth in both landings and value in 1979, and has been fourth in terms of value since 1977. International agreements maintain this fishery in a well-developed and highly regulated state. Because the major tuna species identified in Table 1 are distributed throughout the tropical and temperate region of the Pacific, Atlantic, and Indian Oceans, most tuna fishing is done outside the U.S. management zone. One would expect the U.S. harvest of tuna to remain at present levels of exploitation or decline slightly as more nations exclude American fishermen from their national resource zones.

The salmon industry of the West Coast uses five different species of salmon in a variety of production processes: chinook or king, red or sockeye, pink, silver or coho, and chum. In many cases not only the species of salmon but the size and condition of the fish determine the method of processing and marketing. Although all five species of salmon have relatively well-defined markets, there are marked differences in texture and color which set these species apart from the Atlantic

salmon (salmo salar). It has been reported that Atlantic salmon are preferred to the Pacific varieties in some European countries.<sup>1/</sup>

#### Ex-Vessel Prices and Pricing System

Ex-vessel price determination in the United States has traditionally taken the following forms:

1. Direct negotiations between individual fishermen and processors before or during a season.
2. Negotiations between fishermen's groups and processors prior to a season.
3. Auctions
4. Contractual arrangements with fishermen's cooperatives.

Direct negotiations between individual fishermen and processors are common in areas where processors are not close together, where the species is highly valued or when the fishing operation is very new. Fishermen may also obtain "outside benefits," such as free ice, tendering service, transportation while in port, emergency parts service and seasonal bonus payments, which may not be reflected in the ex-vessel price. These benefits may not be directly connected to the ex-vessel price and may involve only a verbal agreement between the fisherman and the processor. More formal agreements, such as forward contracts, may more clearly specify the ex-vessel conditions for transferring the fish.

In certain cases, where well-organized fishermen groups face strong buying groups, both fishermen and buyers negotiate directly. This method of price negotiation is more common in Alaska and along the West Coast than on the East Coast. Because fishermen are independent entrepreneurs and unable to form unions to bargain collectively, special allowances in U.S. antitrust laws have recently been made enabling fishermen to form "marketing associations." Despite their name, most of these associations

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<sup>1/</sup> Oregon State University, Department of Agricultural and Resource Economics, 1978. Socio-Economics of the Idaho, Washington, Oregon and California Coho and Chinook Salmon Industry, final report to the Pacific Fishery Management Council, Vol. B., Corvallis, Oregon.

are primarily concerned with pre-season bargaining for a price on the future landings and are sometimes called bargaining cooperatives.

Auctions are more common in the northeastern United States, in large ports on the Gulf Coast and in California and Hawaii where buyers and sellers are more highly concentrated. The types of auctions common in the United States have been described by Nichols, et al. (1980) as "hands-on" and "hands-off" auctions. In the former situation the buyer inspects or selects the fish he wishes to buy prior to the auction, while in the other type, lots are sold without inspection. One of the more well known "hands-on" auctions is the Honolulu fish auction, which deals primarily in tuna.

"Hands-on" auctions are especially suited to the marketing of fish which has a great degree of variability in quality and must meet exacting qualifications for a specific consumer group. In Honolulu, where a large amount of the fish may be purchased for raw consumption by the local Oriental population, pre-purchase inspection is a necessity.

"Hands-off" auctions, although common in many agricultural commodities in the United States, are not prevalent in the fishing industry. There are, however, two auctions of this type cited by Nichols; a telephone bidding system for shrimp in Brownsville, Texas and a pre-trip tuna auction in California. In both cases "hands-off" bidding can be done because most product forms of shrimp and tuna destined for cans have standard, well-defined, physical characteristics. In addition, shrimp-fishing traditions on the Gulf Coast rigidly dictate methods of on-board handling.

The Capper-Volstead and the Fishery Cooperative Marketing Acts are the two pieces of legislation permitting farmers and fishermen to unite in order to sell their products under mutually agreeable conditions without violating anti-trust laws. As of 1979 there were 102 cooperatives in operation in the United States and possessions. Of these, 41 described themselves as marketing and purchasing cooperatives while 27 were described as marketing cooperatives only. Thirty-four of the cooperatives had some other primary function. These cooperatives must operate under

certain strict requirements. Fifty percent of all their transactions must be with members and each member must have one vote. Co-op dividends cannot exceed 8 percent per annum. The National Marine Fisheries Service conducts yearly investigations to assure that cooperatives are complying with existing laws.

Tables 2 and 3 give some ex-vessel prices for major fish and shellfish groups caught by the United States since 1970, unadjusted for inflation. It should be noted that the most dramatic increases in prices appear to be in albacore tuna and shrimp, as well as scallops and lobsters.

#### Domestic Fleet

Although there is wide variability in the size and gear versatility of vessels in the United States, some generalizations can be made. Two principal types of gear used are the trawl and the purse seine. Various modifications of these basic gear designs are applied to a number of fisheries.

Trawl vessels, or draggers, are common on all coasts but are most widely used in the northeastern United States and in the Gulf of Mexico. The U.S. dragger is not nearly as large as vessels used by other major fishing nations because most dragging occurs in areas close to U.S. ports. One notable exception is the larger shrimp vessels which fish off Mexico, around Campeche Banks. Large, factory stern-trawler operations do not seem to be well suited to the economic structure of U.S. fisheries nor to the U.S. mariners conception of a "realistic" time at sea. Furthermore, there appears to be little reason for a large factory stern-trawler fleet, since there is currently little incentive to develop far-offshore fisheries with this gear type.

The invention of power-block systems for purse-seine net retrieval has moved purse-seining from a relatively primitive, back-breaking catching method to an extremely efficient and versatile form of fishing for surface-schooling fishes. Purse seines are common in the menhaden, herring/sprat, tuna and salmon fisheries. A closely related gear type,



Table 2. Ex-vessel prices of major fin-fish commodities, 1970-1979.

Year	Cod <sup>1/</sup>	Flounder <sup>1/</sup>	Haddock <sup>1/</sup>	Ocean Perch <sup>1/</sup>	"Sardines" <sup>2/</sup> (Sea Herring)	Tuna <sup>3/</sup> Albacore	Tuna <sup>3/</sup> Bluefin	Tuna <sup>3/</sup> Skipjack	Tuna <sup>3/</sup> Yellowfin
----- Cents Per Pound -----									
1970	13.6	15.0	28.1	5.0	1.8	550	353	317	367
1971	15.3	16.2	32.4	5.1	2.3	630	400	370	418
1972	22.1	19.1	43.1	5.8	3.1	680	422	405	442
1973	20.7	23.2	40.4	8.1	3.1	830	461	431	581
1974	21.5	27.1	39.0	8.2	3.6	820	555	544	575
1975	25.6	37.2	36.1	10.5	3.7	675	480	471	523
1976	26.8	41.0	43.6	13.7	4.3	864	577	553	590
1977	22.9	46.9	32.4	15.3	4.9	1,099	790	707	757
1978	25.1	61.1	32.0	17.1	5.7	1,200	819	788	839
1979	30.3	51.2	61.9	20.7	5.1	1,285	889	792	890

Year	Chinook Salmon <sup>4/</sup> Troll Caught	Chinook Salmon <sup>4/</sup> Other Gear	Coho Salmon <sup>4/</sup> Troll Caught	Coho Salmon <sup>4/</sup> Other Gear	Red Salmon <sup>4/</sup>	Pink Salmon <sup>4/</sup>	Chum Salmon <sup>4/</sup>
----- Cents Per Pound -----							
1970	81	21	53	25	25	13	12
1971	67	24	34	22	26	16	14
1972	69	25	61	32	31	18	18
1973	112	66	100	61	44	32	39
1974	101	51	82	56	69	35	38
1975	99	48	80	55	45	32	34
1976	152	66	136	68	61	34	39
1977							
1978							
1979							

Source: National Marine Fisheries Service; Alaska Department of Fish and Game.

<sup>1/</sup> Weighted annual average at major New England ports.

<sup>2/</sup> Maine landings.

<sup>3/</sup> Midpoints of price ranges received from California canners.

<sup>4/</sup> Ex-vessel prices averaged over all Alaskan ports.

Table 3. Ex-Vessel Prices of Major Shellfish Commodities, 1970-1979.

Year	Blue Crab (Hard)	King/ Crab <sup>1/</sup>	Tanner/ Crab <sup>1/</sup>	Shrimp <sup>2/</sup> (South Atlantic & Gulf)	Shrimp <sup>3/</sup> (Alaska)	Sea <sup>4/</sup> Scallops	American Lobster <sup>5/</sup>
----- Cents Per Pound -----							
1970		25.3	9.8	84	4.01	137	98
1971		27.0	10.6	104	4.12	149	107
1972	9.0	29.4	12.4	126	5.36	201	137
1973	13.7	58.2	17.4	168	3.30	187	148
1974	11.9	40.9	20.4	135	10.20	152	157
1975	17.3	39.2	15.0	231	7.99	229	189
1976	22.7	64.9	20.0	258	8.99	184	195
1977	26.0			208		166	213
1978	22.1			265		253	225
1979	21.2			387		342	224

Source: National Marine Fisheries Service; Alaska Department of Fish and Game.

- <sup>1/</sup> Ex-vessel prices averaged over all Alaskan ports.
- <sup>2/</sup> Headless, raw shrimp, prices averaged over size grades.
- <sup>3/</sup> Average overall species and sizes, head on.
- <sup>4/</sup> Weighted average at New Bedford, Massachusetts.
- <sup>5/</sup> Average over Maine price.
- <sup>6/</sup> Simple average over nine months.

the Lampara net, is commonly used for catching squid and surface-schooling fish in California. Some of the largest purse-seines in the world are found in the Southern California tuna fleets.

Long-line and pot-fishing vessels are also common in the United States. Pots are used for taking lobster in the New England states and southern Florida and California, crab in the Atlantic Gulf and Pacific states and Alaska, shrimp in the Pacific states and Alaska, and sable fish and octopods in the Pacific Northwest.

Longline fishing has recently been "rediscovered" as an effective method of taking certain high-valued species of fish. Considerable research both in this country and in Norway for example has been done on reducing the labor costs involved in handling traditional "skate" gear, and results using various automatic retrieval setting and baiting systems have been promising.

The foregoing discussion on gear should not suggest that vessels are currently being built around the use of one type of gear. In the past, some fishermen have been reluctant to fish multiple seasons for different species and use different types of gear. However, modern fishing technology and the costs of capital require that considerable versatility be built into new vessels. Therefore, one is more likely to find modern fishermen choosing longer work seasons and more versatile vessels.

#### Major Ports

Figure 1 and Table 4 describe the 50 major ports in terms of catch value for 1979. A ranking by volume landed is also shown in Table 4. An interesting aspect of the top 10 U.S. ports is their small size compared to their surrounding cities. For instance, several maps do not show the port of Bayou LeBatre (ranked 9th, but not found on any map consulted) or Dulac-Chauvin, both major Louisiana ports.

In terms of pounds landed, Louisiana has an important port at Cameron. In fact, three of the 10 highest producing ports in terms of

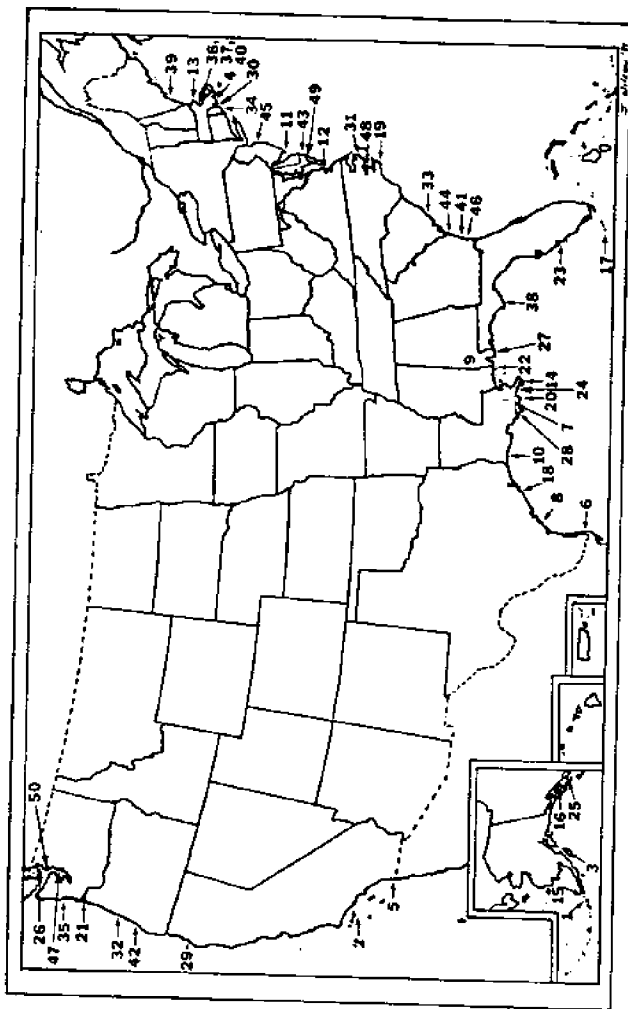


Figure 1. The Location and Rank in Terms of Value Landed of the 50 Major Fishing Ports of the United States.

Table 4. Major Ports of the U.S., 1979, with ranking in terms of value and poundage landed

	Ranking by Value of Landings	Value of Landings	Ranking by Quantity Landed	Quantity Landed
Dutch Harbor, AK	1	92.7	10	136.8
San Pedro, CA	2	89.3	2	378.2
Kodiak, AK	3	73.4	9	150.5
New Bedford, MA	4	67.4	11	86.0
San Diego, CA	5	62.7	8	156.6
Brownsville, Port Isabel, TX	6	50.0	29	246.3
Dulac Chauvin, LA	7	41.5	5	19.0
Aransas Pass - Rockport, TX	8	40.0	33	21.8
Bayou La Batre, LA	9	34.9	30	593.1
Cameron, LA	10	34.3	1	58.3
Cape May - Wildwood, NJ	11	32.2	13	27.2
Hampton - Norfolk, VA	12	31.1	24	160.2
Gloucester, MA	13	29.7	7	278.9
Empire Venice, LA	14	28.8	4	38.2
Akutan, AK	15	28.2	18	34.8
Petersburg, AK	16	26.0	20	16.5
Key West, FL	17	25.9	36	8.0
Freeport, TX	18	25.0	50	218.5
Beaufort Morehead City, NC	19	22.7	6	15.6
Golden Meadow - Leeville, LA	20	22.5	39	40.4
Astoria, OR	21	18.2	16	283.8
Pascagoula - Moss Point, MS	22	18.1	3	15.9
Fort Myers, FL	23	17.8	38	10.4
Lafitte - Barataria, LA	24	16.6	44	22.1
Ketchikan, AK	25	16.4	28	40.0
Bellingham, WA	26	16.3	17	-
Ron Secour - Gulf Shores, AL	27	16.0	-	-
Delcambre, LA	28	14.8	-	-
Eureka, CA	29	14.3	22	32.1
Newport, RI	30	13.2	31	21.6
Wanchese - Stumpy Point, NC	31	13.0	21	34.6
Newport, OR	32	12.6	19	36.0
Charleston - Mt. Pleasant, SC	33	12.5	49	8.1
Point Judith, RI	34	11.0	14	54.3
Westport, WA	35	10.8	25	25.0
Boston, MA	36	10.7	23	30.3
Provincetown, MA	37	10.3	27	23.4
Apalachicola, FL	38	10.1	45	10.4
Portland, ME	39	10.1	12	59.6
Sandwich, MA	40	9.8	35	17.5
Darien - Bellville, GA	41	8.7	48	9.0
Charleston - Coos Bay, OR	42	8.2	26	23.5
Ocean City, MD	43	8.2	34	18.4
Thunderbolt, GA	44	8.1	-	-
Point Pleasant, NJ	45	6.8	40	12.8
Brunswick, GA	46	6.7	-	-
Seattle, WA	47	6.6	37	16.5
Oriental - Vandemere, NC	48	6.6	32	19.5
Chincoteague, VA	49	6.5	41	12.3
Anacortes - La Conner, WA	50	6.4	42	12.0

Source: Fisheries of the United States, 1979.

poundage are in Louisiana. In terms of value, Louisiana, Texas, Alaska and California dominate the top 10 with New Bedford, Massachusetts, in the number four position.

### Markets for Seafood

#### Characteristics of Domestic Markets

The U.S. annual per capita consumption of seafood has fluctuated between 7.9 lbs. per year (1943) and 13.5 lbs. per year (1978). Since 1960, consumption appears to have increased in all product forms except cured. In general, the U.S. consumption of seafood is about 37 percent less than the average of all developed countries. U.S. consumption is almost twice that of the underdeveloped countries, however (Combs, 1978).

One explanation for the low level of U.S. fish consumption is the amount of other meat products produced. The United States has long been a world leader in the production of beef and poultry. A study by Gillespie and Loomis (1977), conducted in Texas, showed that seafood, of all product forms listed, was least often prepared at home, and consequently, was not bought as often as beef and poultry.

However, even though Americans do not cook fish at home as often as other meat items, they do tend to order it in restaurants. Therefore, it is reasonable to expect that consumption of seafood would rise and fall in response to real income levels, assuming that restaurant dining increases as personal income increases.

Figure 2 depicts the time trend from 1960 to 1979 of the per capita consumption of fish as a total and in the three major product forms. The rise in total consumption can largely be attributed to the increased consumption of fresh and frozen products. This pattern can be traced to two developments in the market for seafood.

First, there has been an increase in the availability of fresh and frozen fillets, sticks, and other easy-to-prepare portions in grocery stores. Second, the number of restaurants and especially, "fast food"

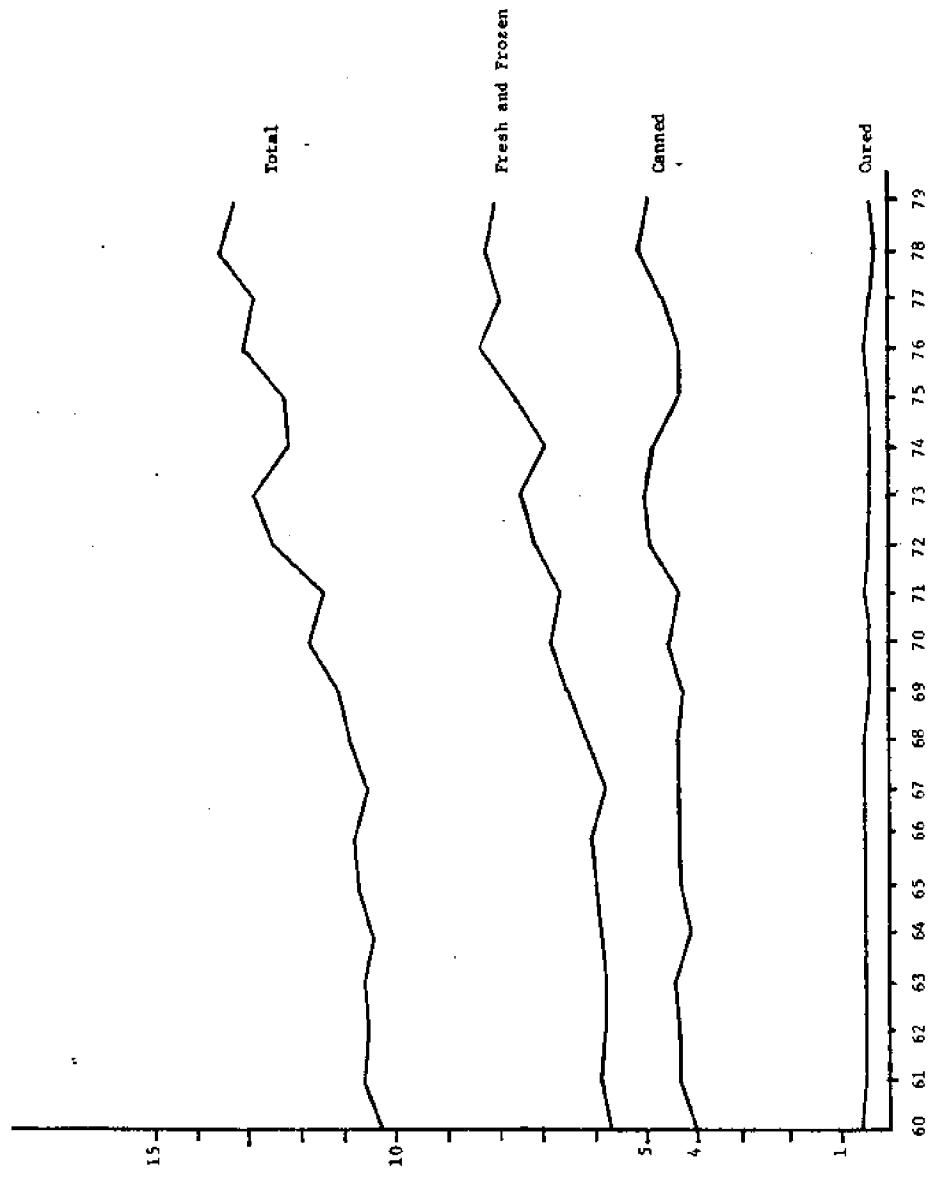


Figure 2. U.S. Annual Per Capita Consumption of Commercial Fish and Shellfish.  
Source: National Marine Fisheries Service; Fisheries of the United States, 1979.

restaurants specializing in fish preparations has increased. These fast food and family restaurants have the ability to affect consumption of certain target seafoods through advertising.

Table 5, showing per capita consumption of three major groups within the general category of "fresh and frozen products," gives further evidence of the trend towards sticks and portions in U.S. markets. While per capita consumption of fillets and steaks increased about 60 percent between 1960 and 1979, consumption of sticks and portions increased steadily from .63 pounds per year to 2.15 pounds per year, an increase of over 240 percent.

Figure 2 also shows the per capita consumption of canned seafood from 1960 to 1979. For this product form, consumption peaked in 1978. Much of the increase in canned seafood consumption can be attributed to the consumption of canned tuna (Table 6). There was also a slight increase in the consumption of canned salmon.

Cured seafoods have shown a dramatic decrease in consumption since 1909. This probably reflects a major shift in consumer tastes. Consumption of cured products has, however, remained relatively constant in recent years. Although data are not readily available, it is suspected that there is a limited, but very strong, market for items such as lox, roll-mops, pickled herring, and other smoked and pickled preparations. These highly specialized consumption patterns may be associated with the existence of ethnic groups within the United States who create a relatively stable demand for these products.

Tables 7, 8, and 9 show wholesale and retail prices for different species of whitefish, canned stock, and shellfish products. It is apparent from comparing Table 9 with Tables 7 and 8 that the shellfish commodity group has experienced the greatest increase in prices at both the retail and wholesale levels.



Table 5. U.S. per capita consumption of major fresh and frozen seafood commodities.

Year	Filletts and <sup>1/</sup> steaks	Sticks and portions	Shrimp, all preparations
----- Pounds <sup>2/</sup> -----			
1960	1.64	0.63	1.08
1961	1.67	.71	1.01
1962	1.77	.82	1.02
1963	1.60	.92	1.17
1964	1.62	.98	1.16
1965	1.68	1.12	1.24
1966	1.74	1.14	1.21
1967	1.64	1.21	1.29
1968	1.86	1.32	1.37
1969	2.01	1.63	1.31
1970	2.17	1.73	1.44
1971	2.04	1.63	1.39
1972	2.29	1.79	1.44
1973	2.54	2.00	1.36
1974	2.14	1.84	1.51
1975	2.42	1.80	1.41
1976	2.56	2.07	1.50
1977	2.56	2.05	*1.59
1978 <sup>3/</sup>	*2.72	*2.19	1.51
1979 <sup>3/</sup>	2.68	2.15	1.34

Source: Fisheries of the United States, 1977; 1979.

<sup>1/</sup> Data include groundfish and other species. Data do not include blocks, but fillets could be made into blocks from which sticks and portions could be produced.

<sup>2/</sup> Product weight of filletts and steaks and sticks and portions, edible weight of shrimp.

<sup>3/</sup> Preliminary

\*Record

Table 6. U.S. per capita consumption of major canned seafood commodities.

Year	Pounds					Total
	Salmon	Sardines	Tuna	Shellfish	Other	
1960	0.7	0.4	2.0	0.4	0.5	4.0
1961	.8	.5	2.1	.4	.5	4.3
1962	.9	.3	2.1	.4	.6	4.3
1963	.9	.4	2.0	.5	.6	4.4
1964	.7	.3	2.0	.5	.6	4.1
1965	.9	.3	2.3	.5	.3	4.3
1966	.8	.4	2.3	.4	.4	4.3
1967	.7	.4	2.4	.5	.3	4.3
1968	.7	.4	2.4	.5	.3	4.3
1969	.7	.4	2.4	.5	.2	4.2
1970	.7	.4	2.5	.5	.4	4.5
1971	.7	.4	2.4	.5	.3	4.3
1972	.7	.4	2.9	.5	.4	4.9
1973	.4	.5	3.1	.5	.5	5.0
1974	.3	.4	3.1	.6	.4	4.8
1975	.4	.2	2.9	.4	.4	4.3
1976	.4	.3	2.9	.4	.3	4.3
1977	.5	.3	2.9	.6	.3	4.6
1978 <sup>1/</sup>	.6	.3	3.3	.5	.4	5.1
1979 <sup>1/</sup>	.5	.3	3.3	.5	.3	4.9

Source: Fisheries of the United States, 1977; 1979.

<sup>1/</sup> Preliminary.

Table 7. Wholesale and Retail Price Time Trends for Some Whitefish

	Cod	Flounder	Haddock	Ocean Perch
	cents per pound			
<u>Wholesale Price</u> <sup>1/</sup>				
1970	33.6	53.5	55.2	35.3
1971	45.1	59.7	57.7	35.9
1972	53.7	64.7	68.7	42.4
1973	64.5	81.7	83.2	57.3
1974	71.4	81.6	88.3	48.9
1975	62.5	86.2	84.9	60.2
1976	71.7	106.1	95.9	84.9
1977	91.1	116.7	105.0	93.1
1978	90.5	126.3	102.1	98.1
1979	88.5	148.1	112.6	106.7
<u>Retail Price</u> <sup>2/</sup>				
1970	66.7	97.6	87.9	63.2
1971	78.5	96.3	100.0	72.4
1972	89.7	105.9	106.3	76.8
1973	111.1	131.1	131.4	98.8
1974	140.3	154.7	149.4	108.1
1975	146.0	166.0	151.5	112.6
1976	151.3	177.0	161.6	137.8
1977	169.7	200.9	185.8	165.3
1978	182.5	221.0	206.1	178.9
1979	198.3	258.4	229.2	203.8

Source: Food Fish Market Review and Outlook, various years.

<sup>1/</sup> Frozen fillets, Canadian, 5 lb. block, at Boston, Massachusetts.

<sup>2/</sup> Frozen fillets at New York City, Operation Price Watch.

Table 8. Wholesale and retail price time trends for some canned stock.

Year	Tuna, White Solid		Tuna, Light Chunk		Red Salmon		Pink Salmon		Chum Salmon		"Sardines"	
	dollars/case <sup>1/</sup>	dollars/case <sup>1/</sup>	dollars/case <sup>2/</sup>	dollars/case <sup>2/</sup>	dollars/case <sup>3/</sup>	dollars/case <sup>3/</sup>	dollars/case <sup>3/</sup>	dollars/case <sup>3/</sup>	dollars/case <sup>3/</sup>	dollars/case <sup>3/</sup>	dollars/case <sup>4/</sup>	dollars/case <sup>4/</sup>
Wholesale Price	cents/can		cents/can		cents/can <sup>7/</sup>		cents/can <sup>7/</sup>		cents/can <sup>7/</sup>		cents/can	
Retail Price <sup>5/</sup>	cents/can		cents/can		cents/can <sup>7/</sup>		cents/can <sup>7/</sup>		cents/can <sup>7/</sup>		cents/can	
1970	20.68	17.01	43.19	32.65	28.71	14.07						
1971	22.07	18.61	42.85	34.86	30.56	15.96						
1972	23.39	19.42	51.08	40.01	34.27	16.84						
1973	25.89	20.74	76.74	54.25	48.48	16.53						
1974	29.47	24.25	109.31	70.97	65.45	20.21						
1975	28.14	24.85	83.14	69.65	59.63	22.53						
1976	33.82	27.62	82.78	68.53	59.78	22.22						
1977	39.79	31.75	88.82	67.02	58.99	24.35						
1978	43.80	34.78	92.54	65.19	57.40	30.10						
1979	48.00	37.92	99.44	69.94	62.39	32.10						
1970			39.4	16.1								
1971	46.6 <sup>6/</sup>		44.0	19.9								
1972	53.6 <sup>6/</sup>		45.5	21.3								
1973	57.1 <sup>6/</sup>		49.2	23.2								
1974	65.9 <sup>6/</sup>		57.7	27.2	206	148						
1975	76.7 <sup>6/</sup>		60.3	32.2	293	199						
1976	79.5 <sup>6/</sup>		59.3	33.2	271	204						
1977	83.6		68.7	36.3	267	201						
1978	100.0		76.6	43.9	268	219						
1979	110.7		81.7	49.2								

Source: Food Fish Market Review and Outlook, various years.

<sup>1/</sup> 30. 1/2 - 7 oz., 48's in water advertized brands. Average prices reported by California brokers and canneries, F.O.B., canners terminal.

<sup>2/</sup> No. 1/2 - 6 1/2 oz., 48's in oil. Average of prices reported by California brokers and canneries, F.O.B., canners terminal.

<sup>3/</sup> 48 tails (1-lb. can). Average of weekly prices reported by Seattle brokers and canners.

<sup>4/</sup> Keyless canned Maine sardines at New York City.

<sup>5/</sup> Prices for chunk light tuna previous to 1976 was collected by the Bureau of Labor Statistics.

<sup>6/</sup> Price per can at Boston; Source, Bureau of Labor Statistics Estimated Retail Food Prices.

<sup>7/</sup> Average 10 city price of standard 1-lb. tall canned salmon.

Table 9. Wholesale and retail time trends for some shellfish products, in dollars per pound.

Wholesale Prices	Raw Headless					NA
	Shrimp <sup>1/</sup>	Scallops <sup>3/</sup>	King Crab <sup>5/</sup>	Snow Crab <sup>5/</sup>	Blue Crab <sup>6/</sup>	
1970	1.36/1.05	1.47	2.25	1.35	NA	
1971	1.75/1.21	1.64	2.45	1.36	NA	
1972	1.98/1.54	2.23	2.74	2.91	2.58	
1973	2.46/2.00	2.13	4.09	3.18	3.22	
1974	2.36/1.65	1.85	4.53	2.77	2.98	
1975	2.91/2.37	2.14	3.40	2.39	3.32	
1976	4.14/3.23	2.38	4.91	3.39	4.09	
1977	NA	1.99	6.58	3.91	4.67	
1978	4.01/3.13	2.93	8.96	5.45	4.08	
1979	5.82/4.73	3.78	8.15	5.53	4.10	

Retail Prices	Raw Headless <sup>2/</sup>		Blue Crab <sup>4/</sup>
	Shrimp	Scallops <sup>4/</sup>	
1970	2.06/1.60	1.86	NA
1971	2.39/1.75	1.85	NA
1972	2.92/2.06	2.65	2.85
1973	3.23/2.57	2.99	3.87
1974	3.67/2.65	2.87	3.88
1975	3.90/3.30	3.15	4.12
1976	4.97/3.81	3.49	5.17
1977	NA	3.12	6.00
1978	5.05/3.80	4.02	5.40
1979	7.76/6.59	5.65	5.74

Source: Shellfish Market Review and Outlook, various years.

<sup>1/</sup> First quote is for 21-25 count (shrimp per pound) and second quote is for 31-40 count, at New York.

<sup>2/</sup> First quote is for 21-25 count (shrimp per pound) and second figure is for 36-42 count, at Baltimore, Maryland.

<sup>3/</sup> At Boston, Massachusetts, raw frozen.

<sup>4/</sup> At Baltimore, Maryland.

<sup>5/</sup> At Chicago.

<sup>6/</sup> Lump and flake meat, mixed.

### Market Structure

Tables 10 and 11 show a time series of plant and employment figures for processors and wholesalers in major areas of the United States. The Gulf Coast and mid-Atlantic states have more wholesale and primary processing plants than other areas. The tables indicate net growth in numbers of processing plants between 1975 and 1979 for the Gulf Coast, Pacific Coast and Alaska. The most pronounced decrease in numbers of processing plants is exhibited in Hawaii, American Samoa and the New England states. Processing plants of the Pacific region employ the most people year round. The next most important areas in terms of employment are the Gulf Coast, the mid-Atlantic, New England and Alaska.

The mid-Atlantic, Gulf Coast, and Pacific states, as well as Hawaii experienced net growth in wholesale or secondary processing plants between 1975 and 1979. Although there are some small secondary processing plants in Alaska, figures for them are not available. Secondary processing has contracted considerably in the Island states, and moderately so in the New England and South Atlantic regions. Employment in seafood wholesaling is greatest in the mid-Atlantic and Gulf Coast states.

In 1976, there were 1,668 seafood processing plants in the United States. Yearly and seasonal employment was 60,397 and 77,951 persons, respectively. However, a large seafood processing firm with annual sales of over \$10 million would be considered small by other standards in the food processing industry.

### Fresh Product Form

Capalbo (1976) states that in 1974, 10 of the largest 20 plants producing fresh fish products were located in the New England region, especially the Chesapeake area. This is undoubtedly because of the large production and local consumption of oysters and other shellfish products.

While firms operating a single plant are common, multi-plant firms tend to dominate this sector in terms of the value of production. Most

Table 10. Processing plants and average yearly employment, 1975-1979, for major areas of the U.S.

	1975 Plants	1975 Employment	1976 Plants	1976 Employment	1977 Plants	1977 Employment	1978 Plants	1978 Employment	1979 Plants	1979 Employment
New England <sup>1/</sup>	247	7,385	230	7,175	246	7,903	240	7,861	243	8,054
Mid Atlantic <sup>2/</sup>	317	11,190	322	10,696	312	9,635	316	9,161	306	9,502
South Atlantic <sup>3/</sup>	166	5,018	155	4,519	146	4,266	165	4,484	192	4,318
Gulf Coast <sup>4/</sup>	350	9,058	357	10,417	364	10,601	425	11,164	455	11,217
Pacific <sup>5/</sup>	230	10,891	216	11,523	233	12,812	237	13,961	202	12,418
Alaska <sup>6/</sup>	221	6,000	225	6,200	225	6,500	225	6,000	225	6,000
Inland <sup>7/ 8/</sup>	161	2,662	134	2,406	136	2,529	108	1,954	92	1,438
Hawaii and American Samoa	23	1,398	24	1,483	19	1,724	17	1,799	8	8,056
Puerto Rico	5	6,679	5	5,978	5	5,622	5	6,837		
Total	1,720	60,281	1,668	60,397	1,686	61,592	1,738	63,221	1,723	61,003

Source: Fisheries of the United States, 1975-1980.

<sup>1/</sup> Includes: Maine, New Hampshire, Massachusetts, Rhode Island and Connecticut.

<sup>2/</sup> Includes: New York, New Jersey, Pennsylvania, Delaware, District of Columbia, Maryland and Virginia.

<sup>3/</sup> Includes: North Carolina, South Carolina, Georgia and the east coast of Florida.

<sup>4/</sup> Includes: west coast of Florida, Alabama, Mississippi, Louisiana and Texas.

<sup>5/</sup> Includes: Washington, Oregon and California.

<sup>6/</sup> This data is from the Labor Department, State of Alaska.

<sup>7/</sup> Includes: Arkansas, Kansas, Kentucky, Tennessee, Colorado, Utah, Idaho, Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Nevada, North Dakota, Oklahoma, South Dakota, Nebraska, Ohio and Wisconsin.

<sup>8/</sup> A partial survey was made in some inland states.

Table 11. Wholesale plants and average yearly employment, 1975-1979, for major areas of the U.S.

	1975 Plants	1975 Employment	1976 Plants	1976 Employment	1977 Plants	1977 Employment	1978 Plants	1978 Employment	1979 Plants	1979 Employment
New England <sup>1/</sup>	262	1,226	273	1,307	251	1,252	252	1,225	237	1,244
Mid Atlantic <sup>2/</sup>	430	2,945	446	2,899	459	3,310	447	3,273	438	3,358
South Atlantic <sup>3/</sup>	354	1,120	367	1,176	342	1,151	341	1,183	500	1,625
Gulf Coast <sup>4/</sup>	373	1,976	370	1,746	505	2,367	415	2,010	391	1,885
Pacific <sup>5/</sup>	136	1,344	146	1,711	163	1,518	200	1,886	155	1,203
Alaska <sup>6/</sup>	-	-	-	-	-	-	-	-	-	-
Inland <sup>7/ 8/</sup>	351	2,184	377	2,295	213	1,583	198	1,459	162	1,347
Hawaii and American Samoa	-	-	14	183	19	251	20	300	-	-
Puerto Rico	-	-	-	-	-	-	-	-	-	-
Total	1,906	10,795	1,993	11,317	1,952	11,432	1,833	11,336	1,883	10,662

Source: Fisheries of the United States, 1975-1979.

<sup>1/</sup> Includes: Maine, New Hampshire, Massachusetts, Rhode Island and Connecticut.

<sup>2/</sup> Includes: New York, New Jersey, Pennsylvania, Delaware, District of Columbia, Maryland and Virginia.

<sup>3/</sup> Includes: North Carolina, South Carolina, Georgia and the east coast of Florida.

<sup>4/</sup> Includes: west coast of Florida, Alabama, Mississippi, Louisiana and Texas.

<sup>5/</sup> Includes: Washington, Oregon and California.

<sup>6/</sup> Data from the Department of Labor Statistics, State of Alaska does not include data on wholesale establishments.

<sup>7/</sup> Includes: Arkansas, Kansas, Kentucky, Tennessee, Colorado, Utah, Idaho, Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Nevada, North Dakota, Oklahoma, South Dakota, Nebraska, Ohio and Wisconsin.

<sup>8/</sup> Only a partial survey was made for some inland states.



firms are owned by corporations and the plants are usually small, with about 10,000 square feet of processing and storage space. They have about 30 to 40 employees.

The national seller concentration ratios are quite small. The four largest processors of fresh seafood handled approximately 10 percent of all sales in 1974. The largest 20 firms handled approximately 26 percent of all sales.

In order to assure supplies, processing firms have always exercised some degree of control over the harvesting sector. Methods for gaining this type of control range from loose agreements with individual fishermen, to holding liens on vessels, to outright ownership of vessels. However, because of the nature of these arrangements, it is very difficult to determine the extent of these practices.

On the other hand, as fishermen's cooperatives become more common, the incidence of fisherman ownership of processing firms increases. Two examples are the Point Judith Fishermans Co-op on the East Coast and the Halibut Producers Co-op on the West Coast.

#### Frozen Product Forms

Most plants in the United States specializing in fresh product forms also produce frozen fish products. However, plants specializing in frozen seafood products are more widespread with the 20 largest plants evenly distributed over the United States (Capalbo, 1976). Again, as with the fresh product forms, most firms that specialize in frozen products have a single plant, although multi-plant firms tend to capture a greater market share.

Freezing lines in plants generally require more space, are more capital intensive and employ fewer workers than do processing lines for fresh fish. Seller concentration is small with the largest four firms controlling only 17 percent of the market. There are certain regions, however, such as New England, the middle Atlantic region, and Florida, where fewer firms control a greater market share. In the frozen shrimp

industry, for example, Alvarez, et al. (1976) reported that the largest four firms controlled approximately 74 percent of the market while the largest eight firms controlled almost 95 percent. The crab industry appears to be similarly concentrated.

Again, the frozen processing firms try to insure the stability of supply by exercising control over their supply sources. Alvarez, et al. (1976) reported that 56 percent of the total number of firms in the shrimp industry were involved in controlling their supplying fishermen in one way or another. Orth, et al. (1979 and 1981) discovered that some processing firms own crab and shrimp vessels as well as salmon vessels. However, this practice seems to be much less prevalent in the frozen sector than in the fresh sector.

#### Canned Product Forms

In 1974, 16 of the 20 largest canning plants were located in the Pacific region. The nature and size of these plants range anywhere from single plant firms producing specialty products, to Alaska firms with several plants throughout the state. Reportedly, the Pacific Coast processing firms have recently become more involved with multinational corporations, principally those from Japan.

At the national level, the market for Pacific canned seafoods is highly concentrated. This is especially true for canned tuna where the top four firms control 80.5 percent of the market and the top eight firms control 97.7 percent (Kolhonen, 1976).

As in the other processing sectors, canneries attempt to control their supplies. However, the level of this is not as high as in others. Some canneries seek to control supply by extension of credit and by services rather than outright ownership of fishing boats.

#### Cured Product Form

The 20 largest plants specializing in cured fish preparations in 1974 were located primarily in the middle Atlantic and the Pacific

regions. The middle Atlantic specialized mainly in cured seafood production (17.7 percent of total production). The four largest plants in this sector controlled 50.6 percent of the market. Within the major regions, the top 20 curing plants reported some measure of control over their suppliers. At the national level, however, this occurred in only 10 percent of all firms engaged in curing seafood.

### International Trade

U.S. export activity in seafood has increased since 1970. In North and Central America alone, trade has been extended to 10 countries since 1970, and sales in all countries combined have increased (Table 12). The same trend is seen in trade with Europe, Asia, Oceania and Africa.

Japan has become the single largest buyer of U.S. fish and shellfish products, at over \$.5 billion in 1979. The next most important customer is Canada which bought just under \$120 million worth of products in 1979.

From the standpoint of percentage growth of U.S. trade, Africa is second to Asia with a 25-fold increase since 1970 versus a 28-fold increase for Asia in nominal value terms. This reflects the efforts of some U.S. processors to initiate trade in the more well-to-do countries on that continent. One should hasten to say that the absolute volume of trade in Africa compared to that in Europe or Asia is quite small. The 1979 trade with all of Europe placed it second in terms of the value of commodities exported to it.

Table 13 describes the species and product types exported by the United States to all countries. The most dramatic increases in both quantity and value of exports have been experienced in whole fish, fillets, and sticks and portions, as well as in frozen shrimp, king crab, and snow (Tanner) crab. Other substantial increases occurred in the U.S. export markets for canned salmon and fish roes.

The United States is also a major importer of fish products from a number of different countries. The principal exporting countries to the United States are shown in Table 14. Trade flows are fairly difficult to describe because a wide variety of products move into the country.



Table 12. (continued)

Continent and Countries	Year 1979 Value of US Export (1,000 \$)	Year 1970 Value of US Export (1,000 \$)
<u>Asia (cont'd)</u>		
South Vietnam		367
Nansei & Nanpo Islands		150
<u>Australia &amp; Oceania</u>		
Australia	15,297	1,209
New Zealand	1,670	204
French Pacific Islands	770	270
Trust Pacific Islands	152	
Other Pacific Islands	95	
<u>Africa</u>		
Egypt	4,569	
Republic of South Africa	970	183
Canary Islands	681	71
Nigeria	307	
Guinea	61	

Source: National Marine Fisheries Service, Fisheries of the United States 1971 and 1979.

1/ Only countries who bought \$50,000 or more in either year were included.

Table 13. A comparison of species and product form groups exported by the United States in 1970 and 1979.

	1970		1979		
	Classification	(1,000 lb)	(1,000 \$)	(1,000 lb)	(1,000 \$)
<u>EDIBLE FISHERY PRODUCTS</u>					
<u>Fresh &amp; Frozen</u>					
	*				
<u>Whole or Eviscerated</u>					
Salmon	*	28,201	18,145	140,160	302,324
Other	*	17,471	5,658	104,941	91,650
Cod, Haddock, Hake, Pollock, Cusk	*	1,233	431		
<u>Fillets</u>					
Salmon				4,205	9,270
Other				46,559	35,720
				896	1,453
<u>Fish Sticks &amp; Portions</u>					
Shellfish	*				
Shrimp	*	29,570	26,416	28,934	87,392
King Crab				36,219	96,346
Snow Crab				42,978	70,296
Other	*	11,761	5,425	37,759	52,519
<u>Canned Fish &amp; Shellfish</u>					
Mackerel	*	98	20	8,357	11,142
Salmon	*	16,811	13,134	50,719	91,916
Sardines	*	1,456	670	1,590	1,180
Shrimp	*	6,076	6,652	5,469	12,391
King Crab	*			866	3,898
Squid	*	8,825	1,075	8,382	2,447
Other	*	9,860	9,364	3,447	9,957
Cured	*	9,366	8,225	10,441	15,326
<u>Fish Roe</u>					
Other Fish & Shellfish				21,010	123,551
				648	1,426
<u>NON EDIBLE FISHERY PRODUCTS</u>					
Fish Meal	*			31,402	5,526
Fish Oil	*	158,787	15,699	198,497	39,571
Seal Furs (number of skins)	*	(393,000)	4,136	(23,000)	2,450
Other <sup>1/</sup>	*			-	14,615
Whale Oil	*	5,099	707		
Shells	*	393	4,136		
Other marine animal products, nonedible	*	-	166		

Source: National Marine Fisheries Service, Fisheries of the United States, 1971 and 1979.

<sup>1/</sup> For 1979 this figure includes an amount of whale oil.

Table 14. Principal nations exporting fish and shellfish products to the United States, 1970 and 1979.

	1970	1979	1970	1979
	(thousand pounds)		(thousand pounds)	
<u>North America</u>				
Canada	178,211	631,066	147,162	256,042
Mexico	82,985	356,650	18,809	61,503
Panama	11,901	78,890	6,117	85,370
Nicaragua	6,709	30,964	4,480	
El Salvador	5,536		6,133	
Honduras	4,883	27,081	4,379	
Other	34,120	79,352	14,440	242,879
Greenland		19,878		111,103
				100,445
<u>South America</u>				
Brazil	16,063	104,507		
Venezuela	11,905			
Guyana	11,734			
Ecuador	8,922	69,558	24,859	80,877
French Guiana	5,893		11,569	22,484
Other	21,603	74,381	7,982	15,285
Argentina		35,749	669	4,626
Peru		30,733		16,642
Chile		25,579		
<u>Europe</u>				
Iceland	44,603	215,226	16,518	48,627
Norway	37,561	68,560	933	
Denmark	10,543	52,387	1,059	
United Kingdom	7,143	47,898	3,788	2,708
Spain	7,848	33,696	367	
Portugal	7,802		6,467	10,564
Poland	3,822			7,936
Netherlands	4,215			4,154
Other	10,799			
Italy		118,074		
Federal Republic of Germany		549,397		
Switzerland		54,061		
		36,358		
<u>Asia</u>				
Japan				
India				
Taiwan				
Thailand				
Pakistan				
Malaysia				
Other				
Republic of Korea				
Hong Kong				
<u>Australia &amp; Oceania</u>				
Australia				
New Zealand				
British Pacific Islands				
Other				
New Guinea				
<u>Africa</u>				
Republic of South Africa				
Angola				
Sierra Leone				
Ivory Coast				
Ghana				
Other				
Mauritius				
Senegal				

Source: National Marine Fisheries Service; Fisheries of the United States, 1971 and 1979.

The major imported products are shown in Table 15 for the years 1970 and 1979. There has been considerable growth in the sale of frozen blocks and slabs as well as a slight growth in the sales of frozen fillets. As would be expected, the U.S. has not relied heavily on other countries for supplies of frozen salmon and halibut. This was particularly evident in 1979, possibly because of large improvements of salmon stocks in Alaska and some improvement in the halibut resource within the U.S. jurisdiction.

Major import increases have occurred with albacore and other tuna species. Shrimp is the other major import of the U.S. in terms of both value and poundage. Although U.S. importation of shrimp increased only slightly between 1970 and 1979, the value of the product sold more than tripled.

Some crab, albeit a small amount compared to other commodities imported, was imported in 1979 even though the domestic crab industry has expanded fairly rapidly over the past decade. Other important seafood commodities imported are lobster, canned sardines, canned oysters, and cured herring and whitefish.

#### Public Policy: Regional, National, International

#### Regulatory Environment of the Fishing Industry

The major management institutions for the seafood industry are organized at the international, national and state levels. Each level of management has, in the past, had areas of jurisdiction that were relatively well defined. However, since the enactment of the Fisheries Conservation and Management Act of 1976, there have been some adjustments in jurisdiction and a general de-emphasis of purely biological management in favor of multiple-objective management approaches. This has resulted in broader policy implications and led to the formation of new fisheries management groups as well as new departments within older organizations.



Table 15. A comparison of species and product form groups imported by the United States in 1970 and 1979.

	1970		1979	
	(1,000 lb)	(1,000 \$)	(1,000 lb)	(1,000 \$)
<b>EDIBLE FISHERY PRODUCTS</b>				
<b>Fresh &amp; Frozen</b>				
<b>Fillet</b>				
Groundfish	186,107	64,010	252,957	284,953
Other	136,102	63,592	174,569	185,418
Total	322,209	127,602	427,526	470,371
Blocks & Slabs	272,655	70,622	405,152	337,365
Halibut	18,213	8,124	4,119	7,407
Salmon	7,448	6,656	5,022	11,390
Tuna				
Albacore	205,261	56,897	212,517	144,553
Other	234,279	41,528	535,262	171,307
Loins & Discs	3,229	2,099	5,842	5,706
Crabmeat			2,784	9,807
Scallops (meat)	16,830	19,666	25,155	84,906
Lobster				
American	17,113	18,991	16,262	39,047
Spiny	37,741	74,801	44,417	259,421
Shrimp (some canned & dried in 1970)	218,715	200,035	220,216	705,008
Other			182,349	100,706
<b>Canned</b>				
Herring, not in oil			7,077	9,481
Salmon	2,441	1,577	434	800
Sardines				
in oil	34,070	15,820	22,878	27,679
not in oil	12,838	3,535	26,878	16,299
Tuna				
in oil	153	114	627	743
not in oil	72,109	44,195	53,076	64,328
Bonito and yellowtail				
in oil	830	367	300	224
not in oil	402	157	71	67

Table 15. (continued)

	1970		1979	
	(1,000 lb)	(1,000 \$)	(1,000 lb)	(1,000 \$)
<u>Canned (cont'd)</u>				
Abalone			4,282	15,035
Clams			5,967	7,427
Crabmeal	2,765	5,283	5,073	12,329
Lobsters				
American	2,381	7,803	1,790	10,912
Spiny	102	163	134	743
Oysters	14,953	8,140	19,075	18,320
Shrimp			4,288	8,230
Other (includes cured)	376,563	98,355	56,306	58,640
<u>Cured</u>				
<u>Pickled or Salted</u>				
Cod, Haddock, Pike			39,683	43,293
Herring			17,218	9,433
Other			7,849	12,592
Other Fish & Shellfish			6,740	4,482
<u>NON-EDIBLE FISHERY PRODUCTS</u>				
Scrap & meat	502,984	37,713	179,226	29,616
Solubles	1,545	87	207	24
Other	-	181,136	-	1,113,599
Whale Oil	55,608	5,944	-	-

Source: National Marine Fisheries Service; Fisheries of the United States, 1971 and 1979.

### International Agreements and Conventions

Prior to the development of the extended resource management zone, ocean fishing beyond the territorial waters were governed by organizations formed as a result of treaties between the United States and other nations. These organizations, although they had no power to enforce their recommendations, exerted considerable influence by providing the only empirical data upon which national fishery policies could be based. Most of these commissions have lost some of their influence on U.S. fisheries policy. Recently, some consideration has been given to dissolving the International Pacific Halibut Commission. Also, the United States dropped out of the International Commission for the Northwest Atlantic Fisheries (ICNAF) in 1976. As of this writing (1982) the U.S. is not a signatory to the Northwestern Atlantic Fisheries Organization (NAFO) which has replaced ICNAF. Nevertheless the United States still has an active role in this organization.

### Fisheries Management at the National Level

Since 1969, the National Marine Fisheries Service has managed fisheries at the national level. The NMFS has the broad objectives of providing research and informational services in the areas of resource utilization and management and international fisheries. It allows more direct formulation of fishery policy based on research findings and is directly involved in a wide range of activities that affect most aspects of the fishing industry. Figure 3 outlines the major offices and divisions of the NMFS.

In addition to the NMFS, a number of other federal agencies regulate the fishing industry. The most notable of these are the regional management councils, formed under the auspices of the Fisheries Conservation and Management Act of 1976. There are eight councils, each corresponding to a major area of the country and its possessions. These councils are responsible for preparing fisheries management plans (FMP's) for the exploitable fisheries resources under their jurisdiction. In many cases, these plans provide for both domestic and foreign fishing.

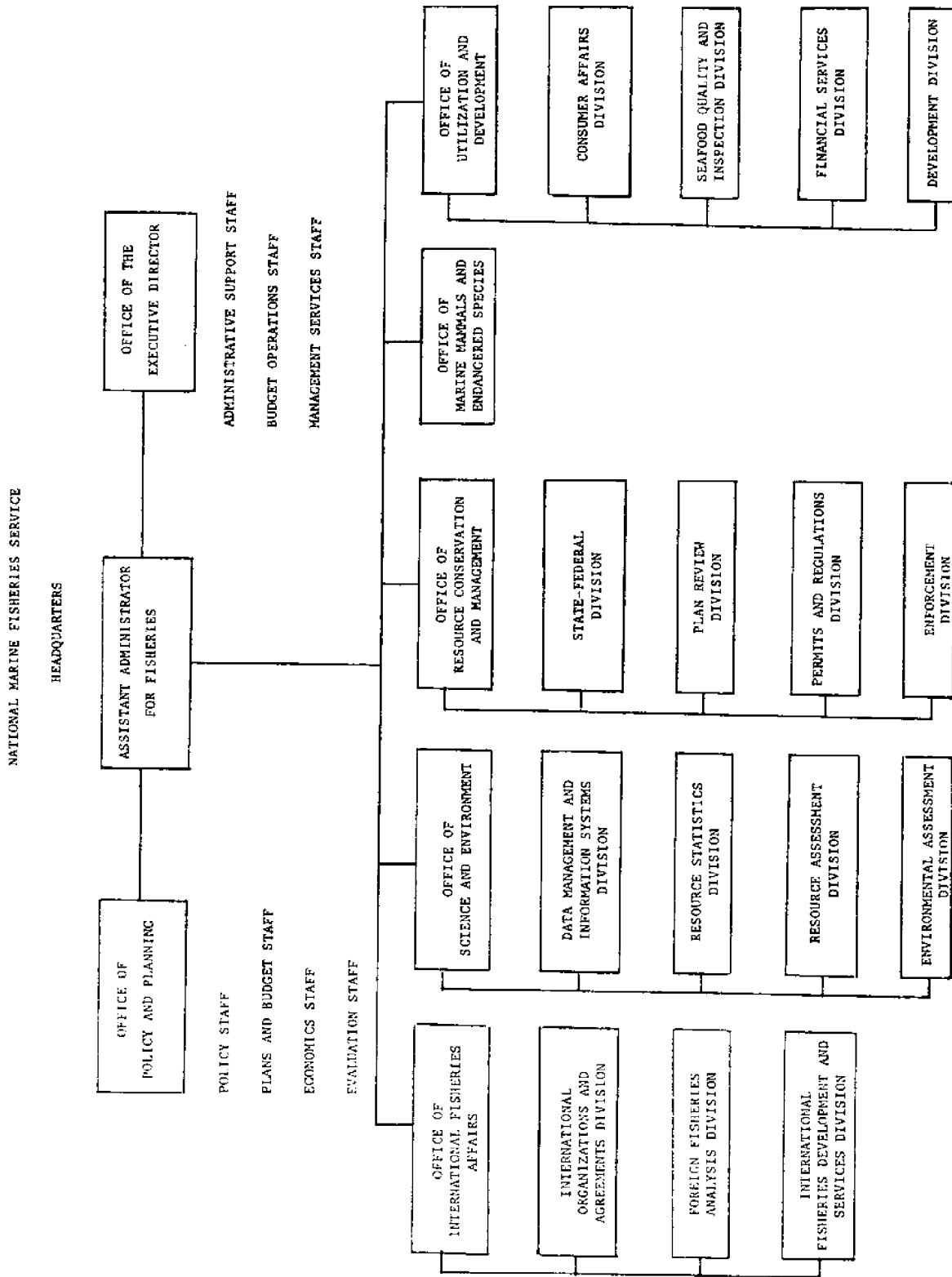


Figure 3. Organizational Structure of the National Marine Fisheries Service.

The amount of foreign fishing allowed in any region depends on the existence of prior fishing activity by foreign fishermen as well as the availability of the resource in question.

A foreign country wishing to fish within the U.S. fishing zone negotiates a fishing agreement through the U.S. State Department. The agreement is then reviewed by the President and Congress. After a fishing agreement is in force, permit applications by foreign vessels are reviewed by the NMFS, the regional councils and the Coast Guard. Depending on the abundance of the resource and the perceived competition between foreign and domestic fleets, allocations to foreign and domestic fishing are then made. The enforcement of fishing quotas is carried out by the Department of Commerce with the assistance of NMFS observers and the Coast Guard. When no fishery management plan has been developed by the councils, the Secretary of Commerce is empowered to develop preliminary management plans so foreign allocation can be made.

There are also federal agencies that indirectly affect the structure of the fishing industry. Some of the most notable of these are the Environmental Protection Agency, the Food and Drug Administration of the Department of Health, Education and Welfare, the Occupational Safety and Health Administration of the Department of Labor, the Bureau of Indian Affairs under the Department of the Interior and the Antitrust Division of the Department of Justice. In addition to these agencies, the Commerce Department sponsors the National Sea Grant College Program, which is a source of research and advisory information with widespread impact on the fishing industry.

#### Fisheries Management at the State Level

Practically every state involved with sport or commercial fishing has a management arm that evaluates resources (usually concurrent with efforts by NMFS) and enforces fishing laws. To a large extent formulation of harvest laws is still in the hands of state government. However, for some species, the regional management councils, through recommendations made in their fishery management plans, contribute to management at the

state level. The actual formulation of the regulations surrounding the method of fish capture is usually carried on by the state management agencies.

At the state level some new management methods for domestic fishermen have been adopted as alternatives or additions to efficiency restrictions. In the past, efficiency restrictions have taken the following forms: restrictions on the length of season, restrictions on the vessel size, gear and mesh size restrictions, and area closures. Recently, several states have been experimenting with various methods of limiting entry as a means of reducing effort, especially in fisheries already characterized by large numbers of fishing firms.

Although these methods of reducing the fishing effort are hampered by problems of implementation, there are few other alternatives that are readily accepted by fishermen. The imposition of quotas in addition to limited entry has been suggested by some economists (Pearse, 1981); however, this method has not yet gained wide popularity within the fishing industry.

#### Regulations Affecting Domestic Processing and Marketing

The same federal agencies listed above as having an effect on the structure of the fishing industry also regulate the manner in which the product is processed, distributed and sold. In addition to the agencies cited above, a number of other federal agencies indirectly affect the interstate trade of all commodities, including seafood. These agencies are the Interstate Commerce Commission, the Federal Maritime Commission, the Civil Aeronautics Board, and the Federal Aviation Administration.

There are also private groups that affect the exploitation level, market structure, and distribution patterns of seafood. These groups usually interact directly with the policy making bodies through lobbying activities and are themselves affected by policies developed by state and federal agencies. The resulting network of forces that determine the allocation of fish resources within any state is illustrated in Figure 4.

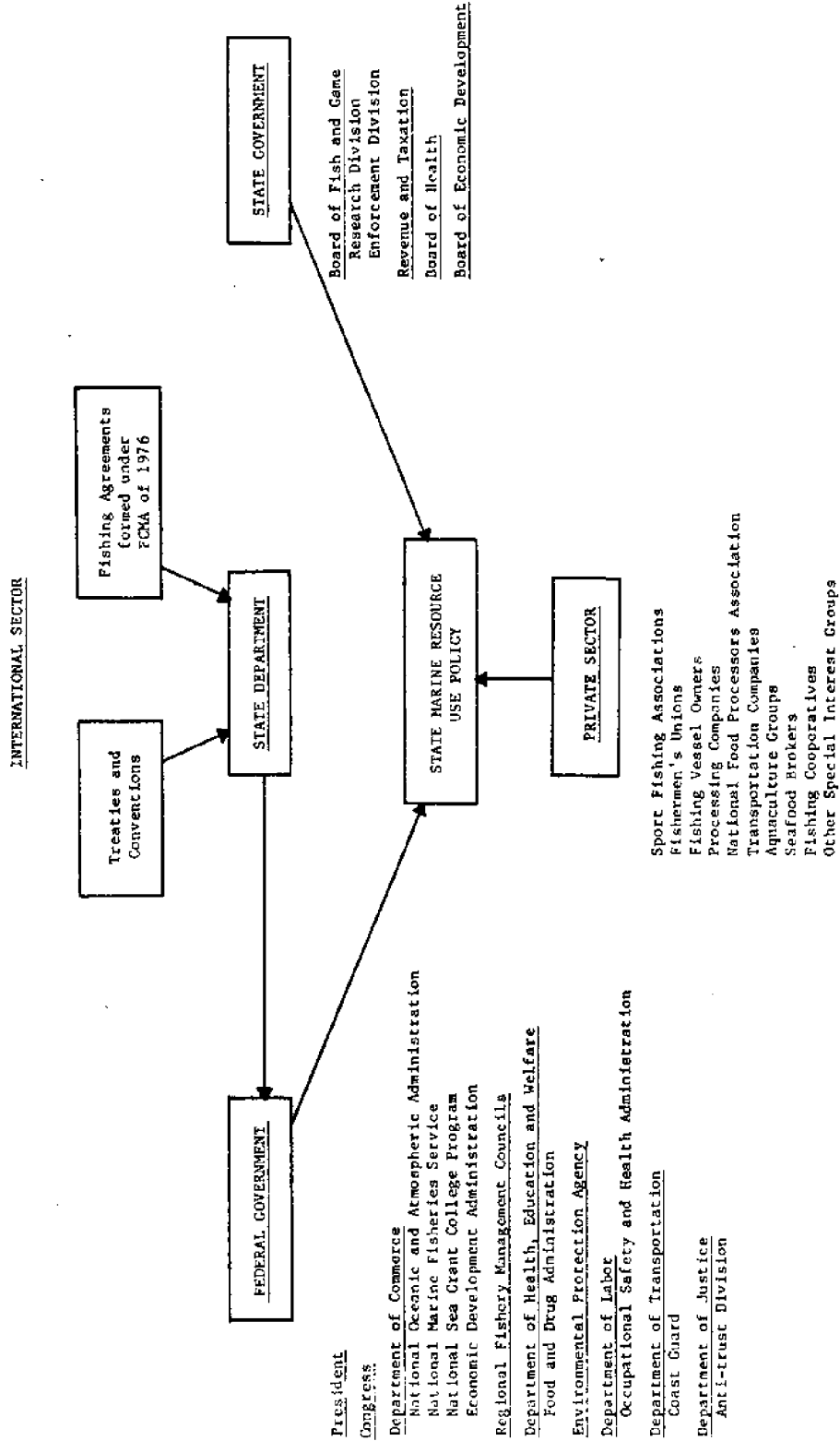


Figure 4. Agencies and Organizations Affecting a State's Marine Resources, and Their Use. For application to a particular state, see Orth, et al. 1981.

Tariffs and Other Trade Barriers to the U.S.

While the U.S. does not have any explicit seafood quota system against any country, there is a general quota on some product forms of fresh chilled and frozen whitefish and some canned tuna. There are, however, a number of restrictions and rules that must be complied with before exporting to the United States. Some of these restrictions may act as effective trade barriers. A few of these rules as reported by the Tariff Schedules of the United States Annotated, 1981, and the Air Cargo Tariff, 1978, are described below.

Statistical data on the country importing the commodity, the point of entry or exit into or out of the United States, dates of importation and exportation, the vessel or airline transporting the commodity and the commodity itself must be provided.

In addition, some restrictions on packing exist. Natural unprocessed fibers such as hay straw and willow twigs as well as unfinished or reused wooden boxes are prohibited. For fish products, a declaration of importation of wildlife from the U.S. Bureau of Sport Fisheries and Wildlife must accompany the shipment. Also, since fish products are considered "meat" for purposes of importation, they fall under some restrictive regulations from U.S. Customs and Health Authorities.

Tariff charges for goods imported into the United States are fairly complex and subject to considerable change through time. Different tariffs are charged depending on the status of the country seeking to export goods. Besides the traditional classifications that the U.S. has with industrialized countries there is also a "favored country" status for developing countries which are independent (having sovereignty in and of themselves) or non-independent. Among these independent countries are 26 developing countries which enjoy further tariff reductions. These countries are called the "Least Developed Developing Countries."



### Distribution Channels

Because of the large numbers of specific fish products and distribution systems in the U.S. fishing industry, the scope of this paper makes it impossible to examine each of them in detail. For the purposes of this paper two seafood products, shrimp and salmon, were chosen on the basis of their importance to domestic consumers and their importance to international trade activity in terms of import or export value.

### Market Channels for Salmon

The marketing channels for salmon can be appropriately discussed in terms of the physical distribution channel of the product. And, while this distribution system is intended to be representative of general U.S. market channels for all fish, it should be noted that distribution varies with the product form (fresh, frozen or canned) and with the species of fish.

One of the major features of salmon marketing is that there are only four producing states. One of these, Alaska, completely dominates primary production. However, the domestic supply of salmon in the fresh and frozen product forms is also significantly served by landings in Washington, Oregon and California.

In the past, most salmon was shipped via surface transport, steamer, rail, and more recently, truck; currently, the per unit value of certain salmon product forms makes it feasible to use air transport not only to domestic markets but also to other countries. Surface transport is still important, though, especially to domestic markets.

From Alaska, frozen or canned salmon is shipped to Washington state, usually to the ports of Bellingham or Seattle, where it is repackaged and shipped to wholesalers. Surpluses are generally stored on site. A major development in salmon trade channels is the shift away from Seattle as the principal processing and distributing center. Alaskan cities are being increasingly involved not only in primary processing but in distribution of the processed product.

In the contiguous states, Washington, Oregon and California support the demand of high-population areas in the Southwest, Far West and Southeast, and to a lesser extent the Great Lakes and Northeast. Columbia River salmon tend to be shipped more often to the East coast than are southern Oregon/California salmon. The latter is exported, sent to Puget Sound, the San Francisco Bay Area, or to southern California. The principal mode of shipping is surface: truck, rail, or rail/truck transports.

The exchange or negotiation channel in Figure 5 shows the major transaction points which take place in the marketing of salmon products. This representation takes account of most of the diversity in marketing channels found in different states. Smokers and curers have played a decreasing role in the processing of salmon. Some processing companies have tended to diversify their marketing activities to the point where, often, brokers never enter the picture, except perhaps beyond the wholesale level. In Alaskan salmon processing, most of the marketing activities are done by the processing firm.

The major difference between fresh and frozen salmon distribution is time. The intricacies of marketing a fresh, iced salmon product sometimes requires the use of airfreight. Often layovers on large shipments, which are common for connecting flights to the East coast, can only be avoided by the use of charter flights. Several airlines actively solicit transport contracts involving very large quantities of highly valued seafood.

Once it is frozen, salmon takes on a product form that allows it to be traded over long periods of time. This creates the opportunity for speculative activity and off-season sales to remote markets. While it can be implied that fresh salmon steak is generally the same product form as frozen salmon steak, the cold storage extension of the trading life must certainly have an influence on its product definition.



### Market Channels for Shrimp

Since there are several different types of shrimp harvested in the United States and, since the size of shrimp is important in terms of the markets that are served, it is generally true that the markets and the marketing channels will be different for different species. For example, shrimp caught in the Gulf of Mexico and Southern Atlantic are somewhat larger than the pandalid shrimps caught in the temperate and boreal fishing grounds. Most cocktail-size shrimp products come from Alaska, the other North Pacific states, and Maine. Most of the breaded shrimp and shrimp prepared for the "main course" of a meal come from Florida, Louisiana, and Texas.

Main Course Shrimp. There are five common processing methods for "main course" shrimp: (1) no processing, heads on, fresh; (2) headed, not shelled, fresh or frozen; (3) headed, shelled, deveined, fresh or frozen; (4) breaded, shelled, deveined, frozen; (5) all of the above, cooked.

The first product form is seldom available to consumers outside the port towns. Most supermarkets and seafood stores in the United States stock shrimp fresh or frozen, headless but not shelled, although the incidence of this product form also decreases rapidly as one moves inland.

The last three product forms are distributed throughout the United States. Alvarez (1976) did the most definitive work on market channels for shrimp in the northern United States, concentrating in Florida. Florida relies heavily on outside sources of raw product. Brokers play a large role in the procurement of foreign sources of shrimp. Figure 6 describes the marketing channels of the Florida shrimp processing industry as of 1972. Institutional buyers are prevalent in the market. Also foreign suppliers dominate the supply of frozen raw shrimp while U.S. sources supply the bulk of the fresh raw shrimp. Most of the product is eventually shipped to the Northeastern section of the country with the Southeast and West ranked second and third, respectively, in terms of percent distributed.

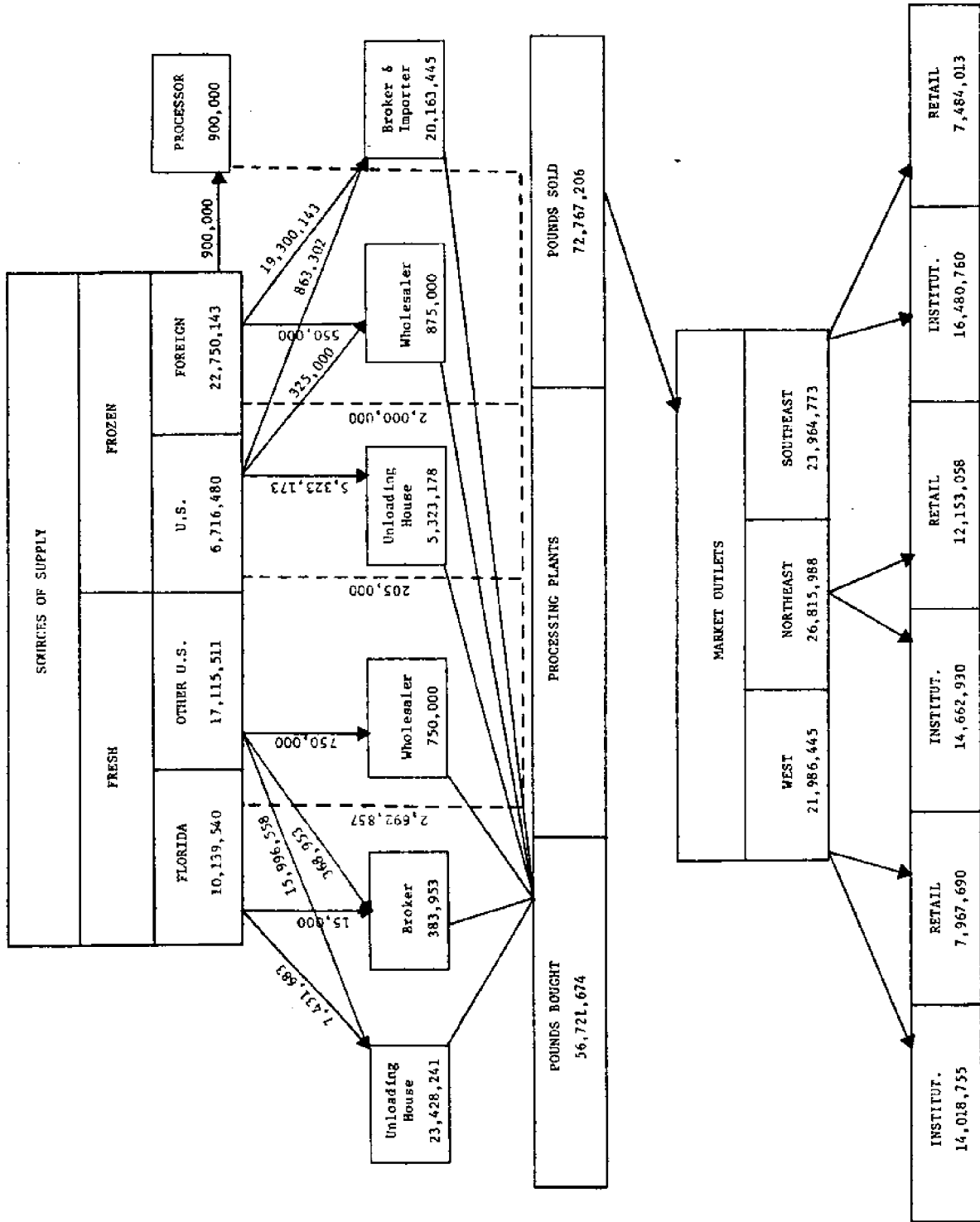


Figure 6. Marketing Channels for the Florida Shrimp Processing Industry, 1972.

a/ Note that total pounds purchased do not equal total pounds sold because products either lose or gain weight in the production process.

As one moves west, one finds that local sources are relied on more as sources of raw product. Also, the distribution channels shift away from the Northeast as a major market and toward the western centers of population.

Cocktail-Size Shrimp. Most shrimp of this type are pandalid shrimp and are harvested principally in Maine, Oregon and Alaska, although California and Washington have a growing pandalid shrimp fishery. There are five process forms for cocktail shrimp: (1) frozen raw, whole; (2) frozen raw, peeled; (3) frozen cooked, blocks or canned; (4) individually quick frozen.

In each area, the major processing activity occurs close to the area of landing. Alaskan shrimp, however, may undergo some repackaging in Seattle, Bellingham, Everett or Monroe before being shipped to major distribution centers in Los Angeles, Denver, Minneapolis, Chicago, Philadelphia, New York and Boston.

Exports are made directly to foreign buyers, to domestic sales organizations or through brokers. Sales to areas within the United States are made out of warehouses in major sales areas via field brokers, or to institutional buyers.

The major transport form for shrimp products is truck, except for shipments from Alaska where water-borne carriers and ship/truck container operations are common. Figure 7 describes the major market routes for fresh-frozen shrimp from fishermen to consumer described by Langmo, et al. (1975). The market channels for Oregon's fresh-frozen shrimp can be viewed as having six levels: fisherman, processor, broker, wholesaler, institutional user or retailer, and consumer.

Langmo, et al. estimates that 10 to 15 percent of Oregon's fresh-frozen shrimp is consumed within the state, although the single most important wholesaling center is in San Francisco. Smaller amounts are wholesaled in Portland, Seattle and Los Angeles. Langmo, et al. also suggest that there is competition between Oregon, Alaska and Maine which tends to make the Oregon producers strive for some product

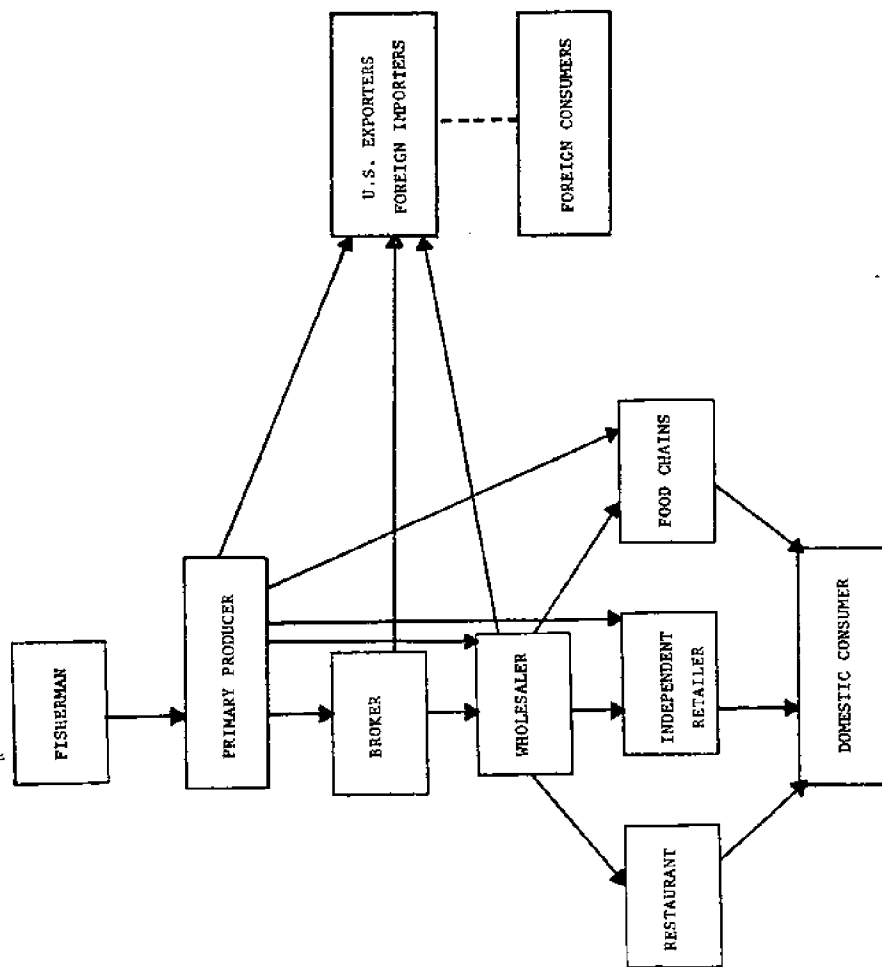


Figure 7. Alternative Marketing Routes of Fresh-Frozen Oregon Shrimp from Fisherman to the Consumer.

Source: Langmo, et al., 1975.

differentiation. Oregon shrimp are usually cooked, individually-quick-frozen, and packed in five-pound cases under several different brand names and sold for institutional use.



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