

The Mexican Fishery for Northern Anchovy, *Engraulis mordax*

The northern anchovy, *Engraulis mordax*, is the most abundant species found in the California Current which dominates the coastal waters off the Baja Peninsula in Mexico and off Southern California in the United States. Until recently, the species was relatively unutilized by either Mexican or U.S. fishermen.

In the early 1970's, however, Mexico initiated a massive fishing effort for this species which has now become the largest single component of the country's fisheries catch. The increased anchovy catch has enabled the current Mexican Administration to claim that the massive \$1.4 billion fisheries development program has been a great success. Some observers, however, are concerned that anchovy stocks may not be able to support the intensive fishing effort over a sustained period.

Table 1.—Mexico's anchovy catch by month and type of processing, 1979, in 1,000 t¹.

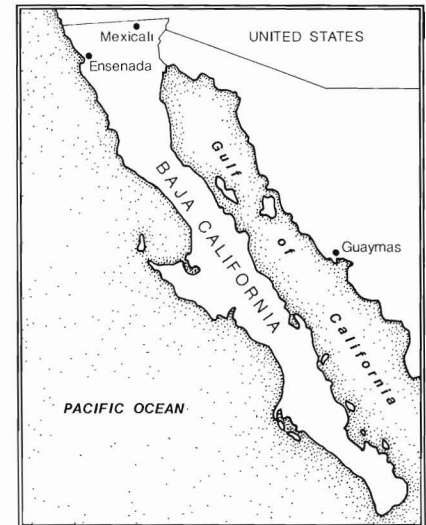
Month	Utilization		Total ²
	Edible	Fish meal	
January	Negl.	1.1	1.1
February	Negl.	3.1	3.1
March	0.1	0.7	0.8
April	Negl.	7.1	7.1
May	0.2	35.8	36.0
June	0.1	21.7	21.8
July	0.4	29.6	30.1
August	0.1	16.2	16.3
September	0.4	10.7	11.1
October	0.6	22.3	22.9
November	1.2	25.7	26.9
December	0.3	23.0	23.3
Total ²	3.4	197.0	200.4

¹Discrepancy with Table 2 is unexplained. Source: Departamento de Pesca, "Anuario Estadístico Pesquero, 1979," p. 134-135.

²Totals may not agree due to rounding.

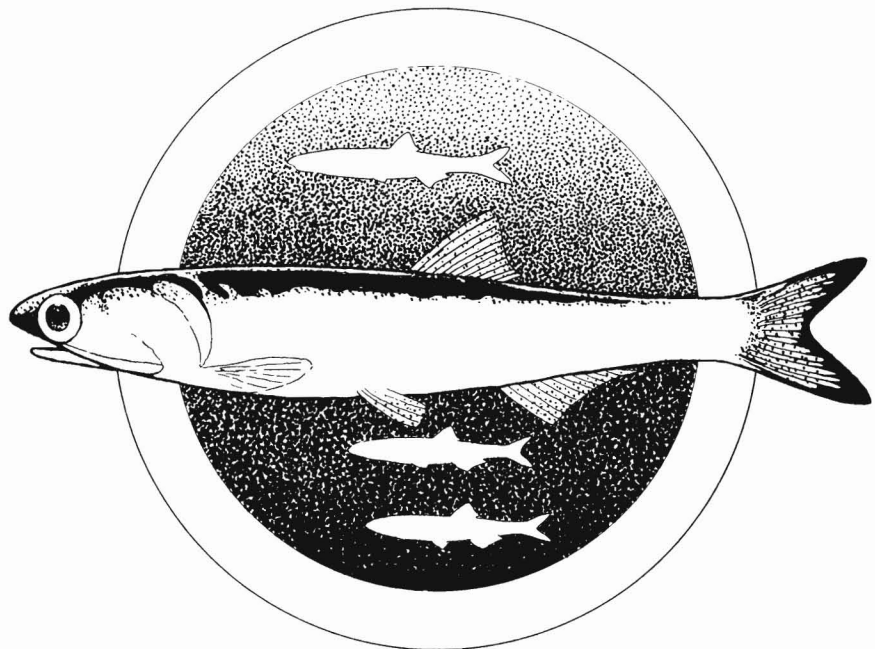
Catch

Almost all of Mexico's anchovy catch is taken off the Pacific Coast of the Baja Peninsula (see map). About 80 percent of that catch is landed in Ensenada. The fishery was originally conducted within 5 miles, but recent reports from the port of Ensenada indicate that the fishermen have now moved further offshore. The highly seasonal catch is mostly taken between May and December (Table 1) when Mexico's entire anchovy/sardine fleet is based in Ensenada. During the rest of the year, many of these vessels



are based in Guaymas, where they are deployed for sardine fishing in the Gulf of California.

Mexican fishermen have sharply increased their anchovy catch in recent



The northern anchovy, *Engraulis mordax*.

years. Preliminary statistics suggest that the catch totaled nearly 340,000 metric tons (t) in 1980, a 20 percent increase over the 250,000 t taken in 1979 (Table 2). Preliminary 1981 reports indicate that the 1981 catch will exceed the 1980 catch, but much will depend on the November-December results, which were not yet available. Mexican officials eventually hope to increase the annual catch to 500,000 t.

Fish Meal Production

The development of the Baja anchovy fishery has enabled Mexico to increase its fish meal production to about 80,000 t (Table 3). The anchovy catch is being used primarily for reduction to fish meal. Fish meal is used as a dietary supplement by Mexico's important poultry and live-

Table 2.—Mexico's North Pacific Anchovy catch, 1975-80¹.

Year	Quantity (1,000 t)	Year	Quantity (1,000 t)
1975	59.6	1978	180.1
1976	79.4	1979	249.6
1977	178.8	1980	339.0

¹The Baja California Norte catch through June 1981 was 95,500 t. Sources: FAO "Yearbook of Fishery Statistics," 1979 (1975-79 data) and NMFS Southeast Fisheries Center (1980 data).

Table 3.—Mexico's fish meal production, imports, exports, and consumption, 1975-81, in 1,000 t¹.

Year	Production	Imports	Exports	Total consumption
1975	35.0	47.5	Negl.	82.5
1976	² 47.0	30.6	Negl.	77.6
1977	53.7	14.3	Negl.	68.0
1978	59.4	24.0	Negl.	83.4
1979	75.2	³ 42.1	Negl.	117.3
1980	^{2,4} 79.0	² 20.0	Negl.	² 99.0
1981 ⁵	⁶ 80.0	⁶ 25.0	Negl.	² 105.0

¹Sources: FAO "Yearbook of Fishery Statistics," 1979 (1975-79 import data) and *Oil World*, various issues (1975-81 production data and 1980-81 import data).

²Estimate.

³Different sources on Mexican fish meal are in rough agreement, with the exception of 1979. The publication *Oil World* estimated that only 26,000 t was imported that year while FAO and the International Association of Fish Meal Manufacturers reported that 42,100 t was imported.

⁴*Oil World* estimate may be low. Based on the 1979 anchovy catch, fish meal production could have reached 90,000 t.

⁵Projection based on *Oil World* January to September 1981 forecast of 60,000 t produced and 14,000 t imported, compared with 59,000 t produced and 9,000 t imported from January to September 1980. Again the *Oil World* projection may be low based on the projected 1981 anchovy catch.

⁶Projection.

stock industry. Before 1976, Mexico imported most of its fish meal. The increased domestic production based on the anchovy has enabled the country to keep imports below 30,000 t.¹

Government officials eventually hope to use the anchovy as an important part of its program to increase domestic food production. The Departamento de Pesca (DEPES) wants anchovies to be used to produce edible products and has met with fish meal companies to plan for their reduced use for fish meal. Instead, DEPES wants the fish meal plants to use offal from canneries and freezing plants and species which cannot be used to produce edible products.² It is likely to be several years, however, before such a shift is actually implemented. As part of its fish meal policy, DEPES had planned to restrict the construction of additional fish meal plants. Unconfirmed reports from Mexico, however, suggest that DEPES may have reevaluated its anchovy policy, at least for the immediate future, and now plans to authorize the construction of additional fish meal plants. The Bank of Mexico has been considering loans to finance the construction of additional fish meal plants in 1982.

Companies

Several Mexican companies, based in Ensenada, fish for anchovies. In 1979, there were eight fish meal plants in the Ensenada area, less than 10 percent of the country's 86 fish meal plants. Those eight plants, however, produced more than half of Mexico's entire fish meal production in that year.

The most important fish meal company is Pesquera Zapata, S.A.,³ a Mexican-United States joint venture formed in 1974. Pesquera Zapata catches and reduces about 80 percent of the ancho-

vies landed in Ensenada. The company began operations in 1976 with six U.S.-built 33 m long purse seiners and later added additional Mexican-built purse seiners. In 1980, Pesquera Zapata purchased three new seiners from a Norwegian shipyard. These new vessels will increase the company's fleet to 13 vessels.

At the height of the season, the company employs 450-500 workers processing anchovies and sardines into fish meal and oil. It operates a totally integrated plant with the most modern facilities in Mexico. It is the only fish meal plant in Mexico, for example, with offshore landing facilities. The catch is fed into a 36 cm pipe which runs underwater to the plant. The company claims that air and water pollution is thus avoided, although some local observers believe that the system has not entirely solved the pollution problem. Unconfirmed reports from Ensenada suggest that because of various problems with the pump, much of the catch during 1981 was landed manually in Ensenada and trucked to the Zapata plant.

Once in the plant, the fish are pressed, crushed, and cooked; the product is then dried and the meal milled while the liquid is treated and separated into various components. Continuous analysis of the catch is conducted at the plant to study the size, age, and sex of fish. The plant has the capacity to produce 100 t of fish meal per hour. The plant's entire production is marketed domestically. It is shipped to the Mexican rail center of Mexicali and from there it is distributed throughout Mexico.

Mexico's state-owned company, Industrias Pesqueras Paraestatales del Noroeste (IPPN), is also interested in processing anchovies. In 1980, however, IPPN only canned about 5,000 t of anchovies at its Ensenada plant. The company hopes to increase substantially its anchovy utilization in the future. IPPN is primarily responsible for supplying the domestic market with edible fishery products.

IPPN not only hopes to can more anchovies, but is also planning to use anchovies and other species such as hake to produce fish protein concentrate (FPC). IPPN has ordered an FPC plant from a company in the United States

¹Mexican statistics report fish meal imports of 42,000 t in 1979. Some observers believe that official statistics are in error and that actual imports did not exceed more than 26,000 tons.

²Details on Mexican Government plans for the fish meal industry can be obtained by requesting "Mexican Fish Meal Industry" (IFR-81/111) from your local NMFS Statistics and Market News office.

³Mention of trade names or commercial firms does not imply endorsement by the National Marine Fisheries Service, NOAA.

and hopes to begin production in 1983. The recent installation of an unloading pump has increased the plant's unloading capacity to 80 t of anchovies or sardines per hour. More importantly, the pump has improved the quality of the unloaded fish. Before the pump was installed, 40 percent or more of the landings were unfit for processing into edible products. IPPN officials now claim that almost all of the fish landed with the new pump can be canned.

DEPES announced plans in September 1981 for the construction of a new \$3.2 million cannery in Ensenada. It is not known at this time who will build the cannery, but it will probably be operated by IPPN. The cannery will eventually be able to process 10,000 t of anchovies annually. DEPES estimated that it will take about 2 years to build the plant.

Prospects

Stock assessment surveys conducted by the National Marine Fisheries Service (NMFS) suggest that in an average year, about 70 percent of the anchovy stock is found in the U.S. 200-mile Fisheries Conservation and Management Zone and about 30 percent within the 200-mile Exclusive Economic Zone (EEZ) claimed by Mexico. U.S. anchovy fishermen, however, are strictly regulated. The U.S. anchovy catch in 1980, for example, was only about 50,000 tons. U.S. and California officials, as a result, are becoming increasingly concerned by the rapidly increasing Mexican catch.

Many U.S. officials are convinced that anchovy stocks can probably not tolerate a sustained annual catch in excess of 500,000 t, which is the Mexican goal. U.S. officials maintain that anchovy stocks, like the stocks of other small pelagic species, are subject to extreme annual fluctuations. Estimates for 1980, for example, suggest an anchovy biomass of 2.8 million t, which probably could have supported a 0.5 million t catch in that year. As recently as 1978, however, a biomass of only 1.3 million t was estimated by the NMFS. A Mexican catch approaching the 0.5 million t level during that year could have had a disastrous impact on the anchovy stock. U.S. officials point out that fisheries, much larger than the northern anchovy fishery, have

been decimated by combinations of adverse environmental conditions and overfishing.

Most Mexican officials and private consultants, however, are convinced that the anchovy stock can withstand the increasing fishing effort and cite FAO studies suggesting a possible maximum sustainable yield of from 1.5 to 2.0 million t. Some Mexicans are concerned, however, about the future of the fishery. Especially disturbing have been reports

from the fishermen who say that they have had to search for anchovy further and further off the coast, and that the range of the stock appears to be contracting. In addition, an increasing percentage of juvenile anchovy was taken during 1981. Some observers believe that these developments, especially the increasing proportion of juveniles, is an indication that the intensive Mexican effort on anchovy is adversely affecting the stocks. (Source: IFR-82/7.)

Canada-EC Sign 6-Year Fisheries Agreement

The Canadian Government and the European Community (EC) have signed a 6-year fisheries agreement. Drafted and initialed by both countries in November 1980, it was finally signed by

Canadian and European Community officials in Brussels on 30 December 1981. The agreement was originally to have covered the 6-year period from 1981 to 1986; Canada and the EC, however, held up implementation for more than 1 year. Consequently, it will be in force from 1982 through 1986, although negotiations for a possible 1-year extension are being considered.

The final agreement, which does not differ substantially from the 1980 draft, guarantees EC vessels fishing rights for cod and squid taken from Canadian-claimed waters. The cod allocation to EC fishermen will be 16,000 metric tons (t) annually through 1986; the squid allocation will be 7,000 t per year (Table 1). In exchange, the Canadians will be

Table 1.—Canada's annual catch quotas allocated to the European Economic Community, by species and area, 1982-86.

Species	NAFO zones ¹	Quantity (t)
Cod	2J, 3K, and 3L	9,500
Cod	2G and 2H	6,500
Total		16,000
Squid	3 and 4	7,000
Grand total	2, 3, and 4	23,000

¹Northwest Atlantic Fisheries Organization zones.

Table 2.—European Community annual import quotas and reduced import duties for Canadian fishery exports, 1 January 1982 to 31 December 1986.

Commodity	Duty (%)		Quantity				
	EC Import	Reduced	1982	1983	1984	1985	1986
Frozen							
Cod whole ¹	13.9	² 3.7	5,000	6,000	6,000	6,000	6,000
Redfish, whole	15.0	² 4.0	8,000	8,000	9,000	9,000	9,000
Cod fillets ¹	15.0	² 6.0	10,000	11,000	12,000	13,000	15,000
Total, frozen			23,000	25,000	27,000	28,000	30,000
Salted							
Cod fillets ¹	20.0	—	NA ³	NA	2,500	3,500	4,000
Cod whole ¹	13.0	—	NA	NA	4,000	5,000	6,000
Pickled herring	20.0	10.0	4,000	4,500	6,000	6,500	7,000
Total, salted			NA	NA	39,000	43,000	47,000
Grand total			NA	NA	66,000	71,000	77,000

¹The EC requires a certificate of Canadian origin for all North Atlantic cod, *Gadus morhua*, imports.

²The reduced tariffs apply only to Canadian fishery exports that will be processed in the EC. Prior minor handling such as cleaning, sorting, packing, etc., will not qualify Canadian exports for the reduced duty. The reduction is also not allowed if the processing is to be carried out at the retail level. In addition, only fishery products for human consumption qualify.

³NA Not available.

allowed to export specific quantities of fish to the EC at lower than regular tariffs; this quantity will be increased annually (Table 2). The Canadians will export partially processed products which will be produced in final form by European companies.

Background

Canada is aggressively attempting to develop its fishing industry, primarily by expanding export markets for its increasing catch. Much progress has been made in recent years and, in 1980, Canada was the world's leading exporter of fishery products (US\$1 billion). As part of the Government's fisheries development policy, Canada has tied catch allocations in its 200-mile fishing zone to foreign cooperation in lowering tariff and nontariff barriers on Canadian fishery exports. Several EC countries have been interested in access to Canadian-claimed fishery resources because restrictions by other coastal countries have closed many traditional fishing grounds to distant-water fleets.

The Federal Republic of Germany (FRG) is the most important of these. In 1980, the FRG's 2,000 deep-sea fishermen caught 175,000 t of fish, of which 60,000 t was cod. Nearly 15,000 t of the cod catch (about a quarter of the total) was obtained from Canadian-claimed waters and it is evident that the modern and profitable German distant-water fleet needs access to Canadian-claimed waters. Furthermore, the FRG distant-water fleet operates from two principal German ports, Cuxhaven and Bremerhaven, both of which have suffered severe economic problems, especially in the steel and auto industries. The FRG Government consequently feels it desirable to support the distant-water fishing industry (which employs 15,000 fish processors in addition to the 2,000 fishermen). The FRG, in its role as the primary economic power of the EC, was one of the major proponents of a fisheries agreement with Canada.

Agreement Negotiated

With these mutual benefits in mind, a fisheries agreement was negotiated by the EC and Canada during 1980 and initialed in November of that year. It

immediately became a point of controversy within the fishing industries of both Canada and the EC. Disagreement about the benefits and drawbacks of the proposed treaty became a source of continual debate in both the Canadian and the EC fishing communities for more than a year.

Canadian Objections

Canadian Atlantic coast fishermen and processors immediately criticized the draft agreement. The Canadians had two principal objections: many felt that it would not be in Canada's interest to give up part of its catch to the Europeans in exchange for reduced tariffs on Canadian fish, which they believed the Europeans would probably buy anyway to support their fish processing industry. This proved not to be the case, however, and a weakening market for Canadian fishery exports in 1981 changed the minds of many Canadians, especially in the processing sector.

Secondly, many Canadians also objected to a clause permitting Greenland fishermen to catch salmon along Greenland's western coast.¹ A significant percentage of the salmon fished by Greenland fishermen spawn in Canadian rivers. The agreement allotted EC fishermen a quota of 1,190 t of salmon west of long. 44° W, but both sides agreed the quota might be increased slightly if the season were begun later and if the fishermen used a larger mesh size. The EC subsequently set a later starting date for the season and raised the salmon catch quota to 1,270 t. Canada objected that the EC failed to implement the mesh size change and that the quota was too high. The higher catch limit and the dispute over the mesh size caused considerable opposition to the agreement with the EC in Canada.

European Objections

Opposition to the proposed agreement within the EC came mainly from

the United Kingdom. British fishermen would not benefit from the agreement because Britain no longer has a distant-water fleet. Much of the cheaper Canadian fishery exports would be sold on the already depressed British markets and compete with the catch of British fishermen. The U.K. Government withheld approval of the agreement to press its demand within the EC Fisheries Commission for a Common Fisheries Policy (CFP). U.K. fishermen, especially the Scots, have protested the importation of low-priced fish for their market. The CFP has long been a special problem for the United Kingdom whose fishermen claim that, because two-thirds of the EC fisheries catch is taken in British coastal waters, they should receive special rights within the EC-claimed 200-mile zone.

Most other EC member states have rejected these demands as a violation of the basic right of all EC member states to equal access to EC-claimed fishery resources. Successive British Governments have used EC fishery negotiations with non-EC members to press the U.K. views of the CFP. As a result, in February 1981, the British repeated their long-standing position (at a meeting of EC foreign ministers in Brussels) that there could be no agreements with outside countries until the EC member-states had settled their dispute over the Community's internal fisheries policy.

EC Approves Treaty

The United Kingdom finally accepted the Canada-EC fisheries agreement after assurances were given guaranteeing the protection of EC markets from an excess of low-priced foreign fishery imports. Under this arrangement, when fish are imported into an EC member-state at prices below the established reference price,² that state will notify the EC Commission which must take corrective action within 3 days. British fishermen had complained for some time that the EC reference price system was

¹Greenland is part of the Danish realm and consequently is included as an EC member state in EC fisheries agreements with nonmember countries. Greenland's catch quotas are set by the EC.

²Reference prices are minimum import prices established by the EC to protect domestic fishermen from foreign competition.

too slow and cumbersome to protect them from cheap foreign imports. The new assurance of swift EC action was accepted by the British Government, although some fishermen were still skeptical that the problem had been solved. With British acquiescence, the EC finally approved the agreement on 29 September 1981.

Canada Approves Treaty

After the EC approved the agreement, the Canadian Government felt that further study was needed before making the agreement final. The full impact of the new reference price system adopted by the EC was of particular concern to the Canadians. They believed that a thorough examination of this policy was required to verify that Canadian fishery products, especially frozen cod filets, would not be penalized. After a reexamination of the agreement, the EC reference price system, and the fishing industry's attitude toward the agreement, the Canadian Government finally decided to approve the treaty.

Agreement Signed

The formal signing of the agreement by Canadian and EC authorities took place in Brussels on 30 December 1981. The EC members were especially interested in enacting the agreement before the end of the year so that EC fishermen could begin operations in Canadian waters as soon as possible in 1982.

Remaining Problems Resolved

Canadian and EC officials remained in Brussels after 30 December 1981 to discuss a few remaining "minor" details concerning the implementation of the agreement. The Canadians were, however, not satisfied with the outcome of these informal talks and were concerned over which EC-member countries would import what quantities of Canadian fishery products. Canadian and EC officials subsequently met on 25 January 1982 and resolved their differences.

The NMFS Foreign Fisheries Analysis Division has learned that the Canadians have begun to issue permits to EC fishing vessels. Still unresolved, howev-

er, is a possible 1-year extension of the agreement to 31 December 1987. (Source: IFR-82/25.)

Canada Okays Over-Side Sales to Foreign Firms

The Canadian Government has described two new over-the-side, direct sales contracts with foreign companies. Fishermen from the Maritime provinces (Nova Scotia, Newfoundland, and Prince Edward Island) and Quebec will be permitted to sell mackerel and river herring (gaspereau) directly to foreign buyers.

One contract is between the Maritime Fishermen's Union and the Joint Trawlers (Canada) Company¹ of St. Johns, Newfoundland, a subsidiary of Joint Trawlers of Helsingborg, Sweden. The second contract is between the Eastern Fishermen's Federation, J. Marr Seafoods company of Hull, United Kingdom, and the AMFAL Group of Dartmouth, Nova Scotia.

The first of seven foreign freezer vessels was scheduled to arrive on 15 May 1982 to begin receiving the mackerel catch off eastern Nova Scotia. Another vessel was to begin receiving river herring on 19 May at Chatham, New Brunswick.

Foreign vessels are required to remain at their purchasing stations for a specified number of days. If the vessel arrives late, or leaves early, and does not fulfill its minimum number of purchasing days, the foreign partner would lose a significant portion of the catch allocation to which it would have been entitled. In the past, some Canadian fishermen did not have enough time to reach the foreign purchasing vessels. The new minimum purchasing days rule will give Canadian vessels more time to sell their catch.

The price Canadian fishermen will receive was established at 13 cents/pound (28.7 cents/kg) for mackerel and 8.5 cents/pound (18.8 cents/kg) for alewives.

Canadian Department of Fisheries and Oceans officials are monitoring the implementation of the two over-the-side

¹Mention of trade names or commercial firms does not imply endorsement by the National Marine Fisheries Service, NOAA.

sales agreements. If a partner to the contract encounters difficulties, the Minister of Fisheries has reserved the right to intervene to resolve the problem.

The contracts will give the European partners direct access to a limited amount of offshore species which have not been traditionally fished by Canadians and in which Canadian fishermen have shown little interest. Foreign vessels deployed under the contracts will be subject to the Canadian access and fishing fees for foreign flag vessels.

Sales of fish by Canadian fishermen directly to foreign buyers have been authorized by the Government of Canada intermittently since 1976. The program has provided an opportunity for inshore Canadian fishermen to sell that portion of their catch for which no Canadian market exists at economically acceptable returns to fishermen. Total Atlantic coast over-the-side sales in 1981 represented less than one percent of total fishery landings in Atlantic provinces. (Source: Department of Fisheries and Oceans.)

Canadian Scallop Catch, and Culture Potential

The Ministry of the Environment of the Province of British Columbia has issued a report on the potential for scallop mariculture on the Canadian Pacific coast. The report concludes that while the technology is available, the economic feasibility and the availability of foreign and domestic markets is by no means sure and that more study is needed.

During January-August 1981, Canadian fishermen landed 60,600 metric tons (t) of scallops (round weight) or 29 percent more than during the comparable period in 1980 when 47,000 t were landed. The value of the 1981 catch was about \$45 million. Canada exported 7,400 t of scallops (product weight) worth \$73.5 million during January-September 1981 according to the latest Canadian statistics. During the same 9 months of 1981, scallop exports were valued at \$52.2 million, 40 percent less than in 1981. Virtually all Canadian scallop exports went to the United States in 1981.